

**Social Factors in the Production, Perception and Processing of Contact Varieties:
Evidence from Bilingual Corpora, Nativeness Evaluations, and
Real-time Processing (EEG) of Spanish-accented English**

by

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Abstract

Originating in the 1960's with the work of William Labov, the field of sociolinguistics has given way to a rich literature that continues to uncover the many ways in which social factors influence how we produce, perceive, and process speech. Sociolinguistic research has burgeoned alongside increasing globalization and migration, which has, in the case of the U.S. at least, resulted in increased levels of bilingualism and more frequent interactions with non-native English speakers. My dissertation, which consists of three distinct chapters, combines insights from the sociolinguistic literature with methodologies from cognitive science in order to better understand the ways in which perceptions of identity and social attitudes towards nonstandard language varieties influence our everyday spoken interactions. More specifically, I investigate how several social factors (i.e. language background, dialect stigmatization, and speaker accent) may influence speech production, perception, and processing. The data presented come from over sixty fieldwork interviews, a series of corpus analyses, two online surveys, and one neurolinguistic experiment. In the first paper, I identify how social factors have appeared to influence auxiliary verb choice among some Ecuadorian Spanish speakers. While the markedly frequent use of auxiliary *ir*, Sp. 'to go' in Ecuadorian Spanish has historically been traced to contact effects from Quichua, analysis of a present-day Ecuadorian Spanish corpus reveals that Quichua-Spanish bilinguals do not use the construction significantly more than Spanish monolinguals. Given auxiliary *ir* may be marked as a slightly nonstandard alternative for the auxiliary *estar* and that Quichua-Spanish bilinguals have long been denied linguistic prestige in the sociolinguistic stratification of Ecuadorian Spanish, I propose the possibility that language background and dialect stigmatization may explain the current distribution of auxiliary *ir* production among Ecuadorian Spanish speakers. In the second chapter, I investigate the relationship between speaker accents and American perceptions of nativeness. Specifically, I examined how young adult Midwesterners today perceive two main kinds of Spanish-influenced English varieties: L1 Latino English (as spoken in Chicago, U.S.) and L2 Spanish-accented

English (as spoken in Santiago, Chile). Since Latinos have recently become the dominant ethnic minoritized group in the U.S., the varieties of English that they speak are under increasing scrutiny, and cases of linguistic discrimination are on the rise. Results from an accent evaluation survey reveal that respondents distinguished the L1 Latino English from the L2 Spanish-influenced English speaker, but still rated him as slightly more foreign-sounding than L1 speakers with more established U.S. dialects (e.g. New York). In other words, native U.S. speakers perceived as “sounding Hispanic” were perceived as sounding “almost American,” which suggests that what Midwesterners count as sounding American may be in the process of expanding to include U.S.-born Latinos. In the third chapter, I focus on the effect that speaker accent has on online word processing in the brain. Specifically, does Spanish-accented English speech increase activation of the Spanish lexicon in the mind of Spanish-English bilingual listeners? Though more data is needed for a clear answer, preliminary data from an EEG experiment suggests that speaker accent may possibly modulate bilingual lexical activation. This is investigated via analysis of N400 responses from bilingual listeners when false cognates from Spanish were produced by a Spanish-accented English speaker relative to a Chinese-accented English speaker.

Chapter 1 Introduction

It is well known that social factors play an influential role in how we produce, perceive, and process language (Labov, 1972; Escobar, 2009; Campbell-Kibler, 2010; Hanulíková, Van Alphen, Van Goch, & Weber, 2012). This is especially true for *contact language varieties*, a term which I use to describe non-standard language varieties that are characterized by their contact with another language or dialect. Quichua-influenced Spanish and Spanish-influenced English are two examples of such varieties, both of which lie at the center of my dissertation. While research in fields of linguistics (alongside other disciplines such as psychology and anthropology) have made significant advances over the last several decades, our current understanding of specifically *how, which, and to what degree* social factors impact our linguistic interactions still leaves much to be discovered. In an attempt to contribute to this line of research, I present a dissertation that consists of three distinct chapters. In each chapter, I use a different type of experimental sociolinguistic methodology to examine a different variable of sociolinguistic significance, though all share a common language area of study: contact language varieties spoken by Latina/os in Spanish-speaking communities. With 535 million speakers worldwide, Spanish is the second most widely spoken language in the United States and fourth most spoken language in the world (Ethnologue, 2020). The language varieties and speech communities that I study in this dissertation include Quichua-influenced Spanish speakers in Ecuador (Chapter 2), L1 speakers of Latino English in the U.S. (Chapter 3), and L2 Spanish-accented English speakers in the U.S. (Chapter 4). Based on spoken corpus data from one picture book

narration task, two online surveys, and a neurolinguistic experiment, I examine how social factors like language contact, dialect stigmatization and speaker accent influence language production, perception, and processing. In the remainder of this introduction, I will briefly outline the three papers that together compose this dissertation.

In the second chapter, I propose the possibility that dialect stigmatization might be a social factor influencing auxiliary verb choice for a particular group of Spanish speakers in Ecuador. While the auxiliary verb *ir*, Sp. ‘to go’ had significantly waned in usage among standard Spanish monolinguals in the 1950s, it remained quite common among (Quichua-) bilingual Spanish speakers in Ecuador, presumably due to contact effects from a corresponding ‘to go’ auxiliary verb in Quichua (Toscano Mateus, 1953). In an attempt to investigate the current frequency distribution of auxiliaries in Ecuadorian Spanish, I compiled a present-day Ecuadorian Spanish corpus through fieldwork in 2016-17 and analyzed auxiliary verb tokens by speaker profile. I found that Quichua bilingual speakers did *not* use auxiliary *ir* any more frequently than their Spanish monolingual counterparts. Given the dialect stigmatization of Quichua-influenced Spanish speakers in Ecuador and the somewhat colloquial connotations of auxiliary ‘to go’ in Ecuadorian Spanish, I argue the relative decrease in auxiliary *ir* selection among Quichua-Spanish bilinguals may possibly be explained as avoidance of a slightly stigmatized feature in an attempt to manifest higher linguistic prestige within the sociolinguistic stratification of Ecuadorian Spanish varieties. In other words, this chapter details a project that initially set out to test a hypothesis about potential contact-induced change in auxiliary verbs. As the results suggested there was no significant difference in auxiliary verb usage between the two speech communities of interest, I explore the possibility that dialect stigmatization may be the reason why the

Quichua-Spanish bilinguals presently do not use 'ir' slightly more frequently than Spanish monolinguals.

In the third chapter, I investigate the relationship between speaker accent and listeners' perceptions of foreignness. Since Latinos have recently become the dominant ethnic minoritized group in the U.S., Latinos, the varieties of English that they speak have increasingly become a focus of public attention. Such attention comes in many forms: attempts to celebrate (or perform) representation of Latina/o culture (Cepeda, 2016), financial motivation to target a growing economic market (e.g. McDonald's promotional strategy of the Fiesta menu; Puzakova, Kwak, & Bell, 2015) and political aims to winning the "Latino vote" (Anguiano, 2016; Zimmer, 2012 ;Varela, 2019). What is more, previous research has provided evidence that some U.S. Americans perceive L2 Spanish-accented English speakers as more "foreign-sounding" than other foreign accented speakers from predominantly white countries (e.g. Germany), which is reminiscent of what Leo Chavez calls the *Latino Threat*, an ideology of ethnic othering towards Latinos. Unfortunately, such foreigner bias has been associated with cases of linguistic discrimination in classrooms and job interviews (Carlson & McHenry, 2006; Cobas & Feagin, 2008; Chakraborty, 2017). Based on such reports that "sounding Hispanic/Latino" in America is often associated with foreigner bias, I set out to examine whether this applies also to U.S.-born Latina/os who speak *Latino English*, which are native U.S. dialects of Spanish-influenced English. It is not accurate to say Latino English is simply a "Spanish accent." While it may sound superficially similar to the English of non-native speakers, especially for those outside the community, in fact the two varieties are distinct" (Fought, 2006: 82). Accent evaluation data from a preliminary sample of young Midwesterners ($n= 32$) seem to suggest that the speech of a

Latino English speaker was perceived as more native-sounding than L2 Spanish-accented speech, but still slightly more foreign-sounding than other L1 U.S. accents (e.g. New York accent). This study serves as a reminder that what “sounds American” is likely a moving target, and language attitudes will continue to evolve alongside our evolving sociolinguistic landscape.

In the fourth chapter, I focus on the effect that speaker accent (a social factor) has on word processing in the brain. This paper contributes to current theories of sociolinguistic perception and bilingual word processing by examining the degree to which social information (i.e. speaker accent) influences activation of the non-target lexicon in the minds of bilingual listeners. In line with current bilingual cognition research, this chapter sets out to understand the complex web of factors that modulate the dynamic nature of bilingual lexical activation (Pavlenko, 2009). Based on the results of recent studies suggesting that speaker accent can influence semantic processing for dialect-ambiguous words (e.g. *bonnet*, in Br. vs. Am. Eng.) in monolingual listeners (Goslin, Duffy, & Floccia, 2012; Cai, et. al., 2017), this study investigates the degree to which speaker accent may modulate bilingual lexical activation for language-ambiguous words in bilingual listeners. The data presented come from an EEG (N400) experiment in which Spanish-English bilinguals listened to sentences in English that intermittently contained false cognates from Spanish (e.g. Eng. *bland* used as [[soft]]; Sp. ‘*blando*’ = [[soft]]). Crucially, stimuli were presented across three speaker accents: MUSE¹-, Spanish-, and Chinese- accented English. It was found that regardless of speaker accent, false cognates elicited an N400 reduction effect relative to anomalous control

¹ MUSE refers to Mainstream United States English, also referred to in the literature as SAE, Standard American English (Lippi-Green, 2012).

words (e.g. Eng. *bland* used as [[dry]]), providing evidence of parallel language activation for the bilingual listeners. It was also found that false cognates elicited an N400 reduction effect when uttered by the Spanish-accented and MUSE-accented speaker, relative to the Chinese-accented speaker, providing evidence for a dynamic sensitivity to speaker accent in the bilingual listeners. The findings are discussed in light of language mode theory (Grosjean, 1998) and support theories of dynamic parallel lexical activation.

In conclusion, this three-chapter dissertation collectively recognizes the fact that patterns of globalization, migration and language contact have transformed – and will continue to transform – the language systems that we use to communicate with one another. Additionally, such patterns will continue to change the language systems themselves. In recognizing this, my dissertation aims to advance our understanding of how language users produce, perceive, and process contact language varieties. While I delimit my focus to social factors relevant to Spanish-influenced varieties of English and Quichua-influenced varieties of Spanish, the primary insights regarding the influence of social factors on the production, perception, and processing of language contact varieties are applicable to sociolinguistic theory more broadly. Namely, in exploring the potential influence that social factors such as language contact, dialect stigmatization, and speaker accent may have on our language varieties and how we use them, we are reminded that language systems are not static codes – but dynamic systems that evolve based on the needs and patterns of its users. In the chapters that follow, I will explore how a combination of social and cognitive factors can influence bilingual language production, perceptions of nativeness, and word processing at the neurological level.

Chapter 2 Auxiliary *Ir* in Ecuadorian Andean Spanish

FULL TITLE:

A Socio-semantic Account of Auxiliary *Ir* in Ecuadorian Andean Spanish

KEYWORDS: Spanish, Quichua, auxiliaries, verbal aspect, semantics, sociolinguistics

Abstract

This paper contributes to current theories of sociolinguistic variation by examining a combination of social and semantic factors that condition variation of auxiliary *ir*, Sp. ‘to go’ in Spanish AUXILIARY + GERUND (AUX + GER) constructions. The data come from Ecuadorian Andean Spanish (EAS), a variety spoken in the Ecuadorian Andes, a region where linguistic variation is closely tied to notions of Quichua indigeneity and socioeconomic class. Previous research has posited two hypotheses about auxiliary *ir* in EAS that have long gone untested. First, it has been suggested that auxiliary *ir* is more frequent in EAS than in other varieties, and that this may be the result of contact from Quichua, a language in contact with EAS that has a corresponding ‘to go’_{AUX + GER} construction (Toscano Mateus, 1953). Second, it has been proposed that in Andean Spanishes, several auxiliaries may be able to convey aspectual meanings not commonly associated with auxiliary *ir* in other varieties of Spanish (Torres Cacoullos, 2000; Escobar 2009). While prior research has described the general linguistic properties that motivate auxiliary distribution in other varieties of Spanish, the social and semantic factors that motivate the distribution of auxiliary *ir* in EAS have yet to be understood. To address these issues, data from two new studies are presented. Study 1 tests the hypothesis that contact from Quichua into EAS may have contributed to a higher frequency distribution of auxiliary *ir*, and Study 2 examines precisely which aspectual meanings auxiliary *ir* can be used to convey in EAS today. Results indicate that speakers who know Quichua are, in fact, no more likely to use auxiliary *ir* than those who do not know Quichua (Study 1) and that auxiliary *ir* may have less uniform meaning interpretations in EAS than in other contemporary varieties of Spanish (Study 2). Social identity construction and grammaticalization theory are used to explain these findings, respectively².

² **Acknowledgments** | Thank you to the U-M Rackham Graduate School, the U-M Linguistics Department for their financial assistance that made this research possible. This project could not have been employed without the constructive feedback of Dr. Marlyse Baptista and Dr. Jonathan Brennan, the transcription assistance from *TranscribeMe* and my undergraduate research assistant Crede Strauser, or the wonderful Ecuadorian Andean Spanish speakers who participated in these studies. Any error in this paper is my own.

1. INTRODUCTION

Although *ir* was reportedly once to be the most common auxiliary verb used to encode imperfective aspect (Keniston, 1936:171), its usage has long since waned relative to other auxiliary verbs in Spanish (Torres Cacoullos, 2000: 15). In fact, most contemporary Spanish grammars (Lipski J. , 1994) and language learning materials (Zayas-Bazan, Bacon, & Nibert, 2019; Guzman, Lapuerta, Liskin-Gasparro, & Olivella Castells, 2020; Duolingo, 2020) exclude auxiliary *ir* altogether from their descriptions of AUXILIARY + GERUND (AUX + GER) constructions, highlighting instead auxiliaries that are currently considered more standard and commonplace (i.e. *estar*, Sp. ‘to go’ and *seguir*, Sp. ‘to continue’). In Ecuadorian Andean Spanish (EAS), however, auxiliary *ir* is still relatively frequently in everyday speech, and it is unclear what aspectual meanings it can be used to convey (Toscano Mateus, 1953). Auxiliary *ir* (used interchangeably with the term ‘*ir* + GERUND’) is a periphrastic expression in Spanish that emerged from the grammaticalization of *ir*, Spanish ‘to go’ and translates as the Eng. ‘to go *x*-ing.’ Once the most common imperfective AUXILIARY + GERUND construction in Spanish (Keniston, 1936:171), it has since been superseded by *estar* + GERUND, Sp. ‘to be *x*-ing.’ This paper presents two studies, both of which examine the use of auxiliary *ir*, Sp. ‘to go’ in EAS. Study 1 employs a quantitative corpus analysis to test several social and semantic predictors that have been theorized to impact auxiliary *ir* use in this variety, and Study 2 uses an experimental semantics task to clarify which specific imperfective aspectual meanings can be conveyed by auxiliary *ir* in present-day EAS.

More specifically, Study 1 examines the possible role of Quichua contact on the use of auxiliary *ir* today by applying a logistic regression to (*ir* / *estar*) + GER tokens from a new (2016-17) corpus of EAS. This follows an untested hypothesis from Toscano Mateus (1953) that

the observed retention of auxiliary *ir* in EAS may be due in part to contact effects from Quichua, a language with a corresponding ‘to go’_{AUX} + GER construction. This study also tests a recent finding that while *ir* used to commonly convey *general* imperfectivity, it has since undergone semantic specialization in many contemporary varieties of Spanish, such that it is mostly reserved to encode *specialized* types of imperfectivity (Torres Cacoullos, 2000). Study 2 expands upon this broad brushed distinction (i.e. general vs. specific imperfective aspect) by prompting EAS speakers to evaluate the ability of auxiliary *ir* to convey specific types of imperfective aspects that have been attributed to *ir* (i.e. inchoative aspect, gradual aspect, habitual aspect, continuative aspect). The primary justification for doing so comes from the observation that EAS speakers seem to use auxiliary *ir* with aspectual meanings not commonly associated with *ir* in other varieties of Spanish (Toscano Mateus, 1953). In sum, Study 2 aims to shed light on the specific imperfective aspectual meanings that auxiliary *ir* can be used to convey in present-day EAS.

This paper is divided into five main sections. Section 2 summarizes the linguistic ecology of EAS and the current state of linguistic prestige for then Quichua-Spanish community, reviews the existing research into Spanish auxiliary variation, and explains the claims about auxiliary *ir* usage patterns in EAS that motivate the current studies. In Sections 3 and 4, I outline the theoretical motivation, methods, results, and findings of the corpus analysis (Study 1) and experimental judgment task (Study 2), respectively. The paper concludes in Sections 5. Reference citations and all Supplementary Materials (Section 6) have been made available at the end of the paper.

2. BACKGROUND

2.1 Spanish-Quichua language contact in the Ecuadorian Andes

EAS is a variety of Spanish spoken in the Republic of Ecuador, a country located along the northwestern coast of South America whose western border runs along the Pacific Ocean. It shares its northern border with Colombia and its southeastern border with Peru (see Figure 2.1, below).

Figure 2.1 Geographic distribution of Ecuadorian Andean Spanish

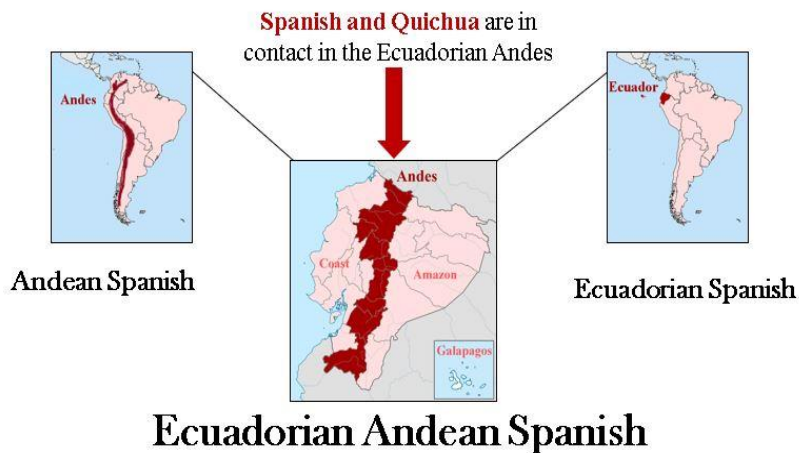


Figure 2.1. Image created based on source: TUBS. (2011, March 28). *Ecuador in South America (+Galapagos Islands) (-mini map -rivers).svg*. Retrieved June 12, 2020, from tinyurl.com/yak2c6nn.

In the early 1530s, the first group of Spanish conquistadors arrived to what is present-day Ecuador (Durston, 2007). The region was colonized by the Spanish for three centuries until 1822, when Ecuador gained its independence from Spain and declared itself a sovereign nation. Although most governmental and educational institutions in Ecuador today use Spanish as the primary language of communication (King & Haboud, 2010), Quichua is still very much alive,

particularly in the Andean region³. Quichua, also orthographically represented as *Kichwa* or referred to as *Runa Simi*, Qui. ‘people’s language,’ was recognized as an official language in Ecuador in 2008 (Constitution, 2008, chapter 2). Of all self-identified indigenous Ecuadorians (86% of whom are Quichua), roughly one third (29)% are bilingual speakers of Spanish and an indigenous language.⁴ The most current estimates suggest that between 30-39% of ethnically Quichua Ecuadorians still speak Quichua (Ecuadorian Census 2010: 82). With such robust figures of Quichua-Spanish bilingualism and after almost 500 years of intense language contact, it is not surprising that both Quichua and Spanish have effected contact-induced change on one another (Haboud, 1998). While contact effects have been documented bi-directionally (Hurley, 1992; Lipski, 2017), contact-induced change from Quichua into EAS has been very well documented at all levels of linguistic representation. For example, we have seen contact effects from Quichua at the lexical level in the form of loan words (e.g. *achachay* to mean ‘How cold!’ (Cordova, 1995a: 29); ‘*huasipichay*’ to mean ‘housewarming party’ (Cordova, 1995b: 536)), at the phonological level in the use of assibilated /r/ instead of the more standard peninsular trill-flap distinction (e.g. [pezɔ] for [pero]) (Lipski, 1994; Bradley, 1999), and at the morpho-syntactic level in the form of the nonstandard double possessive construction which directly maps onto Quichua morphosyntax (e.g. *su hermano de ella*, lit. ‘her brother of her’) (Escobar, 1992)). It is within the context of a long line of Quichua-Spanish language contact research that Toscano Mateus (1953) hypothesized about contact effects in the usage patterns of auxiliary *ir* in

³ There do exist Quichua-speaking communities in the Amazon region, though Quichua is not the majority indigenous language spoken in Amazonian Ecuador, which is home to A’i cofan, Siona, Secoya, Záparo, Huao, and Shuar-achuar (King & Haboud, 2010).

⁴ 35% are monolingual speakers of the indigenous language that corresponds to their ethnic background and 33% are monolingual speakers of Spanish due to heritage language attrition. The remaining 4.4% are comprised of five groups, consisting of individuals who: do not report speaking a language (3.8%), speak an indigenous language, Spanish and a foreign language (0.2%), speak Spanish and a foreign language (0.2), speak an indigenous language and a foreign language (0.1%), or only speak a foreign language (0.1%).

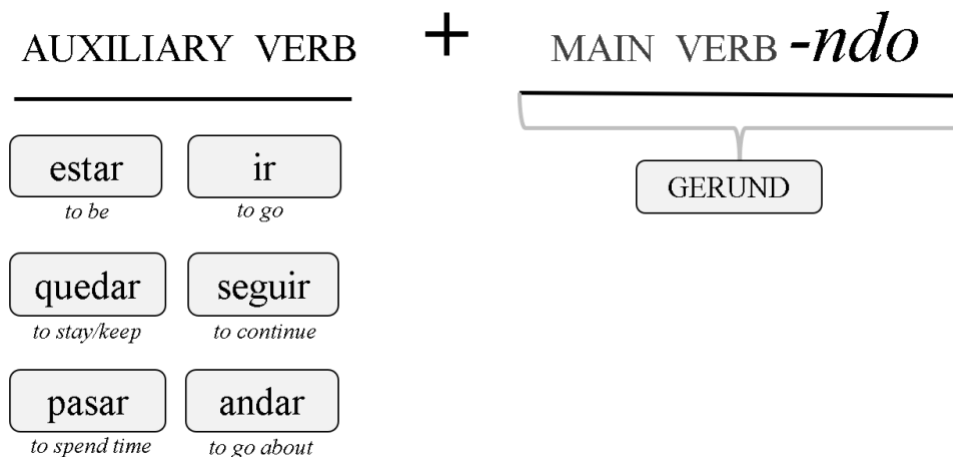
EAS. In this vein, it is important to keep in mind that while contact effects has often been looked to as default explanations for what seem like otherwise divergent linguistic patterns, we must remain cautious in assuming contact-induced change has occurred in a language – especially for grammatical structures (as opposed to loanwords, which are much easier to discern and clearly label as clear contact effects). See Thomason (2001: 91-95) for a comprehensive explanation of the five main criteria needed to argue with a reasonable degree of confidence that contact-induced change has taken place. While this paper does not aim to definitely prove nor disprove contact effects from Quichua in EAS, it does follow up on a previously posited hypothesis regarding contact effects in this contact scenario.

In Ecuador, Quichua-speaking communities have been historically disadvantaged in Ecuador relative to their Spanish monolingual counterparts with non-indigenous roots (e.g. King & Haboud, 2010). As the field of sociolinguistics has demonstrated over the past several decades, those with more overt prestige — in Ecuador, traditionally those of Spanish descentance — are often licensed to use more colloquial language with less risk of being stigmatized for it (e.g. Labov, 1972). On the other hand, those with less overt prestige (i.e. in Ecuador, traditionally those of Quichua descentance) may reduce their use of colloquial language in order to prevent potential stigmatization from others. This finding from social construction identity theory is important, as anecdotal evidence suggests that the feature of interest in this paper (i.e. auxiliary *ir*) may exhibit a colloquial denotation not indexed for overt linguistic prestige within the linguistic stratification of EAS. In the next section, I review the diachronic history of the Spanish AUX + GER construction and identify the semantic properties believed to influence the use of auxiliary *ir*, relative to other Spanish auxiliaries.

2.2 Spanish AUXILIARY + GERUND constructions and the properties of auxiliary *ir*

Spanish AUX + GER constructions are periphrastic expression commonly used to convey imperfective aspect. Imperfective aspect, as defined by Comrie (1976), is a broad grammatical category for verb phrases that encompasses all ongoing, incomplete, or habitual states and events. This paper is primarily concerned with the Spanish auxiliary *ir*, which as a main verb carries the meaning ‘to go.’ Other auxiliaries that participate in Spanish AUX + GER constructions include *estar*, Sp. ‘to be’, *quedar*, ‘to stay/keep’, *seguir*, Sp. ‘to continue’, *pasar*, Sp. ‘to spend time’, and *andar*, Sp. ‘to go about.’ In Spanish, auxiliaries typically precede⁵ the main verb gerund, which is marked morphologically with the suffix *-ndo*, much like Eng. *-ing* (see Figure 2.2, below).

Figure 2.2 Spanish AUXILIARY + GERUND construction template



⁵ This is the most common syntactic ordering of auxiliaries and gerunds in most varieties of Spanish. However, it is not uncommon (particularly in EAS) to observe auxiliaries following the gerund (e.g. *comiendo está*, Sp. eating + to be-3P)

Ir + GERUND (used interchangeably with the term ‘auxiliary *ir*’) is a periphrastic expression in Spanish that emerged from the grammaticalization of *ir*, Spanish ‘to go’ and translates as the Eng. ‘to go *x*-ing’ (e.g. Carlos goes *walk-ing* / *talk-ing* / *look-ing*). While it was once the most common periphrastic construction for expressing general imperfectivity in Spanish (Keniston, 1936:171), it has long ago been superseded by *estar* + GERUND, Sp. ‘to be *x*-ing’ (e.g. Carlos is *walk-ing* / *talk-ing* / *look-ing*). Table 2.1 (below) synthesizes results presented in Torres Cacoullous (2000: 116) in order to compare the relative frequencies of *estar* and *ir* across a set of corpora representing different varieties of Spanish across time. Importantly, notice that auxiliary *ir* was clearly more common than *estar* in older varieties of Spanish (1140 -1499), but *estar* has clearly since become the dominant auxiliary verb in all documented varieties of contemporary Spanish.

Table 2.1 Meta-analysis of Spanish auxiliary *estar* and *ir* variation

CORPUS	DATE	SOURCE	<i>estar</i>	<i>Ir</i>	Other
Old Peninsular Spanish texts	1140-1499	*	27%	45%	28%
Modern Mexican Spanish speech	1990s	**	52%	23%	25%
New Mexican Spanish speech (limited English contact)	1990s	**	51%	17%	32%
New Mexican Spanish speech (extensive English contact)	1990s	**	82%	3%	15%
Peninsular Spanish speech (Madrid)	1990s	Olbertz 1998	76%	19%	5%

* Old Peninsular texts include *Poema* (or *Cantar*) *de mío Cid* (1140/1207), *Libro de Apolonio* (c.1250), *Libro de buen amor* (1330/1343), *Libro de los enxiemplos del Conde Lucanor e de Patronio* (1335), *Arcipreste de Talavera o Corbacho* (1438), *(Tragi)comedia de Calisto y Melibea* or *Celestina* (14999)

** Torres Cacoullous 2000

According to Torres Cacoullous (2000: 119), *estar* + GERUND in present-day Spanish is the default auxiliary used to express general imperfectivity (see row A in

Table 2.2, below). This claim is consistent with the fact that most contemporary Spanish grammars (Lipski J. , 1994) and language learning materials (Zayas-Bazan, Bacon, & Nibert, 2019; Guzman, Lapuerta, Liskin-Gasparro, & Olivella Castells, 2020; Duolingo, 2020) exclude auxiliary *ir* altogether from their descriptions of AUXILIARY + GERUND (AUX + GER) constructions, highlighting instead auxiliaries that are currently considered more standard and commonplace (i.e. *estar*, Sp. ‘to go’ and *seguir*, Sp. ‘to continue’). *Ir* + GERUND, Torres Cacoullos claims, is now reserved for more specialized aspectual meanings. All previously attested imperfective aspectual meanings associated with the *ir* + GERUND construction in Spanish are listed in Table 2.2 (rows B-E); they include prospective, inchoative, continuative, gradual, and habitual aspect. Definitions for the aspectual distinctions and examples from the 2016-17 EAS corpus are provided in Table 2.2.

Table 2.2 Imperfective aspectual distinctions exemplified by auxiliary *estar* and *ir*

Aspect	<i>Ir</i> + GERUND	<i>Estar</i> + GERUND
(A) General <i>yet unended</i>	Como te iba diciendo ... <i>As I went telling you...</i>	Estoy comiendo un sándwich. <i>I am eating a sandwich.</i>
(B) Prospective <i>about to occur</i>	Voy diciendo lo que entiendo. <i>I (will) go saying what I know.</i>	Ya se está graduando ... <i>Soon she is (will be) graduating...</i>
(C) Inchoative <i>just beginning</i>	Ahí lo voy imaginando . <i>From there, I go (begin) imagining it.</i>	Recién está aprendiendo algo así. <i>Recently he is (began) learning that stuff.</i>
(D) Continuative <i>still occurring</i>	Fuimos aprendiendo <i>We went (continued) learning.</i>	n/a
(E) Gradual <i>slowly evolving</i>	Fueron acostumbrando poco a poco. <i>They went adjusting bit by bit.</i>	Se está perdiendo poco a poco. <i>It is being lost little by little.</i>
(F) Habitual <i>often occurring</i>	Vamos enseñando lo que dice la Biblia. <i>We go teaching what the Bible says.</i>	Estoy estudiando solo la maestría. <i>I am working only on a Masters.</i>

Table 2.2 Row (A) refers to tokens of auxiliary *ir* and *estar* that demonstrate general imperfectivity, an aspectual distinction for situations without a specified end. Rows (B-F) refer to specific types of imperfective aspect: prospective, inchoative, continuative, gradual, habitual. Tokens come from the 2016-17 Ecuadorian Andean Spanish (EAS) corpus. As evidenced by the *n/a*, there were no occurrences of *estar* + GERUND in the corpus that clearly and specifically encode for continuative aspect.

According to the Royal Academy of Spanish (henceforth RAE), the leading institutional authority on word and phrase meaning in the Spanish-speaking world, the verb *ir* is associated with over thirty different possible semantic referents, most of which address it as a main verb used with some connotation of the ‘to go.’ The two, however, that involve *ir* as an auxiliary verb in AUX + GER constructions are shown in (1) and (2), below (Real Academia Española, 2019):

(1) Denota que una acción empieza a verificarse. ***Va anocheciendo.***

Denotes that an action starts to occur. *It goes (starts) getting dark out.*

(2) Denota la actual y progresiva ejecución de una acción. ***Vamos caminando.***

Denotes the current and progressive execution of an action. *We go (progressively) walking.*

According to Torres Cacoullos 2000, auxiliary *ir* in several varieties of Spanish (i.e. peninsular Sp., Mexican Sp., New Mexican Sp.) is presently used most commonly to encode inchoative and gradual aspect. This largely aligns with the RAE’s analysis, which identifies inchoative aspect and a combination of gradual aspect and progressive tense. While *ir* had originally acquired the capacity to encode for continuative aspect, that functionality has since been superseded by the verb *seguir*, Sp. ‘to continue.’ Research into these widely spoken varieties of Spanish provides a helpful comparative guide from which to understand the possible meanings of auxiliary *ir* in EAS (Study 2). But beyond the semantic distribution of auxiliary *ir*, what is known about the event properties that influence its usage?

Two factors that have been demonstrated to affect selection of auxiliary *ir* relative to other auxiliaries in Spanish are the motion and stativity status of the main verbs (Torres Cacoullós, 2000; Escobar, 2009). This is not surprising, as many grammaticalized auxiliary verbs (e.g. *andar*, *seguir*) are presently able to encode imperfective aspect derive from lexical items whose meanings are locative or motion-based in nature. This process of recruiting locative-motion verbs like *to go*, *to walk (about)*, *to continue*, or *to be (located)* to encode grammatical aspect is not unique to Spanish. In fact, this is a cross linguistic phenomenon also found in English and Turkish (Bybee, 2015). As grammaticalization relates to Spanish auxiliaries, corpus analyses reveal that *ir* is more likely to accompany motion event gerunds (e.g. *caminando*, Sp. ‘walking’) over non-motion event gerunds (e.g. *comiendo*, Sp. ‘eating’), and only rarely pairs with stative verbs (e.g. *sabiendo*, Sp. ‘knowing’) (Torres Cacoullós, 2000:142). Here, motion events refer to events that require movement of the agent across horizontal space. This explains why gerunds like *comiendo*, Sp. ‘eating’, are classified as a non-motion events despite entailing some degree of low-level, stationary movement of the arm or jaw. Unlike auxiliary *ir*, auxiliary *estar* has been said to show no preference for motion over non-motion status of its accompanying gerund. However, similar to *ir*, *estar* also rarely pairs with stative verbs (Torres Cacoullós, 2000:178). In other words, the known semantic properties by which auxiliary *ir* and the more common auxiliary, *estar*, operate are as follows:

(A) **Accompanying gerunds:** Auxiliary *ir* favors motion event verbs over non-motion event whereas auxiliary *estar* shows no such preference.

(B) **Verbal aspect:** Auxiliary *ir* favors VPs that encode specific types of imperfectivity over general imperfectivity, whereas *estar* is commonly found in VPs that encode both general and specific types of imperfectivity.

This section explained the historical development of auxiliary *ir* in AUX + GER constructions and outlined the syntactic and semantic properties known to impact auxiliary *ir* selection (relative to auxiliary *estar*) in several widely spoken varieties of Spanish. In the next section, we examine auxiliary variation in varieties of Andean Spanish, with a focus on claims that contact effects from Quichua have impacted auxiliary development in those varieties.

2.3 Contact effects from Quichua on auxiliary usage patterns in Andean Spanish

As was mentioned in Section 2.1, there is a robust literature dedicated to the study of contact effects from Quichua into Andean Spanish, some of which focus directly on AUX + GER constructions. In this section, I highlight several studies that explore possible contact effects from Quichua on the usage patterns of auxiliaries in varieties of Andean Spanish, one of which addresses auxiliary *ir* in EAS specifically (Toscano Mateus, 1953). To begin, consider the well-documented *dar*, Sp. ‘to give’ + GERUND expression, an AUX + GER construction used only in Ecuadorian Andean Spanish that conveys the benefactive and is believed to have emerged from contact with Quichua:

- (3) *Dame comprando unas papas* (Hurley 1995: 248)
‘Buy some potatoes for me, please’

Several theories have been proposed about which particular Quichua feature(s) were likely to have facilitated the innovative grammaticalization of *dar*, Sp. ‘to give’ in

EAS. The most intuitive explanation is that it developed as a syntactic calque from a corresponding Quichua construction that uses the Qui. ‘to give’ verb to convey the benefactive, as in (4), below. For an in-depth analysis into the possible origins of the innovative construction, see Hurley (1995), Niño Murcia, (1995), Haboud (1998) or Olbertz (2008).

- (4) Papa-gu-ta **randi-shpa cara-hua-y** (Hurley 1995: 248)
potato-DIM-ACC buy-SUB.SS give-me-IMP

Another study that has examined contact effects from Quechua⁶ into Andean (though not Ecuadorian) Spanish is Escobar (2009), which considers the use of *estar* + GER constructions. It had been widely observed that Andean Spanish speech displayed a noticeably high proportion of periphrastic expressions relative to synthetic ones, presumably due to the productive nature of the gerund in Quechua, *V-chka* (Schumacher 1975; Alberto Escobar 1977). This prompted Escobar (2009) to test whether the frequency of *estar* + GER constructions (e.g. *está comiendo*, Sp. ‘is eat-ing’) relative to non-periphrastic expressions (e.g. *come*, Sp. ‘eats’) was higher in Andean Spanish speakers (Quechua-Spanish bilinguals) than coastal Spanish speakers (Spanish monolinguals with little to no Quechua contact). Results of a corpus analysis confirmed that Spanish speakers with Quechua contact *did* use *estar* + GER more frequently than those without Quechua contact, suggesting that Quechua contact has influenced the usage pattern of AUX + GER in Andean Spanish. Escobar (2009) also found that in Andean

⁶ Quechuan = the language family, Quechua = how most Quechuan varieties are called, Quichua = how the Ecuadorian Quechuan variety is called

Spanish, auxiliary *estar* was used in ways that violated several syntactic-semantic restrictions commonly described in standard Spanish (Bertinetto, 2000):

(5) *El espectáculo **está teniendo** mucho éxito.* (Escobar, 2009)
'The show is having a lot of success.'

(6) ***Estuvieron reconstruyendo** el puente durante dos años.* (Escobar, 2009)
'They were re-building the bridge for two years.'

For example, in (5), AUX *estar* is paired with a stative gerund (i.e. *teniendo*, Sp. 'having'), and in (6) it is paired with a non-durative gerund (i.e. *reconstruyendo*, Sp. 're-building'), both of which Bertinetto (2000) identifies as a violations of the standard syntactic restrictions on auxiliary *estar*. Consequently, it was concluded that contact from Quechua likely played an important role in facilitating the emergence of innovative functions of auxiliary *estar* in Andean Spanish. It should be noted that some research suggests the frequent and nonstandard usage patterns of AUX + GER in Andean Spanish may have less to do with Quechua interference effects and more to do with gerund-heavy foreigner talk on the part of Spanish missionaries during the colonization period in South America (Lipski, 2013).

In conclusion, much of the Andean Spanish literature to date that involves Quichua contact effects on AUX + GER constructions has focused heavily on *dar*, Sp. 'to give,' + GER (Hurley, 1995; Niño Murcia, 1995; Haboud, 1998; Olbertz, 2008) and *estar* + GER (Escobar 2009). One book, however, does mention possible effects from Quichua of the *ir* + GER construction in EAS. Toscano Mateus (1953), the first comprehensive descriptive grammar of Ecuadorian Spanish, made the observation that EAS speakers at the time used the *ir* + GER construction in a way that differed from *la lengua general*,

Sp. ‘the general language,’ a reference to standard peninsular Spanish (p.283). What is more, he explicitly noted that the *ir* + GER in EAS coincides with the Quichua construction:

(7) VERB-*c* + *ri-shun*

VERB-PR.PART. + ‘to go’- 1P.PL.IMP.

Recognizing that the *ir* + GER construction was quite commonplace in Middle Spanish but that its usage had waned in peninsular Spanish by the 1950s, he hypothesized that *ir* + GER may have remained as a frequent construction in EAS because it coincided with the Qui. GER + *ri-shun* construction shown in (7), above. Study 1 of the current paper asks whether we see remnant evidence of that possible contact effect in present-day EAS data. If Toscano Mateus (1953)’s hypothesis was correct, we could expect that Quichua-Spanish bilinguals who have regular contact with Quichua would use the *ir* + GER construction more frequently than do Spanish monolinguals who have little to no contact with Quichua. Toscano Matues (1953) also suggested that semantically nonstandard uses of the *ir* + GER construction (e.g. the hortative, as in *Vamos robándole* Sp. ‘Let’s go robbing him!’) were present in EAS. Study 2 aims to follow up on this claim by clarifying the aspectual distinctions conveyed by auxiliary *ir* in EAS today.

3. STUDY 1: Corpus analysis of auxiliary *ir* in Ecuadorian Andean Spanish

3.1 Motivation for the study

Research from several contemporary varieties of Spanish has demonstrated that variation between auxiliary *ir*, Sp. ‘to go’ and *estar*, Sp. ‘to be’ is substantially motivated by semantic factors, mostly regarding properties of the accompanying gerund (i.e. *ir* prefers gerunds motion events relative to stative and non-motion events while *estar* shows no such preference) and the aspectual meaning of the VP (i.e. *ir* is more commonly used to convey specific types of imperfectivity over general imperfectivity while *estar* shows no such preference) (Torres Cacoullós, 2000; Escobar, 2009). What has yet to be investigated is whether language contact effects from Quichua might also affect their variation in EAS. This study addresses that question by using a logistic regression model on a new corpus of EAS to examine to degree to which a combination of social (i.e. contact effects from Quichua) and semantic (i.e. VP aspect, gerund class) factors may contribute to the variation of the two most frequent auxiliary verbs in EAS AUX + GER constructions, *estar* and *ir*.

3.2 Methods

3.2.1 Data collection

This study entailed the compilation of a new corpus documenting present-day EAS speech, which was then used to quantify the frequency of auxiliary *ir* relative to other auxiliary variants in AUX + GER constructions and run a logistic regression analysis to test the role of Quichua contact on auxiliary *ir* selection. The data come from a 162,127-

word EAS corpus, based on recordings from 59 native Ecuadorian Spanish speakers over the course of two field trips to Ecuador between 2016 -17. Spanish speakers from the Pichincha province of Ecuador, some of whom were monolingual (i.e. in Spanish) and some of whom were bilingual (i.e. in Spanish and Quichua) were recruited via snowball sampling. All interview recordings were made using either a 192kHz Sony PCM-D10 Portable Audio Recorder or a 1.4GHz Motorola Moto E6. Data collection consisted of a semi-guided sociolinguistic interview in the Labovian tradition followed by a picture book narration task in the tradition of Berman & Slobin (1994). Topics for the sociolinguistic interview centered on personal history, daily routines, family background, and language use. For the picture book narration task, subjects were instructed to narrate the pages of the book *Corduroy* (Freeman, 1968) and/or *Wings* (Tinaka, 2006), depending on their time and interest. *Corduroy*⁷ is a children's book about a teddy bear in a toy store who hopes to find a friend. *Wings* is a picture book about a farmer who adopts a flying dog. To view the book covers, see Section 7.2. The decision to use these two particular picture books for data elicitation over the book more commonly used by linguists - Mercer Mayer's 1969 *Frog, Where are You?* (Bochnak & Matthewson, 200:269) was made based on informally polled community interest across several picture book options. I, the author of this paper was the interviewer for all data collection sessions. This is important, as I am not a local or native Quichua-Spanish bilingual. As such, it must be noted that the possibility of an observer's paradox was present in these sessions, based on the fact that a non-local interlocutor was present in the discourse context. However, one

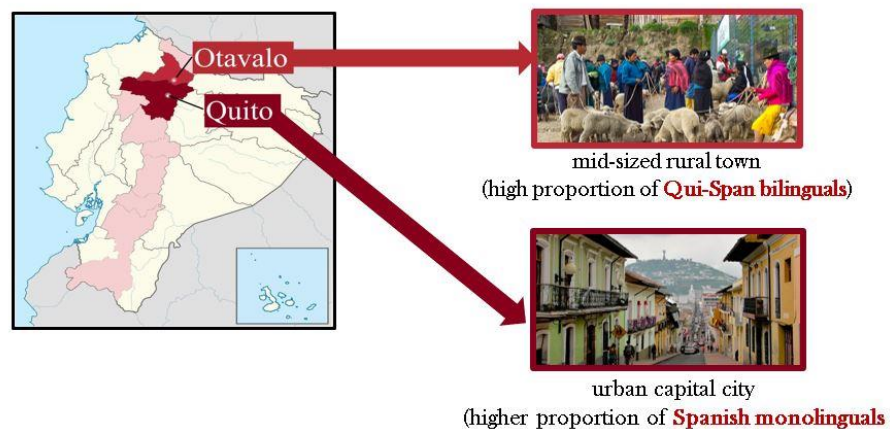
⁷ While *Wings* is a picture-only book, *Corduroy* does include written text. To prevent any possible influence of the written English, paper cutouts were placed over all text so that only the illustrations were visible.

way in which a natural discourse was at least approximated was that all interviews were conducted in the homes and neighborhoods of the interview subjects, often with other locals nearby.

3.2.2 Participants

Data were collected in two cities in the Ecuadorian Andes: Otavalo and Quito (see Figure 2.4, below). Otavalo is a mid-sized town of roughly 40,000 inhabitants in the Imbabura province, and Quito is the large, capital city of Ecuador with a population of over 2 million residents (Ecuadorian Census, 2010). As Otavalo has a high concentration of ethnically Quichua inhabitants, the majority of Quichua-Spanish bilinguals who participated in this study live in Otavalo while the majority of Spanish monolinguals reside in Quito.

Figure 2.3 Data collection field sites in the Ecuadorian Andes, Otavalo and Quito



In total, 62 subjects were interviewed for data collection, three of whom were excluded from analysis for the following reasons. One reported feeling she did not speak Spanish well enough and as a result her family members instructed her on what to say and how to say it. The other two subjects provided only yes-no answers in their interviews and used only a list of nouns and verbs for the picture book narrations. In other words, their speech did not represent naturalistic, native speech data. Of the 59 subjects whose data were retained for analysis, 22 self-reported as Spanish monolingual and 37 as Spanish-Quichua bilingual. Of those 37 bilinguals, 14 were Spanish-dominant bilinguals, 16 were balanced bilinguals, and 7 were Quichua-dominant bilinguals. Language dominance for the bilinguals was self-reported. In all cases, my own observations of their language dominance matched their self-reported labels. There was no rigorous or standardized testing practice to measure subjects' language dominance, as typically used in mainstream language pairings, such as the Bilingual Language Profile (BLP; Birdsong et al., 2012). However, subjects were asked to describe their language usage patterns, how often they used each language, and which language (if either) they felt more confident and comfortable using. While continuous measures, as provided by instruments like the BLP would be ideal for understanding language dominance with a finer resolution, the categorical distinction was deemed sufficient to answer this research question. Based on subjects' oral self-reporting, the placement of respondents into the aforementioned language dominance categories was straightforward. Subject ages ranged between 19-70 yrs. ($\bar{x} = 41$). There was a representative distribution of gender in participants, with women at $n = 29$ (49%), and men at $n = 30$ (51%). See Table 2.3 (below) for a breakdown of the subjects by linguistic profile.

Table 2.3 Speakers by linguistic profile

	Total <i>n</i>	Age (avg)	Gender (F-M)
Span-only	22	34	12 – 10
Span-dom	14	34	7 – 7
Balanced	16	43	6 – 10
Qui-dom	7	55	4 – 3
Total	59	41	49% – 51%

3.2.3 Data preparation and coding

With help from a research assistant and a transcription service (TranscribeMe, n.d.), all audio recordings from the data collection interviews were transcribed and reviewed.

Using a Regular Expressions (RegEx) code⁸ in R, all occurrences of relevant AUX + GER tokens were extracted, which included auxiliaries *ir*, *estar*, *andar*, *seguir*, *continuar*, *pasar*, and *quedar*, Sp. ‘to go, to be, to go (about), to continue/follow, to continue, to spend (time), and to stay/keep,’ respectively. Importantly, the token extraction methodology captured all Spanish conjugations of the auxiliary verbs, allowed for any main verb to fill the accompanying gerund slot, and permitted a reasonable amount of intervening material (i.e. 40 characters in length) between the auxiliary and the gerund in order retain AUX + GER tokens such as *va poco a poco comiendo*, Sp. ‘he goes bit by bit eating’). As instances of lexical *ir/estar/andar/seguir/continuar/pasar/quedar* followed

⁸ Sample of code, which extracts all tokens of *ir* + GERUND. This piece of code initializes variable called *IrGerund_pattern* and defines the target string pattern (all conjugations of *ir* followed by a gerund) and uses the *grep()* function to find the matches (*IrGerund_matches*) in the data (*Corpus*):

```
IrGerund_pattern <- "\\<i(r|do)\\<yendo\\<v(oy|e|a)\\<va(s|mos|n|ya|yas|yamos|yan)|
\\<f(ui|uiste|ue|uimos|ueron|uera|ueras|uéramos|ueran)\\<ib(a|as|an)\\<fbamos|
\\<ir(ía|ías|íamos|ían|é|ás|á|emos|án)\\s.{0,40}ndo
IrGerund_matches <- grep(IrGerund_pattern, Corpus, value = TRUE, ignore.case = TRUE)
```


by an adverbial gerund ($ir_{MainVerb} + GER_{Adverb}$) are indistinguishable from true AUX + GER tokens ($ir_{Auxiliary} + GER_{MainVerb}$) at the unannotated text level, all tokens were manually inspected and tokens with adverbial gerunds were excluded. The resulting data frame was then organized such that each row represented a unique AUX + GER token, described by all relevant speaker details.

Each token was manually coded for by the verbal aspect of the carrier VP and the Motion/Stativity class of the gerund, following the collective guidelines of language-general and Spanish-specific classification schema (Vendler, 1957; Dowty, 1979; Rothstein, 2004; Lopez, 2015). First, each token was categorized by verbal aspect using diagnostic tests from Lakoff (1965) (e.g. ‘*for* test’), the classifications for which included inchoative, habitual, gradual, prospective, and continuative aspect. Tokens which did not fall into any of these specific types of imperfective aspect were coded as general imperfective aspect, or what has also been referred to as the ‘general progressive’ (Comrie, 1979). From there, a higher-level variable was constructed that made a two-way distinction between specific vs. general imperfective VP aspect. The purpose of the fine-grained variable coding for VP aspect (i.e. the variable with 6 levels) was to provide an initial descriptive corpus analysis, while the purpose of the higher-level variable coding for VP aspect (i.e. the second variable with 2 levels) was to test the aspectual specificity of auxiliary *ir* in EAS.

As motion status (i.e. motion, non-motion) and Vendler class (i.e. states, accomplishments, activities, achievements; Vendler, 1957; Dowty, 1991) are known to affect auxiliary choice in Spanish (Torres Cacoullous, 2000), tokens were classified by both of these parameters as well. Following Torres Cacoullous (2000) and Gaytan (1998),

gerunds were coded with motion status when the lexical formation of the verb required displacement of a person or object through space. These included agentive human displacement verbs such as WALK, RUN, SWIM as well as non-agentive object displacement verbs (e.g. RISE, FALL) and limited spatial events (i.e. EAT, GROW). Gerunds were categorized as non-motion status when the lexical formation of the verb did not require displacement of a person or object through space, such as THINK, BE, LISTEN. Regarding Vendler class, each gerund was categorized as a *state* (e.g. THINK, BE), *activity* (unbounded processes; e.g. WALK, EAT), *accomplishment* (bounded process; e.g. WALK HOME, EAT APPLE), or *achievement* (point events e.g. SHUT, WIN) based on aspectual distinctions for Spanish verb phrases outlined by Lopez (2015). To reduce co-dependency between the variables *Motion* and *Vendler Class* (i.e. all statives are of non-motion status; most motion status gerunds are of activity or accomplishment Vendler class), the two factors were combined into a single factor that was meaningful for the research question of this study. The new variable, called *Motion/Stativity* was composed of three levels: *stative*, *non-motion event*, and *motion event*. This coding scheme was optimal for the study at hand because motion status and stativity are two known factors that have previously been shown to influence auxiliary choice in Spanish. Coding for each token was cross-checked and verified by a research assistant.

3.2.4 Planned analyses

To investigate whether *ir* + GER is currently more frequent in EAS relative to other varieties of Spanish (presumably due to contact effects from a corresponding Quichua

construction), a descriptive corpus analysis was conducted to test whether this was still the case in present-day EAS. Specifically, AUX + GER tokens were extracted from the 2016-17 EAS corpus and categorized according to the auxiliary verb encountered, using the coding schema outlined in the previous section. Next, a Welch's t-test was implemented to compare the statistical significance between the proportional uses of auxiliaries *ir: estar* between the two main speech EAS in particular: Quichua-Spanish bilingual and Spanish monolingual groups. A Welch's t-test was used in lieu of a Student's t-test due to the unequal sample sizes between tokens in the two speaker groups. Then, to get a sense of the semantic distribution of auxiliary *ir* relative to *estar* in the EAS corpus, the proportions were calculated by verbal aspect classification. Finally, a generalized (logistic) linear model was applied to test the effect of semantic and sociolinguistic predictors on auxiliary choice (*ir* vs. *estar*). It was posited that three factors would reliably explain *ir – estar* auxiliary choice in the EAS corpus. These included a factor for VP aspect (i.e. whether the VP encoded a general or specific type of imperfective aspect), gerund class (i.e. whether the accompanying gerund was stative, non-motion event, motion event), and speaker language profile (i.e. Spanish monolingual, Spanish-dominant bilingual, balanced bilingual, Quichua-dominant bilingual). The model used the Spanish monolingual group as the base level for *Speaker Profile*, general imperfective as the base level for *VP Aspect*, and motion events as the base for *Gerund Class* predictor. This analysis was motivated by the hypothesis that auxiliary *ir* may be more frequent in Quichua-influenced varieties of Spanish due to contact effects from a corresponding Quichua construction (Toscano Mateus, 1953). It was predicted that EAS speakers who had more Quichua contact would display a higher proportional use of

auxiliary *ir* (relative to *estar*), when compared to EAS monolinguals who had little to no Quichua contact. The results of which are summarized through a barplot, forest plot, and visualized marginal effects.

3.3 Results

Results of the descriptive corpus analysis indicate that together, *estar* and *ir* accounted for 90% of all tokens in EAS. *Estar* was the most common auxiliary, representing 65% of all AUX + GER auxiliaries the corpus. Auxiliary *ir* was the second most auxiliary, representing 25% of tokens. The remaining 10% consisted of auxiliaries *quedar* (5%), *seguir* (5%), *pasar* (<1%), and *andar* (<1%). These descriptive results are summarized in Table 2.4, below.

Table 2.4 Distribution of Spanish AUX + GER auxiliaries in EAS corpus

AUXILIARY	Eng. translation	COUNT	PERCENTAGE
<i>estar</i>	‘to be’	730	65 %
<i>Ir</i>	‘to go’	282	25 %
<i>Quedar</i>	‘to stay/keep’	53	5 %
<i>Seguir</i>	‘to continue’	51	5 %
<i>Pasar</i>	‘to spend time’	9	1 %
<i>andar</i>	‘to go about’	3	0.3 %

Recalling the meta-analysis presented in Table 2.1 (i.e. of all AUX + GER tokens considered, *ir* accounted for 23% in Mexican Sp., 19% in peninsular Sp., 8% in New Mexican Sp.⁹), EAS (i.e. 25% *ir*) demonstrated a slightly more frequent use of auxiliary *ir*

⁹ This figure averages across the findings for the corpus of New Mexican Spanish speakers with extensive English contact and New Mexican Spanish speakers with limited English contact.

in speech. Of course, these results should not be taken as direct evidence that auxiliary *ir* functioned the same way at the time of Toscano Mateus's writing, nor is that the aim of the analysis. Rather, the results merely provide supporting evidence for the claim that varieties of Spanish that have Quichua contact (i.e. EAS) use auxiliary *ir* more frequently than varieties of Spanish that do not have contact with Quichua. All this provides is general, preliminary support for the possibility that contact effects from the corresponding auxiliary 'to go' construction in Quichua may have contributed to the higher retention of auxiliary *ir* in EAS. This is, of course, exploratory speculation, given the available comparative data.

Descriptive corpus analysis of the proportional uses of auxiliaries *ir*: *estar* between the two EAS speech communities of interest (i.e. Quichua-Spanish bilinguals and Spanish monolinguals) indicate that bilinguals used *ir* with a proportional degree (M= 0.26, SD= 0.44) lower than that of the Spanish monolinguals (M= 0.36, SD= 0.48). It should be noted, that while variance was comparable between the two groups, the sample sizes of (*ir* + *estar*) tokens was unequal ($n_{\text{biling}} = 817$; $n_{\text{monoling}} = 195$). As such, a Welch's t-test was implemented to test the difference of the means (i.e. $n_{ir} / (n_{ir} + n_{estar})$). No significant effect was found for group, $t(1) = -2.64$, $p = 0.12$, although bilinguals on average did demonstrate less frequent use of auxiliary *ir*, relative to *estar*.

Of course, we must recognize that the tokens expressed in Table 2.4 do not acknowledge the verbal aspect of the *ir* + GER tokens. To address this, Figure 2.4 (below) summarizes the proportions of auxiliary *ir* to auxiliary *estar* by verbal aspect.

Figure 2.4 Proportions of auxiliary *ir* to auxiliary *estar* selection by VP aspect

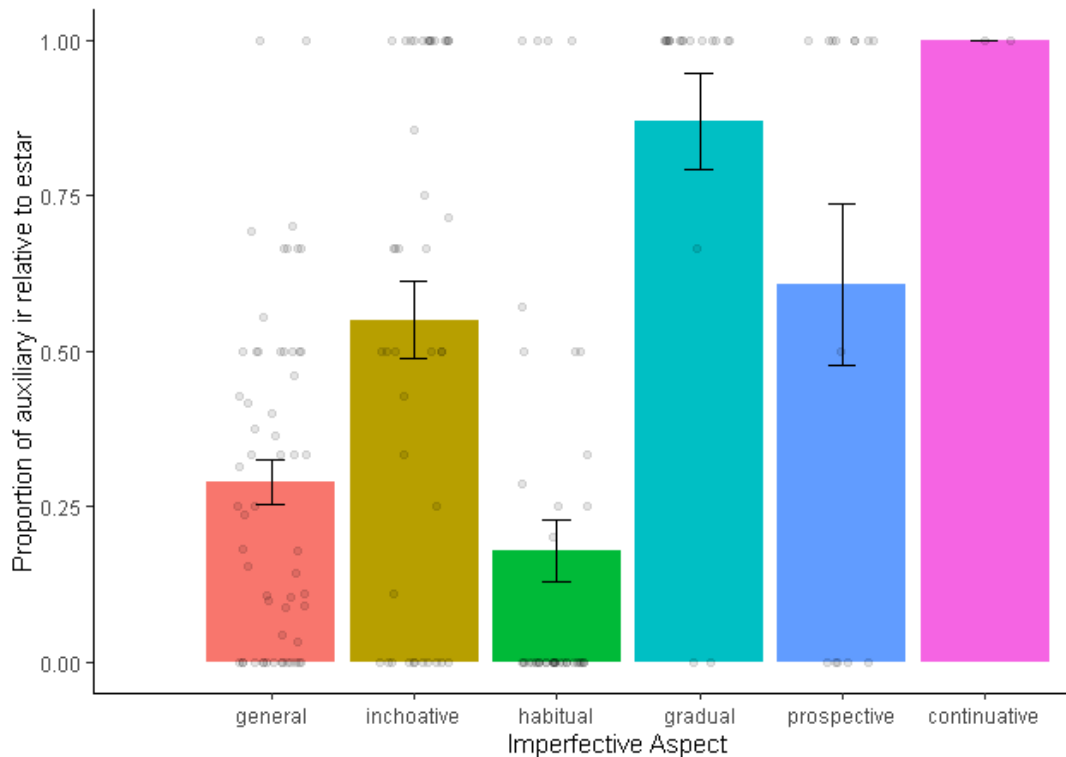


Figure 2.4 X-axis categories distinguish AUX + GER tokens by the type of imperfective aspect conveyed in the VP. Y-axis reflects proportional use of auxiliary *ir* relative to *estar*, such that higher bars reflect a higher proportional use of *ir* and lower bars reflect a higher proportional use of *estar*. Black dots reflect proportions for each EAS speaker. Black bars indicate standard error.

In Figure 2.4, we observe that when the VP conveys general imperfective aspect, *ir* is far less likely to be used relative to *estar*. This is evidenced by the low proportional value of the left-most bar (i.e. just above 0.25). What is more, while roughly 70% of all *estar* + GER tokens were used to convey the general imperfective, only about 50% of *ir* + GER tokens were used for general imperfective aspect. Taken together, these results provide strong evidence that EAS aligns with the grammaticalization pattern of *ir* reported in Torres Cacoullós (2000). That is, while *ir* was once the most common auxiliary used to encode general imperfectivity, it has since been superseded by *estar* in this regard. What remains unclear from these data, however, is the variation between *ir*

and *estar* across the specialized imperfective aspectual distinctions (i.e. prospective, inchoative, continuative, gradual, habitual). There are two main explanations for why these results are so unclear. First, there were very few subjects who employed these more specialized aspectual meanings in their spontaneous speech (as indicated by the relatively low number of black dots for gradual, prospective and continuative aspect). Second, due to the raw imbalance of *estar* and *ir* tokens ($n = 730$ and 282 , respectively), the semantic distribution of auxiliary *ir* is less clearly represented in the corpus. These reasons precluded any reliable conclusions to be drawn from these data regarding the specialized aspectual meanings of *ir* in present day EAS. Subsequently, a follow-up experimental study was conducted to control for these imperfective aspectual distinctions more clearly (Study 2). The question of Quichua contact effects on auxiliary *ir* usage patterns is addressed with a logistic regression analysis in the following section.

The descriptive results of the (*ir / estar*) AUX + GER tokens by factor levels are provided in Figure 2.5 below, which shows the proportion of occurrences of *ir* vs. *estar* across the semantic and social variables at issue. Differences in usage were statistically tested using a logistic regression, the results of which are summarized in Figures 2.6 (comprehensive forest plot) and 2.7 (marginal effects).

Figure 2.5 Proportional use of auxiliary *ir*: *estar* use by social and semantic factors

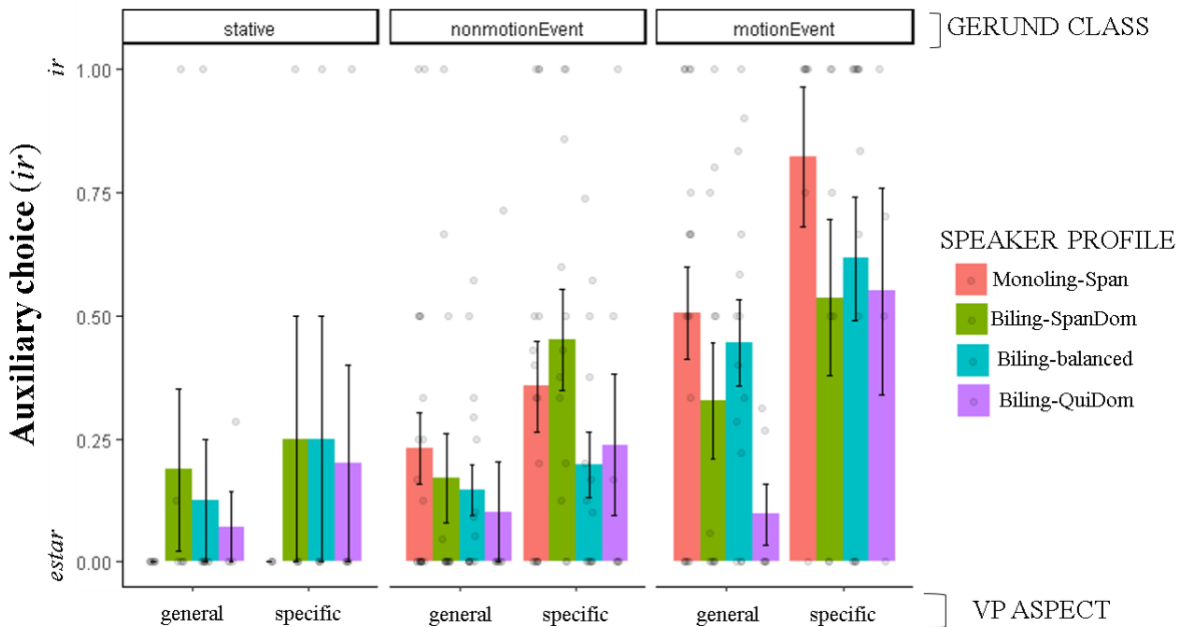


Figure 2.5 X-axis distinguishes data by *VP Aspect* (general imperfectivity vs. a specific type of imperfectivity), facets represent *Gerund Class* (stative, non-motion event, motion event gerunds), and bar colors indicate *SpeakerProfile* (left to right: Monolingual Spanish, Spanish-dominant bilingual, Balanced bilingual, Quichua-dominant bilingual). Black dots reflect the proportional use of *ir*: *estar* for a given subject under the given conditions. Bar height reflects probability of *ir* selection relative to *estar*. Black bars indicate standard error.

The mixed-effects logistic regression model returned the log odds¹⁰ for each interaction between factor levels, estimating the change in the odds that a given AUX + GER token from the corpus would be expressed with auxiliary *ir* instead of auxiliary *estar*. The model¹¹ treated speaker as a random variable to allow for random intercepts and was fit using STAN (version 2.19.2) via the package rstanarm (version 2.19.3) in R (1.0.153). The log odds for each combination of factor levels was calculated, such that the model predicted the log odds

¹⁰ Log odds are probabilities calculated within a logistic regression framework by log transforming a regular odds ratio, such that the log odds of the outcome variable in this study (*Auxiliary choice*) would be $\log\left(\frac{P(ir)}{P(estar)}\right)$.

¹¹ Code for the logistic regression model run in R using the package rstanarm:
`stan_glmmer(auxChoice ~ vpAspect * gerundClass * spkrProfile + (1 + vpAspect * gerundClass | spkrID), family = 'binomial', cores=4)`

of *ir* occurring in an AUX + GER token, given the outlined predictor variables related to semantic properties of the carrier verb phrase (i.e. *VP aspect*, *Gerund class*) and the speaker's level of contact with Quichua (i.e. *Speaker profile*). For example, consider the forest plot and tabular model output provided in Figure 2.7 (below). The intercept row reveals a log odds estimate of -2.5, meaning that of all auxiliary *estar* and *ir* tokens in the EAS corpus with general imperfective aspect and a stative accompanying gerund that were uttered by monolingual Spanish speakers are biased to *estar* selection. The main insight revealed by Figure 2.7 is that Quichua-Spanish bilingual participants (i.e. green, blue, and purple bars) did not demonstrate a significantly greater *ir: estar* use in their speech samples, relative to the Spanish monolinguals (i.e. red bars). In fact, for several conditions (i.e. nonmotionEvent-general, motionEvent-general, motionEvent-specific) the Quichua-Spanish bilinguals demonstrated a slightly lower *ir: estar* ratio, relative to that of the Spanish monolinguals. These differences, as will be shown in the inferential analysis section of this paper, are not statistically significant. However, they by and large seem to suggest that there is little to no difference in the *ir:estar* usage between the two speech communities of interest (i.e. Quichua-Spanish bilinguals, Spanish-monolinguals).

Figure 2.6 Summary of mixed-effects logistic regression on auxiliary choice

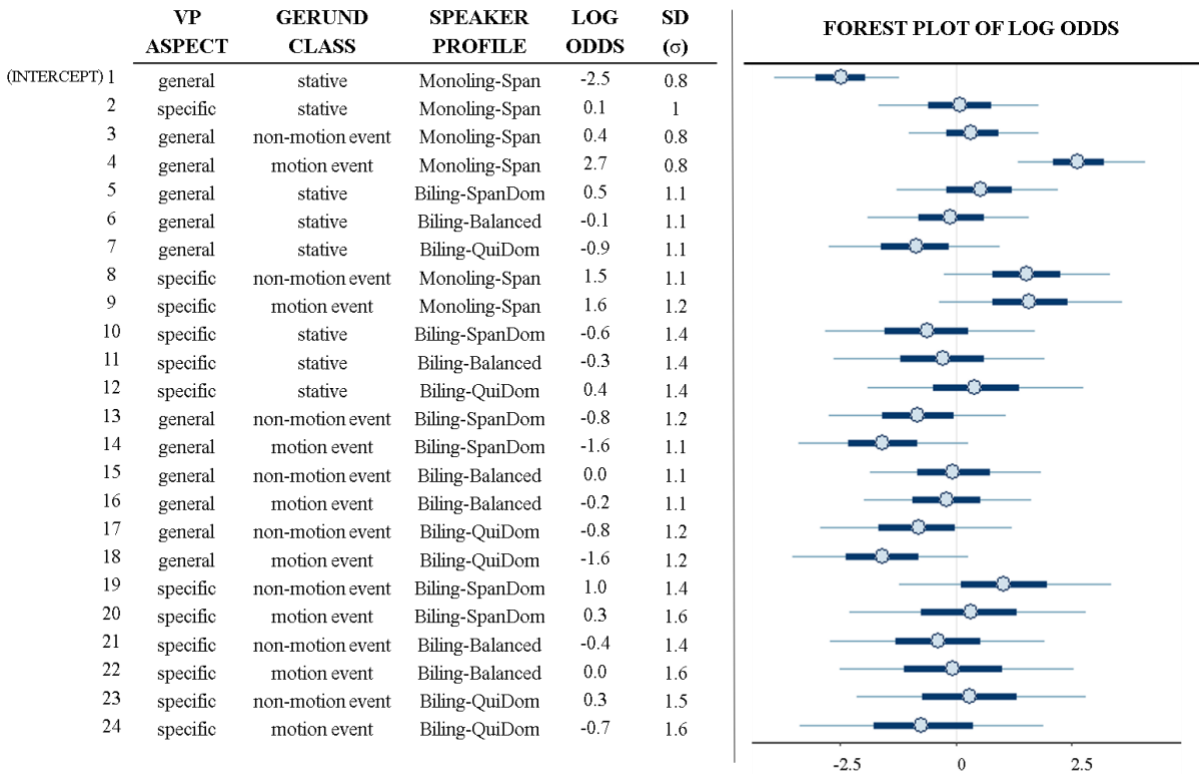


Figure 2.6 Each row represents the log odds of auxiliary *ir* selection relative to auxiliary *estar*, given the specified conditions for *VP Aspect*, *Gerund Class*, and *Speaker Profile*. Credible intervals are indicated by thick (dark blue) horizontal lines and standard deviations are shown with thin (light blue) horizontal lines. Positive log odds reflect a bias towards use of *ir*, negative log odds reflect a bias towards use of *estar*, and log odds of zero indicate that auxiliary choice is at chance.

As is observed in Figure 2.6, there are no obvious patterns of one speech group favoring one auxiliary over the other, as is evident in the lack of systemic deviations from the 0 for each of the conditions specified by rows 1-24. While the detail provided in Figure 2.6 is comprehensive, it does not reveal the possible effects that each of the factor levels may have on auxiliary choice. To address this, estimated marginal effects¹² for

¹² Marginal effects for a binary outcome variable (e.g. *estar* vs. *ir*), reflect the change in log odds when one predictor variable is changed, holding all other predictor variables constant. Note that marginal effects do not partition the variance in the outcome variable (auxiliary choice) across factors and levels. Rather, variance in auxiliary choice is considered holistically for each factor level.

each level of each factor were plotted (see Figure 2.7, below) using STAN (version 2.19.2) via the package rstanarm (version 2.19.3) in R (1.0.153).¹³

Figure 2.7 Estimated marginal effects from logistic regression model

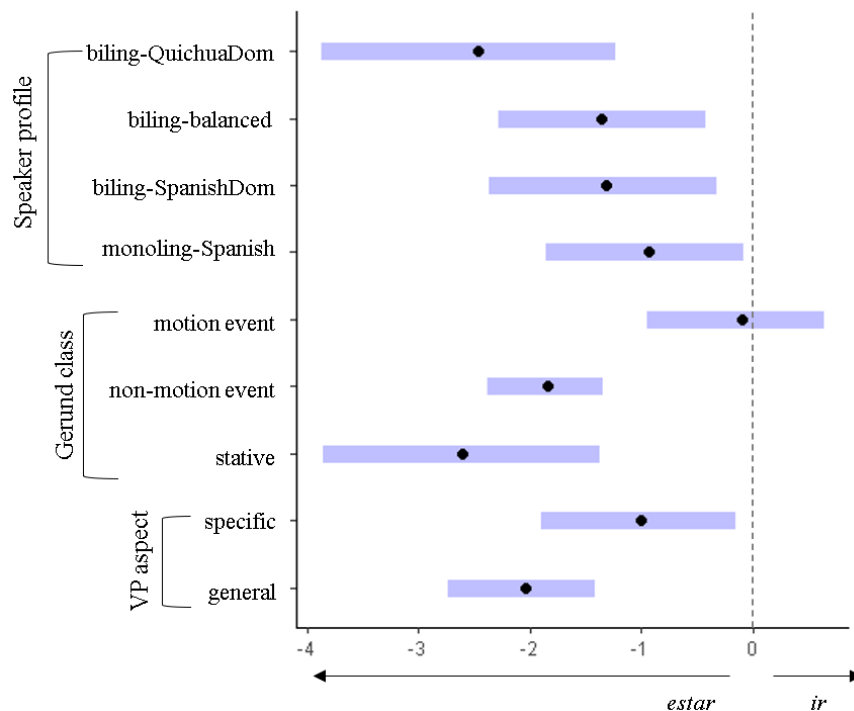


Figure 2.7 X-axis values reflect estimated marginal effects in log odds. Y-axis reflect factor level across the three predictor variables. Each row represents the log odds of auxiliary *ir* selection relative to *estar*, given the specified conditions for *VP Aspect*, *Gerund Class*, and *Speaker Profile*. Credible intervals are indicated by thick horizontal lines. Positive log odds reflect a bias towards use of *ir*, negative log odds reflect a bias towards use of *estar*, and log odds of zero indicate that auxiliary choice is at chance.

Allow us to recall the question of interest, which is whether which language contact with Quichua can explain observed variation of the two most frequent auxiliaries (*estar* and *ir*) in EAS, given their known syntactic-semantic parameters. Contrary to predictions that

¹³ Plot created using the emmeans() function. Code used:

```
p_Aspect <- emmeans(m3, ~ vpAspect)
p_Gerund <- emmeans(m3, ~ gerundClass)
p_LangProfile <- emmeans(m3, ~ spkrProfile)
plot(p_Aspect + p_Gerund + p_LangProfile, pars=names(fixef(m3))) + theme_classic()
```

Quichua contact would be associated with higher proportional use of *ir*, the logistic regression revealed that auxiliary *ir* was *not* used any more frequently by Quichua-Spanish bilinguals, when compared to Spanish monolinguals. This is evidenced by the overlapping, yet more negative, expected proportions of *ir* shown in rows 1-3, relative to row 4 in Figure 2.7. I argue that these results may be best understood within the framework of sociolinguistic variation and identity construction theory (Labov, 1972; Surek-Clark, 2000). Before doing so, however, we must note that regarding *VP Aspect*, auxiliary *ir* was more often used to specialize imperfective meanings rather than the general imperfective (i.e. consistently lower values in Figures 5, 6,7 for bars representing general imperfectivity relative to ones representing specific imperfectivity). This aligns with predictions from Torres Cacoullós (2000). Additionally, regarding *Gerund Class*, speakers preferred to pair auxiliary *ir* with motion event gerunds over non-motion event and stative gerunds (i.e. the descending gradation in values in order from motion events, non-motion events, and statives). This also aligns with reports from the literature regarding the role that the motion-stativity status of accompanying gerunds plays in auxiliary selection of AUX + GER constructions (Torres Cacoullós, 2000).

While the results do not provide any clear support for the hypothesized Quichua contact effect, they may be explored with social identity construction theory. This is in light of the fact that Quichua-speaking communities have been historically disadvantaged in Ecuador relative to their Spanish monolingual counterparts (King & Haboud, 2010). That is, while contact with Quichua may have originally been responsible for the relatively high retention of auxiliary *ir* in EAS, its lower frequency in the Spanish spoken in Quichua communities today may be due in part to one well-known strategy of identity construction among speech

communities with low overt prestige: selection of standard features (i.e. *estar*) over less standard ones (i.e. *ir*) to manifest linguistic prestige (Surek-Clark, 2000). Recall that linguistic prestige refers to the notion that some features, when associated with a particular speech community, may acquire levels of prestige that reflect community values associated with that speech community. In fact, anecdotal evidence from a handful of native EAS speakers¹⁴ suggests that auxiliary *ir* may not be an indicator of a Quichua language background in the minds of most EAS speakers, but that it may sound slightly more colloquial than *estar*. As the field of sociolinguistics has demonstrated over the past several decades, those with more overt prestige — in Ecuador, traditionally those of Spanish descentance — are often licensed to use more colloquial language with less risk of being stigmatized for it (Labov, 1972). On the other hand, those with less overt prestige — in Ecuador, traditionally those of Quichua descentance — may reduce their use of colloquial language in order to prevent potential stigmatization from others. Much in the way that a white man in the U.S. might feel more comfortable than, say, a Black woman, to use a folksy word like *ain't* during a job interview, those with greater sociolinguistic prestige in Ecuador may feel more inclined to integrate colloquial language during an interview with a linguistics researcher. While more confirmatory research is certainly needed to establish the

¹⁴In an informal post-hoc poll, five EAS were informally asked to describe what they considered to be the most distinctive dialects, or ways of speaking, across communities in Ecuador. The idea was to explore whether auxiliary *ir* would be used to describe Quichua-speaking communities. While subjects were able to identify and imitate a host of lexical and grammatical features for a range of dialects, none of them included auxiliary *ir*. This preliminary analysis based on exploratory data suggests that auxiliary *ir* does not appear to be a particularly salient sociolinguistic stereotype or marker. That is, if auxiliary does – or even *did* – have some sociolinguistic significance in EAS based on contact with Quichua, it could at most be classified as an indicator, or the lowest level of sociolinguistic awareness in Labov (1972)'s *stereotypes – markers – indicators* sociolinguistic salience framework. Then, those same five speakers were asked what they felt the difference was between *Él está hablando* (Sp. 'He is talking') and *Él va hablando* (Sp. 'He goes talking'). Of the five respondents, four indicated that auxiliary *ir* sounded more informal or colloquial. No characterizations about socioeconomic status or education were mentioned..

true social indexicality of and language attitudes towards auxiliary *ir* in EAS, the results suggest auxiliary *ir* usage patterns may have less to do with Quichua contact and more to do with social identity construction. Further research incorporating diachronic data and language attitudes theory might shed light into this topic.

In summary, a logistic regression model was applied to a corpus of EAS to examine possible contact effects from Quichua on the use of Spanish auxiliary *ir*. It was found that contact with Quichua was, in fact, associated with *lower – though not statistically significant* – proportional use of auxiliary *ir* relative to *estar*. I argue that the synchronic variation observed between these auxiliaries is most clearly understood within the framework of social identity construction theory, such that Quichua-Spanish bilinguals may opt for more standard-sounding features (i.e. *estar*) over more colloquial ones (i.e. *ir*), given the centuries of linguistic stigmatization that has been associated with their speech community.

4. STUDY 2: Paraphrase judgment task testing specialized meanings of auxiliary *ir*

4.1 Motivation for the study

This study experimentally tests the claim from Toscano Mateus (1953) that *ir* + GER in EAS may encode aspectual meanings not typically associated with the construction in other varieties of Spanish. While the corpus analysis in Study 1 was sufficient for testing the claim about general vs. specific aspect in auxiliary *ir* selection, the question of which specific aspectual meanings auxiliary *ir* can encode for in present-day EAS remains largely

unanswered. To address this, an experiment was designed to identify the semantic distribution of auxiliary *ir*, Sp. ‘to go’ in EAS, relative to the three main auxiliaries believed to share significant semantic overlap: *estar*, *seguir*, *andar* (Sp. ‘to be, to continue, to go about,’ respectively) (Torres Cacoullos, 2000).

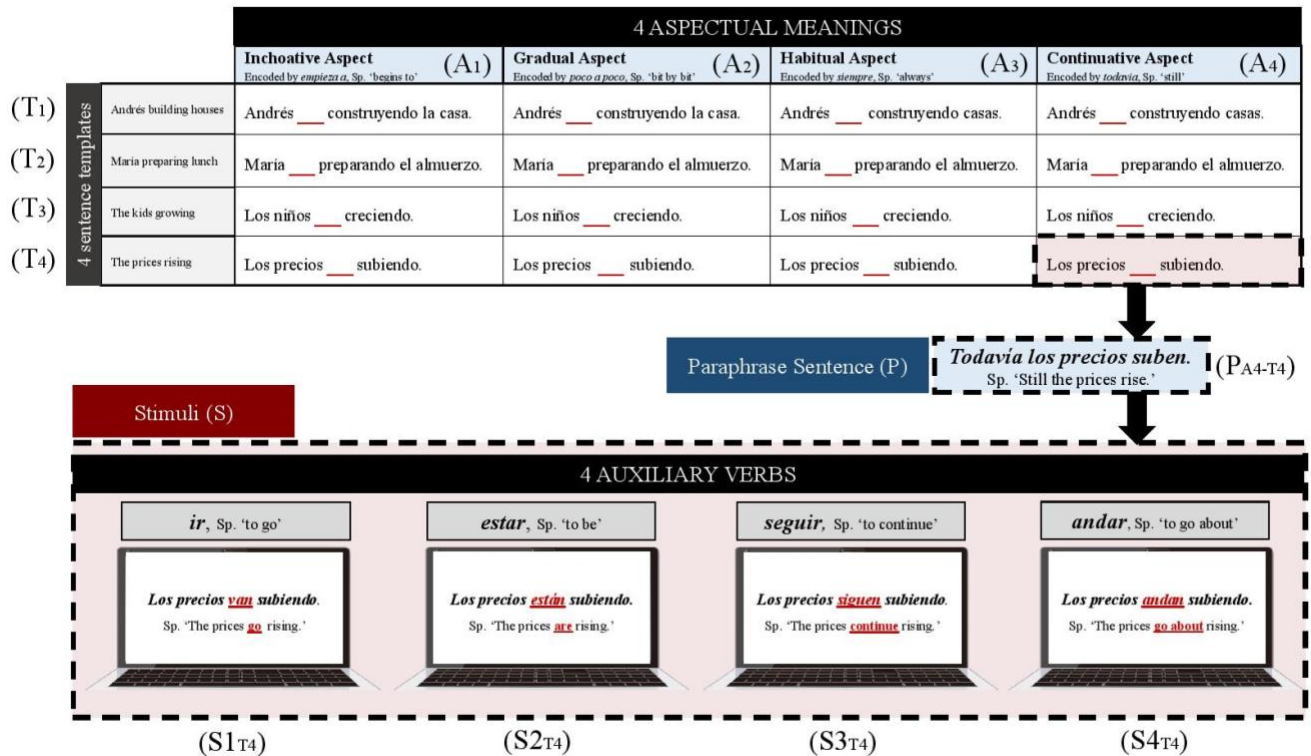
4.2 Methods

4.2.1 Experimental design

A paraphrase judgment task experiment was used to identify the semantic distribution of auxiliary *ir* relative to other common AUX + GER auxiliaries that have been documented to convey overlapping aspectual meanings. The stimuli used in the experiment employed a 4 x 4 experimental design with factors ASPECT (*Inchoative*, *Gradual*, *Habitual*, *Continuative*¹⁵) and AUXILIARY (*estar*, *ir*, *seguir*, *andar*). As illustrated in Figure 2.8 (below), one item in the paraphrase task survey consisted of one paraphrase sentence (P) and one stimulus sentence (S). In total, 64 such items were created, by pairing each of the 16 unique Ps with its 4 corresponding Ss. Aspectual distinctions were implemented in the target stimuli by varying explicit adverbials. For example, to encode gradual aspect in the paraphrase sentences, Sp. ‘poco a poco’ or ‘bit by bit’ was included in the VP. For the full list of adverbials used to encode these aspectual distinctions, see the first row of Figure 2.8, which also summarizes the experimental design of the stimuli.

¹⁵ See Table 2.2 for definitions and examples of these imperfective aspects.

Figure 2.8 Experimental design (4 x 4) for paraphrase task stimuli



To mitigate repetition fatigue and practice effects, four sentence templates (T), each with distinct subjects and main verbs, were constructed and a Latin square design was implemented, such that each subject saw only half ($n = 32$) of the total items ($n = 64$). For more information on the Latin square design, see Section 7.6. This design, which yielded two repeated measures per condition per subject, maximized variation across experimental items while controlling for potential confounds. With 30 respondents and 2 repeated measures within-subject, each of the 16 experimental conditions is associated with 60 data points.

4.2.2 Participants and procedure

The survey was conducted in Spanish on an ASUS laptop using the survey platform Qualtrics. In total, 35 native EAS speakers completed the online paraphrase judgment task. All participants for this study were recruited through snowball sampling in the Ecuadorian capital city, Quito. Five were excluded from analysis due to discovery in the post-experiment survey that they were not in fact native EAS speakers (e.g. recent immigrants from Venezuela, coastal Ecuadorian Spanish speakers visiting Quito). Participants were first presented with instructions about the structure of the paraphrase judgment task. They were told that they would see a series of sentence pairs and that their task would be to rate how well the second sentence paraphrased the meaning of the first. A 5-point response scale was used to rate these stimuli (0 = Totally different, 1 = Quite different, 2 = Similar, 3 = Quite similar¹⁶, 4 = Totally the same). Before beginning the main experiment, each subject saw the same seven practice items (to view all items, see Section 7.8). The practice items served two purposes: to get participants used to the format of the survey and also to fill out the possible scope of paraphrases¹⁷. After completing the practice items, participants were randomly assigned List 1 or List 2. An example of one experimental item is shown in Figure 2.9 (below).

¹⁶ A reviewer aptly notes that the mid-point here is not neutral, as “Quite Similar” is closer to “Totally the Same” than it is to “Totally Different.

¹⁷ An example of a poorly paraphrased item was :

(P) = *Pedro está con sed*, Sp. ‘Pedro is thirsty.’

(S) = *Pedro entiende sed*, Sp. ‘Pedro understands thirst.’

An example of a well paraphrased item was:

(P) = *Pedro está con sed*, Sp. ‘Pedro is with thirst/ is thirsty.’

(S) = *Pedro tiene sed*, Sp. ‘Pedro has thirst/ is thirsty.’

Figure 2.9 Sample item from paraphrase judgement task



Figure 2.9 Participants saw the items in Spanish (left). English translations are provided (right).

After completion, respondents answered a series of questions about their demographic and linguistic history. Participant ages ranged from 18-65 yrs. old ($\bar{x} = 33$ yrs.) and there was an even gender split (15F, 15M). Participants all reported extensive living in the Ecuadorian Andes, with three reporting some time living in the Ecuadorian coastal region. Importantly, all were native EAS speakers. For a comprehensive look at participant background information, see Supplementary Materials.

4.3 Results

This analysis was motivated by the claim from Toscano Mateus (1953) that EAS speakers used auxiliary *ir* to convey aspectual meanings in a way that differed from most varieties of Spanish. To get a sense for the semantic distribution of auxiliary *ir* in present-day EAS, a paraphrase task experiment was implemented on speakers of EAS. Figure 2.10 (below) shows the Likert scale ratings for auxiliary *ir* across four verbal aspects,

compared to those of three auxiliaries said to share an overlapping semantic distribution in other varieties of Spanish (Torres Cacoullos, 2000).

Figure 2.10 Paraphrase task responses by auxiliary verb and imperfective aspect

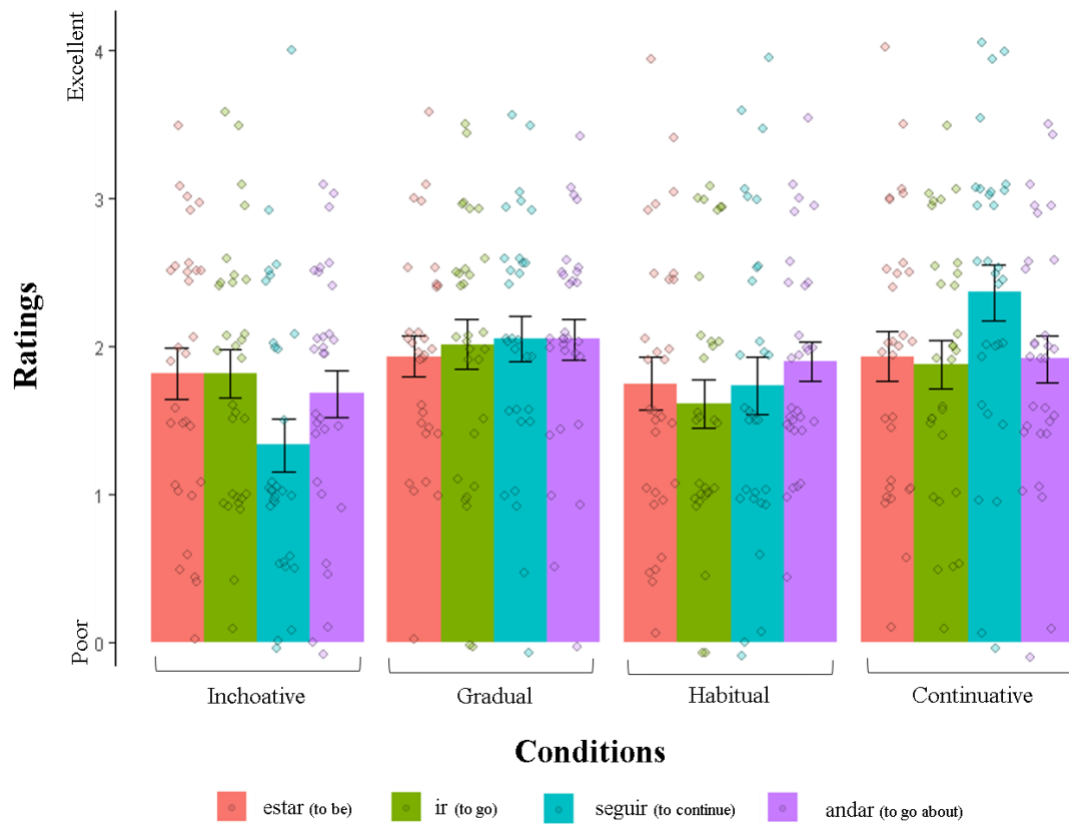


Figure 2.10 Response scale interpretation: 0-1-2-3-4 (0 = given auxiliary very poorly encodes the aspectual meaning; 4 = given auxiliary perfectly encodes the aspectual meaning). Each colored dot¹⁸ reflects the averaged rating from each subject in that condition (RM=2/subject). Bar height reflects the mean. Standard error bars are provided in black.

¹⁸ Notice that some of the black dots fall below the 0 line. This is because for visualization purposes, a jitter has been applied, allowing overlapping datapoints to be shown. See this feature in the R code below:

```
ggplot(data, aes(y=Rating_Avg, x=Aspect, fill=Auxiliary)) +
  geom_bar(position='dodge', stat='summary', fun.y='mean') +
  geom_errorbar(position=position_dodge(width=0.9), width=.4, col='black', stat='summary', fun.data=mean_se) +
  geom_point(aes(fill=Auxiliary), colour="black", pch=21, size=2, stroke =0.1,
  position=position_jitterdodge(jitter.height=0.1,jitter.width=0.4, dodge.width=0.8), alpha=0.3) + theme_classic()
```

Table 2.5 Averages and SD for paraphrase judgment task responses

	Inchoative				Gradual				Habitual				Continuative			
	<i>est</i>	<i>ir</i>	<i>seg</i>	<i>and</i>	<i>est</i>	<i>ir</i>	<i>seg</i>	<i>and</i>	<i>est</i>	<i>ir</i>	<i>seg</i>	<i>and</i>	<i>est</i>	<i>ir</i>	<i>seg</i>	<i>and</i>
\bar{x}	1.8	1.8	1.3	1.7	1.9	2	2.1	2.1	1.8	1.6	1.7	1.9	1.9	1.9	2.4	1.9
SD	1	1	1.1	1	0.8	1	1	0.9	1.2	1.1	1.2	0.9	1.1	1	1.1	1

Table 2.5 *est* = estar, *seg* = seguir, *and* = andar. Values were rounded to the first decimal point.

With the exception of auxiliary *seguir*, Sp. ‘to continue,’ which performed noticeably better than all other auxiliaries in conveying continuative aspect and also significantly worse than all others in conveying inchoative aspect, results of the paraphrase judgment task reveal substantial variation for the auxiliary verbs tested. Almost all auxiliaries demonstrated a smattering of ratings for each verbal aspect, with averages (i.e. most residing around 2, as shown in Figure 2.11 and Table 2.5), indicating equally varied and moderate capacity for conveying inchoative, gradual, habitual and continuative aspect. What does this mean regarding the semantic distribution of auxiliary *ir* in present-day EAS?

Regarding the claim that it is specialized to encode for gradual and inchoative aspect in many varieties of Spanish (Torres Cacoullós, 2000), these results do not provide any straightforward support. However, this should not be interpreted as evidence to the contrary either. That is, these data also do not provide clear support for Toscano Mateus (1953)’s that EAS uses auxiliary *ir* in a way that differs significantly from other varieties of Spanish. Considering the nature of the paraphrase task, I argue these data may speak to a larger point about grammaticalization and verbal aspect. To unpack this, let us recall the motivation for implementing the paraphrase task in the first place.

A corpus analysis that examines the possible meanings of an auxiliary verb, as in Study 1 of this paper, entails that in many cases that verbal aspect can only be tentatively inferred. This is largely due in part to the subtle distinctions in verbal aspect that are often not overtly supported by clear adverbial expressions (e.g. ‘bit by bit’ for gradual aspect, ‘continually’ for continuative aspect, ‘usually’ for habitual aspect). Devoid of such explicit adverbials, tokens like *Fuimos aprendiendo*, Sp. ‘We went learning’ could plausibly be intended by the speaker to convey any number of verbal aspects. Recognizing this challenge inherent to the observational nature of a corpus analysis, a paraphrase task experiment was employed, which carefully controlled for aspectual distinctions through the overt use of clear adverbial expressions. In the paraphrase task, the subjects were asked to read a sentence such as and determine how closely the same meaning is captured in a second sentence. Consider examples 8 and 9, below.

(8a) The prices **begin to** rise. (Translated example of inchoative aspect)

(8b) The prices **go** rising. (Translated example of auxiliary *ir*)

(9a) The prices **begin to** rise.

(9b) The prices **continue** rising. (Translated example of auxiliary *seguir*)

Note that in item (8), while (8b) on its own may not adequately convey the clear degree of inchoative aspect displayed in (8a), it is not incompatible with a reading of inchoative aspect. However, in item 9, (9b) *is* incompatible with the clear degree of inchoative aspect displayed in (9a). This explains why auxiliary *seguir* demonstrated clearer, less varied, ratings on its ability to encode continuative and inchoative aspect ratings. It also might explain why items like (8) displayed such a great deal of variation in

ratings across subjects. While EAS subjects may have actually shared similar intuitions about the types of VP aspect in which auxiliaries like *ir* can reasonably occur, they may differ in their intuitions about how clearly those auxiliaries can convey said aspectual distinction on their own, devoid of explicit markers (e.g. ‘begin to’ ‘starting now’). This could be viewed as a critique of the nature of the paraphrase task and/or a real difference in the intuitions of native speakers regarding the specialized grammaticalization of these auxiliaries. Unfortunately, the data from this study do not allow for these possibilities to be disentangled. However, subsequent studies may be able to do so. For instance, a metalinguistic task that asks subjects to talk through their logic in rating these paraphrase task items would likely shed light on the true underlying intuitions of native speakers regarding auxiliary meaning and tease apart the cause of the variation (i.e. true differences in intuitions vs. mere differences in interpretation of the paraphrase task instructions itself).

While the results of the paraphrase judgment task did not provide clear support for or against previous claims regarding the semantic distribution of auxiliary *ir* in present-day EAS, they do shed light on one methodological challenge one important theoretical issue, both of which affect the existing literature into verbal aspect. Regarding the methodological challenge, most of the claims about auxiliary grammaticalization and specialized aspectual meanings have historically been made based on observational corpus analyses. Since these often require inferences about meaning in the absence of clear context and overt adverbials, I offer the possibility that many auxiliaries — *ir* included — are more semantically bleached than previously thought. As evidenced by the great deal of variation in the ratings of this paraphrase task, I also offer the possibility

that many auxiliaries — *ir* included — have less unanimous semantic interpretations than previously thought. Future research should consider (A) a metalinguistic version of the paraphrase task to better understand the grammaticalization and possible meanings of auxiliary *ir* in EAS, and (B) survey methodology research into the reliability of paraphrase tasks as a tool by which to determine meaning interpretation in order to evaluate the effectiveness of the task.

5. CONCLUSION

The primary motivation for the present paper derives from two impressionistic observations reported in a seminal grammar of Ecuadorian Spanish (Toscano Mateus, 1953), which hypothesized that contact from Quichua had instantiated change in the usage patterns of auxiliary *ir*, Sp. ‘ir’ in Ecuadorian Andean Spanish. This paper presents two studies, which together, tested those hypotheses by (1) experimentally identifying the possible meanings presently associated with auxiliary *ir* in EAS, (2) comparing the frequency of auxiliary *ir* occurrences in a new corpus on present-day EAS relative to that of other varieties of Spanish, and (3) comparing the usage patterns of auxiliary *ir* across EAS speakers with a range of Quichua language contact.

Regarding the question of aspectual meanings associated with *ir*, results from the corpus analysis in Study 1 found that while auxiliary *ir* in EAS *does* display a clear preference for conveying specialized imperfective aspects (over general imperfective aspect) as reported in Torres Cacoullos (2000), results were largely inconclusive in demonstrating any clear patterns between the kinds of specialized imperfective aspects that *ir* can be used to encode. Results from a follow-up paraphrase judgment task in which EAS speakers rated auxiliary *ir*

on its capacity for encoding a variety of aspectual meanings (Study 2), were also largely inconclusive, unable to reveal any clear patterns in auxiliary *ir* meaning. Previous research based on corpus analyses of other Spanish varieties (Torres Cacoullos, 2000) have reported clear findings in this regard (i.e. *ir* has grammaticalized to encode mostly inchoative and gradual aspect). What, then, may explain the inconclusive results from Study 2 of this paper? I argue the difference in methodologies may be at the core. While corpus analyses are inherently more reliant on subjective interpretation and inferences about verbal aspect, a careful experiment (as in the paraphrase judgment task) allows for more objectivity and explicitly control for the subtle distinctions of verbal aspect. In this way, I interpret the highly varied data from the paraphrase task as a possible indicator that Spanish auxiliaries — *ir* included — may be either more semantically bleached than previously thought or that their aspectual meanings are less uniform across speakers than prior literature may have led us to believe.

Regarding the question of EAS speakers' purported retention of auxiliary *ir* in everyday speech, it was found that EAS *does* display a more frequent use of auxiliary *ir*, when compared to other varieties not in contact with Quichua (i.e. peninsular Sp., Mexican Sp., New Mesian Sp.). While this aligns with the claim that Quichua contact effects may have influenced auxiliary *ir* use in EAS, it cannot be interpreted as clear or direct evidence in support of it. To be sure, a whole host of factors beyond Quichua contact effects may contribute to the difference in auxiliary use among varieties of Spanish.

To address this, a mixed-effects logistic regression was applied to the 2016-17 EAS to compare the use of auxiliary *ir* between speakers of the same variety who varied in their degree of contact with Quichua. It was found that EAS speakers who knew Quichua, relative

to those who did not, were associated with a less frequent use of auxiliary *ir*. These results do not provide support for the hypothesized contact effects from Quichua. However, I suggest that they might be at least partially explored within the framework of social identity construction theory. Given the linguistic stigmatization of Quichua speakers that still exists in Ecuador today and the anecdotal evidence that *ir* may evoke connotations of folksiness in the region, it is possible that members of the Quichua community would display a preference for more standard-sounding features (i.e. *estar*) over more colloquial-sounding alternatives (i.e. *ir*) in order to socially construct their desired identity of linguistic prestige.

In sum, this paper addresses linguistic variation in Spanish by analyzing the relative frequency and aspectual properties of the *ir* + GER constructions in a corpus of speech collected from Ecuadorian Andean Spanish speakers. In conclusion, the main contributions of this paper include compiling the largest known corpus of EAS and furthering our understanding of how auxiliary *ir* behaves, both in terms of function and frequency, across Ecuadorian Andean Spanish speakers with different sociolinguistic profiles.

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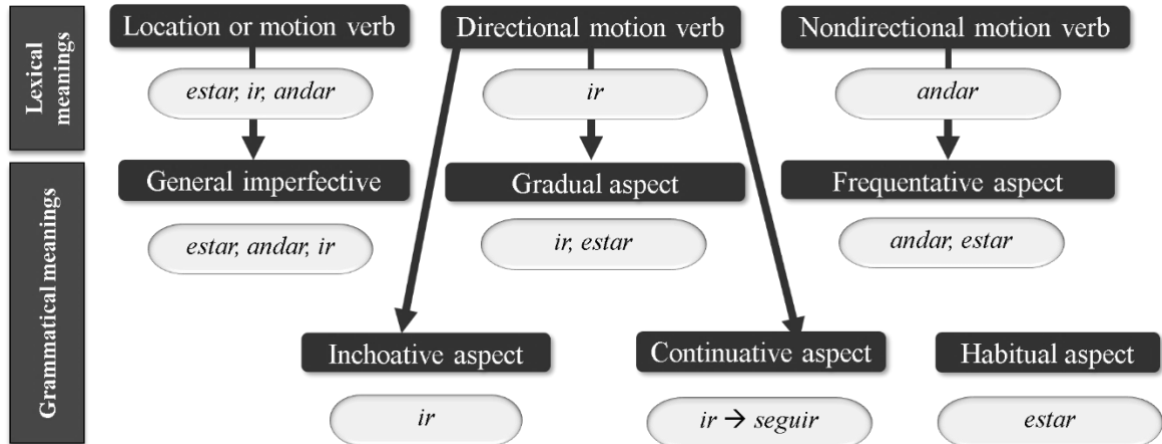
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7. SUPPLEMENTARY MATERIALS

7.1 Diachronic development in Spanish auxiliary grammaticalization

Notes: I created this schematic visualization based on the findings of Torres Cacoullos (2000).

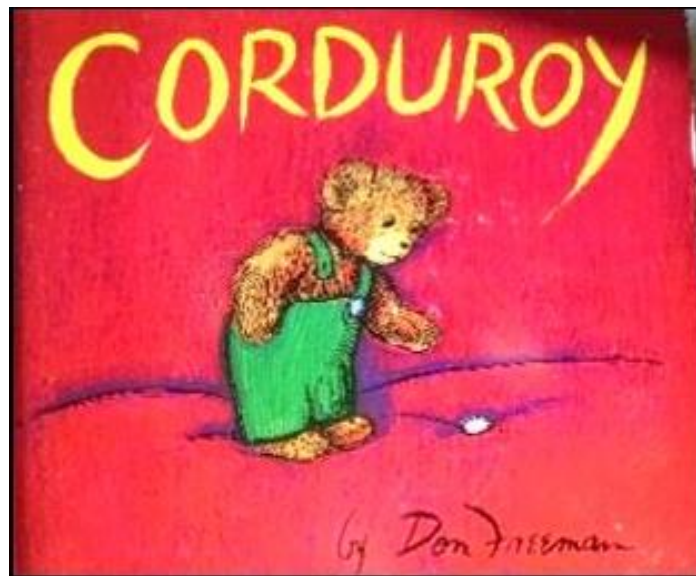


7.2 Subject background and metadata from Study 1 (corpus analysis)

Notes: In the Language background column, the abbreviated items reflect the following. *Span-dom* = Spanish-dominant bilingual, *Qui-dom* = Quichua-dominant bilingual, *Balanced* = equal proficiency in both Spanish and Quichua, *Span-only* = Spanish speaker who does not know Quichua. Age is reported in years.

Sub ID	Age	Gender	Language profile	Sub ID	Age	Gender	Language profile
01	26	F	Span-dom	31	56	F	Span-dom
02	30	M	Span-dom	32	62	M	Span-dom
03	38	F	Balanced	33	59	M	Balanced
04	42	M	Balanced	34	61	F	Span-only
05	46	F	Qui-dom	35	40	F	Span-only
06	46	M	Balanced	36	64	M	Span-only
07	49	M	Qui-dom	37	38	F	Span-only
08	48	F	Balanced	38	45	M	Span-only
09	42	M	Balanced	39	28	F	Span-only
10	50	M	Span-dom	40	26	M	Span-only
11	19	M	Span-dom	41	20	F	Span-only
12	62	F	Qui-dom	42	26	F	Span-only
13	57	M	Balanced	43	26	M	Span-only
14	25	F	Balanced	44	26	M	Span-only
15	30	M	Span-dom	45	28	M	Span-only
16	45	F	Qui-dom	46	62	F	Span-only
17	47	M	Balanced	47	23	F	Span-only
18	28	F	Span-dom	48	26	F	Span-only
19	22	F	Span-dom	49	27	M	Span-only
20	54	M	Span-only	50	20	F	Span-only
21	22	F	Span-dom	51	28	F	Span-only
22	26	F	Span-only	52	43	M	Balanced
23	23	M	Span-only	53	50	F	Balanced
24	34	F	Span-dom	54	41	M	Span-only
25	44	M	Balanced	55	22	M	Span-dom
26	38	F	Balanced	56	23	M	Span-dom
27	42	M	Qui-dom	57	47	M	Balanced
28	28	M	Balanced	58	68	F	Qui-dom
29	54	F	Span-dom	59	70	M	Qui-dom
30	26	F	Balanced				

7.3 Picture books used for story narration task in Study 1 (corpus analysis)



7.4 Raw data frame used in logistic regression model in Study 1 (corpus analysis)

Notes: *ID* = unique subject ID number, *Asp* = VP aspect, *Ger* = Gerund class, *Aux* = auxiliary choice, *Sp-dom* = Spanish-dominant bilingual, *Qu-dom* = Quichua-dominant bilingual, *Bal* = equal proficiency in both Spanish and Quichua, *Sp-only* = Spanish speaker who does not know Quichua, *gen* = general imperfective aspect, *spec* = a specific type of imperfective aspect (i.e. inchoative, prospective, habitual, gradual, continuative), *M* = motion event gerund (e.g. *caminando*, Sp. ‘walking’), *NM* = non-motion event gerund (e.g. *comiendo*, Sp. ‘eating’), *S* = stative gerund (e.g. *pensando*, Sp. ‘thinking’). In the Aux column, *0* = *estar*, *1* = *ir*. There are 1012 AUX + GER tokens included in this dataset.

I	Profil	As	Ge	Au										
D	e	p	r	x										
1	Sp-dom	spe	N	0	1	Sp-dom	gen	N	0	2	Sp-dom	gen	M	0
1	Sp-dom	c	M	0	1	Sp-dom	gen	M	0	2	Sp-dom	gen	S	0
1	Sp-dom	spe	N	0	1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0
1	Sp-dom	c	M	0	1	Sp-dom	gen	N	0	2	Sp-dom	gen	N	0
1	Sp-dom	spe	N	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	c	M	0	1	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	spe	N	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	c	M	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	S	0
1	Sp-dom	gen	M	0	1	Sp-dom	gen	N	0	18	Sp-dom	gen	N	0
1	Sp-dom	gen	N	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	M	0	1	Sp-dom	gen	N	0	18	Sp-dom	gen	N	0
1	Sp-dom	gen	N	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	M	0	1	Sp-dom	gen	N	0	18	Sp-dom	gen	S	0
1	Sp-dom	gen	N	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	M	0	1	Sp-dom	gen	S	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	M	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	M	0	1	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	N	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	M	0	1	Sp-dom	gen	N	0	18	Sp-dom	gen	S	0
1	Sp-dom	gen	N	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	N	0
1	Sp-dom	gen	M	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	N	0	1	Sp-dom	gen	N	0	18	Sp-dom	gen	S	0
1	Sp-dom	gen	M	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	S	0
1	Sp-dom	spe	M	0	1	Sp-dom	gen	N	0	18	Sp-dom	gen	N	0
1	Sp-dom	c	M	0	1	Sp-dom	spe	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	M	0	1	Sp-dom	c	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	M	0	1	Sp-dom	gen	N	0	18	Sp-dom	gen	S	0
1	Sp-dom	gen	M	0	1	Sp-dom	gen	N	0	18	Sp-dom	gen	S	0
1	Sp-dom	gen	S	0	1	Sp-dom	gen	M	0	18	Sp-dom	gen	S	0
1	Sp-dom	gen	M	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	M	0	2	Sp-dom	spe	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	c	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	spe	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	M	0	2	Sp-dom	c	M	0	18	Sp-dom	gen	S	0
1	Sp-dom	gen	M	0	2	Sp-dom	spe	N	0	18	Sp-dom	gen	S	0
1	Sp-dom	gen	M	0	2	Sp-dom	c	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
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1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
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1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
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1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
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1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
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1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
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1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
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1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	M	0	18	Sp-dom	gen	M	0
1	Sp-dom	gen	S	0	2	Sp-dom	gen	N	0	18	Sp-dom	gen	M	0
1	Sp-dom													

18	Sp-dom	gen	M	0	5	Qu-dom	gen	S	0	5	Qu-dom	spe c	S	0
18	Sp-dom	gen	M	0	5	Qu-dom	gen	M	0	5	Qu-dom	gen	M	0
18	Sp-dom	gen	M	0	5	Qu-dom	gen	M	0	5	Qu-dom	spe c	N	0
18	Sp-dom	gen	N	0	5	Qu-dom	spe c	N	0	5	Qu-dom	gen	N	0
3	Balan c	gen	M	0	5	Qu-dom	spe c	N	0	5	Qu-dom	gen	S	0
3	Balan c	gen	S	0	5	Qu-dom	gen	N	0	5	Qu-dom	gen	N	0
3	Balan c	gen	N	0	5	Qu-dom	gen	S	0	5	Qu-dom	spe c	M	0
3	Balan c	spe c	M	0	5	Qu-dom	gen	S	0	5	Qu-dom	gen	S	0
3	Balan c	gen	N	0	5	Qu-dom	gen	S	0	5	Qu-dom	spe c	N	0
4	Balan c	spe c	S	0	5	Qu-dom	gen	N	0	5	Qu-dom	spe c	N	0
4	Balan c	spe c	S	0	5	Qu-dom	gen	N	0	5	Qu-dom	gen	N	0
4	Balan c	spe c	S	0	5	Qu-dom	gen	N	0	5	Qu-dom	gen	M	0
4	Balan c	spe c	S	0	5	Qu-dom	gen	N	0	5	Qu-dom	spe c	N	0
4	Balan c	gen	S	0	5	Qu-dom	gen	N	0	5	Qu-dom	gen	S	0
4	Balan c	gen	S	0	5	Qu-dom	spe c	N	0	5	Qu-dom	gen	N	0
4	Balan c	gen	M	0	5	Qu-dom	gen	M	0	5	Qu-dom	gen	N	0
4	Balan c	gen	M	0	5	Qu-dom	gen	M	0	5	Qu-dom	spe c	N	0
4	Balan c	gen	M	0	5	Qu-dom	spe c	M	0	6	Balan c	gen	M	0
4	Balan c	gen	M	0	5	Qu-dom	spe c	M	0	6	Balan c	gen	N	0
4	Balan c	spe c	N	0	5	Qu-dom	gen	N	0	6	Balan c	gen	M	0
4	Balan c	gen	M	0	5	Qu-dom	gen	N	0	6	Balan c	gen	N	0
4	Balan c	gen	N	0	5	Qu-dom	gen	S	0	6	Balan c	gen	S	0
4	Balan c	gen	N	0	5	Qu-dom	gen	M	0	6	Balan c	gen	N	0
5	Qu-dom	spe c	N	0	5	Qu-dom	gen	S	0	7	Qu-dom	gen	S	0
5	Qu-dom	spe c	N	0	5	Qu-dom	gen	N	0	7	Qu-dom	gen	M	0
5	Qu-dom	gen	N	0	5	Qu-dom	gen	N	0	7	Qu-dom	gen	M	0
5	Qu-dom	spe c	M	0	5	Qu-dom	gen	N	0	7	Qu-dom	gen	N	0
5	Qu-dom	spe c	N	0	5	Qu-dom	gen	M	0	7	Qu-dom	gen	M	0
5	Qu-dom	spe c	N	0	5	Qu-dom	gen	N	0	7	Qu-dom	gen	M	0
5	Qu-dom	gen	M	0	5	Qu-dom	gen	M	0	7	Qu-dom	gen	M	0
5	Qu-dom	gen	M	0	5	Qu-dom	spe c	M	0	7	Qu-dom	gen	M	0
5	Qu-dom	gen	N	0	5	Qu-dom	spe c	M	0	7	Qu-dom	spe c	M	0
5	Qu-dom	spe c	M	0	5	Qu-dom	gen	S	0	7	Qu-dom	gen	N	0
5	Qu-dom	gen	S	0	5	Qu-dom	spe c	S	0	7	Qu-dom	gen	S	0

7	Qu-dom	gen	N	0	8	Balan	gen	N	0	8	Balan	gen	M	0
7	Qu-dom	gen	S	0	10	Sp-dom	gen	N	0	8	Balan	gen	M	0
7	Qu-dom	gen	N	0	8	Balan	spe	S	0	8	Balan	spe	N	0
7	Qu-dom	gen	N	0	8	Balan	spe	S	0	8	Balan	spe	N	0
7	Qu-dom	gen	M	0	10	Sp-dom	spe	N	0	8	Balan	gen	N	0
7	Qu-dom	gen	N	0	10	Sp-dom	spe	N	0	8	Balan	gen	N	0
7	Qu-dom	gen	N	0	10	Sp-dom	gen	N	0	10	Sp-dom	gen	N	0
7	Qu-dom	gen	M	0	10	Sp-dom	gen	N	0	10	Sp-dom	gen	M	0
7	Qu-dom	gen	M	0	10	Sp-dom	gen	N	0	10	Sp-dom	spe	N	0
7	Qu-dom	gen	M	0	10	Sp-dom	gen	N	0	10	Sp-dom	gen	N	0
7	Qu-dom	gen	M	0	10	Sp-dom	gen	N	0	10	Sp-dom	gen	N	0
7	Qu-dom	gen	N	0	8	Balan	gen	M	0	10	Sp-dom	gen	N	0
7	Qu-dom	gen	N	0	8	Balan	gen	N	0	10	Sp-dom	gen	N	0
7	Qu-dom	gen	S	0	8	Balan	gen	N	0	10	Sp-dom	gen	M	0
7	Qu-dom	gen	S	0	8	Balan	gen	N	0	10	Sp-dom	gen	N	0
7	Qu-dom	spe	M	0	8	Balan	gen	N	0	10	Sp-dom	gen	N	0
7	Qu-dom	spe	M	0	8	Balan	gen	N	0	10	Sp-dom	gen	N	0
7	Qu-dom	spe	N	0	8	Balan	gen	N	0	10	Sp-dom	gen	N	0
7	Qu-dom	gen	N	0	8	Balan	gen	N	0	10	Sp-dom	gen	M	0
7	Qu-dom	gen	N	0	8	Balan	spe	M	0	10	Sp-dom	gen	M	0
7	Qu-dom	gen	N	0	8	Balan	gen	M	0	10	Sp-dom	gen	N	0
7	Qu-dom	gen	N	0	8	Balan	spe	M	0	10	Sp-dom	gen	N	0
8	Balan	spe	N	0	8	Balan	gen	M	0	10	Sp-dom	spe	S	0
10	Sp-dom	spe	N	0	8	Balan	gen	N	0	15	Sp-dom	spe	N	0
10	Sp-dom	spe	M	0	8	Balan	gen	N	0	15	Sp-dom	spe	N	0
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8	Balan	spe	N	0	8	Balan	gen	N	0	15	Sp-dom	spe	N	0
8	Balan	spe	N	0	8	Balan	gen	M	0	8	Balan	spe	N	0
10	Sp-dom	spe	N	0	8	Balan	gen	N	0	15	Sp-dom	gen	N	0
8	Balan	gen	N	0	8	Balan	gen	M	0	15	Sp-dom	gen	N	0
8	Balan	gen	N	0	8	Balan	spe	M	0	15	Sp-dom	gen	N	0
8	Balan	gen	N	0	8	Balan	spe	M	0	15	Sp-dom	gen	N	0

15	Sp-dom	gen	M	0	12	Qu-dom	gen	N	0	13	Balan	gen	N	0
15	Sp-dom	gen	N	0	12	Qu-dom	gen	N	0	13	Balan	gen	N	0
15	Sp-dom	gen	N	0	12	Qu-dom	gen	N	0	13	Balan	gen	N	0
9	Balan	spe	N	0	12	Qu-dom	gen	N	0	13	Balan	gen	N	0
9	Balan	spe	N	0	12	Qu-dom	gen	N	0	13	Balan	gen	N	0
9	Balan	gen	N	0	12	Qu-dom	gen	N	0	13	Balan	gen	N	0
9	Balan	spe	N	0	12	Qu-dom	gen	M	0	13	Balan	gen	M	0
9	Balan	gen	N	0	12	Qu-dom	gen	M	0	14	Balan	gen	N	0
9	Balan	spe	N	0	12	Qu-dom	gen	M	0	14	Balan	gen	N	0
9	Balan	spe	N	0	12	Qu-dom	gen	N	0	14	Balan	gen	M	0
9	Balan	gen	N	0	12	Qu-dom	gen	S	0	14	Balan	spe	N	0
9	Balan	gen	N	0	12	Qu-dom	gen	S	0	7	Qu-dom	gen	N	0
9	Balan	gen	M	0	12	Qu-dom	gen	M	0	16	Qu-dom	gen	M	0
9	Balan	gen	N	0	12	Qu-dom	gen	M	0	16	Qu-dom	gen	M	0
9	Balan	gen	N	0	12	Qu-dom	gen	N	0	16	Qu-dom	gen	M	0
11	Sp-dom	gen	M	0	12	Qu-dom	gen	N	0	16	Qu-dom	gen	N	0
11	Sp-dom	gen	N	0	12	Qu-dom	gen	S	0	16	Qu-dom	gen	M	0
11	Sp-dom	gen	M	0	12	Qu-dom	gen	N	0	16	Qu-dom	gen	N	0
11	Sp-dom	spe	M	0	12	Qu-dom	gen	M	0	16	Qu-dom	gen	N	0
11	Sp-dom	gen	N	0	12	Qu-dom	gen	N	0	16	Qu-dom	gen	N	0
11	Sp-dom	gen	M	0	12	Qu-dom	gen	N	0	16	Qu-dom	gen	M	0
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12	Qu-dom	gen	M	0	12	Qu-dom	gen	N	0	16	Qu-dom	gen	N	0
12	Qu-dom	gen	M	0	12	Qu-dom	gen	N	0	16	Qu-dom	gen	N	0
12	Qu-dom	gen	M	0	12	Qu-dom	gen	N	0	16	Qu-dom	gen	N	0
12	Qu-dom	gen	N	0	12	Qu-dom	gen	N	0	16	Qu-dom	spe	N	0
12	Qu-dom	spe	N	0	13	Balan	gen	N	0	16	Qu-dom	gen	N	0
12	Qu-dom	spe	M	0	13	Balan	spe	M	0	17	Balan	spe	N	0
12	Qu-dom	gen	S	0	13	Balan	gen	N	0	17	Balan	spe	N	0
12	Qu-dom	spe	S	0	13	Balan	spe	N	0	17	Balan	spe	N	0
12	Qu-dom	gen	S	0	13	Balan	spe	N	0	17	Balan	spe	N	0
12	Qu-dom	gen	M	0	13	Balan	spe	N	0	17	Balan	gen	N	0
12	Qu-dom	gen	M	0	13	Balan	spe	N	0	17	Balan	gen	N	0
12	Qu-dom	gen	N	0	13	Balan	gen	N	0	17	Balan	spe	N	0
			M					M					M	

17	Balan	gen	N	0	23	Sp-	gen	M	0	25	Balan	spe	N	0
	c		M			only					c	c	M	
17	Balan	gen	N	0	23	Sp-	gen	N	0	25	Balan	spe	N	0
	c		M			only		M			c	c	M	
17	Balan	gen	N	0	23	Sp-	gen	N	0	25	Balan	spe	N	0
	c		M			only		M			c	c	M	
17	Balan	gen	N	0	24	Sp-	spe	N	0	25	Balan	spe	S	0
	c		M			dom	c	M			c	c		
17	Balan	gen	N	0	24	Sp-	spe	N	0	25	Balan	spe	S	0
	c		M			dom	c	M			c	c		
17	Balan	gen	N	0	24	Sp-	spe	S	0	25	Balan	spe	N	0
	c		M			dom	c				c	c	M	
17	Balan	gen	S	0	24	Sp-	gen	N	0	25	Balan	spe	N	0
	c					dom		M			c	c	N	
17	Balan	gen	M	0	24	Sp-	gen	N	0	25	Balan	gen	N	0
	c					dom		M			c		M	
17	Balan	gen	M	0	24	Sp-	gen	M	0	25	Balan	spe	N	0
	c					dom					c	c	M	
19	Sp-	spe	S	0	24	Sp-	gen	N	0	25	Balan	gen	N	0
	dom	c				dom		M			c		M	
19	Sp-	gen	N	0	24	Sp-	gen	N	0	25	Balan	gen	S	0
	dom		M			dom		M			c			
19	Sp-	gen	N	0	24	Sp-	gen	N	0	25	Balan	gen	N	0
	dom		M			dom		M			c		M	
19	Sp-	spe	N	0	24	Sp-	gen	M	0	25	Balan	gen	N	0
	dom	c	M			dom					c		M	
20	Sp-	gen	M	0	24	Sp-	gen	N	0	25	Balan	gen	N	0
	only					dom		M			c		M	
20	Sp-	gen	N	0	24	Sp-	gen	S	0	25	Balan	gen	N	0
	only		M			dom					c		M	
21	Sp-	gen	N	0	24	Sp-	gen	M	0	25	Balan	gen	N	0
	dom		M			dom					c		M	
21	Sp-	spe	N	0	24	Sp-	spe	S	0	25	Balan	gen	N	0
	dom	c	M			dom	c				c		M	
21	Sp-	gen	M	0	24	Sp-	spe	M	0	25	Balan	gen	N	0
	dom					dom	c				c		M	
22	Sp-	gen	N	0	24	Sp-	gen	M	0	25	Balan	gen	N	0
	only		M			dom					c		M	
22	Sp-	spe	N	0	24	Sp-	gen	M	0	25	Balan	gen	M	0
	only	c	M			dom					c			
22	Sp-	gen	N	0	24	Sp-	gen	M	0	25	Balan	gen	M	0
	only		M			dom					c			
22	Sp-	gen	N	0	25	Balan	spe	N	0	25	Balan	gen	N	0
	only		M			c	c	M			c		M	
22	Sp-	gen	M	0	25	Balan	spe	N	0	26	Balan	gen	M	0
	only					c	c	M			c			
23	Sp-	spe	N	0	25	Balan	spe	N	0	26	Balan	spe	N	0
	only	c	M			c	c	M			c	c	M	
23	Sp-	spe	N	0	25	Balan	spe	N	0	26	Balan	gen	N	0
	only	c	M			c	c	M			c		M	
23	Sp-	spe	N	0	25	Balan	spe	M	0	26	Balan	spe	N	0
	only	c	M			c	c				c	c	M	
23	Sp-	spe	N	0	25	Balan	gen	N	0	26	Balan	gen	N	0
	only	c	M			c		M			c		M	
23	Sp-	gen	N	0	25	Balan	gen	M	0	26	Balan	gen	N	0
	only		M			c					c		M	
23	Sp-	gen	M	0	25	Balan	spe	N	0	26	Balan	gen	N	0
	only					c	c	M			c		M	
23	Sp-	gen	N	0	25	Balan	spe	N	0	26	Balan	gen	N	0
	only		M			c	c	M			c		M	
23	Sp-	gen	M	0	25	Balan	spe	N	0	26	Balan	spe	N	0
	only					c	c	M			c	c	M	
23	Sp-	gen	M	0	25	Balan	spe	N	0	26	Balan	spe	N	0
	only					c	c	M			c	c	M	
23	Sp-	gen	M	0	25	Balan	spe	N	0	26	Balan	spe	N	0
	only					c	c	M			c	c	M	

26	Balan	spe	N	0	29	Sp-	gen	N	0	33	Balan	gen	N	0
	c	c	M			dom		M			c		M	
26	Balan	spe	N	0	29	Sp-	gen	N	0	33	Balan	gen	S	0
	c	c	M			dom		M			c		S	
26	Balan	gen	M	0	30	Balan	spe	M	0	33	Balan	gen	N	0
	c					c	c				c		M	
26	Balan	gen	M	0	30	Balan	gen	N	0	33	Balan	gen	N	0
	c					c		M			c		M	
26	Balan	gen	N	0	30	Balan	spe	N	0	33	Balan	gen	N	0
	c		M			c	c	M			c		M	
26	Balan	gen	N	0	30	Balan	gen	M	0	34	Sp-	gen	S	0
	c		M			c					only		S	
26	Balan	gen	N	0	30	Balan	gen	N	0	34	Sp-	gen	N	0
	c		M			c		M			only		N	
26	Balan	gen	N	0	30	Balan	spe	N	0	34	Sp-	gen	N	0
	c		M			c	c	M			only		M	
26	Balan	gen	M	0	30	Balan	gen	N	0	34	Sp-	gen	N	0
	c					c		M			only		M	
26	Balan	gen	M	0	30	Balan	spe	N	0	34	Sp-	gen	M	0
	c					c	c	M			only		M	
27	Qu-	gen	N	0	30	Balan	gen	N	0	34	Sp-	gen	M	0
	dom		M			c		M			only		M	
27	Qu-	spe	N	0	30	Balan	gen	M	0	34	Sp-	gen	N	0
	dom	c	M			c					only		M	
27	Qu-	spe	S	0	30	Balan	gen	M	0	34	Sp-	gen	N	0
	dom	c	S			c					only		M	
27	Qu-	spe	S	0	32	Sp-	spe	N	0	34	Sp-	gen	M	0
	dom	c	S			dom	c	M			only		M	
27	Qu-	gen	N	0	31	Sp-	gen	N	0	34	Sp-	gen	N	0
	dom		M			dom		M			only		M	
27	Qu-	gen	S	0	32	Sp-	spe	N	0	35	Sp-	spe	N	0
	dom		S			dom	c	M			only	c	M	
27	Qu-	gen	M	0	33	Balan	gen	M	0	35	Sp-	spe	M	0
	dom					c					only	c	M	
28	Balan	gen	N	0	33	Balan	gen	N	0	35	Sp-	spe	N	0
	c		M			c		M			only	c	M	
28	Balan	gen	N	0	33	Balan	spe	N	0	35	Sp-	spe	N	0
	c		M			c	c	M			only	c	M	
28	Balan	spe	N	0	33	Balan	gen	N	0	35	Sp-	gen	N	0
	c	c	M			c		M			only		M	
28	Balan	spe	N	0	33	Balan	gen	N	0	35	Sp-	gen	M	0
	c	c	M			c		M			only		M	
28	Balan	spe	N	0	33	Balan	gen	N	0	36	Sp-	spe	S	0
	c	c	M			c		M			only	c	S	
28	Balan	spe	N	0	33	Balan	spe	N	0	36	Sp-	gen	N	0
	c	c	M			c	c	M			only		M	
28	Balan	spe	N	0	33	Balan	spe	N	0	36	Sp-	gen	N	0
	c	c	M			c	c	M			only		M	
28	Balan	gen	N	0	33	Balan	gen	N	0	36	Sp-	gen	S	0
	c		M			c		M			only		S	
29	Sp-	spe	N	0	33	Balan	gen	N	0	36	Sp-	gen	N	0
	dom	c	M			c		M			only		M	
29	Sp-	spe	M	0	33	Balan	gen	N	0	36	Sp-	gen	N	0
	dom	c	M			c		M			only		M	
29	Sp-	gen	M	0	33	Balan	gen	N	0	36	Sp-	gen	S	0
	dom					c		M			only		S	
29	Sp-	gen	M	0	33	Balan	spe	N	0	36	Sp-	gen	M	0
	dom					c	c	M			only		M	
29	Sp-	spe	N	0	33	Balan	gen	N	0	36	Sp-	gen	N	0
	dom	c	M			c		M			only		M	
29	Sp-	spe	N	0	33	Balan	spe	N	0	37	Sp-	gen	N	0
	dom	c	M			c	c	M			only		M	
29	Sp-	gen	N	0	33	Balan	spe	N	0	38	Sp-	gen	N	0
	dom		M			c	c	M			only		M	
29	Sp-	spe	N	0	33	Balan	gen	N	0	37	Sp-	gen	N	0
	dom	c	M			c		M			only		M	
29	Sp-	gen	N	0	33	Balan	gen	N	0	37	Sp-	gen	M	0
	dom		M			c		M			only		M	

37	Sp-only	gen	N	0	44	Sp-only	gen	N	0	50	Sp-only	gen	M	0
38	Sp-only	gen	N	0	44	Sp-only	gen	N	0	51	Sp-only	spe	N	0
38	Sp-only	gen	N	0	44	Sp-only	gen	N	0	51	Sp-only	spe	N	0
37	Sp-only	spe	S	0	44	Sp-only	gen	N	0	51	Sp-only	spe	N	0
37	Sp-only	spe	N	0	44	Sp-only	gen	N	0	51	Sp-only	spe	N	0
37	Sp-only	gen	N	0	44	Sp-only	gen	N	0	52	Balan	gen	N	0
37	Sp-only	gen	M	0	44	Sp-only	gen	N	0	52	Balan	spe	M	0
38	Sp-only	spe	N	0	45	Sp-only	spe	N	0	52	Balan	spe	N	0
39	Sp-only	gen	M	0	45	Sp-only	spe	N	0	52	Balan	spe	N	0
39	Sp-only	gen	N	0	45	Sp-only	spe	N	0	52	Balan	spe	N	0
40	Sp-only	gen	N	0	45	Sp-only	spe	N	0	52	Balan	spe	N	0
40	Sp-only	gen	S	0	45	Sp-only	gen	M	0	52	Balan	spe	N	0
41	Sp-only	spe	M	0	46	Sp-only	spe	N	0	52	Balan	gen	N	0
41	Sp-only	spe	N	0	46	Sp-only	spe	N	0	52	Balan	gen	S	0
42	Sp-only	gen	N	0	46	Sp-only	gen	N	0	53	Balan	gen	N	0
42	Sp-only	spe	N	0	46	Sp-only	spe	N	0	53	Balan	spe	N	0
42	Sp-only	spe	S	0	46	Sp-only	gen	N	0	53	Balan	spe	M	0
42	Sp-only	spe	N	0	46	Sp-only	gen	N	0	53	Balan	spe	N	0
42	Sp-only	spe	N	0	46	Sp-only	gen	N	0	53	Balan	spe	N	0
42	Sp-only	spe	N	0	46	Sp-only	spe	N	0	53	Balan	spe	N	0
42	Sp-only	gen	S	0	46	Sp-only	gen	N	0	53	Balan	spe	N	0
42	Sp-only	gen	S	0	47	Sp-only	spe	N	0	53	Balan	spe	N	0
42	Sp-only	gen	N	0	47	Sp-only	spe	N	0	53	Balan	spe	N	0
42	Sp-only	gen	N	0	47	Sp-only	spe	N	0	53	Balan	spe	N	0
43	Sp-only	gen	N	0	47	Sp-only	spe	N	0	53	Balan	spe	N	0
43	Sp-only	gen	M	0	47	Sp-only	spe	N	0	53	Balan	spe	N	0
43	Sp-only	gen	N	0	47	Sp-only	spe	N	0	54	Sp-only	spe	N	0
43	Sp-only	gen	N	0	47	Sp-only	gen	M	0	54	Sp-only	gen	N	0
43	Sp-only	gen	N	0	48	Sp-only	gen	N	0	54	Sp-only	gen	N	0
43	Sp-only	gen	N	0	1	Sp-dom	gen	N	0	56	Sp-dom	spe	N	0
43	Sp-only	gen	N	0	48	Sp-only	spe	N	0	56	Sp-dom	spe	N	0
43	Sp-only	gen	N	0	48	Sp-only	gen	N	0	56	Sp-dom	spe	N	0
43	Sp-only	gen	S	0	49	Sp-only	gen	N	0	56	Sp-dom	spe	N	0
44	Sp-only	gen	S	0	49	Sp-only	gen	M	0	55	Sp-dom	gen	M	0

55	Sp-dom	gen	N	0	1	Sp-dom	spe	N	1	7	Qu-dom	spe	M	1
57	Balan	spe	N	0	18	Sp-dom	gen	M	1	10	Sp-dom	spe	N	1
57	Balan	spe	N	0	3	Balan	gen	M	1	10	Sp-dom	spe	N	1
57	Balan	gen	M	0	3	Balan	gen	M	1	10	Sp-dom	spe	N	1
57	Balan	gen	M	0	3	Balan	gen	M	1	8	Balan	gen	M	1
58	Qu-dom	spe	N	0	3	Balan	gen	M	1	8	Balan	gen	M	1
58	Qu-dom	gen	N	0	3	Balan	gen	M	1	8	Balan	gen	N	1
58	Qu-dom	spe	S	0	3	Balan	gen	M	1	10	Sp-dom	spe	M	1
58	Qu-dom	gen	N	0	3	Balan	gen	M	1	15	Sp-dom	spe	S	1
58	Qu-dom	spe	N	0	3	Balan	gen	M	1	15	Sp-dom	spe	N	1
58	Qu-dom	spe	N	0	3	Balan	gen	M	1	15	Sp-dom	spe	N	1
58	Qu-dom	gen	N	0	4	Balan	spe	M	1	15	Sp-dom	gen	M	1
58	Qu-dom	gen	N	0	4	Balan	gen	M	1	15	Sp-dom	gen	M	1
58	Qu-dom	gen	N	0	4	Balan	gen	M	1	15	Sp-dom	gen	M	1
58	Qu-dom	spe	N	0	5	Qu-dom	gen	M	1	15	Sp-dom	gen	S	1
58	Qu-dom	spe	N	0	5	Qu-dom	gen	M	1	15	Sp-dom	gen	S	1
59	Qu-dom	gen	N	0	5	Qu-dom	gen	M	1	15	Sp-dom	gen	M	1
59	Qu-dom	gen	N	0	5	Qu-dom	gen	M	1	9	Balan	spe	N	1
59	Qu-dom	gen	M	0	6	Balan	gen	M	1	9	Balan	spe	N	1
59	Qu-dom	gen	M	0	6	Balan	gen	N	1	9	Balan	spe	N	1
59	Qu-dom	gen	M	0	7	Qu-dom	gen	M	1	9	Balan	spe	N	1
59	Qu-dom	gen	M	0	7	Qu-dom	gen	M	1	9	Balan	spe	N	1
59	Qu-dom	gen	N	0	7	Qu-dom	gen	M	1	9	Balan	gen	M	1
59	Qu-dom	gen	N	0	7	Qu-dom	spe	M	1	9	Balan	gen	M	1
59	Qu-dom	gen	M	0	7	Qu-dom	spe	M	1	9	Balan	gen	M	1
59	Qu-dom	gen	M	0	7	Qu-dom	gen	M	1	9	Balan	gen	M	1
59	Qu-dom	gen	M	0	7	Qu-dom	spe	M	1	9	Balan	gen	M	1
59	Qu-dom	gen	N	0	7	Qu-dom	spe	M	1	11	Sp-dom	spe	N	1
59	Qu-dom	gen	N	0	7	Qu-dom	spe	M	1	11	Sp-dom	spe	N	1
59	Qu-dom	gen	M	0	7	Qu-dom	gen	S	1	11	Sp-dom	spe	M	1
59	Qu-dom	gen	N	0	7	Qu-dom	spe	M	1	12	Qu-dom	spe	M	1
59	Qu-dom	gen	M	0	7	Qu-dom	gen	S	1	13	Balan	spe	M	1
1	Sp-dom	gen	N	1	7	Qu-dom	gen	M	1	13	Balan	spe	M	1
1	Sp-dom	gen	S	1	7	Qu-dom	spe	S	1	13	Balan	gen	N	1

14	Balan	spe	M	1	24	Sp-	gen	M	1	28	Balan	gen	M	1
14	Balan	gen	M	1	24	Sp-	gen	M	1	28	Balan	gen	M	1
14	Balan	spe	M	1	24	Sp-	gen	M	1	28	Balan	spe	N	1
14	Balan	spe	M	1	24	Sp-	gen	M	1	28	Balan	gen	N	1
16	Qu-	spe	N	1	25	Balan	gen	N	1	28	Balan	gen	N	1
16	Qu-	spe	M	1	25	Balan	spe	N	1	28	Balan	gen	N	1
17	Balan	spe	N	1	25	Balan	gen	N	1	28	Balan	gen	N	1
17	Balan	spe	M	1	25	Balan	spe	N	1	29	Sp-	gen	M	1
17	Balan	gen	M	1	25	Balan	gen	N	1	29	Sp-	spe	M	1
17	Balan	gen	M	1	25	Balan	gen	N	1	29	Sp-	spe	M	1
19	Sp-	spe	N	1	25	Balan	spe	N	1	29	Sp-	spe	N	1
19	Sp-	spe	M	1	25	Balan	spe	N	1	29	Sp-	spe	N	1
19	Sp-	spe	N	1	25	Balan	gen	N	1	29	Sp-	gen	M	1
19	Sp-	gen	M	1	26	Balan	gen	N	1	29	Sp-	gen	N	1
19	Sp-	gen	M	1	26	Balan	gen	M	1	29	Sp-	gen	M	1
19	Sp-	spe	N	1	26	Balan	spe	M	1	29	Sp-	gen	N	1
19	Sp-	spe	N	1	26	Balan	spe	M	1	29	Sp-	gen	M	1
19	Sp-	spe	N	1	26	Balan	spe	N	1	29	Sp-	gen	N	1
19	Sp-	spe	M	1	26	Balan	gen	M	1	29	Sp-	gen	M	1
19	Sp-	spe	N	1	26	Balan	gen	M	1	29	Sp-	gen	N	1
19	Sp-	spe	M	1	26	Balan	spe	M	1	29	Sp-	gen	M	1
19	Sp-	gen	M	1	26	Balan	gen	M	1	29	Sp-	spe	N	1
19	Sp-	gen	M	1	26	Balan	gen	M	1	29	Sp-	spe	M	1
21	Sp-	gen	M	1	26	Balan	gen	M	1	29	Sp-	gen	M	1
22	Sp-	gen	M	1	26	Balan	gen	S	1	29	Sp-	gen	N	1
22	Sp-	gen	M	1	26	Balan	spe	M	1	29	Sp-	gen	N	1
22	Sp-	gen	N	1	26	Balan	gen	M	1	29	Sp-	gen	N	1
23	Sp-	spe	N	1	27	Qu-	gen	N	1	30	Balan	gen	N	1
23	Sp-	spe	N	1	27	Qu-	gen	N	1	30	Balan	gen	M	1
24	Sp-	spe	N	1	27	Qu-	gen	N	1	30	Balan	spe	M	1
24	Sp-	spe	N	1	27	Qu-	gen	N	1	30	Balan	spe	M	1
24	Sp-	gen	M	1	27	Qu-	gen	N	1	30	Balan	spe	M	1
24	Sp-	spe	N	1	28	Balan	spe	N	1	30	Balan	gen	N	1
24	Sp-	gen	M	1	28	Balan	spe	N	1	30	Balan	spe	M	1

30	Balan	gen	M	1	37	Sp-only	gen	M	1	48	Sp-only	gen	N	1
30	Balan	spe	M	1	38	Sp-only	gen	M	1	48	Sp-only	gen	M	1
32	Sp-dom	spe	M	1	39	Sp-only	spe	N	1	48	Sp-only	spe	M	1
32	Sp-dom	gen	N	1	39	Sp-only	gen	M	1	48	Sp-only	spe	M	1
32	Sp-dom	gen	N	1	39	Sp-only	gen	M	1	48	Sp-only	gen	M	1
32	Sp-dom	spe	N	1	40	Sp-only	gen	M	1	48	Sp-only	gen	M	1
31	Sp-dom	spe	N	1	40	Sp-only	gen	M	1	49	Sp-only	gen	M	1
32	Sp-dom	spe	N	1	40	Sp-only	gen	M	1	49	Sp-only	gen	M	1
33	Balan	spe	N	1	40	Sp-only	gen	N	1	50	Sp-only	gen	M	1
33	Balan	spe	S	1	41	Sp-only	gen	N	1	51	Sp-only	spe	M	1
33	Balan	spe	N	1	42	Sp-only	spe	N	1	51	Sp-only	spe	N	1
33	Balan	spe	M	1	43	Sp-only	spe	N	1	51	Sp-only	spe	N	1
33	Balan	spe	N	1	43	Sp-only	spe	N	1	51	Sp-only	spe	N	1
33	Balan	spe	N	1	43	Sp-only	spe	N	1	51	Sp-only	gen	N	1
33	Balan	spe	N	1	44	Sp-only	gen	N	1	52	Balan	spe	N	1
33	Balan	spe	N	1	43	Sp-only	gen	M	1	52	Balan	spe	N	1
33	Balan	spe	N	1	43	Sp-only	spe	M	1	52	Balan	spe	N	1
33	Balan	gen	M	1	45	Sp-only	spe	N	1	52	Balan	spe	N	1
33	Balan	spe	N	1	45	Sp-only	spe	N	1	52	Balan	spe	N	1
34	Sp-only	spe	N	1	46	Sp-only	spe	N	1	52	Balan	spe	N	1
35	Sp-only	spe	N	1	46	Sp-only	spe	N	1	52	Balan	spe	N	1
35	Sp-only	spe	M	1	46	Sp-only	gen	M	1	52	Balan	spe	N	1
35	Sp-only	spe	N	1	46	Sp-only	spe	N	1	52	Balan	spe	N	1
35	Sp-only	spe	M	1	46	Sp-only	gen	M	1	52	Balan	spe	N	1
35	Sp-only	spe	M	1	46	Sp-only	gen	M	1	52	Balan	gen	N	1
35	Sp-only	gen	M	1	46	Sp-only	gen	M	1	52	Balan	spe	N	1
36	Sp-only	gen	M	1	46	Sp-only	gen	M	1	52	Balan	spe	N	1
36	Sp-only	gen	M	1	47	Sp-only	spe	N	1	52	Balan	spe	N	1
36	Sp-only	gen	M	1	47	Sp-only	spe	N	1	52	Balan	spe	N	1
36	Sp-only	spe	M	1	47	Sp-only	spe	N	1	52	Balan	spe	N	1
36	Sp-only	gen	N	1	47	Sp-only	spe	N	1	53	Balan	spe	N	1
38	Sp-only	gen	M	1	47	Sp-only	spe	N	1	54	Sp-only	spe	M	1
38	Sp-only	gen	N	1	47	Sp-only	spe	N	1	54	Sp-only	gen	N	1

54	Sp- only	gen	N M	1
56	Sp- dom	spe c	N M	1
55	Sp- dom	gen	N M	1
57	Balan c	spe c	M	1
58	Qu- dom	spe c	N M	1
59	Qu- dom	spe c	N M	1
59	Qu- dom	spe c	N M	1
59	Qu- dom	spe c	N M	1


7.5 Subject background and metadata from Study 2 (paraphrase judgment task)


Note: Each row represents a unique subject. In the, the abbreviated items reflect the following *Sp* = Spanish, *Qui* = Quichua, *Eng* = English, *Por* = Portuguese, *Fr* = French, *Ita* = Italian, *Pan* = Panama, *U.S.* = United States, *Arg* = Argentina, *Col* = Colombia, *Y* = Yes, *N* = No. Asterisks indicate no/none in the column labeled *Lived outside of Ecuador?* Age is reported in years.


ID	Age	Gender	Languages known	Ecuadorian region	Lived outside of Ecuador?	Identifies as Andean?
1	35	M	Sp, Eng	Andes	*	Y
2	18	F	Sp	Andes	*	Y
3	27	M	Sp, Eng	Andes	*	Y
4	19	M	Sp	Andes	*	Y
5	33	M	Sp, Eng	Andes, Coast	Pan, U.S.	Y
6	62	F	Sp	Andes	*	Y
7	39	M	Sp	Andes	*	Y
8	24	F	Sp	Andes	Honduras	Y
9	34	M	Sp, Eng, Por	Andes, Coast	U.S., Brazil, Arg, Col	N
10	35	M	Sp	Andes	*	N
11	23	M	Sp	Andes	*	Y
12	25	F	Sp, Por	Andes	Portugal	Y
13	52	F	Sp, Eng	Andes	*	N
14	41	F	Sp, Eng	Andes	*	Y
15	21	M	Sp, Qui, Eng	Andes	*	Y
16	22	M	Sp	Andes	*	Y
17	21	F	Sp	Andes	*	Y
18	18	M	Sp, Eng	Andes	*	Y
19	29	F	Sp	Andes	*	Y
20	21	F	Sp	Andes	*	Y
21	22	F	Sp	Andes	Honduras, Italy	Y
22	38	F	Sp	Andes	*	Y
23	56	M	Sp, Qui, Eng	Andes	*	Y
24	65	M	Sp	Andes	*	Y
25	36	F	Sp, Ita, Por, Eng	Andes, Coast	Italy	N
26	21	F	Sp, Eng	Andes	*	Y
27	48	M	Sp, Eng	Andes	*	Y
28	39	F	Sp	Andes	*	Y
29	27	M	Sp, Eng, Fr	Andes	*	Y
30	29	F	Sp, Eng	Andes	U.S.	Y


7.6 Latin Square design for survey stimuli in Study 2 (paraphrase judgment task)


		ASPECT			
		Inchoative	Gradual	Habitual	Continuative
AUXILIARY	Estar	T1	T1	T1	T1
		T2	T2	T2	T2
		T3	T3	T3	T3
		T4	T4	T4	T4
	Ir	T1	T1	T1	T1
		T2	T2	T2	T2
		T3	T3	T3	T3
		T4	T4	T4	T4
	Seguir	T1	T1	T1	T1
		T2	T2	T2	T2
		T3	T3	T3	T3
		T4	T4	T4	T4
	Andar	T1	T1	T1	T1
		T2	T2	T2	T2
		T3	T3	T3	T3
		T4	T4	T4	T4

 = items in List 1 are bolded
items in List 2 are unbolded

 = **sentence template 1**
(Andrés building houses)

 = **sentence template 2**
(María preparing lunch)

 = **sentence template 3**
(The kids growing)

 = **sentence template 4**
(The prices rising)

7.8 Instructions and practice items from Study 2 (paraphrase judgment task)

INSTRUCCIONES: Usted leerá las dos oraciones en negrita. Su objetivo es evaluar qué tan parecido es el mensaje comunicado en la segunda oración en comparación con la primera. Sus opciones serán: 0 = Totalmente distinto, 1 = Bastante distinto, 2 = Parecido, 3 = Bastante igual, 4 = Totalmente igual. No hay una respuesta correcta. Antes de empezar, le presentamos unos ejemplos para que vea como será la encuesta:

INSTRUCTIONS: You will read two sentences in bold. Your objective is to evaluate how similar the meaning of the second sentence is with the meaning in the first sentence. Your options are: 0 = Totally different, 1 = Pretty different, 2 = Similar, 3 = Pretty similar, 4 = Totally the same. There is not a correct answer. Before beginning, we present you with a few examples so that you can see how the survey works:

PRACTICE ITEM 1:

Pedro está con sed. Sp. 'Pedro is with thirst.'

Pedro tiene sed. Sp. 'Pedro has thirst.'

PRACTICE ITEM 2:

Tengo ganas de comer helado. Sp. 'I want to eat ice cream.'

Tengo que comer helado. Sp. 'I have to eat ice cream.'

PRACTICE ITEM 3:

Tengo ganas de comer helado. Sp. 'I have a craving to eat ice cream.'

Quiero comer helado. Sp. 'I want to eat ice cream.'

PRACTICE ITEM 4:

Está a punto de comprar el traje. Sp. 'He is just about to buy the suit.'

Ya mismo comprará el traje. Sp. 'Very soon he will buy the suit.'

PRACTICE ITEM 5:

Está a punto de comprar el traje. Sp. 'He is just about to buy the suit.'

Ya había comprado el traje. Sp. 'He has already bought the suit.'

PRACTICE ITEM 6:

Ayúdame a apagar la luz. Sp. 'Help me turn off the light.'

Dame apagando la luz. EAS. 'Turn off the light for me.'

Chapter 3 Attitudes towards Spanish-influenced Englishes in the U.S.

FULL TITLE: **Sounding “Foreign” in America: Language Attitudes towards Spanish-influenced Varieties of English**

KEYWORDS: Latino English, accents, perceived foreignness, Perpetual Foreigner Syndrome

Abstract Sociolinguistic research into language attitudes has shown that listeners routinely extract *indexical information* from interlocutors’ speech in order to contextualize them by categories that are socially meaningful (Campbell-Kibler, 2008; Creel, Aslin, & Tanenhaus, 2008; Creel & Bregman, 2011). One such social category that has begun to receive more attention lately is *perceived foreignness* (Lindemann, 2003, 2005; Lindemann & Moran, 2017). With a heightened awareness in the United States regarding issues of immigration and nativism (Alejo, 2018), the issue of perceived foreignness in the United States is quite fraught, as it is often driven by underlying ideologies tied to ethno-racial prejudices (Theiss-Morse, 2012). Unfortunately, the discriminatory behavior that can ensue from such prejudices has been linked to negative, real-life consequences for many groups of people in the U.S. (Lippi-Green, 2012; Deprez-Sims & Morris, 2013; Zentella, 2014). One demographic for whom this has been especially true is Latina/os, who have recently become the largest minoritized group in the country (Krogstad, 2020). Results from one recent accent evaluation study suggest that some U.S. listeners rate (L2) Spanish-accented English speakers as more foreign-sounding than proficiency-matched L2-accented speakers from predominantly white countries, which is suggestive of underlying sociolinguistic stereotyping towards Latina/os. This, in addition to recent reports that U.S.-born Latina/os – even those who speak English natively – are often mistaken as foreigners in their own country (Coker, et al., 2009; Cordova & Cervantes, 2010), motivates the current study, the aim of which is to better understand the nature of current sociolinguistic attitudes towards U.S.-born Latina/os who are speakers of *Latino English* varieties. Latino English refers to any non-standard variety of native (L1) U.S. English that shows the influence of language contact from Spanish (particularly in the phonology) and is spoken by U.S.-born Latina/os (Fought, 2006). The preliminary data presented in this paper come from an online accent evaluation survey in which thirty-two young adults living in the Midwestern U.S. listened to a series of speakers with different English accents read aloud the same passage and then, evaluated them on measures of perceived nationality and English background. Crucially, the stimuli included a Latino English (L1) speaker from the U.S. and a Spanish-accented English (L2) speaker from Chile. Ratings for these two target speakers were compared to each other and to speech samples from three comparison groups of speakers: L1 accents in the U.S. (e.g. New York), L1 accents from abroad (e.g. British), and L2 accents from abroad (e.g. Russian). While a larger-scale study is needed to understand the generalizability of the findings, the results preliminarily reveal that, on both perceived foreignness and English background, the respondents perceived the (L1) Latino English speaker as significantly more American/L1-sounding than the (L2) Spanish-accented English speaker, but still slightly more foreign/L2-sounding than other native varieties of U.S. English. These results are discussed within a language attitudes framework and the changing sociolinguistic landscape of the United States²⁰.

²⁰ **Acknowledgments** | Thank you to the U-M Rackham Graduate School, the U-M Linguistics Department for their financial assistance that made this research possible. This project could not have been employed without the constructive feedback of Dr. Marlyse Baptista and Dr. Jonathan Brennan, the speakers who shared their voices as

1. INTRODUCTION

Housed within the field of sociolinguistics, language attitudes research has demonstrated that we, as listeners, routinely extract *indexical information* from speech in order to contextualize our interlocutors by categories that are socially meaningful to us (Campbell-Kibler, 2008; Creel, Aslin, & Tanenhaus, 2008; Creel & Bregman, 2011). Such indexical information from the speech signal is used by listeners to form assumptions about speakers' social identities, which are based on learned associations called *sociolinguistic stereotypes*. There is growing evidence to suggest that listeners routinely draw from sociolinguistic stereotypes to infer a myriad of social identities; these can include gender (Strand, 1999), sexuality (Munson, Jefferson, & McDonald, 2006), age (Kim, 2016; Kim & Drager, 2018), social status (Labov, 2006), personality (McAlear, Todorov, & Belin, 2014), and even attractiveness (Zheng, Compton, Heyman, & Jiang, 2020). Two related social categories that have begun to receive more attention lately are the speaker's race/ethnicity (Scharinger, Monahan, & Idsardi, 2011; Rosa, 2019; Weissler & Brennan, 2020) and their inferred nationality, which together can inform listeners' ideological constructs of *perceived foreignness* (Lindemann, 2003, 2005; Lindemann & Moran, 2017). With a heightened awareness today in the United States regarding issues of immigration and nativism (Alejo, 2018), the question of who is thought of as foreign in the United States is quite fraught and often driven by underlying ideologies tied to ethno-racial prejudices (Theiss-Morse, 2012). These underlying ideologies are inherently related to linguistic variation in the U.S., as perceptions of foreignness are often formed based on the way a person speaks and listeners' ideologies about what accents count as "American-sounding" (Castelan Cargile, Maeda, Rodriguez, & Rich, 2010).

experimental stimuli in this study, and the participants who provided the survey data upon which this paper was based. Any error in this paper is my own.

Unfortunately, linguistic discrimination based on (covert or overt) racio-ethnic prejudices is widely documented and has been linked to negative, real-life consequences for many groups of people in the U.S. (Lippi-Green, 2012; Deprez-Sims & Morris, 2013; Zentella, 2014). One demographic for whom this has been especially true is Latina/os, who have recently become the largest minoritized group in the country (Krogstad, 2020). Results from one recent accent evaluation study suggest that some U.S. listeners rate (L2) Spanish-accented English speakers as more foreign-sounding than proficiency-matched L2-accented speakers from predominantly white countries (e.g. Germany), which is suggestive of underlying sociolinguistic stereotyping towards foreign-born Latina/os (Castelan Cargile, Maeda, Rodriguez, & Rich, 2010). This, in addition to recent reports that U.S.-born Latina/os – even those who speak English natively – are often mistaken as foreigners (Coker, et al., 2009; Cordova & Cervantes, 2010), motivates the current study, which seeks to examine the nature of current sociolinguistic attitudes towards U.S.-born Latina/os who are speakers of what are known as *Latino English* varieties. In line with Fought (2006)'s definition of the term, *Latino English* refers to any non-standard variety of native (L1) U.S. English that shows the influence of language contact from Spanish (particularly in the phonology) and is spoken by U.S.-born Latina/os (Fought, 2006). The preliminary data presented in this paper come from a novel online accent evaluation survey in which thirty-two young adults living in the Midwestern U.S. listened to a series of speakers with different English accents read aloud the same passage and then, evaluated them on perceived nationality and English background. Of critical interest was how listeners would evaluate a Latino English speaker on these two measures related to perceived foreignness. As a first step, only one speaker was used to represent each of the two English varieties of interest: one speaker of (L1) Latino English and one speaker of (L2) Spanish-accented English. While including several different speakers per condition would be

ideal for gauging the generalizability of listener evaluations for each variety of interest, this single-speaker design (a) allowed for the study to remain a reasonable length for respondents (to avoid attentional fatigue) and (b) served as foundational first step and proof of concept for subsequent research. The results suggest that the participants in this study consistently rated the Latino English speaker as sounding slightly more foreign/L2-sounding than speakers of other more established U.S. accents, but as distinctly more American/L1-sounding than an L2 Spanish-accented English speaker born and raised in Latin America.

The remainder of this paper is organized as follows. In Section 2 (*Background*), I provide the sociohistorical context that has led to the formation of the Spanish-influenced English varieties we have in the United States today (Section 2.1), review the relevant prior scholarship that has examined language attitudes towards speakers of these varieties (Section 2.2), and briefly explain how the present study will attempt to answer the central research question therein posited (Section 2.3). In Section 3 (*Methods*), I outline the experimental design and materials used in the online survey study (Section 3.1), describe the survey respondents who participated in the study (Section 3.2), detail the experimental procedure (Section 3.3), and specify the data processing and analysis measures (Section 3.4). This is followed by a reporting of the results (Section 4) and a discussion of the research findings as they relate to the central research question (Section 5). The paper concludes with Section 6.

2. BACKGROUND

2.1 Sociohistorical context of Spanish-influenced Englishes and a key distinction

I begin this section by providing a brief overview of the sociohistorical context of Spanish-English contact in the U.S. This overview provides the background needed to understand how Spanish-influenced English speech communities have emerged in the U.S. and why they were chosen as the object of study for this paper. In the second half of this section, I place my emphasis on the introduction of a key distinction between two main types of Spanish-influenced English varieties in the U.S. These are Latino English and Spanish-accented English, which, as I will describe later in more detail, refer to a native (L1) variety of U.S. English and a foreign (L2) variety of “learner” English, respectively (Fought, 2006). Defining and characterizing this distinction is crucial, given that the objective of the current study is to investigate where, on scales of perceived foreignness, U.S. listeners situate Latino English speakers, relative to other accents, such as Spanish-accented English.

To understand the history of Spanish-English contact in present-day United States, we must go back as early as the mid 1560s, when Spanish-speaking settlers from the Iberian Peninsula first settled in areas such as present-day Florida, New Mexico, Arizona, and Texas (Fought, 2006:73). These areas that are now part of the United States were, in fact, home to Spanish speakers before the English ever arrived²¹. Then, in the early 19th century, in the aftermath of the Texas War of Independence (1836) and the Mexican-American War (1848), the U.S. gained a considerable addition of native Spanish-speakers – and not because they crossed the border, but,

²¹ While beyond the scope of this paper, it must be mentioned that this is, of course, in addition to the fact that the native Americans, who were indigenous to the land and occupied large swaths of what we now call the United States, spoke many other languages in these regions prior to their forced assimilation, genocide, and relegation to reservations and English-only schools.

as the saying goes, “because the border crossed them” (Lipski, 2008). Then, beginning in the 1940s, labor shortages in the agriculture sector of the U.S. yielded a significant influx of migration between Latin America and the United States (Cortés & Sloan, 2013:388-90), which has continued through today.

At present, the U.S. still has no official language, and after English, Spanish is the most widely spoken language in the country (Krogstad, 2020). In fact, Spanish is such an integral part of U.S. society and history that it serves as its own language group at the U.S. Census²² (Shin & Kominski (2010). Of those who speak a non-English language at home in the U.S., 62% speak Spanish (U.S. Census, 2010). That is 35 million people in the U.S. speaking Spanish at home. This, however, does not mean that those 35 million people are L2 speakers of English or have low proficiency in English. To the contrary, over half of them self-report speaking English fluently. Furthermore, data indicates that U.S. Latinos who speak Spanish are becoming increasingly English-dominant, particularly those in 3rd - 4th generation in the country. This is due to attrition of their heritage language (Rosa, 2019).

As the result of long, intense contact between Spanish and English in the United States, much research in this contact situation has focused on bidirectional language contact effects (Silva-Corvalán, 1994; Bayley, 2008) and community norms around code-switching (Poplack, 1980; Otheguy & Stern, 2010). When it comes to Spanish-influenced varieties of English, there are many labels that have been introduced, typically related to the region in which they are developed and/or the heritage country association with the community, such as Tejano English, Miami English and Puerto Rican English (Bayley & Santa Ana, 2004; Escobar & Potowski,

²² The four main groups are Spanish, Other Indo-European languages, Asian and Pacific Island languages, and All other.

2015). As there are many different varieties of Spanish-influenced Englishes spoken in the U.S., identifying and describing them exceeds the scope and purpose of this paper. What is of key importance to this paper, however, is the difference between two particular *types* of Spanish-influenced Englishes; these are native (L1) Latino English and foreign (L2) Spanish-accented English. Several scholars have explicitly analyzed this distinction before, and their terms for labeling them differ slightly, though the underlying distinction remains the same. For example, Santa Ana (1993) proposed a distinction between what he calls *Non-Spanish-Based English* vs. *Spanish-Based Accented English* or *Mexican Interlanguage English*. He characterizes the former as usually being spoken by 3rd-/4th-generation speakers with little to no knowledge of Spanish and having other influences on their English (e.g. AAL). He describes the latter as usually being spoken by 1st - 2nd generation speakers who are Spanish-dominant English bilinguals. Crucially, the model provides some preliminary descriptions for distinguishing levels of Spanish interference in Latina/o speakers of English living in the U.S. While preliminary in nature, Santa Anna (1993) provides a list of linguistic features associated with these two distinct language varieties. For example, he outlines that Mexican Interlanguage English speakers (which I refer to in this study as Spanish-accented speakers) show a preference for Spanish phonological features (e.g. phonetic realization of /ɪ/ as [i]; e.g. Eng. /bit/ pronounced as [bit]), whereas Non-Spanish-Based English speakers (which I refer to in this study as Latino English speakers) would retain a closer approximation of the local standardized vowel spaces for this tense-lax distinction (e.g. Eng. /bit/ pronounced as [bit]). Fought (2006) expanded upon Santa Anna (1993)'s framework by describing in further detail the phonetic – and even prosodic - differences between the two types of Spanish-influenced varieties. For example, she explains that while both Latino English (L1) and Spanish-accented English (L2) speakers share several features in their accent (e.g. both

have been shown to demonstrate infrequent word-final glides, produce interdental fricatives as plosives, show a tendency for a syllable-timed prosody rather than the standard stress timing of standard varieties of English) they have noticeable differences. For example, while Spanish-accented English speaker collapses several key English phonemic distinctions (i.e. /i/-/ɪ/, /ɛ/-/æ/, /tʃ/-/ʃ/) based on the lack of corresponding phonemic categories in Spanish, the Latino English speaker retains such distinctions, in a way that resembles the distinctions of the local standard variety, a finding which has since been corroborated by Preston (2009). One other salient phonetic feature that distinguishes these speakers is their realization of word-final /z/. The L2 Spanish-accented speaker produces the non-standard [s], which aligns with Spanish phonological rules of coda devoicing, while the Latino English speaker produces a voiced [z] in a way that reflects most native U.S. English accents. For a comprehensive description of Latino English linguistic features at the phonological, lexical, prosodic and morphosyntactic levels, refer to Santa Ana (1993), Fought (2003), and Bayley (2015).

While it exceeds the scope of this review, it must be noted that there exists a rich body of work from the field of Second Language Acquisition (SLA) that contends with the ideological constructs that underlie L2 accent detection and the ways in which experimental designs may seek to disentangle them. In light of this literature, the experimental procedure implemented in the current study follows the best practice suggestion that subjects be asked not only about the underlying construct directly (i.e. L2-accentedness), but that other measures (i.e. intelligibility, perceived language proficiency) be probed as well (e.g. Derwing, Rossiter, Munro, & Thomson, 2004). For additional insight into foundational SLA scholarship that investigates how research design can tease apart the underlying constructs (i.e. intelligibility, comprehensibility) that listeners use to distinguish L1 and L2 accents, refer to Munro & Derwing (1995).

Additionally, Fought (2006) identifies ways in which the linguistic distinction between Latino English and Spanish-accented English speakers is also a cultural one, noting that these two types of speech communities often share clear and somewhat tense boundaries between one another, based on differing identification with their dominant heritage culture and nationalities. This is important, as it further points to these groups as separate identities that cannot be collapsed into a tidy monolith. Fought (2005) also simplified the labels of Santa Anna's (1993) model to *Latino English* (a term which I adopt) and *Non-native Spanish-influenced English* (which I call *Spanish-accented English* in this paper), respectively. Regarding terminology, it is worthwhile to mention that some scholars (and language users as well) use the term *Chicano English* as equivalent to Latino English (Santa Anna, 1993; Galindo, 1995). However, many others also use the term Chicano English in a narrower sense; that is, to refer to a native ethnolect of English spoken by U.S.-born Latina/os of Mexican-American descentance who lives in the *Southwestern U.S* (Silva-Corvalán, 1994; Fought, 2003). As the particular speech variety under study in the present paper comes from a U.S.-born Latino of Mexican-American descentance who lives in Chicago, I adopt the more general term Latino English in any discussion of the current study in order to reduce terminological confusion.

To conclude, in this section, I very briefly summarized the sociohistorical context of Spanish-English contact in the U.S. and described the Latino English vs. Spanish-accented English distinction that lies at the heart of this paper. In the following section, I review the existing sociolinguistic literature regarding language attitudes towards Spanish-influenced varieties of English speech in the U.S.

2.2 Previous language attitudes research into Spanish-influenced Englishes in the U.S.

In this section, I review the existing research on language attitudes towards Spanish-influenced varieties of English in the United States. It is important to do so, as the novel contribution of this paper lies in advancing our understanding of how U.S. listeners conceive of U.S.-born Latino English speakers on the ideological construct of foreignness. The relevant research available stems from two main topics of inquiry: (1) research into how L2 Spanish-accented English speakers in the U.S. are evaluated on such measures of foreignness and (2) how U.S.-born Latina/os (many of whom are Latino English speakers) are evaluated on measures of foreignness-based information not directly tied to their spoken accent (e.g. skin color, biographical information). In this way, I will introduce the phenomenon known as *Perpetual Foreigner Syndrome* (e.g. Lippi-Green, 2012), a particular kind of ethnic othering, as it has been shown to operate towards Latina/os in the U.S. By unpacking the existing research into racio-ethnic prejudices towards to Latina/os and the language attitudes held towards speakers of Spanish-accented English, it will become clear why the present paper aims to understand current language attitudes towards U.S.-born speakers of Latino English.

Given that the U.S. Latino population has recently become the dominant ethnic minoritized group in the U.S. (U.S. Census, 2010; Krogstad, 2020), Latina/os, they and the varieties of English that they speak are increasingly the focus of scholarly research (e.g. Marker, 2010; Cepeda, 2016) and public discussion (Bernstein, 2001; Navarrette, 2011). While some of this increased attention toward Latina/os in the U.S. stems from honest attempts to represent diversity and yields positive celebrations of Latina/o culture (Cepeda, 2016), not all of the growing public attention towards Latina/os is positive. In fact, there exists a great deal of ethnic othering towards Latina/os in the U.S. (Brennan & Brennan, 1981; Cobas & Feagin, 2008;

Ditlmann & Lagunes, 2014). This correlation between a rising Latina/o demographic and a growing number of cases of ethnic othering and towards Latina/os (Markert, 2010) can, in part, be explained by relevant theoretical frameworks from sociology. According to Blalock's (1967) *power-threat theory*, the larger a minoritized group's size, the greater its threat to the majority group (i.e. predominantly white in the U.S.). As the majority group tends to protect its own dominant status, strategies for keeping the growing minority group at bay may be observed. Power-threat theory provides a framework for understanding how language attitudes towards Spanish-influenced English speakers in the U.S. may operate. For instance, in America, when a speaker is evaluated as “sounding Latino/Hispanic/Spanish,” what sociolinguistic information is being indexed, exactly? For instance, it may be an observation of the speaker’s assumed ethnic background and/or inferred language repertoire. However, it is also quite possible that it may, even at the same time, be an instance of raciolinguistic othering, a covert index towards an underlying construct of *perceived foreignness* that casts the Latina/o speaker as comparatively “less American” than others. This could be possibly indirectly linked to perceived language background (i.e. “sounds like an L2 English speaker”) or directly linked to perceived nationality (i.e. “sounds like they are not American”). One question that has not been tested until now, is how U.S. listeners “hear” U.S.-born Latinos who speak native (L1) Latino English: more as the accent of a native (L1) or foreign (L2) speaker? As this is the question at hand in this paper, the following section provides an overview of the existing scholarship into language attitudes towards Latina/o speakers of Spanish-influenced varieties of English.

Unfortunately, the United States’ long history of categorizing people based on their national origin – and in some cases, even just their distant ancestral descent – has contributed to the sad reality that not all Americans are perceived to be equally “American” (Castelan Cargile, Maeda,

Rodriguez, & Rich, 2010). Of course, such prejudice is unjustified, given that, with the exception of Native Americans who were the First People of this nation, all those living in the United States today are descendants of past immigrant communities. Nevertheless, such ideologies regarding foreignness are still very prevalent. In the field of linguistics, in particular, decades of language attitudes research have demonstrated that people quite often use speaker accent as a proxy measure to infer foreignness (Cobas & Feagin, 2008; Rosa, 2019). While our inferences regarding a given speaker's nationality can of course be correct, they can also be subject to implicit biases. Such a situation is known as *Perpetual Foreigner Syndrome (PFS)* (Lippi-Green, 2012), a phenomenon by which foreignness is misattributed to a person based on racial or ethnic stereotypes, not by more objective measures (i.e. birthplace, place of residence, citizenship). Of course, it should be noted that sounding foreign is not, in and out of itself, something that should be avoided. On the contrary, one's accent in a language is one form of identity expression. However, sounding foreign can be problematic when we realize that speakers perceived as foreign are often evaluated more negatively than their native-sounding counterparts on dimensions of likeability and solidarity (e.g. Ryan M. G., 1972) and measures of professionalism in the workplace (Zentella, 2014), which can lead to negative, real-life consequences for many people in the U.S. (Lippi-Green, 2012). This leads to the question: what does existing research suggest about U.S. language attitudes towards Spanish-influenced English speech?

Previous research has found that among U.S. Americans, L2 English speakers from Latin American countries (i.e. Spanish-accented English speakers) are rated as significantly more foreign-sounding than L2 English speakers from western European nations that are predominantly white (Brennan & Brennan, 1981; Castelan Cargile, Maeda, Rodriguez, & Rich,

2010). This has been interpreted as being suggestive of an underlying racial/ethnic stereotype tied to oversimplified narratives of Latinos as illegal immigrants (Avila-Saavedra, 2011; Anguiano, 2016; Alejo, 2018). Not only does sounding Hispanic/Latino yield higher foreignness evaluations, but it has also been associated with cases of linguistic discrimination in classrooms and job interviews (Carlson & McHenry, 2006; Cobas & Feagin, 2008; Hosoda, Nguyen, & Stone-Romero, 2012; Chakraborty, 2017). However, whenever an individual does speak English, what underlying ideologies (i.e. sociolinguistic stereotypes), might make them sound more or less foreign? To understand this, we must define *standard language ideology*, a deeply rooted belief system in which there is one standard variety of American English, surrounded by a myriad of “non-standard” English varieties (Giles, Williams, Mackie, & Rosselli, 1995). Perceptual dialectology research suggests that this standard corresponds to MUSE (Mainstream United States English), an abstract construct of mostly white speech and a conglomeration of pronunciation patterns, lexical preferences, and grammatical features from the general Midwestern area. Linguistic ideologies of *foreignness* are often inferred from one’s accent; that is, the phonetic pronunciation patterns and prosody associated with one’s speech (Clarke & Garrett, 2004). To be certain, morphosyntactic and lexical differences are also involved in ideologies of nativeness, which are typically described in the literature as either dialectal differences (e.g. Baugh, 2007) or L2 interference effects, such as syntactic calques, loanwords, and false cognates (Cañizares-Álvarez & Mueller Gathercole, 2020). However, the scope of this literature review is limited to speaker accent, as that is the focus of the experiment presented in this paper.

While Cargile et al. 2010 examined only L2 Spanish-accented English speech, the present study includes L1 Latino English speech. The motivation for doing so is based on the fact that

foreigner bias has been directed at foreign-born *and* U.S.-born Latinos alike (Coker, et al., 2009; Cordova & Cervantes, 2010). In fact, many U.S.-born Latina/os cite language as the leading source of discrimination against them – sometimes before socio-economic status, immigration status or even race (Lippi-Green, 2012). One illustration of how PFS has related to the Latina/o experience in the United States comes from one U.S. Latina student whose professor refused to believe she wrote an essay because “*Mexicans cannot express themselves well in English*” (Cobas & Feagin, 2008). Another comes from over three dozen cases discovered in Texas of police officers ticketing native Spanish-speakers for being “non-English-speaking drivers,” which is not, in fact, a legal infraction (Goldstein, 2009). For a list of discriminatory language-focused practices that have been documented against Latino/as, see Lippi-Green (2012:267-8). In light of these findings, it is important for sociolinguistic research to advance our understanding regarding the degree to which PFS may apply to U.S.-born Latino English speakers today. In the following section, I briefly introduce and summarize the study presented in this paper.

2.3 The current study

Previous experimental language attitudes research has suggested that some U.S. listeners exhibit what appears to be an ethnicity-based foreigner bias towards L2 Spanish-accented English speakers in the United States (Castelan Cargile et al., 2010). One question previously not tested in an experimental study, however, is how U.S. listeners situate Latino English speakers on scales of perceived foreignness. Recall that *Latino English* refers to a variety of English spoken by U.S.-born Latina/os whose native (L1) accent reflects historical language contact from Spanish phonology, and that this language variety is qualitatively distinct from L2 Spanish-

accented English speech (Santa Ana, 1993; Fought, 2006). As a first step in addressing the aforementioned gap in the literature, the present study investigates the current nature of U.S. Midwesterners' language attitudes towards Latino English speakers by presenting data from a new accent evaluation survey. The data come from a preliminary set of young adult U.S. Midwesterners ($n = 32$) who listened to the same elicitation passage read aloud by 14 different speakers, each of whom carried a different English accent. The two speakers of interest included a Latino English (L1) speaker from Chicago and a Spanish-accented English (L2) speaker from Chile. Respondents were asked to evaluate the speakers on measures of perceived nationality and perceived English background. Based on previous scholarship, I conceive of *perceived foreignness* as a latent construct that involves at least two (and likely many more) distinguishable proxy measures: *perceived nationality* (from U.S. – from abroad) and *perceived English background* (L1-sounding vs. L2-sounding). The former is a direct measure of foreignness in the U.S., while the latter is an indirect measure, based on the (mistaken) language ideology that one must speak English natively in order to be American. A schematic representation of this latent construct and the outcome measures used to measure it in the current study are shown in Figure 3.1, below. Ratings for the two target speakers were compared to each other and to speech samples from three comparison groups of speakers: L1 accents in the U.S. (e.g. New York), L1 accents from abroad (e.g. British), and L2 accents from abroad (e.g. Russian). This study is limited, as a larger-scale study is necessary to understand the generalizability of the findings; the preliminary results presented here very tentatively show that the respondents perceived the (L1) Latino English speaker as significantly more American and more L1-sounding than the (L2) Spanish-accented English speaker, but still slightly more foreign/L2-sounding than other native varieties of U.S. English. The findings are discussed

within the framework of Lippi-Green (2012)'s *Perpetual Foreigner Syndrome* and Rosa (2019)'s raciolinguistic account of standard language ideologies.

Figure 3.1 Schematic representation of the latent construct and proxy measures

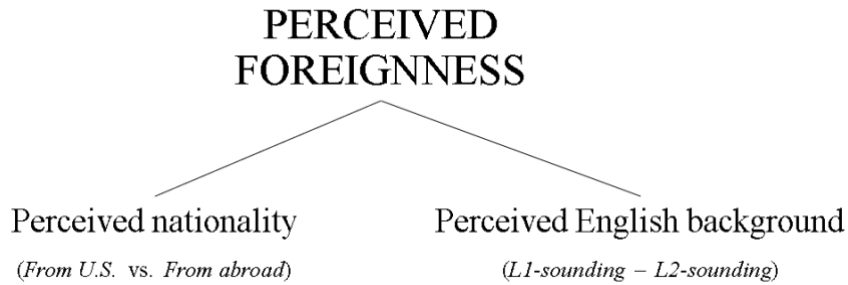


Figure 3.1 As shown here schematically, the current study conceives of *perceived foreignness* as a latent construct that involves minimally the two distinguishable proxy measures shown: *perceived nationality* (from U.S. – from abroad) and *perceived English background* (L1-sounding vs. L2-sounding).

3. METHODS

3.1 Materials

The stimuli for this experiment consisted of a total of 14 recordings, each from a different speaker, as they read the *Please call Stella* elicitation script²³ from the Speech Accent Archive (SAA) (2015). Beyond the two recordings of experimental interest (i.e. the Latino English and Spanish-accented English), an additional 12 speaker recordings were needed. These corresponded to three comparison groups of interest: speakers with L1 accents native to the U.S. (i.e. New York, Southern, Midwestern, African American Language), speakers with L1 accents from abroad (i.e. British, Scottish, Australian, Irish), and speakers with L2

²³ *Please call Stella. Ask her to bring these things with her from the store: Six spoons of fresh snow peas, five thick slabs of blue cheese, and maybe a snack for her brother Bob. We also need a small plastic snake and a big toy frog for the kids. She can scoop these things into three red bags, and we will go meet her Wednesday at the train station.*

accents from abroad (e.g. Russian, Korean, French, Chinese). The purpose of including these accent comparison groups was to allow for subsequent comparative analyses of perceived foreignness along parameters of nationality and English background. Table 3.1 summarizes the 14 speakers whose voice recordings served as stimuli for the survey.

Table 3.1. Speaker recordings background information

Group	Eng. variety	From	American ?	In U.S.	Gender	Age	Audio
Experimental (Spanish-influenced varieties)	Latino (L1)	Chicago	Y	100%	M	25	OG
	Spanish (L2)	Chile	N	7%	M	41	OG
Group 1 (L1 U.S. English dialects)	New York	New York	Y	100%	M	21	SAA
	Southern	Alabama	Y	100%	M	22	SAA
	Midwestern	Michigan	Y	100%	M	22	OG
	African Amer.	Georgia	Y	100%	M	18	SAA
Group 2 (L1 foreign English accents)	British	England	N	0%	M	20	SAA
	Scottish	Scotland	N	0%	M	35	SAA
	Australian	Australia	N	6%	M	34	OG
	Irish	Ireland	N	0%	M	24	SAA
Group 3 (L2 foreign English accents)	Russian	Russia	N	49%	M	41	OG
	Korean	S. Korea	N	16%	M	32	OG
	French	France	N	29%	M	42	OG
	Chinese	China	N	29%	M	31	OG

Table 3.1 Categorization for American was self-reported. Age is reported in years. For audio recording source, SAS = Speech Accent Archive (2015), OG = Original recording made for this study. Values in the ‘In U.S.’ column reflects (*n* of years lived in U.S. / age in years at the time of the study).

Of the 14 speech recordings used in the experiment, 6 were selected from a pre-existing archive (Weinberger, 2015) and 8 were created specifically for this study. The recordings for the two speech samples of experimental interest were original in order to allow extensive interviewing into the speakers’ sociolinguistic background. For the other 12 speaker accents, pre-existing recordings were used if available and original recordings were created as needed. For both the original and pre-existing recordings, the SAA guidelines

were used: (1) the researcher instructed the speaker to read the passage first to themselves and to ask questions about specific words or pronunciation as needed and (2) the speaker read aloud the *Please Call Stella* elicitation passage minimally two times. While recording equipment and setup details for the pre-existing recordings may differ, the original speech samples were recorded in a sound-attenuated booth using an AKG P420 microphone at a sampling rate of 44.1 kHz and bit depth of 16 bits. Training was provided by the researcher when necessary to obtain the desired speed, but no training was provided for pronunciation or prosody, as natural production was the goal.

As it is shown in Table 3.2, the study operationalized the two key speakers of interest as follows. The (L1) Latino English speech recording came from a U.S.-born, L1 English speaker from Chicago who is of Mexican American descent and self-reports as a balanced, simultaneous bilingual in Spanish and English. The (L2) Spanish-accented English speech condition was operationalized via a recording from an L2 Spanish-accented English speaker who is from Chile but recently moved to the U.S. and self-reports as a Spanish-dominant sequential bilingual. The differences in the speech samples from these two speakers generally align with phonetic distinctions typically reported between the two general speech communities they represent. While both the Latino English (L1) and Spanish-accented English (L2) speakers carry accents that reflect Spanish language contact effects on their vowel and consonant realizations (e.g. both monophthongize word-final glides and realize interdental fricatives /θ/ and /ð/ as stops [t] and [d]) they are markedly distinct. For example, while the L2 Spanish-accented English speaker collapses several key English phonemic distinctions (i.e. /i/-/ɪ/, /ε/-/æ/, /tʃ/-/ʃ/) based on the lack of corresponding phonemic categories in Spanish, the Latino English speaker retains such distinctions, in a

way that resembles the distinctions of the Mainstream U.S. English speaker. One other salient phonetic feature that distinguishes these speakers is their realization of word-final /z/. The L2 Spanish-accented speaker produces the non-standard [s], which aligns with Spanish phonological rules of coda devoicing, while the Latino English speaker produces a voiced [z] in a way that reflects most native U.S. English accents. What is most important to understand from these descriptions is that the Latino English speaker produces a noticeably distinct accent than that of the L2 Spanish-accented English speaker. Table 3.2 below summarizes the phonological realizations of these two speech samples, alongside a comparative description of how the Mainstream U.S. English speech sample realized each linguistic variable. The analysis derives from an impressionistic acoustic analysis of linguistic features relevant to Spanish-influenced English varieties.

Table 3.2 Features of Spanish-influenced English speaker stimuli

LINGUISTIC VARIABLE	PASSAGE EXAMPLE	(L1) Latino English	(L2) Spanish-accented English	Mainstream U.S. English
/i/ - /ɪ/ distinction	‘please’ – ‘big’	retained	collapsed	retained
/ɛ/ - /æ/ distinction	‘fresh’ – ‘snack’	retained	collapsed	retained
/tʃ/ - /ʃ/ distinction	‘cheese’ – ‘she’	retained	collapsed	retained
word-final glides	‘go’	monophthongal	monophthongal	glided
unstressed vowels	‘plastic’	slight ə reduction	no ə reduction	ə reduction
word initial /θ/ and /ð/	‘things’ and ‘the’	[t] and [d]	[t] and [d]	[θ] and [ð]
word final consonants	‘snack’	glottalized	reduced	retained
word-final /z/	‘please’	[z]	[s]	[z]

Table 3.2 Linguistic variables in English that are relevant to Spanish-influenced English varieties are listed in the left-most column. The second column identifies one example for each linguistic variable from the *Please Call Stella elicitation* passage upon which the speech recordings were based. The three right-most columns indicate how the Latino English, Spanish-accented English, and Mainstream U.S. English speakers each realized those linguistic variables

3.2 Participants

Eligibility requirements for the study were for English speakers currently living in the Midwestern U.S. who were 18 years or older. Thirty-two English-speaking subjects were recruited through an internal university subject pool and alumni network at a large midwestern university. Subjects ranged in age from 19 – 34 years ($M = 22$) and were currently living in the United States at the time of completing the study. With the exception of two respondents who reported English as an L2, all self-reported English as a native language. When asked about Spanish, 16 reported no knowledge of the language, 15 reported having studied it in school, and one claimed it as a native language. Respondents varied in their geographic residential history, though most reported having lived the majority of their lives in MI. Twenty-four of the respondents have lived exclusively in the United States, and among those who have lived abroad ($n=8$), 50% lived in the U.S. for a longer period of time than they lived abroad. Regarding race/ethnicity, the majority of respondents were White ($n=16$), 3 were Black, 9 identified as Asian, 1 identified as Hispanic/Latino, and three identified as mixed (2 as Asian-White, 1 as Hispanic-White). Additional descriptive information regarding the respondents' demographic and linguistic background are included in Table 3.3, below.

Table 3.3 Survey respondent background information

ID	Eng.	Span.	Other languages	U.S. states lived	In U.S.	Race / Ethnicity	Age
1	L1	n/a	n/a	MI	100%	Black	34
2	L1	L2	Chin, Span	MI	84%	Asian	19
3	L1	n/a	Guj, Hin, Fr, Span	IL, IN, MI	85%	Asian	26
4	L1	n/a	Span, Arab	FL, MI	100%	White	24
5	L1	n/a	Jap, Fr, Mar, Hin	MI	100%	Asian	21
6	L1	n/a	Lat	MI	100%	White	19
7	L1	L2	Span	WI, IL, MO, OH, MI	100%	Black	24
8	L1	L2	Span	MI	100%	White, Hispanic	20
9	L1	n/a	Kor, Span, Arab, Chin, Jap, Russ	IL, NY, GA, AK, NC, MI	94%	White, Asian	34
10	L1	n/a	Fr	MI	100%	White	21
11	L1	n/a	Russ	MI	100%	White	25
12	L1	n/a	Ben, Jap, Arab	MI	100%	Asian	20
13	L1	L2	Span	MI	100%	White	20
14	L1	L2	Span	MI	100%	White	19
15	L1	L2	Russ, Span, Lat, Fr	NY	100%	White	21
16	L1	n/a	Thai, Jap	MN, TX	32%	Asian	19
17	L1	n/a	Chin, Jap, Span	MI	100%	White, Asian	19
18	L1	L2	Span, Ital, Dan	IL, MN, NY, MI, MO	100%	White	30
19	L1	L2	Span	MI	100%	White	21
20	L1	L2	Span	MI	100%	White	22
21	L2	n/a	Chin, Span, Jap	MI	32%	Asian	19
22	L1	n/a	Lat	MI	100%	Black	21
23	L1	L2	Span	KY, MI	100%	White	20
24	L1	L2	Span	MI	100%	White	20
25	L2	L1	Span	IL, MI	42%	Hispanic	19
26	L1	L2	n/a	IL, MI	100%	White	21
27	L1	L2	Span	MI	100%	White	23
28	L1	n/a	Chin	MI, PA	14%	Asian	22
29	L1	n/a	Ger	MI, NJ	100%	Asian	22
30	L1	L2	Span, Chin	MA, MI	95%	Asian	21
31	L1	n/a	Lat, Ger	IN, IL, MI	100%	White	27
32	L1	L2	Ger, Span, Jap, Ital	MI	100%	White	19

Table 3.3. Values in the ‘In U.S.’ column reflect (*n* of years lived in U.S. / age in years at the time of the study). Age is reported in years.

3.3 Procedure

Upon consenting to participate in the study,²⁴ respondents were provided the link to a secure, online survey, distributed on the software platform Qualtrics and conducted entirely in English. Respondents were presented with the recordings from the 14 speakers listed in Table 3.1 (randomized order) and were asked to answer five evaluative questions about them, each of which used a Likert response scale. The questions are shown in Table 3.4, below. The parameters of critical interest to this paper were perceived nationality (i.e. American vs. foreign-sounding) and perceived English background (i.e. L1 vs. L2-sounding English). At the end of the survey, subjects were asked to answer several questions about themselves and their language background (see Supplementary Materials), the information upon which the data presented in Table 3.3 was created.

Table 3.4 Critical items from the accent evaluation survey

1.	This person sounds like they are... ...from the UNITED STATES. ...from ANOTHER COUNTRY.
2.	This person sounds like they... ...HAVE spoken English their entire life. ...HAVEN'T spoken English their entire life.
3.	This person speaks in a way that is... ...EASY to understand. ...DIFFICULT to understand.
4.	Where specifically do you think this person is from?
5.	Based on this person's voice recording, what else can you tell about them? (Feel free to provide single-word labels or longer descriptions. Among other things, you may include what you believe to be their general age, race/ethnicity, what other language(s) it sounds like they speak...etc.)

Table 3.4 Subjects were asked to respond to these five questions for each of the 15 speech samples they heard. The response scale for the first three questions were on a 5-point Likert Scale. Ratings for Question #1 served as the measure for perceived nationality, and ratings for Question #2 served as the measure for perceived English background. Text labels were as shown and were only provided at the end points of the scale). The last two questions were open-ended text responses, which required subjects to provide a response of at least three characters as a completion validity measure.

²⁴ IRB#: HUM00158504 | Approval date: 07/17/2019

As the point of the study was to gain insight into linguistic stereotypes and social categories, the likelihood was high that subjects might filter their responses to appear less biased, or less stereotypical in nature. To prevent this self-filtering of responses, the study instructions presented at the beginning of the survey indicated that the point of the study was to provide human response verification for a new AI (Artificial Intelligence) speech recognition software that is designed to recognize different speech accents and dialects. Subjects were debriefed at the end and told the true nature of the experiment. The debrief form (see Section 8.6. in Supplementary Materials) also briefly explained the problems associated with Perpetual Foreigner Syndrome and provided practical information for participants interested in understanding and addressing their own implicit biases. Survey respondents were paid for their time in completing the survey, which on average lasted 15-20 minutes.

3.4 Data processing and planned analyses

Survey responses from six respondents were omitted from all subsequent data analyses, due to the respondents' incomplete submission of all survey questions. In each of the individual datasets omitted, the respondent completed less than a third of the survey. Additionally, it was noted that two of the remaining 32 respondents exhibited a noticeable difference in their language background; specifically, Respondents 21 and 25 (see Table 3.3) self-identified as *L2* English speakers, whereas the other 30 respondents reported *L1* English speaker status. While a reader might consider this difference in language profile to be concerning and grounds for omission in favor of a more homogeneous sample, it was determined to include their data in subsequent analyses. The rationale for doing so was based on the fact that (a) *L1*

English status was not an *a priori* eligibility requirement for the study, as the goal of this study was to understand how people currently living in the Midwestern U.S. would evaluate specific speaker accents. Additionally, both of the L2 English respondents were at the time attending an English-speaking institution and had spent over 6 years living in the U.S., which suggests that considerable experience with the American English experience. As such, their sociolinguistic intuitions and evaluations as L2 English speakers living in the Midwestern U.S. are just as valuable as the intuitions and evaluations of L1 English speakers living in the Midwest.

To prepare the final datasets for processing, the 5-point Likert scale ratings were extracted from the two evaluative measures of interest: *perceived nationality* and *perceived English background*. As each subject provided a rating for each of these parameters ($n = 2$) and each speaker recording ($n = 14$), there were 28 data points associated with each survey respondent ($n = 32$), yielding 896 raw scores in total. These individual ratings were categorized by parameter (*perceived nationality* vs. *perceived English background* ratings) and plotted as bar graphs that summarize the comparisons across speaker accent. Then, to target key comparisons more directly, the interactions (i.e. the difference) between the Spanish-influenced English speaker ratings and all other ratings are conducted in bar graph form. To test the significance of these preliminary findings, a comprehensive series of paired t-tests were conducted in R (version 3.6.1). Additionally, the open-ended response portion of the survey, which prompted respondents to specify any other features of the speaker's identity they had picked up on, are shared. As such responses were exploratory in nature, they are analyzed using qualitative methods. The results of these analyses are provided in the following section.

4. RESULTS

First, allow us to recall the research question driving this study: what is the current nature of language attitudes towards Latino English speakers in the Midwestern U.S., as it relates to the ideological construct of perceived foreignness? To answer this question, the following analyses have been conducted and visualized into a series of four graphs that summarize the data from the accent evaluation study. First, the raw Likert scale response data were translated into the descriptive bar plots shown in Figures 2 and 3, below. Considering that U.S. listeners may conceivably perceive of foreignness in speakers not only through direct sociolinguistic stereotypes about the speaker's assumed nationality (i.e. American-sounding vs. foreign-sounding) but also through sociolinguistic stereotypes about the speaker's assumed English background (i.e. L1-sounding vs. L2-sounding), the two dependent variables identified for analysis in this study were *perceived nationality* and *perceived English background*. Figure 3.2 describes how respondents rated each of the 14 speakers on the measure of perceived nationality (5-point Likert scale: 1= "Sounds like they are from the U.S.", 5 = "Sounds like they are from abroad.") and Figure 3.3 does the same for the measure of perceived English background (5-point Likert scale: 1= "Sounds like they have spoken English their entire life.", 5 = "Sounds like they haven't spoken English their entire life."). The average ratings for the Latino English speaker were roughly 2.5 for perceived nationality and approximately 3 for perceived English background. These differed significantly from the average ratings for the Spanish-accented English speaker, both of which hovered around 4.5. In order to provide the necessary context for interpretation, the ratings for each of the other 12 speakers are summarized in Figures 3.2 (perceived nationality) and 3.3 (perceived English background), below.

Figure 3.2 Listener Ratings on Perceived Nationality by Speaker Accent

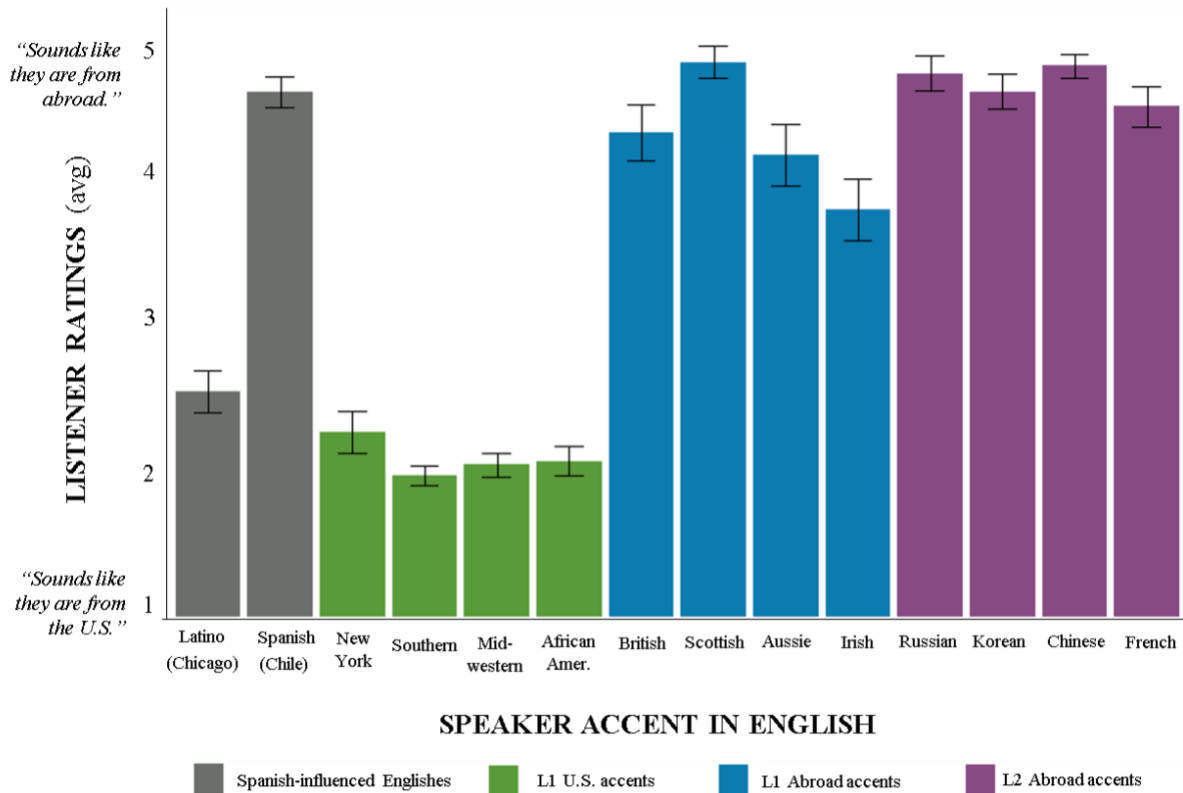


Figure 3.2. Average respondent evaluations of speakers’ foreignness (i.e. nationality) are shown on the y-axis (Likert response scale between 1 (U.S.-sounding) – 5 (Foreign-sounding)). Speaker accents are labeled along the x-axis and are grouped into four categories: Spanish-influenced Englishes (target accents; grey), L1 U.S. English accents (green), L1 Abroad accents (blue), L2 Abroad accents (purple). Standard error is indicated with thin, vertical bars (black).

Two key insights regarding the measure of perceived nationality are gained from Figure 3.2. First, the Spanish-accented speaker (i.e. second gray bar from the left) received ratings that pattern similarly to the accents from abroad (blue and purple bars). The Latino English speaker (i.e. first gray bar from the left), on the other hand, received perceived nationality ratings that most closely aligned with those assigned to the L1 U.S. accents (green bars). However standard error bars between the perceived nationality ratings for the Latino English speaker and the L1 U.S. accented speaker groups show little overlap, suggesting a subtly more foreign-sounding perception for the Latino English speaker.

Figure 3.3 Listener Ratings on Perceived English Background by Speaker Accent

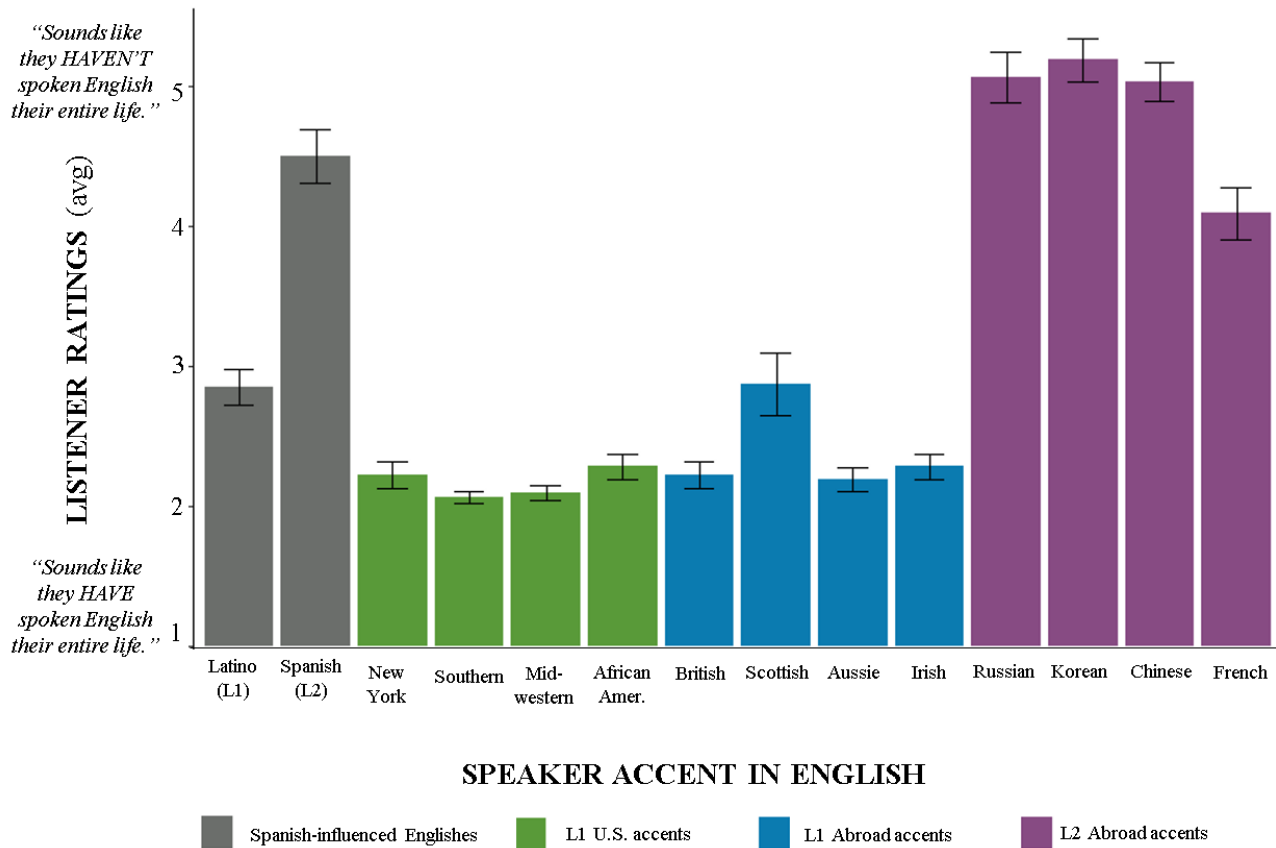


Figure 3.3. Average respondent evaluations of speakers’ perceived English background are shown on the y-axis (Likert response scale between 1 (L1-sounding) – 5 (L2-sounding)). Speaker accents are labeled along the x-axis and are grouped into four categories: Spanish-influenced Englishes (target accents; grey), L1 U.S. English accents (green), L1 Abroad accents (blue), L2 Abroad accents (purple). Standard error is indicated with thin, vertical bars (black).

Two key insights are gained from Figure 3.3. First, on the measure of perceived English background, the Spanish-accented speaker (i.e. second gray bar from the left) received ratings that pattern similarly to the L2 accents (purple bars). The Latino English speaker (i.e. first gray bar from the left), on the other hand, received perceived ratings that most closely aligned with L1 speaker accents (green and blue bars). In examining the standard error bars, it can be observed that the Latino English speaker shares little overlap with the other L1 accented speakers groups, which suggesting a slightly more L2-sounding perception for the Latino English speaker.

In order to calculate the key comparisons of interest, the perceived nationality and English ratings for both Spanish-influenced English speakers were compared to one another and to each of the other 12 accents presented in the experiment. The difference in ratings between each of these 17 comparisons (1 Spanish-accented English – Latino English comparison, 8 L2 Abroad– L1 U.S. accent comparisons, 8 L2 Abroad – L1 Abroad accent comparisons) were calculated and visualized in Figure 3.4 (perceived nationality ratings) and Figure 3.5 (perceived English background ratings), respectively. In the Discussion Section, I will unpack my interpretation of these data, which will involve comparing the difference scores in the Spanish-influenced English comparison condition (shown in gray) with the L2 Abroad – L1 U.S. (shown in green) and the L2 Abroad – L1 Abroad (shown in purple). Doing so allows us to understand how L2 Spanish-accented English and L1 Latino English are situated on scales of perceived foreignness by the respondents surveyed in this sample of U.S. Midwesterners.

Figure 3.4 Differences in Nationality Ratings for Speaker Accent Comparisons

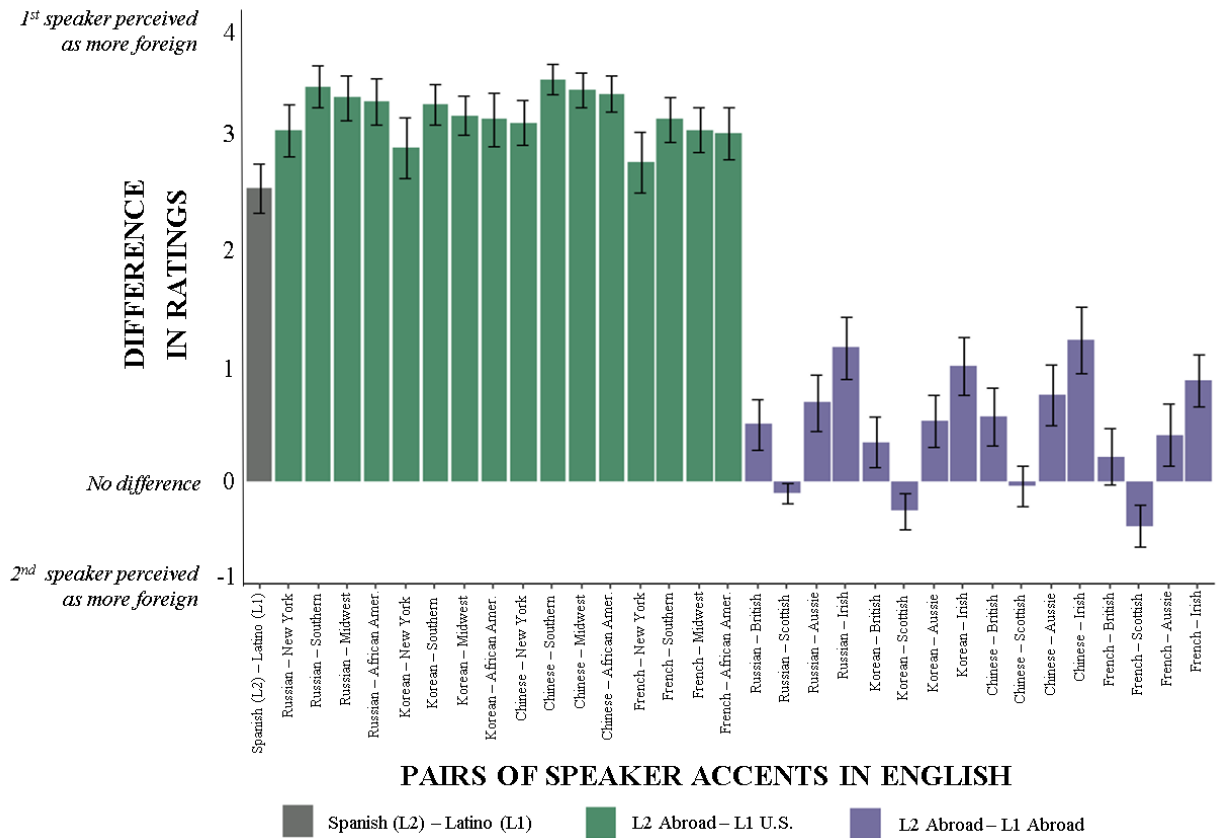


Figure 3.4 Bar height reflects mean differences in perceived foreignness (i.e. nationality) for each speaker accent pair. The further the mean from 0, the greater the difference in respondents' perceptions of speakers' U.S. belonging. A mean difference that is positive indicates that the speaker who was listed first (see x-axis labels, e.g. Russian-New York) was rated as more foreign-sounding (i.e. from outside the U.S.) than the speaker who was listed second. A mean difference of 0 suggests that, on average, the two speakers received comparable ratings regarding perceived foreignness. A mean difference that is negative reveals that the speaker listed first in the pairing was evaluated as more American-sounding (i.e. from the U.S.) than the speaker listed second. Standard error is indicated with thin, vertical bars (black). Speaker pairs are grouped into three categories: Spanish (L2) - Latino (L1) (grey), L2 Abroad - L1 U.S. (green), L2 Abroad - L1 Abroad (purple).

Figure 3.5 Differences in English Ratings for Speaker Accent Comparisons

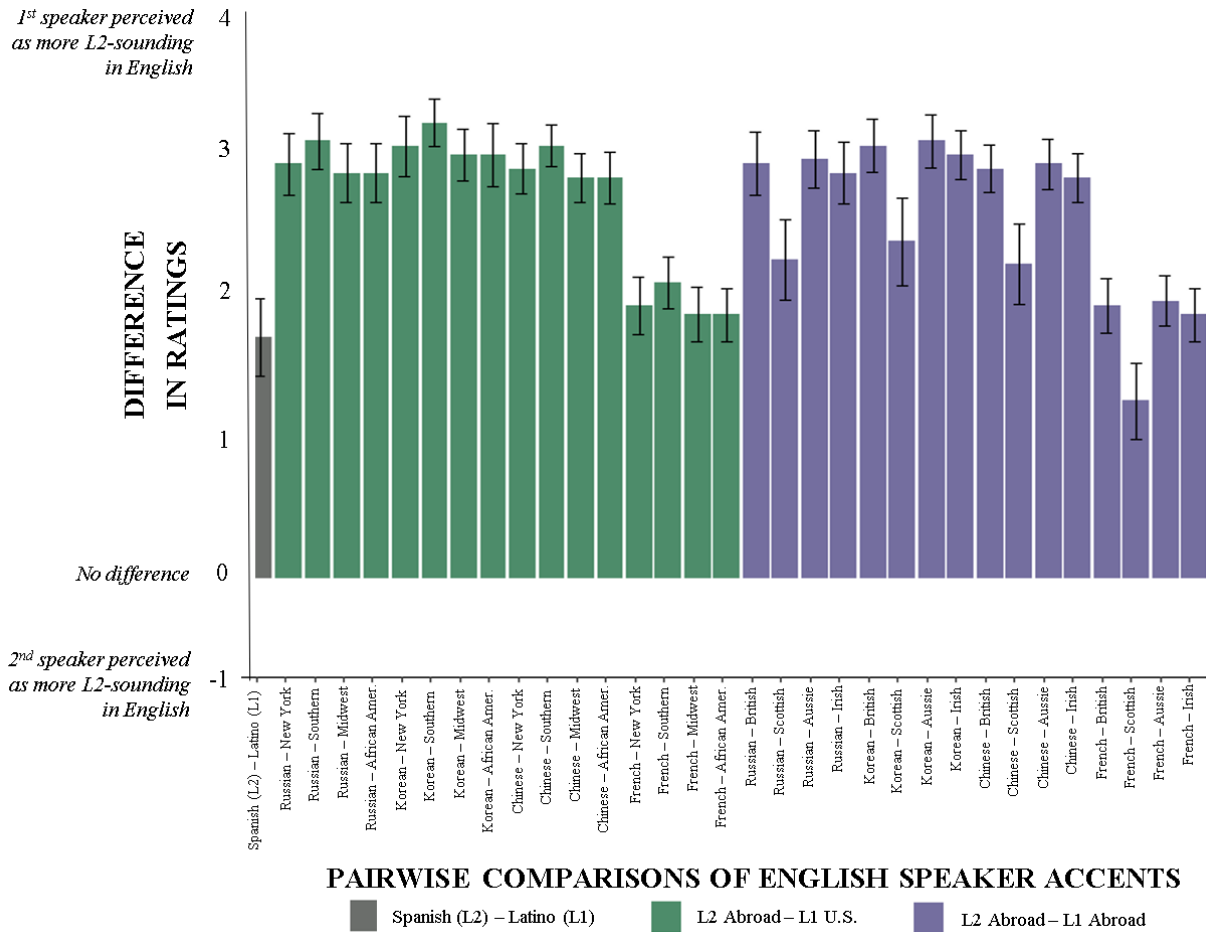


Figure 3.5 Bar height reflects mean differences in English ratings for each speaker accent pair. The further the mean is from 0, the greater the difference in respondents' perception of speakers' English backgrounds. In all pairwise comparisons, the speaker listed first (see x-axis labels, e.g. *French - Irish*) was perceived as more L2-sounding in English than the speaker listed second. In other words, all mean difference (shown on the y-axis) for the 33 speaker comparisons were positive. Standard error is indicated with thin, vertical bars (black). Speaker pairs are grouped into three categories: Spanish (L2) - Latino (L1) (grey), L2 Abroad - L1 U.S. (green), L2 Abroad - L1 Abroad (purple).

To examine the statistical significance of the differences observed in Figures 3.3 and 3.4, a series of 17 dependent t-tests were conducted for the aforementioned comparisons, on the dependent measures of perceived nationality and English background. The results of those analyses are summarized in Table 3.5, below, along with average differences per comparison group (shown in bold).

Table 3.5 Summary Statistics (paired t-tests) for Speaker Accent Comparison Ratings

SPEAKER ACCENTS		PERCEIVED NATIONALITY			PERCEIVED ENGLISH BACKGROUND		
		diff	t (31)	p	diff	t(31)	p
Latino English (L1, U.S.)	Spanish-accented English (L2, Chile)	-2.53	-11.76	**	-1.66	-6.27	**
Latino Eng.	L1 U.S. accents						
	New York	0.34	1.48	0.15	0.63	3.75	**
	Southern U.S.	0.72	3.86	**	0.78	6.26	**
	Midwestern U.S.	0.63	4.06	**	0.75	6.31	**
	African Amer.	0.59	2.97	*	0.56	3.79	**
	<i>AVG DIFF</i>	0.57			0.68		
Latino Eng.	L1 Abroad accents						
	British	-2.19	-7.07	**	0.63	3.90	**
	Scottish	-2.78	-13.29	**	-0.03	-0.11	0.92
	Aussie	-2.00	-7.42	**	0.66	4.49	**
	Irish	-1.53	-5.03	**	0.56	3.36	*
	<i>AVG DIFF</i>	-2.13			0.46		
Latino Eng.	L2 Abroad accents						
	Russian	-2.69	-11.43	**	-2.22	-10.85	**
	Korean	-2.53	-12.02	**	-2.34	-13.21	**
	Chinese	-2.75	-14.05	**	-2.19	-12.40	**
	French	-2.41	-9.98	**	-1.25	-5.93	**
	<i>AVG DIFF</i>	-2.60			-2.00		
Sp.-accented Eng.	L1 U.S. accents						
	New York	2.88	12.16	**	2.28	10.78	**
	Southern U.S.	3.25	21.82	**	2.44	12.82	**
	Midwestern U.S.	3.16	20.20	**	2.41	12.34	**
	African Amer.	3.13	15.28	**	2.22	10.60	**
	<i>AVG DIFF</i>	3.11			2.34		
Sp.-accented Eng.	L1 Abroad accents						
	British	0.34	1.58	0.13	2.28	10.78	**
	Scottish	-0.25	-1.86	0.07	1.63	6.64	**
	Aussie	0.53	2.28	0.03	2.31	11.68	**
	Irish	1.00	3.57	**	2.22	12.08	**
	<i>AVG DIFF</i>	0.41			2.11		
Sp.-accented Eng.	L2 Abroad accents						
	Russian	-0.16	-0.96	0.34	-0.56	-2.41	0.02
	Korean	0.00	0.00	1.00	-0.69	-3.04	*
	Chinese	-0.22	-1.88	0.07	-0.53	-2.58	*
	French	0.13	0.68	0.50	0.41	1.85	0.07
	<i>AVG DIFF</i>	-0.06			-0.34		

Table 3.5. Significance codes: $p \leq 0.00025$ ‘***’, $p \leq 0.0025$ ‘**’, $p \leq 0.0125$ ‘*’

Dark gray row represents the target comparison, while light gray sub-section headers indicate comparative pairwise comparisons. The columns labeled ‘diff’ represent that grand average difference between ratings on the respective outcome measures (i.e. perceived foreignness, perceived English background) the raw scores of which were structured along a Likert scale response of 1 (U.S./L1-sounding) – 5(foreign/L2-sounding). Given the scale, maximum average difference is +-4. P-values have been Bonferroni-corrected ($\alpha = 0.05/4 = 0.0125$) to account for multiple comparisons.

In order to understand the degree to which respondents perceived the Latino English speaker as a Latino English speaker, an analysis was conducted on the open-ended portion of the survey. If the respondent included anything about sounding ‘Hispanic,’ ‘Latino,’ or ‘Spanish-knowing²⁵,’ they were categorized as having identified the speaker as a Latino English speaker. If the respondent mentioned any other races or ethnicities, they were categorized as Other. These included attributions of sounding Black, White, or mixed. If the respondent did not mention anything about race or ethnicity, they were categorized as Unspecified. Then, with this three-way categorization of respondents, survey ratings for perceived nationality and English background were plotted (Figure 3.6).

Figure 3.6 Ratings for Latino English speaker by perceived identity

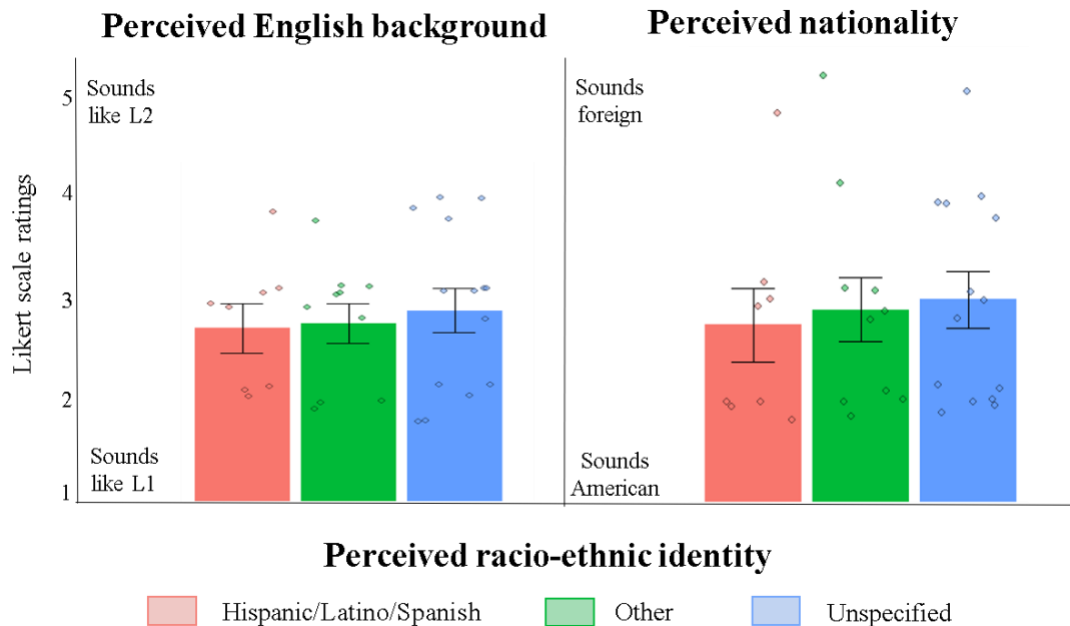


Figure 3.6. Likert responses for national foreignness (Y-axis) are shown for the Latino English speaker, based on the identities perceived by respondents (X-axis). The graph on the left reveals perceived English background for the Latino English speaker by respondents who either perceived him as Hispanic/Latino/Spanish (red; leftmost bar), perceived him as belonging to another racial or ethnic category (green; middle bar), or did not specify (in blue; rightmost bar). The graph on the right reveals perceived nationality for the Latino English speaker along the same x-axis dimensions previously specified. Dots represent individual respondent ratings and black bars indicate standard error.

²⁵ While ‘Spanish-knowing’ is not directly related to a person’s race or ethnicity, it was relevant to include in this analysis, as language background is often used in U.S. discourse as a more comfortable or politically correct way of referring to another person’s race or ethnicity.

The bar graphs in Figure 3.6 indicate that there were a fair number of respondents who either chose not to specify his racial/ethnic demographic or identified him as something other than “Hispanic/Latino/Spanish.” What is most important to notice in Figure 3.6 is that the ratings did not significantly differ as a function of the respondents’ open-ended answers regarding the Latino English speaker’s perceived race/ethnicity. In other words, respondents showed a general tendency for rating the Latino English speaker as “native-trending” regardless of their specification of his assumed race/ethnicity. This is evidenced by the comparatively mid-low scores for all six of the bars. Based on the small sample size, however, it is unclear how generalizable this finding may be. In the following section, I will further unpack the open-ended responses from the survey to provide more nuanced insight into respondents’ perceptions about how these ratings fit within the broader context of the other speaker accents that were analyzed.

In the open-ended section of the survey, respondents were prompted to indicate any characteristics of the speakers they picked up on based on the voice recordings. They were provided with several social identity categories to get started (i.e. general age, race/ethnicity, what other language(s) it sounds like they speak). Looking at the open-ended response data several thematic factors come to the fore. I will begin by summarizing the open-ended responses for the L2 Spanish-accented English speaker, which are rather straightforward. Upon evaluation of the L2 Spanish-accented English speaker from Chile, the majority of respondents mentioned something about a Hispanic heritage or Spanish-speaking background. One representative quote from the survey sums these evaluations up well, saying they “*seem to be from a Spanish speaking country, probably speaks Spanish as a native language.*” However, there was some variation in race-ethnicity evaluations for this speaker. Specifically, of the 9 who mentioned race or ethnicity, 4 said he sounded White and 5 said he sounded

Latino/Hispanic. Of those who mentioned nationality or country of origin ($n=25$), most mentioned Latin America or Europe. Specifically, 12 identified Spain or a Latin American country and 7 mentioned Europe generally or a non-Spanish European, and 2 said India²⁶.

Open-ended responses in the evaluation of the Latino English speaker from Chicago showed substantially more variation. One representative summation from the respondents was, “*He sounds like a white male from the U.S., or someone from another country who has lived in the U.S. speaking English long enough to almost lose an accent.*” This level of slight foreignness is representative of many of the other respondents. Perhaps unsurprisingly, there was significant variation in race/ethnicity evaluations: 5 said White/Caucasian, 5 said Latino/Hispanic, 3 said Black/African American, and 2 said “person of color”/ “not white.” Notably, 5 specifically reported that he sounded like he also spoke Spanish. Importantly, however, no one evaluated his nationality as being from a Hispanic/Latin American country. In fact, all of those who specified a nationality reported him as sounding American or British. Other attributes mentioned included Italian American ($n= 1$), lower class ($n= 1$), and “slight accent” ($n= 2$).

In the following section, I discuss these qualitative responses in combination with the quantitative Likert scale results, both in light of existing language attitudes research. A particular focus is placed on what these data may suggest about the perceived foreignness towards foreign-born and U-S. born Latinos with different linguistic backgrounds in English.

²⁶ The following countries were mentioned by only one respondent each: Lebanon, Indonesia, Russia, and Japan.

5. DISCUSSION

Recall the question under study: in terms of perceived foreignness, how did the young Midwestern listeners evaluate the speech from a Latino English speaker? In particular, how did the respondents situate Latino English speakers on the two outcomes measures of perceived foreignness: perceived nationality and English background? Taken together, the results indicate that the Latino English speaker elicited slightly more foreign sounding evaluations than the other L1 English dialects. While this was true on both measures of perceived foreignness, these statistically significant differences were of moderate effect sizes ($\Delta 0.57$ and $\Delta 0.68$ for perceived nationality and English background respectively, on rating scales from 1-5). In other words, it could be said that, on average, the surveyed Midwesterners evaluated the Latino English speaker as “native-trending.” This is an insightful finding, given what we know about the changing sociolinguistic landscape of Spanish-influenced English varieties in the United States. For instance, as the population of Latina/os (U.S.-born and foreign-born) has continued to rise in the U.S. (Krogstad, 2020), Spanish-influenced English has become more common. For this reason, we may have expected the Latino English speaker to receive foreignness evaluations indistinguishable from speakers of other L1 U.S. accents (e.g. New York). However, as is visually demonstrated in the comparison between the grey and green bar heights in Figures 3.2 and 3.3 (and quantitatively calculated in Table 3.5), the foreignness evaluations for the Latino English speaker were consistently between 0.3 and 0.8 points higher on measures of foreignness. On the measure of English background, the Latino English speaker received ratings more similar to L1 accents from abroad, such as Scottish, which indicate that again a noticeable pattern of what we might call “slight foreignness.” While slight, this consistent foreigner bias towards the Latino English speaker is probably best explained as evidence of

Perpetual Foreigner Syndrome (PFS, Lippi-Green, 2012). Despite the fact that the sociolinguistic landscape of the United States is noticeably changing, and Spanish-influenced English speakers are increasingly commonplace in more regions of the country, there unfortunately still exist sociolinguistic stereotypes that those who carry a non-standard Spanish-accented English accent are somehow less likely than others to be American (Castelan Cargile et al., 2010). To be certain, language (and social) attitudes can take a long time to change, and the results of this preliminary survey shed some much-needed light on issues of PFS as they relate to Latina/os living in the U.S., which are of vital importance from a social advocacy standpoint. Another meaningful insight that resulted from these data was the finding that respondents overall seemed to distinguish the Latino English speaker from the Spanish-accented English speaker. This is evident in the striking difference in foreignness evaluations for the two speakers shown in Figures 3.2 and 3.3 (grey bars) and in the quantitative differences provided in Table 3.5 (Δ 2.53 and Δ 1.66 for perceived nationality and English background respectively, on rating scales from 1-5). Based on the numerous distinctions in the two speakers' phonological patterns (as detailed in Table 3.2), it was predicted that the listeners would evaluate the L2 Spanish-accented English speaker higher on the measures of perceived foreignness, relative to the Latino English speaker. In the following section, I outline several limitations of the study that provide room for future research.

One major shortcoming of this study is, of course, the relatively small sample size. The target range for comparable studies of accent evaluation varies widely, between 30-5,000 respondents (Carrie & McKenzie, 2018; Ladegaard, 1998; Levon, 2014; Levon & Fox, 2014; Campbell-Kibler, 2008; Cussigh, Ballester-Arnal, Gil-Llario, Gimenez-Garcia, & J., 2020; Boughton, 2006). By expanding this study to a larger sample size, I will also be able to

systematically analyze respondents' linguistic experience as a factor. For example, future data collection will include a targeted comparison between respondents with high vs. low levels of exposure to Latino English, in order to capture how exposure may influence evaluations of perceived foreignness. Another shortcoming of this study was that there was only one speaker for the condition of interest, and his recording was only heard once by each subject. Recall, however, that the purpose of the current study was to serve as an initial step in seeking a proof of concept for subsequent research. In particular, this single-speaker design provided the advantage of keeping the survey at a reasonable length for respondents (to avoid attentional fatigue) and also provided a clear foundation for future research. Looking forward, to test the generalizability of these results, I plan to conduct this survey with multiple speakers for each condition. Additionally, I will include speakers of different Latino English varieties, such as Nuyorican English, MexiRican English, Miami English, Puerto Rican English (Escobar & Potowski, 2015; Rosa, 2019). Incorporating stimuli from multiple speakers will allow a broader test of the generalizability of these results. However, given the constraints of the present dataset, the findings as described serve as an important first step in understanding the current state of language attitudes towards speakers of Latino English in the U.S. today.

6. CONCLUSION

The main objective of this paper was to examine the current state of language attitudes towards speakers of *Latino Englishes*, or non-standard varieties of native (L1) U.S. English that show the influence of language contact from Spanish (particularly in the phonology) and are spoken by U.S.-born Latina/os (Fought, 2006). This objective was motivated by a growing line of research, which has documented cases of ethnic othering and linguistic discrimination against

foreign-born and U.S.-born Latina/os in the United States. While varying degrees of foreigner bias towards U.S.-born Latinos in particular had previously been demonstrated based on visual cues (i.e. skin color) and biographical information (i.e. parents' citizenship; Santana, 2018), there had been little research to help us understand if and how such foreigner bias may apply to U.S.-born Latino English speakers through auditory information alone. The accent evaluation study that I conducted in this paper surveyed a preliminary sample of 32 young adults from the Midwest and revealed that Latino English (L1) speech was evaluated as significantly more native-sounding than Spanish-accented (L2) speech, but still slightly more foreign-sounding than other L1 varieties of U.S. English (e.g. New York, African American Language). From these results, we can preliminarily conclude that the surveyed Midwestern listeners generally evaluated the Latino English speaker as what we may call "native-trending," a result which I interpret as a reflection of a slight but persistent case of *Perpetual Foreigner Syndrome*. In light of this finding, I call for future research to further investigate the degree to which the observed foreigner bias towards U.S.-born Latinos may partially derive from language attitudes and ideologies related to sociolinguistic stereotypes that Spanish-influenced accents are more foreign. In order to do so, such studies must be conducted on a larger scale and with speech samples from more than just one Latino English speaker, in order to test the generalizability of the findings herein stated. In closing, it is important to remember that language attitudes are dynamic entities. Much in the way that the sociolinguistic landscape of the United States continues to evolve, so too will our language attitudes towards these "non-standard" varieties.

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8. SUPPLEMENTARY MATERIALS

8.1 Consent and payment form for voice recording

IRB #: HUM00158504 | Approval date: 07/17/2019

Principal Investigator: Emily Rae Sabo, Linguistics Department, University of Michigan

Thank you for visiting the Sound Lab at The University of Michigan to participate in this research project! Below is a description of the task that you have come to participate in today.

Your job is to read aloud a short paragraph into a microphone that records your voice. Your voice recording will be included in an online experiment in which people will listen to several voice recordings (one of which would be yours) and answer questions about the accents they hear (e.g. Where do you think this person is from?). Note that only your voice recording would be included in the final experiment. That is, your name would never be shared in association with your voice recording. You will be paid \$10 for your time and the session should last between 10-20 minutes. If at any point during our session you wish to discontinue, you should feel totally free to do so. Please just let the researcher know.

Do you consent to the use of your voice recording for the online study described above?

- Yes, I do consent. _____
- No, I do not consent. _____

Do you consent for the researcher to play your voice recording at an academic conference²⁷?

- Yes, I do consent. _____
- No, I do not consent. _____

Do you consent for the researcher to make this voice recording publicly available on a website or database?

- Yes, I do consent. _____
- No, I do not consent. _____

PAYMENT INFORMATION

IRB #: HUM00158504 | Approval date: 07/17/2019

Principal Investigator: Emily Rae Sabo, Linguistics Department, University of Michigan

Date: _____ | Paid by: _____ | Amount: _____

Paid to (print your name): _____

Recipient's signature (sign your name): _____

²⁷ Your name would never be identified in association with the recording (unless you specify that you would want it to be shared – in which case, please let me know). General descriptive information relevant to your language background (your age, where you are from, what languages you speak, what age you learned English) may be included, but nothing more personal. If there is anything you particularly do not feel comfortable with the researcher sharing at an academic conference, website, or database – please let me know!

8.2 Stimuli recording recruitment materials

IRB #: HUM00158504 | Approval date: 07/17/2019

Principal Investigator: Emily Rae Sabo, Linguistics Department, University of Michigan

The text used as social media posts and individual emails:

Do you speak with a [insert accent type] accent? Get paid to read sentences for my linguistics research. My name is Emily Sabo, and I am a 5th year PhD student in Linguistics at The University of Michigan. I'm looking for a variety of people to use in an accent perception study that will be part of my dissertation research. If you are interested, you would meet me in the Sound Lab in Lorch Hall Rm 400, it should take less than 20 minutes, I would pay you \$10 for your time, and offer coffee/tea for you either before or after we record. You would read a short paragraph that I would then use in an experiment where listeners would take an online survey with your recording and a variety of others from speakers and they will be asked to answer questions about your accent (e.g. Where do you think this person is from?). Note that only your voice recording would be included in the final experiment. That is, neither your name nor any other personally identifying information will be shared. If you're not able or willing to participate, that's totally okay and thank you anyway! If this is something you would be interested in helping me, please let me know at emsabo@umich.edu.

Participant screening questions:

Thank you for your interest in recording sentences for my accent perception study! Before we can schedule you, there are two pre-screening steps we use to determine if you meet the criteria for participating in this study. To determine that, I ask that you (1) briefly tell me what languages you know and at which ages you started learning each of them and (2) that you send me a quick voice recording as a screening procedure. The quality of the recording doesn't matter, as this recording will be heard only by me, not be used for the research in any way. You can record it on your phone or computer and send it via email or Google Drive to emsabo@umich.edu, If email won't work for you, we can use another medium that is more convenient for you. For the preliminary voice recording, you can read the following passage:

Please call Stella. Ask her to bring these things with her from the store: Six spoons of fresh snow peas, five thick slabs of blue cheese, and maybe a snack for her brother Bob. We also need a small plastic snake and a big toy frog for the kids. She can scoop these things into three red bags, and we will go meet her Wednesday at the train station.

Once I've received your voice recording and your list of languages you know, I'll reach out to let you know if I can use you in the study and we can schedule a time for you to come visit the lab. Thank you!

How the participant screening information will be used:

Their reported language background must match the target language background. For example, if I am advertising for a Russian-accented English speaker, they must report Russian as a native language and English as a non-native language. Then, they must sound Russian-accented to me, the PI, as I am a native speaker of English living in the United States. If both of these conditions are met, they will be invited to come participate in the research and record the sentences that will be used as stimuli in the experiment. If they do not meet both of these conditions, they will be informed they do not meet the requirements of the study and thanked for their time and interest.

8.3 Survey respondent consent form
HUMAN VERIFICATION OF ARTIFICIAL INTELLIGENCE
VOICE PERCEPTION SOFTWARE

IRB #: HUM00158504

Principal Investigator: Emily Rae Sabo, Linguistics Department, University of Michigan

You are invited to participate in a research study about voice perception, specifically accent perception. You have been invited because you expressed interest in participating in this study. In order to participate in this study, you must be a current University of Michigan student, a native speaker of English, and at least 18 years old.

If you agree to participate in this survey, you will be asked listen to a series of audio recordings from a variety of real people speaking in English. Your task is to listen to each person's voice recording and answer a series of questions about them (e.g. Based on how they speak, where do you think this person is from?) You are free to discontinue your participation in the study at any time. Although you may not directly benefit from being in this study, others may benefit because this research will help us to verify a new artificial intelligence software for voice perception. The software has already performed voice perception tasks on these speakers, so the purpose of the present study is to compare its performance with responses from human listeners. At the end of the survey, you will be asked to answer several demographic questions about yourself, mostly pertaining to your language background but also including your age, race, and gender. You are free to decline to respond to any question.

There is no more than minimal risk associated with this study. There are two possibilities of risk that you should be aware of before considering to participate. First, you may feel uncomfortable answering the questions at the end of the survey that ask you how you identify racially/ethnically. This discomfort should be minimized, as your information is kept confidentially, and you are free to decline to respond to any question. Second, in order to compensate you for your completion of the survey, we will need your name as well as a mailing address (the location to which you would like to receive your \$3 MasterCard Gift Card). This of course means we will have your name and mailing address, which poses a slight risk of confidentiality breach. However, this information will be kept secure and confidential (on a secured University of Michigan Qualtrics account and on secured University of Michigan computers only). Additionally, your name and address will be used ONLY to mail you your payment and will not be used in any data analyses.

The experiment takes 20 minutes on average. Upon completion of the survey, you will be compensated \$5 for your time, in the form of a MasterCard Gift Card mailed to the mailing address you provide. You can expect to receive your Gift Card between 10-18 business days.

We plan to publish the results of this study but will not include any information that would identify you. There are some reasons why people other than the researchers may need to see information you provided as part of the study. This includes organizations responsible for making sure the research is done safely and properly, including the University of Michigan or government offices.

To keep your information safe, your name will not be attached to any data, but a study number will be used instead. Information that may be used to identify you will be kept on a password-protected and encrypted computer. These records will be retained for up to ten years. The data you provide will be stored on password protected computers at the University of Michigan. The data may be made available to other researchers for other studies following the completion of this research study, in accordance with

data sharing guidelines in the research community. The data will not contain any information that could identify you.

Participating in this study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time. If you decide to withdraw early, the information and data you provided will be deleted and excluded from any future analysis.

If you have questions about this research, including questions about your compensation for participating, you may contact Emily Rae Sabo (the Principal Investigator of this study) at emsabo@umich.edu or Dr. Jonathan Brennan (Faculty Advisor on the study) at jobrenn@umich.edu. If you have questions about your rights as a research participant, or wish to obtain information, ask questions or discuss any concerns about this study with someone other than the researcher, please contact the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board, 2800 Plymouth Rd. Building 520, Room 1169, Ann Arbor, MI 48109-2800, (734) 936-0933 (or toll free, (866) 936-0933), irbhsbs@umich.edu.

If you agree to participate in the study, please check the box below. Please note that by checking the box below, you are providing your electronic signature. Be sure that you understand what you are being asked to do.

Do you agree to participate in the survey?

1. Yes, I agree to participate in this survey.
2. No, I do NOT wish to participate in this survey. (If so, please exit out of this browser).

8.4 Survey instructions and items

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Participating in this survey requires that you listen to audio clips, so make sure you are in a place where you can listen to the recordings or have headphones for listening. Click the arrow button to proceed to the survey.

After listening to each speaker's audio recording, respondents will answer the following 5 questions about their accent. The first three questions use a 5-point Likert scale and the last two use open ended text responses.

6. This person sounds like they are...
...from the UNITED STATES. - - - - - ...from ANOTHER COUNTRY.
7. This person sounds like they...
...HAVE spoken English their entire life. - - - - - ...HAVEN'T spoken English their entire life.
8. This person speaks in a way that is...
...EASY to understand. - - - - - ...DIFFICULT to understand.
9. Where specifically do you think this person is from?
10. Based on this person's voice recording, what else can you tell about them? (Feel free to provide single-word labels or longer descriptions. Among other things, you may include what you believe to be their general age, race/ethnicity, what other language(s) it sounds like they speak...etc.)

The remaining questions in the survey ask about your language and demographic background.

1. Are you a native speaker of English? (Being a native speaker of English means that you have known it your entire life and are fluent).
 - Yes
 - No
2. List all languages (other than English) that you know or have studied in any way. If multiple, separate by commas and order from most to least proficient. If none, leave blank.
3. In what U.S. cities and states have you lived, and for how long? (e.g. Scranton, Pennsylvania for 4 years). If you've never lived in the U.S., write None.
4. How long (in years) have you lived in the U.S.?
5. What is your race and/or ethnicity? Select all that apply.
 - White
 - Black or African American
 - Latino or Hispanic
 - Asian
 - Native Hawaiian or Pacific Islander
 - American Indian or Alaska Native
 - Other _____
6. What is your age, in years?
7. Do people ever tell you that you have an accent when you speak English?
 - No
 - Yes (Specify what kind in the textbox) _____
8. Do YOU think you have an accent when you speak English?

- No
 - Yes (Specify what kind in the textbox) _____
9. How often do you hear someone speaking English with a Spanish accent?
Very INFREQUENTLY - - - - - Very FREQUENTLY (5-point Likert scale)
10. Can you hold a conversation in Spanish?
- Yes, I am fluent in Spanish.
 - Yeah, but not fluently.
 - No.
11. Which of the following best characterizes your language abilities in English and Spanish?
This question does not appear for respondents who answered 'No' to Question 10.
- I speak both languages natively and fluently.
 - I speak English natively and studied Spanish in school. My English is better than my Spanish.
 - Other (explain in text box) _____
12. Please include any comments, questions, or concerns about this survey here. If you have none, leave blank and proceed.

8.5 Debrief form for survey respondents
HUMAN VERIFICATION OF ARTIFICIAL INTELLIGENCE
VOICE PERCEPTION SOFTWARE
IRB #: HUM00158504

Principal Investigator: Emily Rae Sabo, Linguistics Department, University of Michigan

Thank you for participating in this study! This study was in fact *not* about human verification of artificial intelligence voice perception software. It was about a phenomenon called Perpetual Foreigner Syndrome (Lippi Green 2012²⁸). From a linguistics standpoint, Perpetual Foreigner Syndrome occurs when a person is assumed to be foreign when in fact they are not. This can manifest in everyday interactions of accent perception when, for example, a person who is a native speaker of English and was born and raised in the United States is said to sound like English is not their native language (e.g. “Your English is so good! When did you start learning it?”) or that they sound like they are from a different country (e.g. “But where are you *really* from?”).

The true purpose of this study is initially not shared with survey respondents, as knowing the purpose would likely bias responses. The results of this study are important in understanding how Perpetual Foreigner Syndrome works today in the United States.

Now that you’ve learned about this problem, Perpetual Foreigner Syndrome (PFS), you may ask yourself what you can do about it? One concrete way to mitigate PFS (and it may sound obvious) is to not assume foreignness of those who look and sound different than what you may think of as a prototypical “American.” This can go a long way in reducing linguistic discrimination and increasing equity in our society!

If you have questions about this research, including further questions about the purpose of the study, your compensation for the study, or the final results of the study, you may contact Emily Rae Sabo (the Principal Investigator of this study) at emsabo@umich.edu.

If you have questions about your rights as a research participant, or wish to obtain information, ask questions or discuss any concerns about this study with someone other than the researcher, please contact the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board, 2800 Plymouth Rd. Building 520, Room 1169, Ann Arbor, MI 48109-2800, (734) 936-0933 (or toll free, (866) 936-0933), irbhsbs@umich.edu.

Thank you again for participating in this study! This is important work, and we appreciate your role in helping us better understand how PFS works in the U.S. today.

²⁸ Lippi-Green, R. (2012). *English with an accent: Language, ideology and discrimination in the United States*. Routledge.

8.6 Census data from Shin & Kominski (2010) in the U.S. Census

Table 1.

Population 5 Years and Older Who Spoke a Language Other Than English at Home by Language Group and English-Speaking Ability: 2007

(For information on confidentiality protection, sampling error, nonsampling error, and definitions, see www.census.gov/acs/www/)

Characteristic	Total people	English-speaking ability			
		Very well	Well	Not well	Not at all
NUMBER					
Population 5 years and older.....	280,950,438	(X)	(X)	(X)	(X)
Spoke only English at home.....	225,505,953	(X)	(X)	(X)	(X)
Spoke a language other than English at home.....	55,444,485	30,975,474	10,962,722	9,011,298	4,494,991
Spoke a language other than English at home.....	55,444,485	30,975,474	10,962,722	9,011,298	4,494,991
Spanish or Spanish Creole.....	34,547,077	18,179,530	6,322,170	6,344,110	3,701,267
Other Indo-European languages.....	10,320,730	6,936,808	2,018,148	1,072,025	293,749
Asian and Pacific Island languages.....	8,316,426	4,274,794	2,176,180	1,412,264	453,188
Other languages.....	2,260,252	1,584,342	446,224	182,899	46,787

Table 2.

Languages Spoken at Home: 1980, 1990, 2000, and 2007

(For information on confidentiality protection, sampling error, nonsampling error, and definitions, see www.census.gov/acs/www/)

Characteristic					Percentage change 1980–2007
	1980	1990	2000	2007	
Population 5 years and older.....	210,247,455	230,445,777	262,375,152	280,950,438	33.6
Spoke only English at home.....	187,187,415	198,600,798	215,423,557	225,505,953	20.5
Spoke a language other than English at home ¹	23,060,040	31,844,979	46,951,595	55,444,485	140.4
Spoke a language other than English at home ²	23,060,040	31,844,979	46,951,595	55,444,485	140.4
Spanish or Spanish Creole.....	11,116,194	17,345,064	28,101,052	34,547,077	210.8

8.7 Full table of means and SD for experimental accents and comparison accents

ACCENT GROUP	SPECIFIC ACCENT	MEASUREMENT	AVERAGE	SD	
Experimental (Spanish-influenced accents)	L1 Latino English	National	1.91	1.00	
		Linguistic	1.84	0.72	
	L2 Spanish-accented English	Intelligibility	1.84	0.99	
		National	4.44	0.76	
	Group 1 (L1 U.S. English accents)	New York	Linguistic	3.50	1.08
			Intelligibility	2.44	1.05
Southern		National	1.56	1.01	
		Linguistic	1.22	0.55	
Midwestern		Intelligibility	1.47	0.51	
		National	1.19	0.47	
Group 2 (L1 foreign English accents)	African American	Linguistic	1.06	0.25	
		Intelligibility	1.31	0.54	
	British	National	1.28	0.58	
		Linguistic	1.09	0.30	
	Scottish	Intelligibility	1.22	0.42	
		National	1.31	0.69	
Group 3 (L2 foreign English accents)	Australian	Linguistic	1.28	0.52	
		Intelligibility	1.47	0.72	
	Irish	National	4.09	1.33	
		Linguistic	1.22	0.55	
	Russian	Intelligibility	1.56	0.67	
		National	4.69	0.78	
Group 3 (L2 foreign English accents)	Irish	Linguistic	1.88	1.26	
		Intelligibility	2.53	1.11	
	Korean	National	3.91	1.47	
		Linguistic	1.19	0.47	
	French	Intelligibility	1.44	0.56	
		National	3.44	1.48	
Group 3 (L2 foreign English accents)	Chinese	Linguistic	1.28	0.52	
		Intelligibility	1.88	0.87	
	Russian	National	4.59	0.84	
		Linguistic	4.06	1.01	
	Korean	Intelligibility	2.88	1.13	
		National	4.44	0.84	
French	Linguistic	4.19	0.86		
	Intelligibility	3.03	1.00		
Chinese	National	4.31	0.76		
	Linguistic	3.09	1.06		
French	Intelligibility	2.44	0.91		
	National	4.66	0.55		
Chinese	Linguistic	4.03	0.78		
	Intelligibility	2.88	1.16		

8.8 Full Respondent Background Table

Note: *Fr* = French, *Eng* = English, *Span* = Spanish, *Ital* = Italian, *Ger* = German, *Jap* = Japanese, *Chin* = Chinese, *Gr* = Greek, *Russ* = Russian, *Kor* = Korean, *ASL* = American Sign Language, *Heb* = Hebrew, *Swed* = Swedish, *Guj* = Gujarati, *Mar* = Marathi, *Hin* = Hindi, *Ben* = Bengali, *Arab* = Arabic, *Dan* = Danish.

ID	Eng.	Span	Other languages	U.S. states lived	U.S. yrs. lived	Race / Ethnicity	Age (yrs.)	Do people say you have an accent?
1	L1	n/a	n/a	MI	34	Black	34	Y - Black American dialect
2	L1	L2	Chin, Span	MI	16	Asian	19	N
3	L1	n/a	Guj, Hin, Fr, Span	IL, IN, MI	22	Asian	26	N
4	L1	n/a	Span, Arab	FL, MI	24	White	24	Y - Southern
5	L1	n/a	Jap, Fr, Mar, Hin	MI	21	Asian	21	N
6	L1	n/a	Lat	MI	19	White	19	Y - Michigan
7	L1	L2	Span	WI, IL, MO, OH, MI	24	Black	24	Y - Midwestern
8	L1	L2	Span	MI	20	White, Hispanic	20	N
9	L1	n/a	Kor, Span, Arab, Chin, Jap, Russ	IL, NY, GA, AK, NC, MI	32	White, Asian	34	Y - Midwestern/military drawl
10	L1	n/a	Fr	MI	21	White	21	Y - Yooper (From the UP of MI)
11	L1	n/a	Russ	MI	25	White	25	Y - Not sure what kind exactly
12	L1	n/a	Ben, Jap, Arab	MI	20	Asian	20	N
13	L1	L2	Span	MI	20	White	20	Y - Michigan
14	L1	L2	Span	MI	19	White	19	N
15	L1	L2	Russ, Span, Lat, Fr	NY	21	White	21	N
16	L1	n/a	Thai, Jap	MN, TX	6	Asian	19	N
17	L1	n/a	Chin, Jap, Span	MI	19	White, Asian	19	N
18	L1	L2	Span, Ital, Dan	IL, MN, NY, MI, MO	30	White	30	N
19	L1	L2	Span	MI	21	White	21	Y - Midwest/ Michigan
20	L1	L2	Span	MI	22	White	22	N
21	L2	n/a	Chin, Span, Jap	MI	6	Asian	19	Y - Light Chinese
22	L1	n/a	Lat	MI	21	Black	21	N
23	L1	L2	Span	KY, MI	20	White	20	N
24	L1	L2	Span	MI	20	White	20	Y - Midwestern
25	L2	L1	Span	IL, MI	8	Hispanic	19	Y - Mexican/Spanish

26	L1	L2	n/a	IL, MI	21	White	21	N
27	L1	L2	Span	MI	23	White	23	N
28	L1	n/a	Chin	MI, PA	3	Asian	22	Y - Singaporean
29	L1	n/a	Ger	MI, NJ	22	Asian	22	N
30	L1	L2	Span, Chin	MA, MI	20	Asian	21	N
31	L1	n/a	Lat, Ger	IN, IL, MI	27	White	27	Y - Midwestern

Chapter 4 Speaker Accent May Influence Bilingual Lexical Activation

FULL TITLE:

Speaker Accent May Influence Bilingual Lexical Activation: An EEG Study on Sentence Processing of False Cognates

KEYWORDS: English, Spanish, bilingual lexical activation, speaker accent, EEG, N400

Abstract

One current aim for bilingual cognition research is to understand the complex web of factors that modulate the dynamic nature of lexical activation (Dijkstra, Grainger, & van Heuven, 1999; Dijkstra & van Heuven, 2002; Pavlenko, 2009; Costa, Pannunzi, Deco, & Pickering, 2017; Adamou & Shen, 2019). The EEG study presented in this paper examines the degree to which social information, as inferred from speaker accent, can influence parallel lexical activation for bilingual listeners. This study stems from an emerging body of research suggesting that lexical prediction during auditory comprehension may be sensitive to speaker accent, an inherently social factor. For example, recent studies have found an effect of speaker accent on N400 amplitude in response to dialect-ambiguous words (Martin, Xavier, Potter, Melinger, & Costa, 2015) lexical codeswitches (Kaan, Kheder, Kreidler, Tomic, & Valdes Kroff, 2020), and interlingual homophones (Lagrou, Hartsuiker, & Duyck, 2012). In the current study, I examine the degree to which speaker accent might modulate bilingual lexical activation in response to sentence-embedded false cognates. The preliminary data come from an EEG (N400) experiment in which Spanish-English bilinguals ($n=9$) listened to sentences in English that intermittently contained false cognates from Spanish (e.g. Eng. *bland* used as [[soft]]; Sp. '*blando*' = [[soft]]). Crucially, stimuli were presented across three speaker accents: native-, Spanish-, and Chinese- accented English. Non-selective models of bilingual lexical activation (e.g. BIA+ model) predict that extralinguistic factors like speaker accent should have little or no effect on the bilingual word recognition system. In contrast, dynamic accounts of bilingual lexical activation (e.g. Language Mode theory) assume that a wide range of socially constrained extralinguistic factors in the discourse context are able to dynamically modulate activation of the non-target lexicon for bilingual listeners. Regardless of speaker accent, false cognates on average appeared to elicit slightly smaller N400 components relative to anomalous control words (e.g. Eng. *Bland* used as [[dry]]), providing preliminary support for parallel lexical activation of Spanish in the bilingual listeners. While not significant, the degree of those N400 modulations, appeared to change slightly as a function of speaker accent. Specifically, a slight (though not statistically significant) N400 reduction effect (i.e. false cognates relative to anomalous control words) appeared in grand-averaging analysis in response to the Spanish- and native-accented speech, while no discernible N400 reduction effect was evident in response to Chinese-accented speech. These results suggest that bilingual lexical activation may be slightly sensitive to speaker accent, providing preliminary evidence for dynamic models of parallel bilingual lexical activation; however, a full dataset ($n=30$) will be required to reach the statistical power necessary for testing this prediction.²⁹

²⁹ **Acknowledgments** | Thank you to the U-M Rackham Graduate School, the Linguistics Department, Dr. J. Brennan, Dr. M. Baptista, Dr. J. Boland, and Dr. L. García-Amaya. Any error in this paper is my own.

1. INTRODUCTION

Bilinguals, by definition, possess the knowledge of two lexicons. This presents certain processing challenges, as bilingual language users must continually adjust activation of their respective lexicons based on the demands of the present discourse context (Lauro & Schwartz, 2017). Consequently, one major aim for bilingual cognition research in recent years has been to understand the complex web of factors that modulate the dynamic nature of bilingual lexical activation during online sentence comprehension. The EEG study presented in this paper examines the degree to which speaker accent, a social factor, can influence anticipatory activation of the non-target lexicon, as it unfolds for bilingual listeners during real-time sentence processing. The theoretical motivation for doing so derives from two notions that have emerged within the body of psycholinguistic research: *parallel lexical activation* and *adaptive predictive processing*. Parallel lexical activation (also referred to as bilingual non-selectivity) refers to the notion that bilinguals maintain a certain level of activation for the non-target lexicon even in unilingual contexts (e.g. Spivey & Marian, 1999; Thierry & Wu, 2007; Carrasco-Ortiz, Midgley, & Frenck-Mestre, 2012). Adaptive predictive processing describes a framework of anticipatory language processing, which recognizes that listeners may change – or adapt – their probabilistic expectations of upcoming linguistic representations based on a myriad of linguistic and extra-linguistic factors (e.g. sentential context, word frequency, input variation, interlocutor identity; Huettig, 2015; Romero-Rivas et al., 2015; Hopp, 2016). The preliminary findings of the current study suggest that assumed interlocutor language knowledge, as conveyed by speaker accent, may influence activation of the non-target lexicon for bilingual listeners. These findings contribute to the growing evidence that social information about an interlocutor can modulate anticipatory processing during sentence comprehension (Van

Berkum, Van den Brink, Tesink, Kos, & Hagoort, 2008; Hanulíková, Van Alphen, Van Goch, & Weber, 2012; Molnar, Ibáñez-Molina, & Carreiras, 2015; Kaan, Kheder, Kreidler, Tomic, & Valdes Kroff, 2020).

This remainder of this paper is divided into five main sections. The literature review (Section 2) provides an overview of the scholarship regarding bilingual lexical activation. Specifically, I review the theoretical frameworks and empirical findings that have informed our current models of dynamic parallel activation and adaptive predictive processing. Importantly, the linguistic and extra-linguistic factors that have been shown to influence anticipatory lexico-semantic processing in bilinguals are identified and discussed in order of word- and sentence-level factors (i.e. linguistic effects) and task-, listener-, and speaker-related factors (i.e. extra-linguistic effects). A particular emphasis is placed on reviewing the speaker-related factors, as the role of speaker accent on parallel activation is the focus of the present study. It should be noted that while the focus of the current EEG study is on bilingual lexical activation, studies from the monolingual lexical activation literature are regularly referenced. This is because the dynamic lexical bilingual lexical activation literature evolved from the monolingual lexical activation literature, and only by including both can the full context of speaker-specific anticipatory word processing be provided. In Section 3, I outline the methods for the current study. Sections 4 and 5, respectively, present and discuss the results. The paper concludes with Section 6, followed by the list of references citations and Supplementary Materials (Section 7).

2. BACKGROUND

2.1 How Language Mode theory offers dynamicity to bilingual lexical activation models

BILINGUAL NON-SELECTIVITY, synonymous with parallel activation, refers to the notion that bilinguals maintain at least some level of activation for non-target language representations, even in discourse contexts that are exclusively centered on just one of their languages. This contrasts with BILINGUAL SELECTIVITY, an account that presumes bilinguals fully deactivate, or “turn off” access to, linguistic representations from the non-target language when in unilingual (i.e. monolingual) contexts. While the main objective in the earlier years of the bilingual language processing literature was to determine which of these models better represented the bilingual processor during online word processing, scholars in recent years have moved away from framing this as an either-or debate (Pavlenko, 2009). This is because decades of empirical evidence dating back to the 1980’s have provided overwhelming support for parallel lexical activation (Chen & Ho, 1986; Beauvillain & Grainger, 1987; Caramazza, 1997; Dijkstra, Grainger, & van Heuven, 1999; Spivey & Marian, 1999; Carrasco-Ortiz, Thierry & Wu, 2007; Midgley, & Frenck-Mestre, 2012), alongside more recent studies continuing to uncover the complex web of factors that appear to modulate bilinguals’ online access to the non-target lexicon (Basnight-Brown & Altarriva, 2007; Blumenfeld & Marian, 2007; Friesen & Haigh, 2018; Ito, Pickering, & Corley, 2018, Kaan et al. 2020). As such, most current bilingual lexical activation studies assume a largely non-selective account of the bilingual processor and focus experimental efforts on identifying the factors that can modulate activation of the non-target lexicon (Pavlenko, 2009; Kaan et al. 2020). The two most influential working models that capture the non-selective yet dynamic nature of bilingual lexical activation are the BIA+ (Bilingual

Interactive Activation; Dijkstra & Van Heuven, 2002) and Language Mode Continuum theory (LMC; Grosjean, 1998, 2001).

While many models for bilingual lexical activation have been proposed over the years (e.g. Kroll & Stewart 1994's Revised Hierarchical Model, Green 1998's Inhibitory Control model), the BIA+ (Dijkstra & Van Heuven, 2002) has served as the leading one in recent years. The BIA+ assumes a generally non-selective account of bilingual lexical activation, while acknowledging that at any given time, a host of different factors can modulate the degree of parallel activation. The BIA+ model, which conceives of language membership for lexical items not as a non-hierarchical (i.e. tagged; *soft*_{Eng.}, *blandos*_{Sp}) layer of representation, was developed from its predecessor, the BIA (Dijkstra & Van Heuven, 1998), a model design for application to bilingual visual word recognition. The BIA+, however, makes clear predictions for bilingual auditory word recognition as well, and it differs most importantly from the BIA by making a clear distinction between what it refers to as the bilingual word recognition system vs. the bilingual task/decision system. This distinction between a bilingual word recognition system and a task/decision system is intended to tease apart the time course of bilingual lexical activation into online and offline processes. This distinction is important, as it is used to make predictions about the kinds of factors that can affect bilingual lexical activation. Specifically, the authors of the BIA+ model argue that while linguistic factors (i.e. word and sentence effects) can modulate parallel activation for both the online word recognition as well as offline task/decision system, extralinguistic factors (i.e. task effects, discourse context, language mode, listener and interlocutor effects) can only affect the explicit task/decision system. This prediction from BIA+ that extra-linguistic factors “[do] not affect the activity in the [bilingual word]

identification system” (Dijkstra & Van Heuven, 2002; pp. 188) is of particular importance for the current EEG study, which considers the effect of speaker accent (an extra-linguistic factor) on bilinguals’ automatic recognition of cross-linguistic lexical interferences from the non-target language during online sentence processing. While the authors of the BIA+ assume that extralinguistic factors do not affect bilingual lexical activation during online processing, they do recognize that extra-linguistic factors can affect bilingual lexical activation offline. In this way, their largely non-selective model of bilingual lexical activation does acknowledge that activation to the target-lexicon can be dynamic. The BIA+ model’s dynamic perspective on parallel activation is due in no small part to the introduction of Language Mode Continuum theory (Grosjean 1998, 2001).

Language Mode Continuum theory (LMC) provided a theoretical reconciliation for the debate between non-selectivity and selectivity, which had previously been framed as one of mutually exclusivity. Grosjean (1998) explained that a complex combination of linguistic and extra-linguistic factors could modulate the activation of the non-target language via a shift between what he calls bilingual vs. monolingual mode (see Figure 4.1, below).

Figure 4.1 Language Mode Continuum, a dynamic perspective on parallel activation

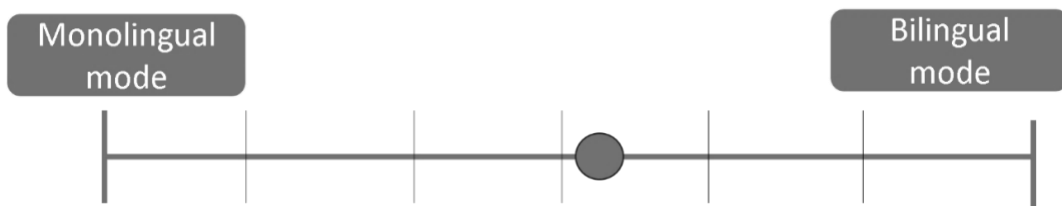


Figure 4.1 Created based on theoretical framework of Grosjean (1998, 2001). The extremes of the continuum represent monolingual mode (left) vs. bilingual mode (right). The dot, which can move along the continuum dynamically, represent the degree of language selectivity in the mind of an individual bilingual, given contextual factors not strictly provided by the framework itself.

According to LMC theory, language mode is defined as the level of parallel lexical activation in the bilingual mind given relevant contextual factors. Within this framework, the extreme ends of the continuum (see Figure 4.1, above) represent monolingual mode and bilingual mode, respectively. Bilingual mode is synonymous with the notion of non-selective parallel lexical activation and monolingual mode refers to selective lexical activation. A bilingual's position along this continuum is conceived as dynamic and subject to shift, representing the degree of language selectivity in the mind of an individual bilingual, given contextual factors not strictly provided by the framework itself. In the research that has flourished in response to the introduction of LMC theory, many different linguistic (i.e. word and sentence-level) factors have been demonstrated to influence bilingual lexical activation in both offline (e.g. RT data in button-pressing lexical decision tasks like) and online processing (ERP data as from Thierry & Wu, 2007; anticipatory eye-tracking data as used in Marian & Spivey, 1999). As such, LMC theory captures the gradient nature of bilingual lexical activation by acknowledging that bilinguals move continuously and dynamically between varying degrees of parallel lexical activation. However, what is left to be reconciled is the degree to which *extra-linguistic* factors can modulate parallel lexical activation at the implicit bilingual word recognition level. While several studies (e.g. Lagrou et al., 2012; Cordova, 2015) have considered how extra-linguistic factors can modulate non-target lexical activation at the offline (i.e. task/decision) level, only a few have directly examined how extralinguistic factors can influence parallel activation during online processing (Molnar, Ibañez-Molina, & Carreiras, 2015; Martin, Molnar, & Carreiras, 2016; Kaan et al. 2020). The current EEG study aims to advance our

understanding of the role that extralinguistic factors – particularly, speaker accent – can play in implicit bilingual word recognition.

In this section, I explained that results from bilingual lexical activation studies have collectively converge on the finding that while bilinguals do not typically demonstrate a total deactivation of the non-target lexicon, they do demonstrate a considerable degree of flexibility in their ability to attenuate it (Costa, Pannunzi, Deco, & Pickering, 2017). In outlining the notion of parallel activation, in combination with the dynamicity afforded by LMC theory, I have laid the groundwork for the current study, which focuses on how speaker accent may influence predictive lexical processing for bilingual listeners. In the following section, I provide a cursory review of several linguistic and extra-linguistic factors that have been shown to affect predictive lexical processing, though I focus primarily on those studies which have explored speaker-related factors like speaker accent.

2.2 Lexical activation: known factors, underlying processes, and experimental measures

In this section, I begin by providing a cursory summary of several prominent linguistic and extra-linguistic factors that prior research suggests can influence lexical activation. Doing so provides the necessary context upon which the current study was designed. Then, as lexical activation is thought to be mediated by the processes of *spreading activation* and *anticipatory processing*, I briefly explain how the findings from psycholinguistic studies into these two related processes eventually gave way to our current working models for how online bilingual lexical processing operates in sentential contexts. By explaining how research into spreading activation and anticipatory processing have shaped current models of dynamic bilingual lexical activation, I briefly introduce the experimental paradigms and

dependent measures most commonly used in psycholinguistic research to measure lexico-semantic activation. This is important for understanding both the findings summarized in the literature review as well as those used in the current EEG study presented in this paper.

Of the various experimental approaches have been used over the years to examine bilingual lexical activation, all generally fall into two main categories: behavioral and neurolinguistic studies, which I will explain in turn. To begin, behavioral studies are typically divided into two sub-types: online and offline tasks. The term *online* as used here, refers to time-constrained tasks that aim to understand language in real-time. This is contrasted by offline studies, which are untimed tasks (e.g. word plausibility or cloze probability surveys) that allow subjects to engage with explicit decision making and as such, are not directly informative in understanding real-time language processing. Online behavioral studies that probe lexical activation can vary wildly in experimental design (e.g. Y/N semantic similarity tasks, phoneme detection tasks, eye-tracking fixations in a visual world paradigm), yet almost all recruit similar outcome measures as proxies for lexical activation. These include reaction time (RT) and error rate (ER) (Neely, 1991). Specifically, longer RTs and higher ER are thought to be indicative of increased processing effort, which is interpreted as increased difficulty in lexical access. If the study is interested in bilinguals' activation of the non-target lexicon, for example, longer RT and higher ER are thought to be indicative of crosslinguistic interference from the non-target lexicon – or more simply, evidence of parallel lexical activation. Behavioral studies have been complemented by neurolinguistic studies, which aim to provide even more precise insights regarding the neural time-course (i.e. with EEG, MEG techniques) and spatial distribution (i.e. with fMRI, MEG) of word processing as it unfolds in the brain (Costa, Pannunzi, Deco, & Pickering,

2017). Of particular interest to the current paper is the N400 component. The N400 component is an event-related potential (ERP) response in the brain linked to meaning processing. The N400 is called as such because it is a negative deflection in the electrical signal that appears approximately 400 milliseconds (ms) after the onset of a word (Kutas & Federmeier, 2011). Based on a long line of research dating back to Kutas & Hillyard (1980), the N400 peak has been shown to increase in amplitude when lexical processing is more difficult (e.g. *I like my coffee with cream and socks/sugar*). Since the discovery that neural components could be used to investigate word processing in the brain (Kutas & Hillyard, 1980), well over 1,000 studies have used the N400 component to measure lexical activation. N400 components are regularly observed between 300 and 500 ms after a stimulus and are largest over centro-parietal sites (Cz and Pz). The N400 has been shown to reflect dynamic and flexible sensitivity to both bottom-up and top-down information (Kutas & Hillyard, 1980; Kutas & Federmeier, 2011). Importantly, it is associated with sensitivity to lexical preactivation (Kutas & Federmeier, 2000), which explains the rationale for the current EEG study utilizing an N400 analysis to measure activation of the non-target lexicon in bilingual listeners.

Now, let us turn our attention to the notion of *spreading activation* (also called Automatic Spreading Activation or ASA). ASA is a cognitive process by which activation of a word (e.g. *bank*) can simultaneously activate related word senses (e.g. ‘money’, ‘river’) or related word forms (e.g. *book, tank*). Support for ASA resulted from a proliferation of associative priming studies, which have overwhelmingly found that word processing is facilitated when a target word is preceded by a related prime, relative to when it is preceded by an unrelated prime (de Groot, 1983; Gottlob, Goldinger, Stone & Van Orden, 1999; Hino

& Lupker, 1996; Rodd, Gaskell, & Marslen Wilson, 2002). Word-level factors that are known to impact spreading activation – and thus, lexical activation – include the following: formal similarities, semantic similarities, word frequency. There exist many studies that provide evidence for these effects on lexical activation for monolinguals (McClelland & Rumelhart, 1981; Frauenfelder; Van Heuven, Dijkstra, Grainger, & Schriefers, 2001; Holcomb et al., 2002; Fugett-Fuller (2008); Rapaso et al., 2006; Kotz et al., 2002; Sass, Drach, Sachs, & Kircher, 2009). One early study that explored this as it relates to *bilingual* lexical activation is Spivey & Marian (1999). The authors used eye-tracking within a visual world paradigm study to measure the level of English lexical activation in Russian-English bilinguals while immersed in a Russian-only context. The subjects were presented with instructions in Russian to look at a series of objects in Russian (e.g. *marku*, *Russ.* ‘stamp’). Upon hearing the target object, they were presented images of four different objects and were asked to look at the picture corresponding to the object they heard in Russian. It was found that a third of the time, they looked at an interlingual homophone distractor from English (e.g. *marker*), instead of the target (e.g. *stamp*) or other two distractor objects (e.g. *key chain*, *quarter*). These results indicate the bilingual subjects maintained a degree of parallel activation of the English lexicon even while in a unilingual Russian context.

Another seminal study, one which – like the current paper -- uses the N400 as a dependent measure, comes from Thierry & Wu (2007). The authors used an implicit semantic priming task in which Chinese-English bilingual respondents were presented auditorily with prime-target words pairs in a unilingual English context. Crucially, some words pairs shared a form-based repetition when translated into Chinese (INTERLINGUAL PRIME: *train* – *ham* (Chin. ‘**huo** che – **huo** tui’), and others did not (UNRELATED PRIME: *apple* – *table* (Chin.

‘ping guo – zhuo zi’). An N400 reduction effect was found for the interlingual prime condition relative to the unrelated prime condition, presumably based on the underlying form repetition (e.g. *huo-huo*). This suggests that Chinese-English bilinguals implicitly activated the Chinese translation of the English words presented during the experiment, providing further support for parallel activation of the non-target lexicon. In short, Spivey & Marian (1999) and Thierry & Wu (2007) are but two of many experimental studies that have examined bilingual lexical activation and found support for parallel lexical activation (for additional reading, refer to Midgley, Holcomb, van Heuven, & Grainger, 2008; Duyck, 2005).

Other factors known to impact lexical processing include word predictability and word plausibility. These factors are directly relevant to the nature of the stimuli used in the current study. When words preceded by a sentential context, spreading activation can occur predictively, which leads into the notion of *anticipatory activation*. As it relates to word processing, anticipatory activation refers to a cognitive process by which language users predict – or preactivate – upcoming word forms and/or meaning during online language comprehension. The idea behind this anticipatory behavior is that it presumably facilitates the later stages of real-time processing. Current psycholinguistic work aims to understand precisely what kinds of words get preactivated (i.e. predicted *content*) and what linguistic and extra-linguistic factors can influence that anticipatory lexical activation (i.e. predictive *cues*) (Huettig, 2015). Of course, the main difference between studying word processing in isolation versus in sentential contexts is the degree of contextual ambiguity. Generally speaking, it has been found that when a target word is situated in a highly semantically constrained sentence (as compared to words in isolation or in loosely semantically

constrained sentences), narrow lexical predictions are stronger. This has been replicated in many studies (e.g. Van Petten & Kutas, 1990; Altarriba, Kroll, Sholl, & Rayner, 1996; Federmeier, Wlotko, De Ochoa-Dewald, & Dutas, 2007; Filik, 2008; Schwartz & Areas, 2008; Carrol & Conklin, 2013). One seminal study that has directly addressed sentence context effects on bilingual lexical activation is Schwartz & Fontes (2008). Using a mediated-priming paradigm, Schwartz & Fontes (2008) asked Spanish-English bilinguals to evaluate whether English word pairs were related in meaning. Crucially, some pairs were unrelated (e.g. blind – bark) and others were mediated through an implicit interlingual homonym relationship (e.g. boat (*barco*) – bark). In this case, Sp. *barco* was the hypothesized mediator because of its interlingual homophone relationship with Eng. *bark*.⁷ When the prime-target word pairs were presented in high-cloze sentential contexts (e.g. INTERLINGUAL PRIME: *We made sure there were life preservers and oars before getting on the boat (barco). BARK.*; UNRELATED PRIME: *He wanted to learn Braille because he had become completely blind. BARK*), it was found that the interlingual prime (e.g. *bark*) resulted in a higher ER and slower RT, relative to the unrelated prime controls (e.g. *blind*). What does this mean for parallel lexical activation in bilinguals? It seems to indicate that even when words are presented with high-cloze sentences in a unilingual context, bilingual listeners still demonstrate some degree of parallel activation of the non-target lexicon, via crosslinguistic spreading activation and anticipatory word processing.

To this point, we have seen overwhelming evidence for non-selectivity in bilingual word recognition. However, it is also true that extralinguistic factors (i.e. task-, listener-, and speaker-related effects) have been shown to *modulate the degree to which* the non-target language is activated. It is in this way that a dynamic account of parallel activation is

introduced. Given that focus of the current study is on the role of speaker accent (a speaker-related effect) on bilingual lexical activation, I do not provide a review into task effects or listener effects. For more on task effects (e.g. task instructions, input reliability, language mode) in lexical processing, refer to Grosjean, 1998; Cordova, 2015; Dijkstra & Van Heuven (2002), Hutchinson (2007), Heyman, Van Rensbergen, Storms, Hutchinson, & De Deyne (2015), Hopp (2016), and Brothers, Swaab, & Traxler (2017). For reading on listener effects (e.g. listener's language proficiency, exposure to community codeswitching norms) in lexical processing, see Rugg (1990), Blumenfeld & Marian (2007), Dussias, Valdes Kroff, Guzzardo Tamargo, & Gerfen (2013), Lauro & Schwartz (2017), Beatty-Martinez & Dussias (2017), Ito, Pickering, & Corley (2018), and, Friesen & Haigh (2018), and Adamou & Shen (2019).

In the following section, I review speaker-related effects that previous studies indicate may impact bilingual lexical activation. This is of direct importance to the study presented in this paper, which examines how speaker accent can adjust anticipatory spreading activation to the non-target lexicon for bilingual listeners during online processing.

2.3 Speaker-related factors believed to influence lexical activation

This section describes the extralinguistic factors related to speaker identity that have been shown to influence listeners' processes of lexical activation during speech comprehension. In line with Fairchild (2018)'s terminology, these are referred to as "speaker effects." These include listener's perception of speaker's foreignness (i.e. L1 vs. L2), familiarity with their

lexical patterns (i.e. dialectal preferences, error typicality), and their assumed language background (i.e. based on speaker accent).

To begin, there is ample evidence to suggest that perceived speaker identity can impact anticipatory word processing in monolingual listeners. Such studies have relied on experimental manipulation of sociolinguistic incongruities (i.e. Van Berkum, van den Brink, Tesink, Kos, & Hagoort (2008),) or dialect-ambiguous words (i.e. (Martin, Xavier, Potter, Melinger, & Costa, 2015). For example, Van Berkum et. al. (2008) conducted an ERP investigation into sentences (e.g. “*Every evening I drink some **wine** before I go to sleep.*”) that when spoken by one kind of speaker (e.g. a child) as opposed to another (e.g. an adult) were socially incongruent based on pervasive social stereotypes and/or pragmatic world knowledge. The study revealed an N400 effect for words that were socially incongruent based on the identity of the speaker (e.g. talk of wine drinking by a child) relative to those that were socially congruent (e.g. talk of wine drinking by an adult), based on the general pragmatic knowledge that children typically do not drink (much less talk about drinking) wine. The key takeaway is that the same sentence, when uttered by a different speaker with a different identity, resulted in a change in lexical processing. This suggests that listeners form expectations about their interlocutors based on social stereotypes related to the speaker identity. While Van Berkum et. al. (2008) directly tested social identities such as gender, age, and social class, they did not directly test regional or national speaker accent. One recent study, however, that has investigated the role of speaker accent on word processing is Cai et. al. (2017), which manipulated speaker accent for dialect-ambiguous words, specifically words whose meanings are ambiguous between British and American English dialects. An example of one of these dialect-specific word meanings is '*bonnet*' which in

British English means the hood of a car but in American English means a type of hat. British and American listeners were presented with a word association task, the stimuli for which came from either a British- or American- accented English speaker. It was found that dialect-ambiguous words (e.g. *bonnet*) elicited different word associations (e.g. *hat* vs. *car*), depending on the speaker's dialect. That is, when *bonnet* was uttered by an American English speaker, British listeners were more likely to infer the American English meaning. In other words, listeners do seem to use accent cues to infer dialect-specific word meaning for ambiguous words. Of course, this explicit (i.e. offline) production task is different from the implicit measures used by ERP studies like Van Berkum et al. (2008) or eye-tracking studies like Spivey & Marian (1999) and Blumenfeld & Marian (2007). Fortunately, Martin, et al. (2015) conducted an ERP study that directly examined speaker accent on the anticipatory processing of dialect-specific word preferences. They found that words inconsistent with the dialect of the speaker (e.g. British-preferred words like '*holiday*' uttered by American accented speakers, American-preferred words like '*vacation*' uttered by British accented speakers) elicited larger negative deflections than consistent words, mainly over posterior regions of the scalp, between 700 and 900 ms after word onset. Note that this effect occurs after the typical time window typically attributed to the N400, which is typically observed 300-600 ms post word onset. As such, it is very possible that this effect is more reflective of semantic integration processes than anticipatory activation modulation. The authors, who entertain both possibilities, ultimately interpret the effect as one of an adaptive change in listeners' predictive word processes. They argue this may be the case as their target words were rather long (~590 ms on average), which could explain the proposed latency effect of the N400. Future studies should control for word length to help clarify the

degree to which these findings more closely speak to predictive processes or semantic integration. Regardless, in light of previous research suggesting lexical prediction and semantic integration are likely parallel processes that unfold in a cascading fashion (e.g. van den Brink et al., 2006), what may be most important from these results is that speaker accent did seem to affect word processing for words that were inconsistent with speaker accent. This provides support for a speaker-specific model of word processing.

While studies like Van Berkum et al. (2008), Cai et al. (2017) and Martin et al. (2015) examined the role of speaker accent on word meaning access, though only considered *native* accents. How applicable is this to foreign (L2) accented speech? Is it processed differently than native speech, such that it is treated as its own social identity group, as some studies have suggested (Goslin, Duffy, & Floccia, 2012; Romero-Rivas, Martin, & Costa, 2015)? Due to increasing globalization and foreign language learning, interactions with L2 language speakers is becoming more and more frequent (Romero-Rivas et al 2016). In response, there has been a surge in scholarly research into the nature of L2 speech comprehension (Clarke et al. 2004; Hanulíková et al., 2012; Goslin et al., 2012; Kaur et al., 2014; Cai et al., 2017, Romero-Rivas et al., 2015; Caffarra et al., 2019). I will review several seminal studies that investigate the role of foreign accentedness on word processing. Taken together, they produce seemingly mixed results. Specifically, it is possible that L2 speech might be no different than native accented speech and all that matters is exposure and familiarity to the accent. However, I will explain how these differences are likely a function of methodological differences between studies.

For example, one seminal study that has examine the effect of foreign-accentedness on word processing is Romero-Rivas et al. (2015). During EEG recording, subjects were

presented with a series of sentences spoken by native and foreign-accented speakers that intermittently contained semantic violations (e.g. *Coming to Barcelona, we also cross a tunnel/piano in the highway.*). The results of an N400 analysis revealed that semantic violations (e.g. piano) elicited a bigger N400 effect when produced by a foreign-accented speaker, as compared to a native-accented speaker. These results suggest listeners may increase anticipatory lexical activation when listening to foreign-accented speech relative to native-accented speech. A possible explanation for doing so may be that since foreign-accented speech can be comparatively harder to process due to less reliable bottom-up acoustic differences in the input, native listeners may strategically devote cognitive resources to anticipatory processing as a way of facilitating comprehension. Such findings are contrasted by studies that report listeners may, in fact, *reduce* anticipatory activation in response to foreign-accented speech. Consider, for example, Goslin, Duffy, & Floccia (2012). During EEG recording, subjects were presented with a series of sentences spoken by native and foreign-accented speakers that did not contain semantic anomalies (e.g. *Roger searched the church tower for the pastor*). The results of an N400 analysis revealed that target words (e.g. pastor) elicited a very slight, but statistically significant, N400 reduction effect when produced by a foreign-accented speaker, as compared to a native-accented speaker. These results suggest listeners may increase anticipatory lexical activation when listening to foreign-accented speech relative to native-accented speech. A possible explanation for doing so may be that since foreign-accented speakers more often produce lexical errors, native listeners may reduce their anticipatory processing efforts to avoid the repair costs associated processing L2 speaker errors, as was suggested by Hopp (2016). While there is some evidence that listeners may increase anticipatory lexical

activation in response to foreign-accented speech (e.g. Romero-Rivas et al., 2015, 2016) and others suggest they may reduce it (e.g. Goslin et al., 2012), other studies have reported no difference at all (e.g. Hanulíková, Van Alphen, Van Goch, & Weber, 2012). In particular, Hanulíková et al (2012) found that semantic anomalies produced by foreign-accented speakers showed no statistically reliable difference when compared to the same semantic anomalies produced by native-accented speakers. In other words, foreign accents, relative to native accents resulted in no difference in N400 amplitudes for semantic violations.

While these data seem to present mixed results about the role of foreign accented speech in word processing, it is important to recognize several differences that may have contribute to these mixed results. I will identify the two I argue are most apparent. First, the instructions given to the subjects were different (i.e. passive listening in Romero-Rivas et. al. (2015) and Goslin et. al. (2012); respond to comprehension questions about the sentences in Hanulíková et. al. (2012)) and as such their processing differences may reflect task effects through a top-down mechanism. Second, the sociolinguistic context of the listeners in these studies (as well as the social stereotypes associated with the foreign accents) are not described and could largely affect how listeners attend to and process their errors. It is will only be through sociolinguistically informed psycholinguistic research that we will gain any clear sense of the possible “foreign accent” effect on word processing in between-study comparisons. Interestingly, in another experiment included in Hanulíková et. al. (2012), it was found that regarding *syntactic* errors, the foreign vs. native accent distinction made a difference in P600 effects. The P600 is a neural component that has been associated with access to morphosyntactic structures, typically appearing 600 ms after

stimulus onset. Specifically, when grammatical gender was incorrectly assigned to a noun, native Dutch listeners demonstrated an P600 reduction effect when that error was uttered by a Turkish-accented Dutch speaker, relative to a native Dutch speaker. These results could reflect one of two claims: that the listeners generally expect less grammatical accuracy from foreign-accented speakers or that they specifically anticipate Turkish-accented speakers to use grammatical gender incorrectly because they know that is a common error, or common feature, of their specific L2 speech variety. Crucially, as the authors explain, most Dutch natives seem to have some degree of metalinguistic awareness that *Turkish*-accented Dutch speakers in particular (not just any L2-accented Dutch speakers) have trouble with the Dutch system of grammatical gender. Their familiarity with Turkish-accented Dutch speech patterns is due to a large recent influx of Turkish immigrants to the Netherlands and increase in interactions with speakers of this particular accent. The fact that Hanulíková et. al. (2012) found a “foreign accent” effect for this well-known syntactic error associated with particular accented speech community but not for anomalous semantic errors, seems to suggest that the dynamic sensitivity observed in the processing mechanism is less about “foreign accentedness” and more about speaker-specific predictions. In this way, the findings suggest a speaker-specific model of anticipatory grammatical processing. What remains to be tested is how speaker-specific models can influence anticipatory activation of the non-target lexicon in bilingual listeners. Several recent studies that have experimentally manipulated listeners’ assumptions about their interlocutors’ language background provide preliminary insight into this question, and I review them in turn in the following paragraph.

One study that examines the effect of speaker accent on bilingual lexical activation is Lagrou, Hartsuiker, & Duyck (2012). This study lays a strong foundation for the study presented in this present paper. Specifically, Lagrou et al. (2012), considered how speaker accent can influence how bilingual lexical activation by presenting bilingual listeners with interlingual homophones from Dutch in English sentences (e.g. *leaf* as [[leaf]]; *lief*, Dutch ‘sweet’). As evidenced by RT on a lexical decision task, these non-anomalous instantiations of interlingual homophones yielded a slight processing cost when produced by a Dutch-accented speaker, relative to when they were produced by a native English speaker. These findings suggest that the non-target lexicon (i.e. Dutch) increased in activation as a function of hearing a Dutch-accented speaker. Another more recent study used ERP data on codeswitch processing to examine the effect that assumed interlocutor language background may have on parallel lexical activation in bilingual listeners. Specifically, N400 effects indicate that the mere physical presence of another bilingual in the discourse context can increase non-target language activation in bilingual listeners (Kaan, Kheder, Kreidler, Tomic, & Valdes Kroff, 2020). Finally, it has also been found that prior association of a speaker and their language repertoire (monolingual vs. bilingual) changes anticipatory processing during speech comprehension, as evidenced through ERP waves measured after visual (interlocutor face) presentation and prior to speech onset (Molnar, Ibáñez-Molina, & Carreiras, 2015; Martin, Molnar, & Carreiras, 2016). Taken together, these results seem to suggest that bilingual listeners adjust their activation of the non-target language in response to extralinguistic factors related to their interlocutors. In this way, a speaker-specific model of anticipatory word activation is introduced with a clear application for dynamic parallel lexical action.

Given the purpose of the current EEG study is to examine how speaker accent influences anticipatory bilingual lexical activation in online sentence processing, this section summarized the influence that existing research suggests speaker accent can have on anticipatory word processing. In the following section, I outline the particular theoretical motivation and experimental design for the current EEG study.

2.4 The current study

Motivated by the recent findings that a listener's assumptions regarding an interlocutor's language background can influence their anticipatory lexical processing (e.g. Kaan et al. 2020), this study examines the degree to which demonstrated speaker accent, a socially-indexed extralinguistic factor, might modulate parallel activation of the non-target lexicon in bilinguals, via a shift towards bilingual language mode. The data presented come from an EEG experiment in which Spanish-English bilinguals ($n = 9$) listened to sentences in English that intermittently contained false cognates from Spanish (e.g. Eng. *bland* used as [[soft]]; Sp. '*blando*' = [[soft]]). Crucially, stimuli were presented across three speaker accents (MUSE³⁰-, Spanish-, and Chinese- accented English) and critical words varied by error type (no error, Spanish false cognate error, anomalous error). Of particular interest was whether average N400 amplitudes, a measure of lexical activation, would show modulation as a function of critical word type and speaker accent. Specifically, would assumed language knowledge of a speaker, as conveyed through speaker accent, affect activation of the non-target lexicon for bilingual listeners?

Based on the evidence for bilingual non-selectivity and recent empirical findings suggesting that bilinguals implicitly activate translation equivalents during online processing (Thierry &

³⁰ MUSE = Mainstream U.S. English

Wu, 2007; Schwartz & Fontes, 2008), it was predicted that false cognates would generally elicit smaller N400 responses than anomalous controls. If assumed language background of the speaker does indeed influence lexical preactivation (e.g. Molnar, Ibáñez-Molina, & Carreiras, 2015; Martin, Molnar, & Carreiras, 2016; Kaan et al., 2020), then Spanish-accented English speech (relative to the other speech), should elicit smaller N400 amplitudes for false cognates (relative to anomalous errors. If, however, N400 amplitudes were to vary as a function of error type but not by speaker accent, that would suggest that the bilingual listeners in this study demonstrated non-selective access to the non-target lexicon but little to no sensitivity to speaker accent.

Only a few studies have considered the effect of speaker accent on monolingual lexical preactivation (Martin et al, 2015; Cai et al., 2017), and even fewer have experimentally tested the effect of speaker accent, or even interlocutor identity more generally, on bilingual lexical activation (Lagrou et. al, 2012, Kaan et al. 2020). The current study seeks to contribute the relatively sparse literature in this research area. To date, none have considered how speaker accent may influence bilingual lexical activation by measuring bilingual responses to false cognates. Two measures that have traditionally been used to measure bilingual lexical activation in sentence contexts are interlingual homophones (e.g. Eng. *embarrassed*, used in an English sentence as [[embarrassed]]; *embarazada*, Sp. 'pregnant') and overt code-switches (e.g. Sp. *embarazada* used in an English sentence as [[pregnant]]). Both interlingual homophones and overt codeswitches maintain a form-function match at the word level (no errors). The current study, however, uses false cognates (e.g. Eng. *embarrassed* used in an English sentence as [[pregnant]]) to measure bilingual lexical activation. The difference between interlingual homophones, codeswitches, and false cognates are provided in the sentences below:

(A) INTERLINGUAL HOMOPHONE:

She answered incorrectly and now her face is turning red. I think she is **embarrassed**.

(B) OVERT CODESWITCH:

She has wanted kids for a long time and now I see a belly bump. I think she is **embarazada**.

(C) FALSE COGNATE:

She has wanted kids for a long time and now I see a belly bump. I think she is **embarrassed**.

Several reasons motivate the selection of false cognates over interlingual homophones and codeswitches. First, interlingual homophones (as in A, above) have previously been used to test the effect of speaker accent on bilingual activation (Lagrou et al., 2012). Lagrou et al. found that reaction times in an English lexical decision task suggested that the non-target lexicon (i.e. Dutch) increased in activation as a function of hearing a Dutch-accented English speaker. As such, using false cognates provides a novel extension to the Lagrou et al. (2012) paper; that is, in addition to use of a more time-sensitive outcome measure (i.e. ERP over RT in a behavioral task). Second, false cognates avoid the processing cost and change in phonological system typically associated with overt codeswitches (as in B, above). This allows us to abstract away from online phonological adaptation and focus, rather, on the underlying lexico-semantic representations. For these reasons, false cognates were used in the experimental paradigm to test the effect of speaker accent on parallel activation in bilingual listeners.

3. METHODS

3.1 Participants

Participants were recruited from a pool of students and recent alumni at the University of Michigan via classroom visits, flyer advertisements, social network posts, and word of

mouth. A total of 34 participants were brought into the lab to participate in the experiment. Of those, nine sessions were terminated prior to the running the main experiment, due to poor SNR (signal-to-noise ratio) discovered on an initial equipment quality check. An additional eleven completed datasets were excluded, due to poor SNR discovered at the data analysis stage. This left 14 datasets viable for subsequent analysis. Participants whose data were submitted for analysis ranged in age from 18-35 years ($M= 23$) and all were fluent English speakers currently living in the Midwestern United States. Crucially, 9 of them were also fluent in Spanish (*Knows Spanish*), and 5 of them had little to no knowledge of Spanish (*No Spanish*). Given the limited sample size for the No Spanish group, results from these analyses are provided only in the Supplementary Materials and are not discussed in this paper. Spanish-English language dominance scores for the *Knows Spanish* group are provided in Table 4.1, based on subjects' responses on the Bilingual Language Profile survey (Birdsong, Gertken, & Amengual, 2012). The BLP scores range from -218 (Spanish only) to 218 (English only), with a score of 0 reflecting perfectly balanced Spanish-English bilingualism. All subjects' scores fell within the central 50% of possible values on the scale (ranged between -85 and 69), indicating no subjects were substantially unbalanced in their Spanish-English language dominance. Importantly, all self-reported high degrees of language proficiency and regular usage of both languages in their daily lives.

Table 4.1 Spanish-English language dominance scores for bilingual subjects

SUBJECT ID	DOMINANCE SCORE	DOMINANCE CATEGORY
1	69	Slightly Eng-dominant
2	50	Slightly Eng-dominant
3	30	Balanced
4	26	Balanced
5	24	Balanced
6	24	Balanced
7	-16	Balanced
8	-48	Slightly Sp-dominant
9	-85	Slightly Sp-dominant

Table 4.1 Category ranges are as follows: Slightly English-dominant bilingualism lies between 45 and 109, Balanced bilingualism between -44 and 44 (the middle 20% of the total range), and Slightly Spanish-dominant bilingualism between -45 and -109. Robust English- and Spanish- dominance would fall within +/-110 and +/-218, respectively. Only two subjects demonstrated a self reporting category than was slightly different from their BLP categories: specifically, subjects 1 and 8 self-reported balanced bilingualism but demonstrated slight English and Spanish dominance on the BLP, respectively.

3.2 Materials

The study consisted of 40 English sentence sets, each containing items across three conditions (no error, Sp. false cognate error, anomalous error) that were spoken by three speakers with distinct accents (MUSE-, Spanish-, and Chinese-accented English). Each item within a set was a short passage composed of 1-3 sentences, in which the final word of the final sentence (i.e. the critical word) was highly semantically constrained. Within a given set, the critical word and its preceding carrier phrase was held constant but varied by the meaning for which the sentence was semantically constrained. Table 4.2 below demonstrates this design with an example of one sentence set, which was recorded by each of the three accented speakers.

Table 4.2 Sample set of critical items (of total n = 40 sentence sets)

ITEM	ITEM DESCRIPTION
Since my aunt usually cooks without any seasoning, the taste of her food tends to be pretty bland .	No error (Eng. <i>bland</i> used as [[bland]]) Probable word is <i>bland</i> . Encountered word is <i>bland</i> .
While the surface of a rock tends to be pretty hard, the surface of a pillow tends to be pretty bland .	Sp. interference error (Eng. <i>bland</i> used as [[soft]]) Sp. <i>blando</i> = [[soft]] Probable word is <i>soft</i> . Encountered word is <i>bland</i> .
Don't use that towel there. That one is usually pretty wet, whereas this one tends to be pretty bland .	Anomalous error (Eng. <i>bland</i> used as [[dry]].) Probable word is <i>dry</i> . Encountered word is <i>bland</i> .

Table 4.2. The study comprises 40 English sentence sets, each containing items across the three conditions shown in this table (no error, Sp. false cognate error, anomalous error) and spoken by three speakers with distinct accents (MUSE-, Spanish-, and Chinese-accented English).

Each subject heard the same 540 items: all 360 critical auditory items (120 unique items x 3 speakers) plus half that many fillers ($n = 180$ filler items). The purpose of the fillers was two-fold: to reduce the overall percentage of sentences with lexical anomalies, and to serve as distractors from the experimental focus on false cognates from Spanish. To distract participants, these fillers included sentences with a progressive, social justice focus so that subjects may believe implicit biases or social judgments were the objective of the study. To this end, of the nine subjects whose data are presented in this paper, 3 subjects reported thinking the experiment was about social bias, as evidenced by responses to an open-ended question on the post-experimental questionnaire. Other perceived goals of the experiment were accent processing ($n=5$), general word error processing ($n=2$), and/or Spanish false cognates ($n= 6$). Subjects' written responses are available in the Supplementary Materials. Of the 180 filler items, 12 were designed to contain lexical anomalies, three of which were in sentence final position and nine of which were placed

sentence-medially. Given the final 360 critical items and 180 filler items subjects heard in the experiment, roughly a third of them had the progressive distractor focus (34%, $n = 185$) and under half contained a lexical anomaly (47%, $n = 252$). A sample of the filler items are provided in Table 4.3, below. For the full list, see the Supplementary Materials.

Table 4.3 Sample of filler items (of total $n = 180$)

ITEM
(a) People of all backgrounds should have equal access to education.
(b) Fighting social injustice is something I am passionate about.
(c) Relative to white people, people of color are disproportionately arrested by police.
(d) The gender pay geek is a huge problem in the United States today.

Table 4.3 As with the majority of filler items, sample filler items (a-c) do not contain any lexical anomalies. Sample filler item (d), however, intentionally includes one (i.e. “The gender pay *geek*” instead of “The gender pay gap”). All fillers maintain a social justice focus for distraction purposes.

Prior to the selection of the final 120 critical items (belonging to 40 critical sentence sets), an initial 202 critical items (belonging to 60 critical sentence sets) were created. First, 60 target words were identified, all English words that share an interlingual homophone relationship with a Spanish word (e.g. *bland- blando*, Sp. ‘soft’; *embarrassed - embarazada*, Sp. ‘pregnant’; *pan – pan*, Sp. ‘bread’). These were identified through a combination of the researcher’s own Spanish-English bilingual word knowledge and consultation of previous scholarly and pedagogical works that have identified interlingual homophones, or false friends, between Spanish and English (Macizo et al. 2010; The State Education Department 2015; McGregor, 2016; Aske, 2019). To ensure that the interlingual homophone pairs were

recognized as such by Spanish-English bilinguals, an Interlingual Homophone survey (IHS) was employed. Seventeen U.S. adults who self-reported as native and highly fluent bilinguals of Spanish and English participated in a Qualtrics survey administered through Amazon Mechanical Turk. Respondents were asked to identify the Spanish word that they believe sounds most similar to the presented English word: *To me, the English word 'bland' sounds most like the Spanish word ____*. Interlingual homophones that were not reliably identified as such by respondents were excluded from the experiment. While an auditory version of this survey might seem preferable, given the stimuli in the EEG experiment would be presented auditorily, a written survey was used in order to avoid effects of accent on word form perception. For the 40 target words used in the experiment, respondents identified the target Spanish word in the interlingual homophone relationship (e.g. *blando/a*) 81% of the time (SD = 17%, Min = 35%, Max = 100%). In addition to this, Levenshtein Distance (LD) was low (avg = 1.7, range=0:6), indicating a high degree of formal similarity. The outcome of norming in line with these criteria was to identify target words in English that could convincingly be considered interlingual homophones with Spanish by scholarly accounts (i.e. LD) and the population of interest (i.e. Spanish-English bilinguals). Next, the interlingual homophones were embedded into sentential contexts that varied by semantic constraint.

For each of the target words, three items were constructed in line with the experimental design: No Error, Sp. Interference Error, Anomalous error. This required manipulation of word predictability and plausibility. In the No Error condition, the target word (e.g. Eng. *bland*) was used in a sentential context semantically constrained for its true word meaning (e.g. [[bland]]). In the Spanish Interference Error (i.e. false cognate)

condition, the target word (e.g. Eng. *bland*) was used in a sentential context semantically constrained for its interlingual homophone meaning in Spanish (e.g. [[soft]]). In the Anomalous Error condition, the target word (Eng. *bland*) was used in a sentential context semantically constrained for an unrelated meaning (e.g. [[dry]]). Where possible, more than one item was generated per condition to allow for several options post-norming. Items within each set were controlled in the following ways. First, the target word form (e.g. *bland*) always appeared sentence finally, and the immediately preceding context (e.g. *...tends to be pretty...*) was kept constant across items. Also, variation in item word count within sets was kept to a minimum. In the final 40 sentence sets, average item length was 27 words (range was 9-48 words) and variation in word count between items *within* sets was relatively small (AVG Δ = 3, MIN = 0, MAX = 7). Additionally, all items were designed to have high-cloze probability for the target word, such that the average native English listener would reliably predict the sentence final word forms for which the sentences were semantically constrained. This was verified with an offline cloze probability task. Each item was measured by 20 native English speakers from the U.S. who reported little to no knowledge of Spanish. It was important to ensure that the respondents had little to no knowledge of Spanish, so as to avoid any possible productions of false cognates. Items with the lowest predictability were excluded from the experiment. Experimental items had an average cloze probability of 0.75 (Min = 0.2, Max = 1, SD = 0.2). In addition to manipulating predictability, plausibility of the encountered word given its sentential context was also systematically controlled. Furthermore, the target word in the two experimental conditions (Sp. Interference and Anomaly) were designed to be comparably low in plausibility, relative to the high plausibility of the target word in the No Error condition.

These criteria were normed for with an offline word plausibility survey hosted on the software platform Qualtrics and distributed on the recruitment interface Prolific. Each critical item was rated by 20 native English speakers from the United States who reported little to no knowledge of Spanish. Subjects were presented with a series of critical items (e.g. *While the surface of a rock tends to be pretty hard, the surface of a pillow tends to be pretty bland.*) and were asked to rate the sensicality of the sentence, using a 5-point Likert scale (1= Doesn't make sense, 5= Makes sense). After norming, plausibility for the No Error, Spanish Error, and Anomalous Error were 4.8 (SD=0.2), 1.9 (SD=0.8), and 1.6 (SD=0.5), respectively.

It was important to the experimental design that the only meaningful difference between the two error conditions (Spanish Error vs. Anomalous Error) was whether the lexical error was reflective of interference from Spanish. As such, the stimuli were matched in semantic and formal similarity. First, the words for which error condition sentences were semantically constrained (e.g. *soft – dry*, for the Sp. interference and anomalous conditions, respectively) were matched in terms of their cosine similarity with the encountered word (e.g. *bland*). Differences in cosine similarity measurements between the predictable word and encountered word were minimized between error conditions within a set (i.e. always Δ 0.15 or less; -1:1 scale). Cosine similarity between predictable and encountered word averaged 0.29 (SD =0.13) for the Spanish Interference condition and 0.29 (SD = 0.12) for the Anomalous condition. Within sets, average difference in cosine similarity between error conditions was 0.06 (Min = 0, Max = 0.15, SD = 0.04). All cosine similarity measurements were calculated in Python³¹ (version 3.7) using Stanford's word-embedded vector GloVe, an

³¹ Code implemented in Python (Spyder) using the SpaCy package to measure semantic similarity:

unsupervised learning algorithm with a vocabulary of the 400,000 most frequent words in English. The cooccurrence matrix was trained on aggregated global word-word co-occurrence statistics from five large corpora: Wikipedia dumps from 2010 and 2014 (1 billion and 1.6 billion tokens, respectively); Gigaword (4.3 billion tokens), the combination of Gigaword5 + Wikipedia2014 (collectively 6 billion tokens) and web data from Common Crawl (42 billion tokens). To control for formal similarity, the following criteria were used. When the false cognate did not share any phonological overlap with the English word (e.g. *bland* - *soft*), the anomalous error term was selected to maximize phonological differences. But, when the homophone pair shared word onset (e.g. *bank* - *bench*), the anomalous error word was selected to have a similar phonological overlap (e.g. *book*).

With the final list of 120 critical items set, speakers were identified, their speech samples recorded, and the auditory stimuli prepared. The three speakers selected for recording of the stimuli were chosen based on the results of an online accent evaluation survey. The survey was completed by 31 respondents with an average age of 22 years living in a Midwestern U.S. city who self-reported as native speakers of English and/or have lived in the U.S. for most or all of their lives. Subjects were asked to listen to a series of 15 speakers with different accented Englishes (e.g. British, African American, Chinese,

```
import spacy
nlp = spacy.load('en_core_web_lg')
#Calculate semantic similarity
tokens = nlp('bland soft')
tokens[0].similarity(tokens[1])
#Find closest semantic neighbors
def most_similar(word):
    queries = (w for w in nlp.vocab if w.is_lower == word.is_lower and w.prob >= -15)
    by_similarity = sorted(queries, key=lambda w: word.similarity(w), reverse=True)
    return by_similarity[:40]
[w.lower_ for w in most_similar(nlp.vocab['bland'])]
```

Russian) as they read the same elicitation passage, taken from the Speech Accent Archive.³² All speakers were male and ranged in age from 18 to 42 years old. Crucially, one speaker had an (L1) Mainstream U.S. English accent and another had an (L2) Spanish-accented English. The purpose of this survey was to identify which of the (L2) foreign-accented English speakers (i.e. Russian, Korean, French, Chinese) would serve as a control for the (L2) Spanish-accented English speaker in the main EEG experiment. Importantly, the speaker in the control condition needed to be easily identifiable and not easily misinterpretable as having an L2 Spanish-accented English. The L2 Chinese-accented English speaker was chosen, as he was accurately identified (84% of respondents) as either Chinese or Pan-Asian and never categorized as having a Spanish/Hispanic/Latino origin. Of equal importance was that the Chinese-accented speaker received ratings relatively similar to those assigned to the Spanish-accented speaker on the following parameters: perceived foreignness (1=From U.S., 5=From abroad), assumed English background (1=L1 English, 5=L2 English), and intelligibility (1=Easy to understand, 5=Difficult to understand). The Chinese-accented speaker was rated as equally foreign ($M= 4.7$, $SD= 0.6$) as the Spanish-accented speaker ($M= 4.4$, $SD= 0.8$), equally L2-English sounding ($M= 4$, $SD= 0.8$) as the Spanish-accented speaker ($M= 3.5$, $SD= 1.1$), equally as intelligible ($M= 2.9$, $SD= 1.2$) as the Spanish-accented speaker ($M= 2.4$, $SD= 1.1$). Degree of exposure to and familiarity with accents was unfortunately not measured in this survey, but it was included in the post-experimental questionnaire for EEG subjects. As anticipated, the MUSE-accented speaker

³² “Please call Stella. Ask her to bring these things with her from the store: Six spoons of fresh snow peas, five thick slabs of blue cheese, and maybe a snack for her brother Bob. We also need a small plastic snake and a big toy frog for the kids. She can scoop these things into three red bags, and we will go meet her Wednesday at the train station.”

received noticeably distinct scores, relative to the Spanish- and Chinese-accented speakers, along these measures of foreignness ($M= 1.3, SD= 0.6$), L2-sounding-ness ($M= 1.2, SD= 0.3$) and intelligibility ($M= 1.2, SD= 0.4$). The three speakers selected to read the stimuli for the EEG experiment are described in Table 4.4 below.

Table 4.4 Characteristics of three speakers and their accents

English	Accent	From	Time in U.S.	Gender	Age
L1	MUSE	Michigan	Entire life	M	22
L2	Spanish	Chile	3 yrs.	M	41
L2	Chinese	China	9 yrs.	M	31

Stimuli were recorded in a sound-attenuated booth using an AKG P420 microphone at a sampling rate of 44.1 kHz and bit depth of 16 bits. First, the researcher read aloud each item while the speaker listened and read along, after which the speaker could ask questions about specific words or pronunciation. Then the speaker read aloud the item minimally two times. Training was provided by the researcher when necessary to obtain the desired prosody and pronunciation, and repetition productions were encouraged by the researcher in cases of disfluencies. Once all items were recorded, a research assistant isolated the items that had maximally intelligible pronunciations and minimal background noise and disfluencies. Once the 540 target audio files were identified, a fade-in and fade-out at 10ms was applied at the onset and offset of each recording to reduce clipping artifacts, and peak volume was normalized to -6.0dB to maintain a comparable volume between items and speaker conditions.

3.3 Procedure

Participants arrived at the lab and signed a consent form, followed by a Handedness Survey. In order to maintain a monolingual language mode (Grosjean, 1998, 2001) in the experimental session, researchers spoke only English with each other and participants; Spanish was never used. After being fit with the EEG cap, participants were seated about 100 cm in front of a computer screen and electrolyte gel was applied to minimize impedances between each electrode and the participant's scalp. Electrodes were also placed on the inside of the right wrist (to serve as the ground for the VEOG) and above and below the left eye (to monitor eye blinks). The participant was then fitted with two in-ear earphones (Etymotic Inc. EA-2). Sound levels were set to 45 dB above each individual's hearing threshold, assessed using 1 KHz tones (300 ms, 10 ms fade in/out). This was followed by a two-minute quality check test, in which the participant was instructed to sit still and stare at a fixation cross on the screen while listening to 120 1 KHz tones. EEG data were visually inspected to check for low noise in the data before moving on to the main experiment. For the main experiment, subjects were instructed to fixate on a crosshair on the screen and listen to a series of utterances by various speakers. They were told to expect that after some recordings, they would be presented with a sensicality judgment (i.e. *Does what they said make sense?*), to which they were required to provide a Y/N keyboard response. These intermittent attentional judgment prompts occurred in a randomized fashion, at a probability rate of 0.17. Figure 4.2 provides a schematic representation of the experimental procedure.

Figure 4.2 Schematic representation of experimental procedure

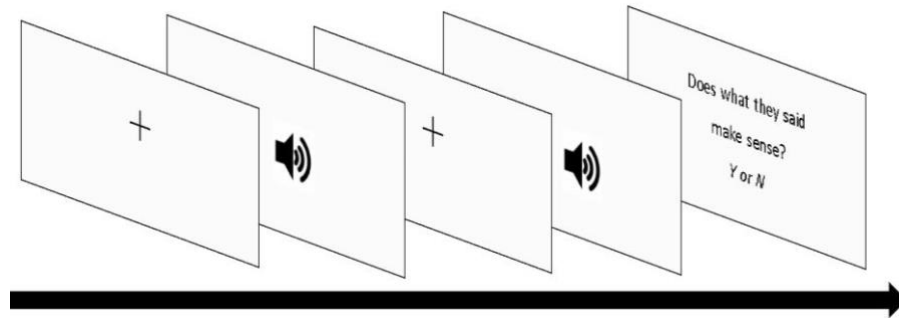


Figure 4.2 Subjects heard a series of audio recordings spoken by three distinctly accented speakers. Each audio recording was preceded by a 500 ms crosshair fixation point. Intermittently (at a probability of 0.17), subjects were presented with a semantic awareness probe in the form of a sensality judgement.

Subjects were presented the auditory items in a randomized series of 15 blocks, each containing 36 pseudo-randomized items. Block order presentation was randomized for each individual subject using PsychoPy (Peirce, et al., 2019), the experimental software by which stimuli were presented and subject responses were collected. The 36 items within each block were pseudo-randomized using the software *Mix* (van Casteren & Davis, 2006),³³ with two distance constraints: items from the same set always had a minimum distance of 15 items between them, and items from the same condition always had a minimum distance of 4 items between them. Two pseudorandomized lists were created to reduce the possibility of a within-block item order confound. However, it should be noted that due to the low SNR that

³³ Randomization script for 540 items using *Mix*:
//Call in the 540 items using the ItemFile command
ItemFile C:\ItemsOriginalOrder.txt
//Set desired Condition and Set properties for the items
Property Condition 2
Property Set 3
//Set the constraints for pseudorandomization
Constraint Condition MinDist 4
Constraint Set MinDist 15
//Have the output file save to the desktop using the OutputFile command
OutputFile C:\ ItemsRandomizedOrder.txt

led to exclusion of several subjects' datasets, there was an imbalance among the subjects whose saw List 1 ($n = 11$) versus List 2 ($n = 3$). However, the items were randomized within lists, not split between lists; that is, all 14 subjects were presented with the same 540 items, just in different pseudorandomized orders. After the main experiment, all participants were asked to fill out a post-experiment questionnaire focused on demographic and linguistic background. Spanish-English bilingual subjects were asked to fill out the online Bilingual Language Profile Survey (Birdsong, Gertken, & Amengual, 2012) to measure language dominance and usage. In total, subjects listened to 540 items (short passages in English), which consisted of 360 critical items and 180 fillers. Accounting for break time in between each block, which was at the discretion of the subject, the average length of the experiment was 75 minutes.

3.4 EEG recording and pre-processing

EEG was recorded with an elastic cap with 61 actively amplified electrodes and one ground electrode (acti-Cap, Brain Products GmbH). Electrodes were distributed equidistantly across the scalp according to the Easycap M10 layout. The electrode impedances were kept at $25\text{k}\Omega$ or below. Data were recorded at 500 Hz between 0.1 and 200 Hz referenced to an electrode placed on the right mastoid (actiCHamp, Brain Products GmbH). The electro-oculogram (EOG) was recorded from electrodes placed above and below the left eye. Offline, the EEG data were epoched based on critical word onset, and re-referencing was conducted through an average from data collected at the right and left mastoid electrodes. Through an initial inspection of the data, channels ($n = 61$) and trials ($n = 540$) with exceptionally high noise were manually removed. After that, any identifiable artifacts

unrelated to the ERP effects of interest were removed (i.e. eye blinks, saccades, alpha waves associated with drowsiness) using an Independent Components Analysis (Makeig, Bell, Jung & Sejnowski, 1996; Jung et al., 2000). A final inspection of variance was conducted and any remaining trials and channels with high degrees of variance were manually rejected. For each of the nine datasets analyzed in this paper, manual rejections were applied to an average of 13% of trials (i.e. roughly 70 trials per dataset) and 14% of channels (i.e. roughly 8-9 channels per dataset). Signals from sensors with unreasonable noise were replaced through surface spline interpolation (Perrin, Pernier, Bertrand, & Echallier, 1989). Baseline correction was performed with reference to pre-stimulus activity (-200-0 ms). Segments were averaged for each subject, experimental condition, and electrode. Average N400 amplitudes were measured across the entire scalp in the standard (300-500 ms) time window following the onset of the critical word.

3.5 Planned analyses

With the broader aim of understanding the degree to which speaker accent may influence bilingual lexical activation during online sentence processing, the current study examined whether bilingual listeners use speaker-specific accent cues to guide word meaning interpretation for crosslinguistic errors. As operationalized in the context of this experiment, I investigated whether Spanish-accented English speech in particular would increase activation of Spanish form-function mappings in the minds of bilingual listeners. Analysis of averaged N400 components were conducted across nine Spanish-English bilingual EEG subjects. In measuring the N400 components, onset of the target words were used as triggers points. Data were averaged across centro-parietal electrodes between 300-500 ms for each participant in

each condition. The data analysis was performed using the FieldTrip toolbox for EEG-analysis, developed at the Donders Institute for Brain, Cognition and Behaviour (Oostenveld, Fries, Maris, & Schoffelen, 2011). To test the significance of differences in averaged N400 amplitudes, a two-way factorial ANOVA model³⁴ was implemented in R (version 3.6.1) that calculated the main effect of both factors as well as their interaction.

4. RESULTS

Results of an N400 analysis for the Spanish-English bilingual subjects are provided below, both in the form of averaged ERP waveforms (Figure 4.3) and box-and-whisker plots (Figure 4.4).

Figure 4.3 Averaged ERP waveforms in the N400 time window

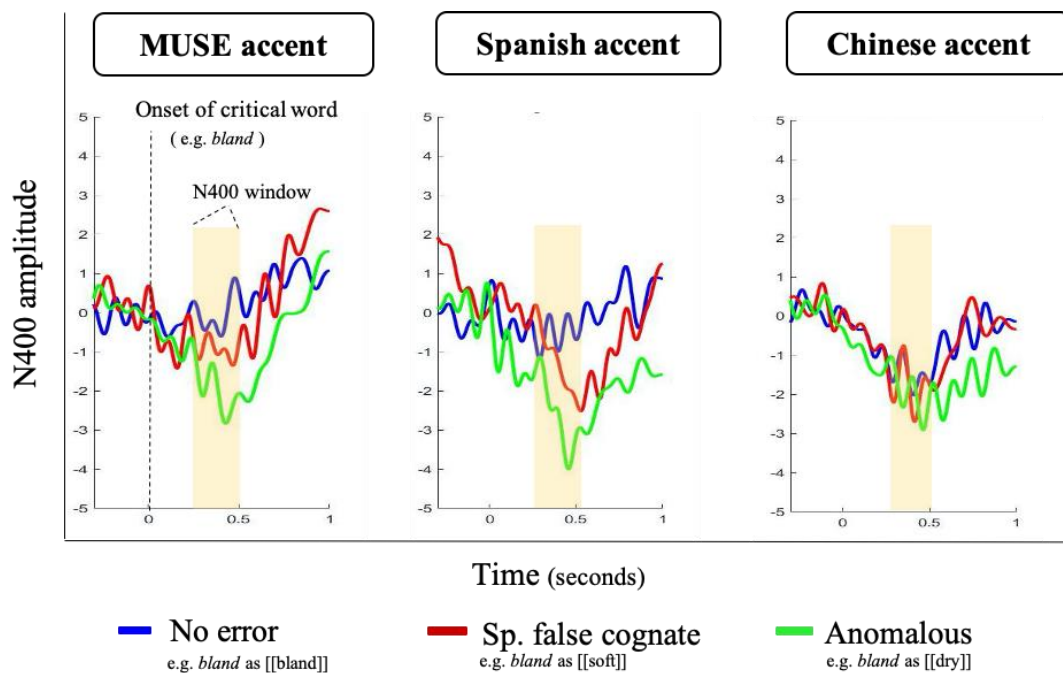


Figure 4.3 Average N400 amplitudes (microvolts) are on the y-axis and time (seconds) on the x-axis. Blue lines reveal average responses to expected words (No error), red lines reflect response to Sp. false cognates (Spanish error), and green lines indicate response to anomalous words (Anomalous error). The three side-by-side plots distinguish speaker accent (left to right: MUSE-, Spanish-, Chinese-accented English). Vertical bars (yellow) highlight the N400 time window, 300-500 ms after onset of the critical word.

³⁴ $\text{aov}(N400 \sim \text{Speaker Accent} + \text{Word Type} + (\text{Speaker Accent} * \text{Word Type}))$

Figure 4.4 Averaged N400 amplitudes by speaker accent and lexical error type

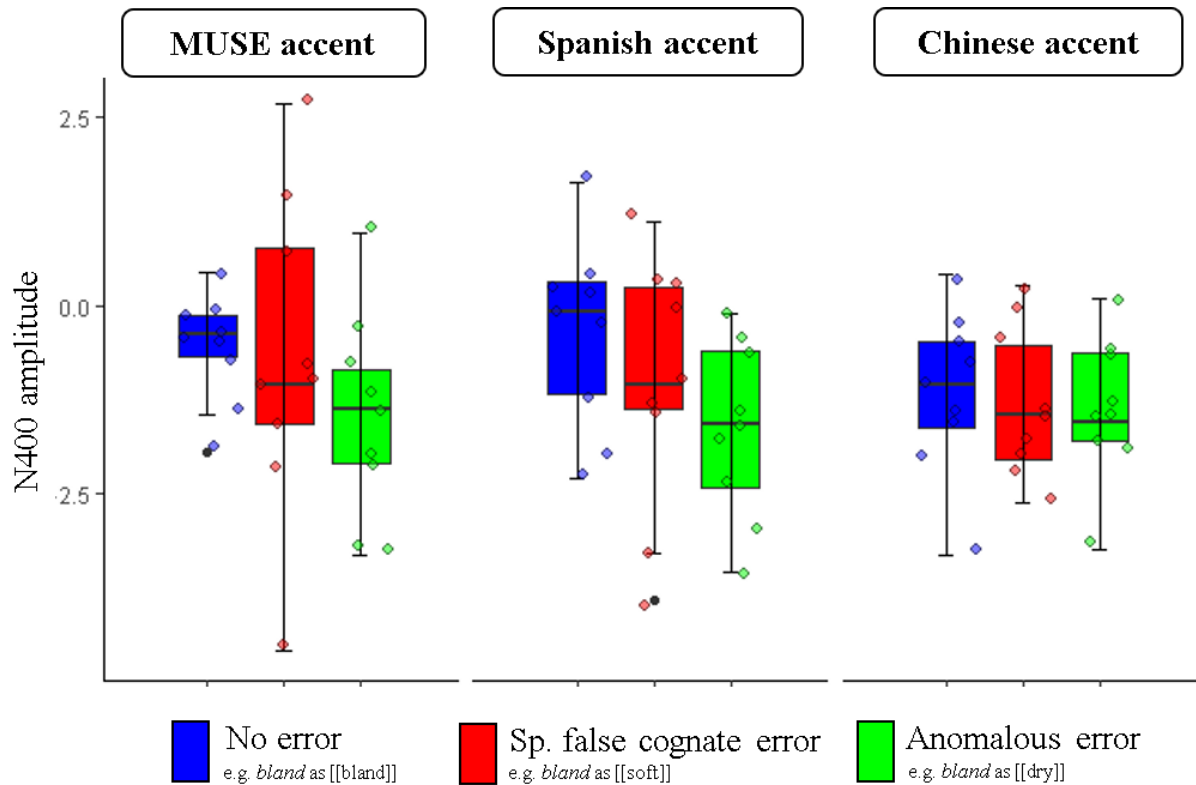


Figure 4.4 Averaged N400 amplitude (microvolts) are measured along the y-axis and experimental conditions are distinguished along the x-axis. Averaged across data from all subjects ($n=9$), blue boxes reveal responses to expected words (No error), red boxes indicate responses to Sp. false cognates (Spanish error), and green boxes reveal responses to anomalous words (Anomalous error). Dots represent average N400 responses for individual subjects. The three side-by-side plots represent responses by speaker accent (i.e. MUSE-, Spanish-, Chinese-accented English). Black horizontal lines within boxes reveal the median. Lower and upper edges correspond to the 1st and 3rd quartiles, respectively. The upper/lower whiskers extend to the largest/smallest values no further than 1.5 times the IQR from the 3rd/1st quartiles.

To test the significance of these preliminary findings, a two-way factorial ANOVA model³⁵ was implemented in R (version 3.6.1) that calculated the main effect of both factors as well as their interaction. Specifically, the role of *Speaker Accent* and *Word Type*, two categorical factors each with three factor levels was examined regarding the average N400 amplitude, a

³⁵ `aov(N400 ~ Speaker Accent + Word Type + (Speaker Accent * Word Type))`

continuous numerical measure. The factor levels for the 3 x 3 factorial design were ordered as follows: *Speaker Accent* (MUSE, Spanish, Chinese) and *Word Type* (No Error, Spanish Error, Anomalous Error). Results reveal a modulation of the N400 as a function of word type and a possible modulation as a function of speaker accent. It should be noted that neither main effects nor their interaction represented statistically significant effects; however, this is not surprising given the small sample size ($n=9$), which is far below the target sample size ($n=30$) needed for statistical power. Simple main effects analysis suggests that word type may have had a possible effect on N400 responses, $F(2, 72) = 2.7, p = 0.08$. This slight effect of word type, which trended towards significance, suggests that lexical access was easiest for words in the No Error condition ($M=-0.69, SD=1.07$), slightly more difficult for Spanish Errors ($M=-1.01, SD= 1.62$) and most difficult for Anomalous errors ($M=-1.52, SD= 1.15$). This trend, if it is born out after further data collection may reflect a non-selective account of bilingual lexical access, in that false cognates from Spanish elicited N400 responses that were smaller than controlled anomalies. The main effect for speaker accent, however, does not provide straightforward support for or against the theory that listeners adjust their anticipatory lexical processing based on speaker accent: $F(2, 72) = 0.5, p = 0.58$. In particular, the grand average across all listeners trended towards smaller N400 amplitudes in response to critical words uttered by the MUSE-accented speaker ($M= -0.91, SD= 1.52$), slightly larger average N400 responses for Spanish-accented speech ($M=-1.03, SD= 1.45$) and the largest average N400 response to Chinese-accented speech ($M= -1.28, SD= 0.99$). In other words, while the reported differences were not statistically significant, these data are not inconsistent with the hypothesis that Spanish-accented speech increased activation of the Spanish lexicon relative to Chinese-accented speech, as average N400 amplitudes were larger for Chinese-accented speech relative to Spanish-accented

speech. To test the generalizability of these preliminary trends, a full sample size of at least $n = 30$ is required. Finally, no interaction was found between speaker accent and word type on N400 responses, $F(4, 72) = 0.5, p = .77$.

Let us consider in more detail the results from each of three speaker accent conditions, in turn. We begin with the MUSE-accented condition. As shown in Fig. 4 (above), we observe an increased negativity in posterior sensors for Anomalous Errors relative to No Errors, and also an increased negativity for Spanish Errors relative to No Errors. These appear to be N400 effects. Based on the grand-averages presented, Spanish Errors seem to elicit slightly smaller N400 amplitudes relative to Anomalous errors. This trend would suggest some level of activation of the Spanish lexicon during comprehension of MUSE-accented speech, which is consistent with a non-selective account of bilingual lexical activation. It appears, however, counterintuitive to language mode theory, which would predict L1 English monolingual speech should temporarily decrease activation of the Spanish lexicon. However, these differences are not statistically reliable with a sample size of only $n = 9$. Turning to comprehension of Spanish-accented speech, we observe that the grand-averaged N400 amplitude for the Anomalous Error condition is more negative than those of the No Error and Spanish Error conditions. However, given that the variance across subjects (i.e. notice the overlap along the y-axis of between the lower and upper edges of the three boxes – and their whiskers in Fig. 4), the data do not reveal any reliable differences between these conditions. Finally, in response to Chinese-accented English speech, respondents demonstrated no discernable differences in N400 responses as a function of critical word type. Unlike responses to MUSE- and Spanish-accented speech, N400 responses to Chinese-accented English were only slightly bigger for error conditions relative to No error conditions, suggesting listeners relied on different probabilistic expectations for anticipatory

processing of Chinese-accented speech relative to the others. Furthermore, there was little difference between even the grand averages for the Spanish Error and Anomalies, suggesting little to no activation of the Spanish lexicon when Chinese-accented English speech was heard. This supports a speaker-specific model of speech comprehension, as it appears Spanish-English bilingual listeners anticipatorily activated Spanish lexico-semantic representations when listening to a Spanish-accented English speaker, but not when listening to a Chinese-accented English speaker. Furthermore, the N400 responses to the Chinese-accented speaker are noticeably smaller than the MUSE- and Spanish-accented speakers. This may reflect an overall reduced degree of anticipatory processing effort, or what Hopp (2016) refers to as adaptive predictive processing. The explanation would be that Spanish-English bilinguals have comparatively less specific information regarding Chinese-accented English speech patterns and so anticipatory processing is more costly than fruitful for sentence processing.

As the experiment was intended to examine theoretical questions regarding speaker-specific models in word processing, the EEG subjects were asked to share the social identities they associated with each of the three speakers from the experiment. Their responses on an open-ended post-experimental accent evaluation survey indicate that 78% ($n=7$) of them perceived the Spanish-accented English speaker as Latino/Hispanic/Spanish-knowing, but none attributed any such characteristics to the MUSE- or Chinese-accented speakers. These results support the finding that the listeners increased activation of their Spanish lexicon when listening to a speaker they assumed might also know Spanish. As will be discussed in further detail in the next section, these findings support the view that bilingual lexical activation can be modulated by the speaker accent and are compatible with a dynamic model of bilingual word recognition.

5. DISCUSSION

Data from this study provided preliminary support for a model of bilingual lexical activation that is largely non-selective but also dynamically sensitive to speaker accent, an extralinguistic factor of sociolinguistic relevance. While main effects and their interactions did not yield statistically significant results (likely due to a small, underpowered dataset), effect sizes appear consistent with underlying patterns of dynamic parallel activation. Specifically, Spanish false cognates relative to anomalous controls, yielded what appears may be an N400 reduction effect. This may reflect that regardless of speaker accent, bilingual listeners demonstrated implicit activation of the non-target lexicon. Additionally, it was observed that N400 responses changed slightly as a function of speaker accent. This provides preliminary support for listeners' dynamic sensitivity to extra-linguistic factors, such as speaker accent. More precisely, listeners demonstrated an N400 reduction effect when false cognates from Spanish (relative to anomalies) were produced by a Spanish-accented speaker, relative to when they were uttered by a Chinese-accented speaker. This is suggestive of a speaker-specific model of speech comprehension, such that listeners adjusted activated of their Spanish lexicon depending on whether they believed the speakers knew Spanish. This mirrors the finding from a recent study (Kaan et al. 2020), which found that bilinguals increased activation of the non-target lexicon when sitting next to a person they believed to be bilingual, as evidenced by faster reading times of intra-sentential codeswitches.

Interestingly, however, lexical activation of Spanish appeared to increase not only in response to Spanish-accented speech, but in response to MUSE-accented speech as well. This may be explained by the fact that (A) many MUSE English speakers in the U.S. study and know Spanish (Instituto Cervantes, 2015) and/or that (B) many U.S.-born, Spanish-knowing Latinos

today do not necessarily have a Spanish-accented English (Rosa, 2019). However, while the average N400 effect for false cognates relative to non-errors was relatively similar when heard in a MUSE accent ($\Delta=0.14$, in microvolts) and Spanish accent ($\Delta=0.67$), there was much wider variation in N400 responses when produced in the MUSE accent ($M=-0.7$, $SD=2.13$). N400 responses to false cognates produced in a Spanish accent were more consistent ($M=-1.03$, $SD=1.68$). In fact, Spanish false cognates produced by a Spanish-accented speaker yielded a distribution of average N400 responses that was quite similar in range to the distribution of N400 responses elicited in the no-error condition, suggesting that the Spanish lexical form was activated in near parallel to the target-lexical form for which the English sentence was constrained. This particular comparison provides additional preliminary support for a model of bilingual non-selectivity. On the other hand, subjects varied wildly in their average N400 responses to Spanish false cognates produced by MUSE-accented. This may reflect a wider variation in listeners' assumptions about whether MUSE-sounding people know Spanish. These data are an excellent example of the importance of analyzing data variance in addition to single-point estimates of central tendency, such as means. Future research into the particular speech patterns and sociolinguistic cues that listeners rely on to determine who sounds like they know Spanish will shed light onto how we should interpret these preliminary findings. A recent ethnography by linguistic anthropologist Jonathan Rosa (2019) entitled *Looking like a Language, Sounding like a Race* has provided a solid foundation for this line of research by examining language attitudes within one Latino-majority public school in Chicago. While more experimental work is needed to understand the particular linguistic cues upon which Spanish-accented English speech may be associated with assumed Spanish language background, the data provided in the current study suggest that speaker accent can influence anticipatory word

processing, as evidenced by bilingual listeners increasing lexical access to Spanish for English speakers they believe know Spanish.

As it relates to the Chinese-accented English speech comprehension, Spanish-English bilinguals demonstrated comparatively small N400 responses that shown little to no differences across word types. Of particular note is that while the difference in N400 amplitude between non-errors and anomalies was noticeable for MUSE- and Spanish-accented speech, it was quite small for Chinese-accented speech (No Error: $M = -1.15$, $SD = 1.1$; Anomaly: -1.39 , $SD = 1$). In other words, the fact that anomalies did not elicit noticeably greater negativity relative to the error-less baseline sentences suggests an overall decrease in anticipatory lexico-semantic processing. This seems to fall in line with the notion of adaptive predictive processing (Hopp, 2016; Dussias, 2019) which suggests that listeners are less likely to devote cognitive resources towards anticipatory processing when they have less confidence in the fruitfulness of their predictions. Hopp (2016) and Dussias & Valdez-Kroff (*in preparation*) have operationalized this in experimental paradigms through exposure to inconsistent input sources. However, the same effect could theoretically be realized in response to speakers who carry a foreign accent that is relatively unfamiliar to the listener and therefore leaves the listener with only a vaguely reliable speaker model from which to derive probabilistic expectancies for upcoming words. While it seems likely that Spanish-English bilinguals in the U.S. who report no knowledge of Chinese language background probably have more fully formed speaker models for Spanish-accented English speakers than they do for Chinese-accented English speakers, this cannot be assumed. As such, EEG subjects were asked to about to rate their familiarity with these two accents on a post-experiment survey. Responses indicate that the Spanish-English bilingual subjects reported relatively equal familiarity with and exposure to Spanish-accented English

($M=4$, $SD= 1$) and Chinese-accented English speech ($M= 4$, $SD= 1.3$), it important to interpret self-reported exposure with caution. A more rigorous analysis of accent exposure and familiarity is needed to understand the comparative specificity of speaker-specific language expectancy models.

Despite the novel contributions of this study, it has several limitations. First, the sample size for the Spanish-English bilinguals subjects was too small to reach adequate statistical power. This was due to the inability of collecting human subject data during the Covid-19 pandemic. Future studies should verify the generalizability of the patterns preliminarily shown here by expanding the sample size to at least 35 participants. Second, to verify that the “false cognate” effect is indeed a reflection of bilingual lexical activation, a group of non-Spanish knowing English listeners should be tested as well. The idea would be that those without knowledge of the Spanish lexicon should demonstrate similarly sized N400 responses to both Spanish Errors and Anomalous Errors. While this paper did test several such subjects ($n= 5$), the sample size was too small to warrant a comparative analysis. Finally, only one speaker was used per accent condition. Future studies may consider incorporating multiple speakers per condition to test the generalizability of these findings and to reduce possible confounds relating to speaker voice. Alternatively, voice actors could be used in a matched-guise paradigm to reduce inter-speaker variation. However, this would require careful training in order to retain accent authenticity.

Future research that builds from this study might also consider using false cognates to examine not only predictive processing, but semantic integration as well. This could be done in three ways. First, the isolation point (IP), the point in a word at which most participants are able to accurately identify it, could be measured for the critical words used in the materials for this study. This could be done with a gating paradigm study (Grosjean, 1980). Since isolation point

(IP) was not measured in these auditory stimuli, it is unclear at which point listeners were able to accurately identify it, and at which point (if at all) they understood it to be a word error that was traceable to Spanish. While previous research (Van den Brink, Brown, & Hagoort, 2006) suggests that IP location within a word does not systematically affect early lexical preactivation or our interpretation of the N400 response, knowing the IP for the false cognates in these sentences would help to construct a clearer timeline for the cascading process of lexico-semantic integration as it relates to cross-linguistic interferences. Specifically, findings from van den Brink et al. (2006) indicate that semantic integration can start before the acoustic information allows the selection of a unique lexical candidate, so at what point during online comprehension would the bilingual word recognition system adjust its learned form-function mapping to the innovative form-function mapping used in the current context? Another way to use false cognates to probe processes of semantic integration would be to compare how bilinguals process them in comparison to overt codeswitches. Lagrou et al (2012) considered how speaker accent can influence how bilingual lexical activation by presenting bilingual listeners with interlingual homophones from Dutch in English sentences (e.g. *leaf* as [[leaf]]; *lief*, Dutch ‘sweet’). As evidenced by RT on a lexical decision task, these non-anomalous instantiations of interlingual homophones yielded a slight processing cost when produced by a Dutch-accented speaker, relative to when they were produced by a native English speaker. These findings suggest that the non-target lexicon (i.e. Dutch) increased in activation as a function of hearing a Dutch-accented speaker, yielding a crosslinguistic interference effect. In the present study, however, I examined how speaker accent can influence bilingual lexical activation by presenting bilingual listeners with false cognates; that is, interlingual homophones used with a form-meaning mismatch (e.g. *bland* as [[soft]]; *blando*, Sp. ‘soft’) and found that

activation of the non-target lexicon (i.e. Spanish) increased in activation as a function of hearing a Spanish-accented speaker. The next step would be to examine how speaker accent can influence bilingual lexical activation by presenting bilingual listeners with overt codeswitches (e.g. *blando* as [[soft]] in an otherwise English sentence). Such a comparison (i.e. between bilingual processing of false cognates and overt codeswitches) would help us understand how semantic integration handles form-function mismatches at the word level (false cognates) versus at the language membership switches at the sentence level (codeswitches). Yet another way to use false cognates to probe processes of semantic integration would be to conduct not only an N400 (reflective of predictive processes) analysis on the data presented in this study, but also to analyze ERP responses to false cognates with an LPC (Late positive complex) analysis. The LPC is a neural component associated with repair processes that has been shown to occur between 500-900 ms post-stimulus at parietal sites. Analysis of the effect that false cognate presentation has on electrophysiological responses at parietal sites in this time window might contribute to theories of semantic integration in the bilingual mind.

This type of analysis (i.e. use of false cognates to probe processes of semantic integration) could also be examined as dependent on knowledge about the speaker's identity. For instance, are listeners less likely to devote cognitive resources to repair lexical errors produced by foreign-accented, relative to native speakers? In other words, how speaker-specific is the semantic integration process? Since false cognates are a naturally occurring byproduct of L2 speech (Cañizares-Álvarez & Mueller Gathercole, 2020) and globalization has led to an increase in exposure to L2 speakers (Romero-Rivas et al. 2015), these questions have practical implications for our everyday interactions. For example, a recent real-world example of a Spanish false cognate used in an English discourse comes from a 2019 Netflix interview with

Money Heist actor Darko Peric. During an interview in English, the Serbian actor who has lived in Spain since 2004 and speaks Spanish was discussing the process of working with an unpredictable but ultimately trustworthy director:

(1) “For me, in the beginning, I was like...**molested**, you know? Like, you don’t feel safe. But then you see the final result and you’re like, okay, I trust you.”³⁶

In this excerpt, Peric did not mean to suggest that he was sexually assaulted or abused. Rather, he had used a false cognate from Spanish, based on the interlingual homophone relationship between Eng. *molest* and Sp. *molesto* [[bother]]. Any English speaker who did not happen to know about the interlingual homophone relationship responsible for this slip-up would likely be left quite confused or even worried. False cognates are not uncommon in bilingual speech (Cañizares-Álvarez & Mueller Gathercole, 2020), and given their easily confusable nature, they have been linked to foreign language teaching materials (Zayas-Bazan, Bacon, & Nibert, 2019; Aske, 2019) and even interethnic conflicts (St. Clair & Kaposy, 1975). In this way, false cognates may prove to be important when studying theoretical models of online semantic integration and even more practical applications related to intercultural pragmatics.

Future research might also consider the role of accent strength on bilingual lexical activation. The (L2) Spanish-accented speaker used in this study had a close to unmistakable Spanish accent. This begs the question, though, of how sensitive listeners are to a gradation in speaker accent. Would bilingual lexical activation be modulated in response to speakers with

³⁶ To watch the clip, visit <https://www.youtube.com/watch?v=JqwgF9T3CV8&t=9s> at 0:41-0:58. The original Netflix interview from which the false cognate was uttered appears to have been removed from YouTube. As such, the aforementioned link is a YouTube video on my channel that explains false cognates to a general audience.

more subtle Spanish accents in English? The offline accent evaluation study presented in Chapter 2 of my dissertation found that, among young Midwesterners, L1 Latino English speech (a native dialect of Spanish-influenced English), is reliably perceived as “Spanish-sounding.” Would hearing native (L1) English speaker whose native U.S. dialectal accent carries phonological and morphosyntactic traces of Spanish (Bayley & Santa Ana, 2004; Bayley, 2008) also increase activation of Spanish lexicon for bilingual listeners – and if so, to what degree? This would test the sensitivity to even subtle hints of Spanish in the discourse context, continuing to contribute to the research on the dynamicity of bilingual lexical activation.

Taken together, the results of this study suggest that while speaker accent may possibly influence bilingual listeners’ degree of parallel lexical activation during anticipatory word processing, though more data is needed. Future bilingual lexical activation studies – particularly those that focus on spoken language comprehension – will need to pay careful consideration to the sociolinguistic backgrounds of the speakers and listeners they study. As psycholinguistic research continues to capture the extra-linguistic complexities involved in language processing, it is becoming more and more readily apparent that our cognitive architecture is not only permeable to these factors, but that it has been (and will continue to be) built from them. The sociolinguistic associations, stereotypes, and models we carry in our minds intrinsically influence the ways in which we understand our world, and adjust our probabilistic expectations for the *what* people say and *how* they say it.

6. CONCLUSION

Decades of bilingual processing research convincingly demonstrate that the bilingual word recognition system is largely non-selective (Dijkstra, Grainger, & van Heuven, 1999; Spivey & Marian, 1999; Thierry & Wu, 2007; Macizo, Bajo, & Martín, 2010), meaning that bilinguals never fully “turn off” the non-target lexicon, even in unilingual contexts. The objective of this study was to examine how one extra-linguistic factor, speaker accent, might modulate bilingual lexical activation during anticipatory word processing. The experimental design leveraged the cross-linguistic properties inherent to interlingual homophones. An EEG experiment was conducted, in which Spanish-English bilingual subjects were presented with English sentences containing false cognates from Spanish. It was found that regardless of speaker accent, false cognates (e.g. Eng. *bland* used as [[soft]]; Sp. *blando*, ‘soft’) elicited an N400 reduction effect relative to anomalous control words (e.g. Eng. *bland* used as [[dry]]), providing evidence of parallel language activation for the bilingual listeners. It was also found that speaker accent, a socially constructed extralinguistic factor, impacted activation of the non-target lexicon during anticipatory processing, as evidenced by the fact that false cognates elicited an N400 reduction effect when uttered by the Spanish-accented and MUSE-accented speaker, relative to the Chinese-accented speaker. These results provide evidence for non-selective bilingual lexical activation and suggest that listeners can recruit speaker-specific models to guide anticipatory word processing during speech comprehension. The findings align neatly with predictions from language mode continuum theory (Grosjean, 1998), inasmuch as X-accented Y speech was found to shift an X-Y bilingual listener closer to bilingual mode, as evidenced by an implicit increase in anticipatory activation of lexical forms from language X.

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8. SUPPLEMENTARY MATERIALS

8.1 Interlingual Homophone Survey (IHS): Participant metadata

Note: This was a stimuli norming survey hosted on Qualtrics and distributed through MTurk.

AoA = Age of Acquisition, *Fr* = French, *Eng* = English, *Span* = Spanish,

Ital = Italian, *Ger* = German, *Jap* = Japanese, *Chin* = Chinese, *Y* = Yes, *N* = No. Age, English AOA, and Spanish AOA are listed in years. Spanish-English dominance was self-rated.

ID	Age	Eng AoA	Span AoA	Spanish-English dominance	Languages known	Currently lives in U.S.?
1	34	6-12	0-5	English-dominant	Fr, Eng	Y
2	32	0-5	0-5	Balanced	Eng, Span, Ital	Y
3	34	0-5	0-5	English-dominant	Span, Eng	Y
4	30	0-5	0-5	Balanced	Eng, Span	Y
5	49	0-5	0-5	English-dominant	Span, Eng, Ital, Fr, Greek	Y
6	27	6-12	0-5	Balanced	Span, Eng	Y
7	37	0-5	0-5	English-dominant	Eng, Span, Fr, Ger, Jap, Ital	Y
8	33	0-5	0-5	English-dominant	Eng, Span	Y
9	36	0-5	0-5	English-dominant	Eng, Span, Ital	Y
10	42	0-5	0-5	Balanced	Span, Eng, Fr	Y
11	22	0-5	0-5	English-dominant	Eng, Span	Y
12	24	0-5	0-5	Balanced	Eng, Span	Y
13	29	0-5	0-5	English-dominant	Span, Eng	Y
14	56	6-12	6-12	Balanced	Eng, Span	Y
15	27	0-5	0-5	Balanced	Span, Eng, Fr	N
16	32	6-12	0-5	English-dominant	Chin, Fr, Jap	Y
17	38	6-12	0-5	Spanish-dominant	Eng, Span	Y

8.2 IHS consent form

Title of the Project: Words that sound similar between English and Spanish
Principal Investigator: Emily Rae Sabo, PhD Student, University of Michigan
Faculty Advisor: Dr. Jonathan Brennan, PhD, University of Michigan
IRB #: HUM00158504 | Approval date: 07/17/2019

Thank you for considering participating in this study. In order to participate, you must be an MTurk worker currently living in the U.S., above 18 years old, and have spoken Spanish and English since you were a kid. This means that you must be highly fluent in both English and Spanish and have spoken both fluently before the age of 12. Your participation is voluntary. We expect this research experiment to provide information about the similarities between English words and Spanish words. While there may not be a direct benefit of this study to you, the data you contribute will greatly enhance the methodological integrity of future linguistics research studies by providing important information about how similar sounding certain English words are with Spanish words. Before you begin, it is important for you to understand what will be expected of you as a subject in this experiment and what you should do if you decide you no longer wish to participate. You must be 18 or older to indicate consent or participate in this study. By indicating consent, you are letting us know that you understand all that is written in the consent form and you are ready to proceed. If you choose to participate, you will read a series of English words and be asked to type the Spanish word you think sounds most like it. For example, you may read the English word 'nude' and respond with what you deem the most similar sounding Spanish (perhaps 'nudo'). It should be noted that there are no right or wrong answers for this study and that your performance in no way reflects your intellectual abilities or language skills. To ensure you are highly fluent in English and Spanish, you will also be required to write a response to a question in both languages and answer several questions about your language history. There is no more than minimal risk associated with this taking this survey. The only risks are possible minor discomfort from sitting stationary for 15-20 minutes while doing the survey, and the rare potentiality of breaching confidentiality, which is low because again, there is no identifying information other than your MTurk ID number. The experiment is not timed, so feel free to stand up and move around as you need.

Since you are enrolling in this research study through the Amazon Mechanical Turk (MTurk) site, we need to let you know that information gathered through Amazon MTurk is not completely anonymous. Any work performed on Amazon MTurk can potentially be linked to information about you on your Amazon public profile page, depending on the settings you have for your Amazon profile. Any linking of data by MTurk to your ID is outside of the control of the researcher for this study. We will not be accessing any identifiable information about you that you may have put on your Amazon public profile page. We will store your MTurk worker ID separately from the other information you provide to us. Amazon Mechanical Turk has privacy policies of its own outlined for you in Amazon's privacy agreement. If you have concerns about how your information will be used by Amazon, you should consult them directly.

This study should take approximately 15-20 minutes to complete. You will receive \$3.00 for your participation. We will be archiving and analyzing the data we collect from your participation, but only your MTurk ID will be attached to your data. There is no identifying information linking you to this experiment other than your MTurk ID. Records will be kept confidential to the extent provided by federal, state, and local law, although the Institutional Review Board, or university and government officials responsible for monitoring this study, may inspect these records. Your participation in this project is voluntary. You may decide to end the study at any time, including after you have confirmed consent and have begun the experiment. If you would like to stop the experiment at any point, simply click out of the browser. You will receive payment upon completion of the entire experiment (should you choose to withdraw early, any data collected will be destroyed). After the experiment, feel free to contact me, Emily Rae Sabo (emsabo@umich.edu), if you have further questions. Should you have questions regarding your rights as a research participant, please contact the Institutional Review Board 2800 Plymouth Road Bldg. 520, Rm. 1169 Ann Arbor, MI 48109-2800, (734) 936-0933, email: irbhsbs@umich.edu. Please confirm your willingness to participate in the study below:

I DO consent to taking this survey. I do NOT consent to taking this survey

8.3 IHS items

Samples before starting to round out expectations (fixed order):

- a) To me, the English word '**probe**' sounds most like the Spanish word...
- b) To me, the English word '**pretend**' sounds most like the Spanish word...
- c) To me, the English word '**animal**' sounds most like the Spanish word...
- d) To me, the English word '**patron**' sounds most like the Spanish word...
- e) To me, the English word '**stink**' sounds most like the Spanish word...
- f) To me, the English word '**inverted**' sounds most like the Spanish word...
- g) To me, the English word '**soap**' sounds most like the Spanish word...

Stimuli for the Survey (randomized):

1. To me, the English word '**bland**' sounds most like the Spanish word...
2. To me, the English word '**choke**' sounds most like the Spanish word...
3. To me, the English word '**crude**' sounds most like the Spanish word...
4. To me, the English word '**seats**' sounds most like the Spanish word...
5. To me, the English word '**direction**' sounds most like the Spanish word...
6. To me, the English word '**embarrassed**' sounds most like the Spanish word...
7. To me, the English word '**impressed**' sounds most like the Spanish word...
8. To me, the English word '**globes**' sounds most like the Spanish word...
9. To me, the English word '**insecure**' sounds most like the Spanish word...
10. To me, the English word '**idioms**' sounds most like the Spanish word...
11. To me, the English word '**blank**' sounds most like the Spanish word...
12. To me, the English word '**rope**' sounds most like the Spanish word...
13. To me, the English word '**quiet**' sounds most like the Spanish word...
14. To me, the English word '**vague**' sounds most like the Spanish word...
15. To me, the English word '**large**' sounds most like the Spanish word...
16. To me, the English word '**clear**' sounds most like the Spanish word...
17. To me, the English word '**complexion**' sounds most like the Spanish word...
18. To me, the English word '**sane**' sounds most like the Spanish word...
19. To me, the English word '**bank**' sounds most like the Spanish word...
20. To me, the English word '**bat**' sounds most like the Spanish word...
21. To me, the English word '**carpet**' sounds most like the Spanish word...
22. To me, the English word '**exits**' sounds most like the Spanish word...
23. To me, the English word '**cancel**' sounds most like the Spanish word...
24. To me, the English word '**assist**' sounds most like the Spanish word...
25. To me, the English word '**constipated**' sounds most like the Spanish word...
26. To me, the English word '**contest**' sounds most like the Spanish word...
27. To me, the English word '**mandate**' sounds most like the Spanish word...
28. To me, the English word '**removed**' sounds most like the Spanish word...
29. To me, the English word '**grabbing**' sounds most like the Spanish word...
30. To me, the English word '**departments**' sounds most like the Spanish word...
31. To me, the English word '**mark**' sounds most like the Spanish word...
32. To me, the English word '**advertisements**' sounds most like the Spanish word...
33. To me, the English word '**man**' sounds most like the Spanish word...
34. To me, the English word '**support**' sounds most like the Spanish word...
35. To me, the English word '**pan**' sounds most like the Spanish word...
36. To me, the English word '**code**' sounds most like the Spanish word...
37. To me, the English word '**posters**' sounds most like the Spanish word...
38. To me, the English word '**car**' sounds most like the Spanish word...
39. To me, the English word '**demand**' sounds most like the Spanish word...

40. To me, the English word '**parents**' sounds most like the Spanish word...
41. To me, the English word '**retired**' sounds most like the Spanish word...
42. To me, the English word '**resistance**' sounds most like the Spanish word...
43. To me, the English word '**desperate**' sounds most like the Spanish word...
44. To me, the English word '**succeed**' sounds most like the Spanish word...
45. To me, the English word '**denounced**' sounds most like the Spanish word...
46. To me, the English word '**humor**' sounds most like the Spanish word...
47. To me, the English word '**title**' sounds most like the Spanish word...
48. To me, the English word '**effective**' sounds most like the Spanish word...
49. To me, the English word '**resume**' sounds most like the Spanish word...
50. To me, the English word '**mass**' sounds most like the Spanish word...
51. To me, the English word '**firm**' sounds most like the Spanish word...
52. To me, the English word '**red**' sounds most like the Spanish word...
53. To me, the English word '**numbers**' sounds most like the Spanish word...
54. To me, the English word '**lecture**' sounds most like the Spanish word...
55. To me, the English word '**goat**' sounds most like the Spanish word...
56. To me, the English word '**fabric**' sounds most like the Spanish word...
57. To me, the English word '**sensible**' sounds most like the Spanish word...
58. To me, the English word '**signature**' sounds most like the Spanish word...
59. To me, the English word '**ambience**' sounds most like the Spanish word...
60. To me, the English word '**arena**' sounds most like the Spanish word...

Participant background information questions (fixed order):

- In years, how old are you?
- When did you start learning English?
 - Between the ages of 0-5 years old
 - Between the ages of 6-12 years old
 - Between the ages of 13-18 years old
 - After the age of 18
- When did you start learning Spanish?
 - Between the ages of 0-5 years old
 - Between the ages of 6-12 years old
 - Between the ages of 13-18 years old
 - After the age of 18
 - I don't know Spanish
- Which most accurately reflects how you use English and Spanish in your daily life?
 - I use English more often than Spanish.
 - I use Spanish more often than English.
 - I speak both equally often.
- List every language you know or have studied in any way. Separate them by commas.
- Do you currently live in the continental United States?
 - Yes
 - No

Language proficiency validation (randomized order):

- En español, describa como usted se cuida cuando está enfermo/a. Utilizaremos su respuesta escrita para verificar que usted habla español.
- In English, describe how you take care of yourself when you are sick. We will use your written response to verify that you speak English.

8.4 IHS raw response data

Notes: ✓ indicates target word match (e.g. target response is *blando*, subject writes *blando*, *blanda*, *blandos*, *blandas*). Word stem match is the target; differences in grammatical gender suffixation, verb conjugation suffixation, accent marks, and unequivocal typos/spelling errors (e.g. *embarasada* for *embarazada*) are overlooked. A response is counted as a target word miss when the subject produces a different word (stem) from that which is the target (e.g. expected *blando*, subject wrote *banda*). Each column represents a particular subject's ($n = 17$) responses and each row represents a particular survey item ($n = 60$). Recall that in this survey, respondents were asked to produce the Spanish word they thought most sounded like a given English word. For example, 'To me, the English word **'bland'** sounds most like the Spanish word _____', for which the target word was *blando*.

Target word	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>blando</i>	✓	✓	✓	blanco	✓	✓	banda blanco	✓	✓	blanco	✓	✓	✓	✓	✓	✓	✓
<i>choque</i>	✓	✓	✓	coca	chocol ate	✓	chocar choco	✓	cholo	chocar	chocol ate	✓	✓	✓	✓	✓	✓
<i>crudo</i>	✓	✓	✓	✓	✓	✓	cruz	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>citas</i>	sitio	✓	zeta	asient o	sitios	si	si	sis	seas	cinto	siete	si	seta	✓	✓	cinta	silla
<i>dirección</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>embarazada</i>	embar rado	✓	✓	✓	✓	✓	ebaraz ada	✓	✓	embar rar	✓	✓	✓	✓	✓	✓	✓
<i>impresionado</i>	impres o	impres o	impres so	presio nado	impres o	impres ión	impres ora	impres sivo	impres o	impres o	impres ar	impres or	impres ión	Impres o	impres o	impri mir	impres o
<i>globos</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	globes	✓	✓	✓	✓	✓	✓
<i>inseguro</i>	✓	✓	✓	✓	insect o	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>idiomas</i>	✓	✓	✓	✓	✓	✓	idiota	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>blanco</i>	✓	✓	✓	✓	banco	✓	✓	bebe	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>ropa</i>	✓	✓	✓	ropero	ropero	✓	✓	robo	✓	✓	rompe	✓	✓	✓	✓	✓	✓
<i>quieto</i>	✓	✓	✓	✓	calle	calle	quitar	coqui	✓	cuales	✓	quinto	✓	✓	✓	coyote	✓
<i>vago</i>	✓	✓	✓	✓	✓	✓	✓	venir	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>largo</i>	✓	✓	✓	✓	lancha	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	largar	✓
<i>claro</i>	✓	clima	✓	✓	ir	✓	✓	cleo	✓	que ir	✓	✓	✓	✓	✓	mear	clero
<i>complexión</i>	compl ejo	compl ejo	✓	compl eja	compl ejo	compl ejo	✓	compl ejo	compl eccion	✓	compl eccion	compl eccion	✓	Compl ección	compl ección	refleci ón	compa sion
<i>sano</i>	✓	seis	✓	✓	cene	✓	✓	sane	✓	✓	sin	✓	sane	✓	✓	✓	✓
<i>banco</i>	✓	✓	✓	✓	van	✓	✓	bano	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>bata</i>	bate	bate	baton	basta	vaso	bate	bate	bate	bat	bate	bate	vato	bar	Bate	bate	vato	bate
<i>carpeta</i>	✓	✓	✓	✓	carpint ero	✓	carbon	carro	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>exitos</i>	existe	✓ o	✓	excitar	✓	existe	✓	existi r	exitar	exita	✓	✓	✓	✓	✓	existe	exitad o
<i>cancelar</i>	✓	✓	✓	✓	cancer	✓	✓	Kangr ego	✓	cancel	✓	✓	✓	✓	✓	✓	cancel
<i>asistir</i>	✓	✓	✓	✓	asiste nte	✓	✓	asi	✓	✓	✓	✓	✓	✓	✓	✓	asiste nte
<i>constipado</i>	contra riado	✓	✓	conspi rar	consta ta	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	conspi rar
<i>contestar</i>	conten to	✓	✓	con	✓	✓	✓	✓	conten to	✓	✓	✓	✓	✓	conten ido	✓	✓
<i>mandar</i>	manda tario	manda to	✓	✓	✓	✓	manda to	manda to	✓	✓	✓	manda to	manda to	✓	✓	✓	✓
<i>remover</i>	✓	✓	✓	movir	✓	✓	✓	remod elar	✓	✓	✓	✓	remov e	✓	✓	✓	✓
<i>grabando</i>	✓	gravill a	✓	✓	✓	grave	✓	✓	✓	graves	✓	✓	✓	✓	✓	✓	✓
<i>departamentos</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<i>marca</i>	✓	✓	✓	✓	marcó	✓	✓	marco	✓	✓	✓r	✓	marco	✓	✓	✓r	✓	
<i>advertencias</i>	✓	✓	✓	✓	✓	✓	✓	advisos	✓	✓	✓	avisos	✓	✓	✓	✓	✓	
<i>mano</i>	mina	✓	✓	manzana	mani	mal	manda	✓	✓	pan	✓	✓	✓	✓	✓	pan	✓	
<i>support</i>	✓	supone	suporte	✓	✓	✓	suportar	sopa	✓	✓	✓	✓	suporte	✓	✓	✓	✓	
<i>pan</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<i>codigo</i>	✓	✓	codigocodigo	✓	con	codigo	jode	✓	✓	✓	✓	conde	✓	✓	✓	✓	codigo	
<i>postres</i>	porter	postes	postar	✓	poste	poster	✓	✓	✓	poster	✓	✓	póster	✓	✓	postear	✓	
<i>cara</i>	carro	✓	caro	carro	✓	carro	✓	cajo	carro	carro	caro	carro	carro	carga	cal	carro	carta	
<i>demandar</i>	✓	✓	✓	✓	demandado	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<i>parientes</i>	✓	✓	✓	padres	parental	parental	✓	pajaro	pareds	pareja	parentas	parede	parental	Parentesis	✓	aparentar	parentesis	
<i>retirado</i>	✓	✓	✓	✓	retrato	✓	✓	reir	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<i>resistencia</i>	✓	✓	✓	resista	resistense	✓	resistir	reirse	resista	resisten	✓	✓	✓	✓	✓	resistir	✓	
<i>despierto</i>	desesperado	✓	desesperado	disparar	✓	desesperado	desperado	desperado	espera	desesperado	✓	✓	desperado	espera	desperado	desesperado	desesperado	
<i>suceder</i>	sugerir	subir	sucess	suicidio	✓	✓	cesped	sexi	✓	✓	✓	suceso	suceso	suceso	✓	✓	saco	suceso
<i>denunciado</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	denunciar	✓	✓	✓	denunciado	renunciado	✓	
<i>humor</i>	✓	✓	✓	ahumado	junto	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	humor	✓
<i>titulo</i>	timbre	tallo	✓	✓	trato	dile	✓	te	tilde	tallo	titular	Tiro	✓	N/A	tiro	titere	✓	
<i>efectivo</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<i>resumir</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	resumar	✓	✓	✓	✓	✓	✓	
<i>masa</i>	✓	✓	✓	✓	✓	✓	mas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<i>firma</i>	✓	firme	firme	firme	✓	✓	firme	furniture	✓	firme	firme	firme	✓	✓	✓	✓	✓	
<i>red</i>	te	res	enredar	roja	arde	✓	✓	editor	✓	ver	ruido	✓	✓	✓	✓	✓	✓	
<i>nombres</i>	numeros	✓	numeros	numero	✓	✓	numeros	✓	numeros	✓	✓	numeros	numeros	numeros	numero	numero	numero	
<i>lectura</i>	✓	✓	✓	✓	✓	✓	lechuga	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<i>gota</i>	gato	gol	✓	gol	✓	gol	goal	hobo	✓	gol	✓	gato	goza	✓	✓	✓	gol	
<i>fabrica</i>	✓	✓	✓	✓	✓	✓	✓	fabuloso	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<i>sensible</i>	✓	✓	✓	sencillo	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	insensible	✓
<i>asignatura</i>	seguimiento	senador	signo	si	significar	✓	significar	siguiente	Singapur	signos	sigiente	significar	signatura	Signatario	✓	asignatura	✓	
<i>ambiente</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<i>arena</i>	✓	✓	✓	✓	arruinar	✓	✓	✓	✓	✓	harina	harina	✓	✓	✓	✓	✓	

8.5 IHS summarized response data

Target word	% produced	Target word	% produced	Target word	% produced
direction	1	mandate	0.88	quiet	0.65
departments	1	removed	0.88	man	0.59
pan	1	advertisements	0.88	code	0.59
effective	1	support	0.88	resistance	0.59
ambience	1	retired	0.88	succeed	0.59
crude	0.94	humor	0.88	complexion	0.53
insecure	0.94	sensible	0.88	exits	0.53
idioms	0.94	bland	0.82	posters	0.53
vague	0.94	carpet	0.82	red	0.53
large	0.94	grabbing	0.82	firm	0.47
assist	0.94	denounced	0.82	parents	0.41
demand	0.94	arena	0.82	goat	0.41
resume	0.94	choke	0.76	title	0.35
mass	0.94	rope	0.76	numbers	0.35
lecture	0.94	sane	0.76	desperate	0.29
fabric	0.94	cancel	0.76	seats	0.18
embarrassed	0.88	constipated	0.76	impressed	0.18
globes	0.88	contest	0.76	car	0.18
blank	0.88	mark	0.76	signature	0.18
bank	0.88	clear	0.71	bat	0

Cloze Probability survey (CLOZE) participant metadata

Note: This was a stimuli norming survey hosted on Qualtrics and distributed through Prolific.
Fr = French, *Eng* = English, *Span* = Spanish, *Ital* = Italian, *Ger* = German, *Jap* = Japanese, *Chin* = Chinese, *Gr* = Greek, *Russ* = Russian, *Kor* = Korean, *ASL* = American Sign Language, *Heb* = Hebrew, *Swed* = Swedish

Sub ID	List	Languages known	English	Spanish
1	A	Eng	L1	L1
2	A	Eng, Sp	L1	studied, not conversational
3	A	Eng, Sp, Fr	L1	studied, not conversational
4	A	Eng, Sp	L1	studied, not conversational
5	A	Eng, Lat, Sp	L1	studied, not conversational
6	A	Eng, Fr, Ital	L1	no Span
7	A	Eng	L1	studied, not conversational
8	A	Eng, Sp, Fr	L1	studied, not conversational
9	A	Eng, Russ	L1	no Span
10	A	Eng	L1	studied, not conversational
11	A	Eng, Sp	L1	studied, not conversational
12	A	Eng, Sp	L1	studied, not conversational
13	A	Talking	L1	no Span
14	A	Eng	L1	no Span
15	A	Eng, Fr, Sp	L1	studied, not conversational
16	A	Eng, Sp	L1	studied, not conversational
17	A	Eng, Sp	L1	studied, not conversational
18	A	Eng	L1	no Span
19	A	Eng	L1	no Span
20	A	Eng, Sp, Klingon	L1	studied, not conversational
21	B	Eng	L1	no Span
22	B	Eng	L1	no Span
23	B	Sp, Eng, Fr, ASL	L1	L1
24	B	Eng, Sp, Ger, Chin	L1	studied, not conversational
25	B	Eng	L1	no Span
26	B	Eng, Fr	L1	no Span
27	B	Eng, Sp, Fr	L1	studied, conversational
28	B	Eng	L1	no Span
29	B	Eng, Sp	L1	studied, not conversational
30	B	Eng, Sp, Fr	L1	studied, not conversational
31	B	Eng, Fr, Sp	L1	studied, not conversational
32	B	Eng, Fr	L1	no Span
33	B	Eng, Sp	L1	studied, not conversational
34	B	Eng, Fr, Sp	L1	studied, conversational
35	B	Eng, Sp	L1	studied, not conversational
36	B	Eng, Sp, Jap, Kor	L1	studied, not conversational
37	B	Eng, Ger	L1	no Span
38	B	Eng, Sp, Heb	L1	studied, not conversational

39	B	Eng	L1	no Span
40	B	Eng, Sp	L1	studied, not conversational
41	C	Eng, Sp, Fr	L1	studied, not conversational
42	C	Eng, Sp	L1	studied, conversational
43	C	Eng, Ger, Sp, Gr, Lat	L1	studied, not conversational
44	C	Eng, Fr, Sp	L1	studied, not conversational
45	C	Eng, Ger, Jap, Kor	L1	no Span
46	C	Eng	L1	studied, not conversational
47	C	Eng, Sp	L1	studied, not conversational
48	C	Eng, Sp, Jap, Gr, ASL	L1	studied, not conversational
49	C	Eng, Sp, Jap	L1	studied, not conversational
50	C	Eng, Sp	L1	studied, not conversational
51	C	Eng	L1	studied, not conversational
52	C	Eng, Lat, Fr, Ital, Russ	L1	no Span
53	C	Eng, Sp, Fr	L1	studied, not conversational
54	C	Eng, Sp, Ital	L1	studied, not conversational
55	C	Eng, Sp, Fr	L1	studied, not conversational
56	C	Eng	L1	L1
57	C	Eng, Jap	L1	no Span
58	C	Eng, Sp, Jap	L1	studied, not conversational
59	C	Eng, Swed, Sp	L1	studied, not conversational
60	C	Eng	L1	no Span

8.6 CLOZE survey consent form

Title of the Project: Word Predictability | IRB #: HUM00158504 | Approval date: 07/17/2019

Principal Investigator: Emily Rae Sabo, PhD Student, University of Michigan

Faculty Advisor: Dr. Jonathan Brennan, PhD, University of Michigan

Thank you for considering participating in this study. In order to participate, you must be Prolific worker currently living in the United States, above 18 years old, and a native speaker of English. Being a native speaker of English means that you have spoken English your entire life and are fluent in it. Your participation is voluntary. We expect this research experiment to provide information about the predictability of words in sentences. While there may not be a direct benefit of this study to you, the data you contribute will greatly enhance the methodological integrity of future linguistics research studies by providing important information about the word predictability of the sentences you will read. Before you begin, it is important for you to understand what will be expected of you as a subject in this experiment and what you should do if you decide you no longer wish to participate. You must be 18 or older to indicate consent or participate in this study. By indicating consent, you are letting us know that you understand all that is written in the consent form and you are ready to proceed. If you choose to participate, you will read a series of sentences of which the final word is omitted. You will be asked to type in the word you predict that sentence to end in. For example, you may read a sentence like "It was a windy day, so the boy went outside to fly his _____." In the blank, you would write the word you expect to finish the sentence. It should be noted that there are no right or wrong answers for this study and that your performance in no way reflects your intellectual abilities or language skills. This study meets the definition of "minimal risk", whereby the probability and magnitude of anticipated discomfort or harm is no greater than that ordinarily encountered in daily life or during the performance of routine psychological tests. The only risks are possible minor discomfort from sitting stationary for 15 minutes while doing the survey, and the rare potentiality of breaching confidentiality, which is low because again, there is no identifying information other than your Prolific ID number. The experiment is not timed, so feel free to stand up and move around as you need. Since you are enrolling in this research study through the Prolific site, we need to let you know that any linking of data by Prolific to your ID is outside of the control of the researcher for this study. Prolific has privacy policies of its own outlined for you in its privacy agreement. If you have concerns about how your information will be used by Prolific, you should consult them directly. However, the researchers of this study will only be analyzing your responses to the survey questions contained therein and not any identifiable information about you that you may have put on your Prolific profile. In order to further protect your identity, we will store your Prolific ID separately from your responses to the questions in this survey.

This study should take approximately 15-20 minutes to complete. You will receive \$3.00 for your participation. We will be archiving and analyzing the data we collect from your participation, and your Prolific ID will not be attached to your data. That is, there will be no identifying information linking you to this experiment. Records will be kept confidential to the extent provided by federal, state, and local law, although the Institutional Review Board, or university and government officials responsible for monitoring this study, may inspect these records. Your participation in this project is voluntary. You may decide to end the study at any time, including after you have confirmed consent and have begun the experiment. If you would like to stop the experiment at any point, simply click out of the browser. You will receive payment upon completion of the entire experiment (should you choose to withdraw early, any data collected will be destroyed). After the experiment, feel free to contact me, Emily Rae Sabo (emsabo@umich.edu), if you have further questions. Should you have questions regarding your rights as a research participant, please contact the Institutional Review Board 2800 Plymouth Road Bldg. 520, Rm. 1169 Ann Arbor, MI 48109-2800, (734) 936-0933, email: irbhsbs@umich.edu.

Please confirm your willingness to participate in the study below:

_____ I *do* consent to taking this survey.

_____ I do *not* consent to taking this survey.

8.7 CLOZE survey items

Note: There are 202 items (sentences) in total. To avoid attentional fatigue, each subject was only asked to respond to approximately one third ($n = 67$ or 68) via random assignment to one of three versions of the survey (A,B,C). Item order within surveys was randomized.

CLOZE Survey A

1. Since my aunt usually cooks without any seasoning, the taste of her food tends to be pretty ___.
2. While the surface of a rock tends to be pretty hard, the surface of a pillow tends to be pretty ___.
3. We don't have many hills in this part of the country, so the land generally tends to be pretty ___.
4. Don't use that towel there. That one is usually pretty wet, whereas this one tends to be pretty ___.
5. C'mon – sit up, don't do that. You know it's dangerous. You know that if you eat food while you're lying down, there's a good chance you're gonna _____.
6. If you're driving with your eyes closed and another car is coming towards you, you might not die, but there's a good chance you're gonna _____.
7. Since you're already wet, maybe you don't care. But if you keep walking along the edge of the pool like that, there's a good chance you're gonna _____.
8. I suppose I would use petroleum oil after it's been refined, but not if it's still _____.
9. No sushi for me please. I'll eat fish after it's been cooked but not if it's still _____.
10. I would open my eyes if the plane was already high but not if it's still _____.
11. I would use that lotion on my skin once it's already smooth but not if it's still _____.
12. You can use the varnish on that surface once it's smooth but not if it's still _____.
13. My grandma can't stand for this entire bus ride. Can you check the back of the bus to see if there are any available _____?
14. If at all possible, I'd really like to see Dr. Goldstein today. Could you check his schedule to see if there are any available _____?
15. My younger brother is currently looking for an entry-level job in finance. Could you ask around your company to see if there are any available _____?
16. I like this property, but before I even consider buying it, I need to know where it faces: North, East, South or West. When you get a chance, let me know the _____.
17. The letter is already in an envelope, ready to be mailed out to you. I just need to know where exactly you want me to send it. When you get a chance, let me know the _____.
18. Don't worry about it - I'm happy to call their customer service line for you. But it looks like I don't have them saved in my phone. When you get a chance, let me know the _____.
19. After accidentally farting in front of her boss, my wife's face immediately turned bright red, which only happens when she's _____.
20. We hadn't been trying for a third child, but my wife just had what we think is morning sickness, which only happens when she's _____.
21. Katie must've come down with something. She stayed home from work today and canceled all her meetings, which only happens when she's _____.
22. To be honest, I didn't think his voice was gonna be that good. He just doesn't look like he's had a lot of vocal training. But after hearing him sing, I must admit - I'm _____.
23. Wow - I told you that in confidence because I thought I could trust you. I can't believe you just went and told everyone. I did not see this coming. I must admit - I'm _____.
24. At first, I didn't want to believe the cops when they told me my dad robbed a bank. I refused to believe it. But now that they've shown me the evidence, I must admit - I'm _____.
25. Right now, the geography classrooms only have maps, which are flat. But the Earth is round, so they need to buy...what do you call them? The round, spherical things...They need to buy _____.
26. They need more party decorations than this. I'm gonna bring over my helium tank. Tell them they need to buy...what do you call them? The brightly colored rubber things...They need to buy _____.
27. Two of my best friends are planning to propose to their girlfriends. But before they do, they need to buy the...what do you call them? The jewelry that goes on your finger...They need to buy _____.

28. Recent studies have shown that, compared to adults, teenagers tend to have much less confidence in themselves. In other words, they tend to be more _____.
29. Studies have shown that, compared to small towns, big cities have higher crime rates and more reports of armed robbery. In other words, they tend to be more _____.
30. Studies have shown that Rated-R movies, compared to PG-13 movies, tend to have more scenes with guns, knives and fighting. In other words, they tend to be more _____.
31. Despite English not being her native language, she knows a lot of those quirky sayings like “kick the bucket” and “hit the hay.” In other words, she knows a lot of _____.
32. My niece Sara is only 4 years old and she already knows how to speak English, Chinese, Portuguese, Arabic and Japanese. In other words, she knows a lot of _____.
33. My grandma knows all those old, tired sayings like “Don’t judge a book by its cover” and “The grass is greener on the other side.” In other words, she knows a lot of _____.
34. My grandma may be old, but she still somehow knows all the new, hip words that young people are using these days. In other words, she knows a lot of _____.
35. My 2-year old daughter still doesn’t know many verbs yet. But she does know a lot of the words for people, places, and things. In other words, she knows a lot of _____.
36. The first few pages shouldn’t have anything written on them at all. They should be _____.
37. Party dresses can be any color you want. But wedding dresses? They should be _____.
38. When your eyeglasses are old, they might be blurry. But new glasses? They should be _____.
39. Pieces of coal? They should be opaque. But pieces of glass? They should be _____.
40. We can’t go to the park right now - the skies are cloudy. They should be _____.
41. I’ll show you how to tie a sailor’s knot. Can I borrow some _____?
42. Everything I’m wearing right now is soaking wet. Can I borrow some _____?
43. I can’t walk out there in my bare feet. Can I borrow some _____?
44. Talking is strictly prohibited while inside the library. You need to keep _____.
45. Don’t move your legs or fidget with your hands. You need to keep _____.
46. It’s freezing cold outside, so wear your winter coat. You need to keep _____.
47. I need to know specific names. You can’t just keep saying “some people.” Why are you being so _____?
48. You’ve spent the entire weekend lying around doing absolutely nothing. Why are you being so _____?
49. That is not a nice thing to say. Now you’re just trying to hurt my feelings. Why are you being so _____?
50. I wouldn’t say this company is small. It’s actually quite _____.
51. I wouldn’t say her hair is short. It’s actually quite _____.
52. I wouldn’t say the price is high. It’s actually quite _____.
53. I wouldn’t say this bag is heavy. It’s actually quite _____.
54. The skies aren’t cloudy anymore. They’re actually pretty _____.
55. Her eyes aren’t very dark. They’re actually pretty _____.
56. Those women are not weak. They’re actually pretty _____.
57. While some people have issues with oiliness, Jake’s face is naturally too dry. Using a good face lotion is really important for someone with his kind of _____.
58. Jason has a nice, muscular frame – and he’s not overly tall. A career in gymnastics would be perfect for someone with his kind of _____.
59. Of course it’s expensive. But you know how much Jerry has in the bank. That house would be easy to buy for someone with his kind of _____.
60. Raising five kids can make you go a little crazy. But daily meditation will help keep you _____.
61. Take care of yourself by avoiding greasy foods. Eating fruits and vegetables will help keep you _____.
62. No, don’t drink warm milk. That’ll make you fall asleep. Drinking coffee will help keep you _____.
63. Where can I deposit a check or apply for a loan in this town? I haven’t seen a single _____.
64. I literally can’t find anywhere in this entire park to sit down. I haven’t seen a single _____.
65. This is supposedly a library, but there’s nothing here to read. I haven’t seen a single _____.

66. No one here has facial hair. I haven't seen any moustaches. And I haven't seen a single _____.
 67. For baseball, you usually use a wooden one. But that one's made of metal. Is that a new _____?

CLOZE Survey B

68. After you shower, you usually put on one that's terrycloth. But that one's silky. Is that a new _____?
 69. The one you usually wear on your finger is gold. But that one is silver. Is that a new _____?
 70. Wow - your shoes are completely covered in mud. Don't you dare walk inside my house with all that mud on your shoes, or you'll drag it into my _____.
 71. This isn't my own personal computer. It's a shared computer. So when I save a file, I can't leave it on the desktop. I need to drag it into my _____.
 72. I own the land from this line over. As your neighbor, I'm asking that you keep your trash can over there and that you not drag it onto my _____.
 73. From this line over is my property where I grow my crops. As your neighbor I ask that you keep your harvesting equipment over there and not drag it onto my _____.
 74. I make the opposite of entrances. I make _____.
 75. I make the opposite of failures. I make _____.
 76. I make the opposite of enemies. I make _____.
 77. If you no longer need that appointment, please call my scheduling secretary so that you can _____.
 78. After your appointment, head over to the receptionist and give her your credit card so that you can _____.
 79. Wait - you've never swung a golf club before? Here, borrow mine for a second so that you can _____.
 80. You have a technical expertise that we need in the operating room during this procedure. I know you don't want to lead the procedure. But if we assign another surgeon to lead it, would you be willing to _____?
 81. I know how much you hate our corporate dinner parties. But your presence at next week's is important to our investors. If I can ensure it won't drag on too long, would you be willing to _____?
 82. Listen, I know you two have always wanted to have kids that are your own, biological children. But if that's not turning out to be an option, then would you be willing to _____?
 83. Unfortunately, he's still having the same digestive problems as before. He hasn't gone to the bathroom for a while. Like, he hasn't had a bowel movement for several days now. In other words, he's still really _____.
 84. The good news is that he doesn't have the sore throat anymore. But unfortunately, his nasal passages are still...you know...he still can't really breathe in through his nose. In other words, he's still really _____.
 85. I was hoping he'd feel more relaxed now that that big deadline is behind him. But unfortunately, work is still crazy, and his boss just continues to pile on the pressure. In other words, he's still really _____.
 86. You still need to maintain a healthy distance from him when you visit. His infection can be transmitted to you very quickly, through direct or even indirect contact. In other words, he's still really _____.
 87. He still hasn't decided whether or not to tell her. On one hand, she deserves to know the truth. But, also telling her will hurt her. He's not sure which is the right choice. In other words, he's still really _____.
 88. This is a really hard math problem for a kid his age. And even though you've been explaining it to him for over an hour, I still don't think he has any idea how to do it. In other words, he's still really _____.
 89. Of course I believe that the Earth is round! That's not a claim that I would ever _____.
 90. That's a question that they're not allowed to ask. And it's also not one that I would ever _____.

91. Mechanical engineering simply doesn't interest me. It's just not a career path that I would ever _____.
92. Mandatory recycling is the kind of law that congress would say they support but never actually _____.
93. That's the kind of mean email that I would just write and keep as a draft but never actually _____.
94. Yeah, that is the kind of homemade, do-it-yourself project that I would start but never actually _____.
95. She has appendicitis. If we don't operate right now, her appendix will burst. It needs to be _____.
96. Can you hand me a big spoon? The bowl of cake mix is starting to look clumpy. It needs to be _____.
97. Do you see the blank line there at the bottom of the receipt? You can use this pen. It needs to be _____.
98. Uh-oh, I think our little baby girl may have just pooped her diaper. Yep...she needs to be _____.
99. As soon as babies see a toy within reach, their little hands will start _____.
100. Remember - as soon as you hit the microphone's ON button, it will start _____.
101. I am so behind for our book club. As soon as I get the book, I will start _____.
102. We work at the same university and even in the same building. But I'm in English and she's in Psychology. In other words, we work in two different _____.
103. For a couple months, we tried living together to save on rent. But we fought too much. So now we're back to living in two different _____.
104. I thought it was just one big container. But it turns out there's a divider that runs through the middle of it. In other words, it actually has two different _____.
105. If you've never played in an orchestra, the trumpet and the trombone may look the same to you. But I assure you - they are two different _____.
106. My sheets must be super soft. I slept with my face pressed directly against them all night last night and they didn't leave any particular _____.
107. When it comes to buying shampoo, I just buy whatever's cheapest. I honestly don't care if it's Pantene or L'Oréal. I don't have loyalty to any particular _____.
108. There should be something posted to let clients know that smoking is not allowed in here. I looked around on the walls, but I couldn't find any particular _____.
109. If you upgrade your normal YouTube account to a paid YouTube Premium account, then you'll get to watch all your videos completely uninterrupted. That means that you won't have to waste your time anymore sitting through a bunch of _____.
110. I've been a total pushover. When my kids misbehave, I tell them I won't punish them this time but that they need to be careful because I definitely will punish them next time. I can't just continue letting them off the hook with a bunch of _____.
111. Unfortunately, a lot of accounting firms around here have been closing down lately. And even the national ones that are still in business have closed their regional branches. But if you're looking for a job, our firm actually has a bunch of _____.
112. That furniture looks heavy. And you, as women, aren't as physically strong as us. I can always come over and help you move it - if you need a _____.
113. Wow, that's way too many dirty dishes for one person to have to clean by themselves. I'm happy to help - if you need a _____.
114. Hey, I just heard you got laid off. You know, if you're looking...we have some openings where I work - if you need a _____.
115. I'm sorry to hear you had a rough day. You know, we could go see a comedy show tonight, hear some jokes...if you need a _____.
116. Those beams don't look structurally sound. You suggested adding more weight to them, but how much more can they possibly _____?
117. I can tell that his parents are already at their wit's end with his rude behavior. How much more can they possibly _____?

118. The authors should stop. The book is already too long. When it comes to additional pages, how much more can they possibly _____?
119. I need to fry some onions. I see you have a pot, but there's no _____.
120. I want a sandwich. I see the jelly and the peanut butter, but there's no _____.
121. We need all three utensils. I see a spoon and a knife, but there's no _____.
122. For the longest time, we couldn't decipher his messages...no matter how hard we tried. But we finally ended up cracking his _____.
123. The car crash damaged most of the bones in his forearm. It broke all of his fingers, fractured his wrist, and ended up cracking his _____.
124. When the orange juice slipped out of his hands, the juice went flying everywhere and the fall ended up cracking his _____.
125. I thought they would have covered the walls of their dorm room with their favorite bands or musicians or something, but surprisingly they didn't have any _____.
126. The event was at a fancy restaurant. So after dinner, I expected they would have a cake or at least some pie for us to eat. But surprisingly they didn't have any _____.
127. On her birthday, my mom always buys herself gold earrings that are expensive and sparkly. Last year's pair had gold but surprisingly they didn't have any _____.
128. His driver must have driven it straight through a mud pit because there is dried-up mud all over his _____.
129. My teenage brother has a lot of acne around his nose. Actually...he has a lot of acne all over his _____.
130. It looked as if my brother had peed himself. But in reality, he'd just spilled a cup of tea all over his _____.
131. When my sister meets with her boss tomorrow, she is going to be adamant about getting that pay raise. It's not something she's going to just ask for. It's something she's going to _____.
132. Since I'm responsible for damaging her property, I told her I'd pay her whatever she needs me to. I never thought she'd get lawyers involved. But now that she did, that probably means she's going to _____.
133. Yeah – she is really strong, and she's highly trained in self-defense. So, if someone ever does try to attack her or something, she's not gonna shrivel up or run away. She's going to _____.
134. We're pretty open with our kids. My mom and dad were much more closed off with me and my brothers growing up. They were more distant _____.
135. I've been feeling pretty lonely since my mom and dad died. So I've started spending the holidays with some of my more distant _____.

CLOZE Survey C

136. I know we're not closely related. But if we looked back far enough in our family trees, I bet we'd find we share some more distant _____.
137. Soon, my parents won't have to work anymore. In just a couple years, they are going to be _____.
138. Our military presence is no longer needed in Afghanistan, so all of our troops are going to be _____.
139. Where the old tiles used to be, we're gonna put in new tiles. In other words, the old ones are going to be _____.
140. Pretty soon, no one will have any memory that they ever existed. Pretty soon, they are going to be _____.
141. Unfortunately, the antibiotics we gave her are no longer working for her anymore. It seems that her body has built up _____.
142. She used to get winded on 5-minute runs. But now she can run for a full hour with no problem. She has built up _____.
143. She used to be self-conscious and doubt herself. But now she walks around with her head held high. She has built up _____.

144. Lately, he just asks out every girl he meets and goes on dates with whoever will say yes. What I'm trying to say is...he's _____.
145. Trust me – he is not asleep. It's not even 10pm and his light is still on! What I'm trying to say is...he's _____.
146. There's no one in there with him because he doesn't have anyone. No family. No close friends. What I'm trying to say is...he's _____.
147. I expected him to respond by freaking out and yelling. But he's actually speaking in a cool, collected tone. What I'm trying to say is...he's _____.
148. Oh - I actually thought that plan would fail. How does something like that _____?
149. Really? I didn't think that was even possible. How does something like that _____?
150. I know it was windy, but that tree was sturdy. How does something like that _____?
151. So far, the organization hasn't spoken out publicly against racism. But obviously, racism is wrong and needs to be _____.
152. If a student tells you she's experiencing abuse at home, you can't keep that information to yourself. It needs to be _____.
153. Listen to me. You have so many good ideas, and the world needs to hear what you have to say. Your voice needs to be _____.
154. That comedian is funny, but he wouldn't be a good fit for this. We run a clean show here and he's too vulgar. He just doesn't have the right kind of _____.
155. Trust me - don't even try talking to him about any important issues right now. He's too angry and irritable. He's really just not in the right kind of _____.
156. For this job, we need someone who is friendly and outgoing. Your brother is too shy and quiet. He just doesn't have the right kind of _____.
157. My favorite pro wrestler was just named the Leading World Class Champion, and he deserves it. He worked really hard to earn that _____.
158. My son got pretty emotional at his college graduation ceremony, which makes sense. He worked really hard to earn that _____.
159. My brother's company is now worth a million dollars, and he deserves every penny of it. He worked really hard to earn that _____.
160. We've tested that drug and it does work for some people. Unfortunately, it's not gonna work for you. It's not gonna be _____.
161. No one uses paper money anymore. When your customers pay, it'll be all credit cards. It's not gonna be _____.
162. I don't know what I'm cooking for dinner yet. But since I hate salmon, cod, and tilapia, it's not gonna be _____.
163. That was an unexpected interruption to our meeting. But now that I have all of your attention back again, I would like to _____.
164. We covered a lot of information today. But all those details boil down to just three main points, which quickly I would like to _____.
165. I understand that time is up, but I'm almost done. This is a project that I started and it's also one that I would like to _____.
166. Those molecules are already really tightly packed. They're packed to the brim. If you inject any more particles into them, they're gonna end up with too much...what's the word? It's not volume, it's not matter...they're gonna end up with too much _____.
167. To make bread, the first step is to form the...whatchamacallit? You know, the gooey water-flour mixture? Go easy on the water and flour though, or you'll end up with too much of it...of that gooey whatchamacallit...you're gonna end up with too much _____.
168. I understand that he wants to make some kind of bold public statement by not shaving his beard, his moustache, or his armpits for the entire year. But if he sticks to that plan, he's simply gonna end up with too much _____.
169. My mom's a lawyer, and today they promoted her to partner! She works in the city for that...you know...big law...I can't remember the name, but if you mentioned a few, I'm pretty sure I could pick out which is her _____.

170. I wouldn't be great at forging it, but I've seen my mom write her name before. Let's just say if she and a couple other people wrote her name in cursive, I'm pretty sure I could pick out which is her _____.
171. It's been about fifteen years since I've visited my grandma on my mom's side. I definitely remember which street she lives on. And if I drove down it, I'm pretty sure I could pick out which is her _____.
172. The painting that she bought at the art show is really pretty. It's bright and has all warm colors. There's yellow and orange...but actually, now that I think of it there isn't any _____.
173. They haven't finished setting up the outdoor volleyball court yet. The posts are in the ground, but they haven't hung up the mesh thing. In other words, between the posts there isn't any _____.
174. I'm supposed to house sit for her while she's away, but I can't get inside. The front door is locked. And I've looked through the bag of stuff she gave me, but there isn't any _____.
175. Well, I've honestly never been good at math. I'm so bad with _____.
176. I'm good at remembering people's faces, but I'm so bad with _____.
177. I freak out when the doctor says I need a shot. I'm so bad with _____.
178. I never read the paper or keep up to date on current events. I'm so bad with _____.
179. I'm good with adjectives and verbs, but I'm so bad with _____.
180. The head professor is usually the one who teaches us, the one who stands in front of the class and delivers it. He was just out of town yesterday, so he wasn't able to do the _____.
181. For today's class, the students were assigned a chapter in the textbook. Everyone came prepared – except for Steven, who says he was up sick all night and so he wasn't able to do the _____.
182. Sean studied extra hard and stayed up all night cramming for the SAT. Unfortunately, he fell asleep without setting his alarm. So in the end, he wasn't able to do the _____.
183. The officiant was excited to marry the happy couple, but he got stuck in traffic on the way to the venue and arrived too late. So, he wasn't able to do the _____.
184. Sean is really good at fixing things. He was able to do the TV without a problem. But he doesn't know how FM or AM work, so he wasn't able to do the _____.
185. You know the animals with horns that kinda look like sheep but without the wool coats? Some people call them billy? Anyways, we've always had two of them in our barn. But when I checked the barn this morning, all I saw was one single _____.
186. When I turned on the faucet in the kitchen sink yesterday, I was really hoping to see a nice, flowing stream of water. But because of the drought we're experiencing right now, all that came out of the faucet...all I saw, was one single _____.
187. My cousin has an entire set of them. He's got a snare, bongos - even a timpani. But when I visited him at his house last week, I discovered he actually keeps most of them in storage. All he had sitting out, all I saw was one single _____.
188. We were planning to make it out of velvet. But, depending on her preferences, we could make the dress out of whatever she likes best: cotton, wool, satin, chiffon, polyester. As I'm sure you can tell, we have almost every kind of _____.
189. This is an industrial town. Everyone here works long hours in assembly lines. The good thing is there are a lot of places to work. There's the steel one downtown, the automotive one off the highway...honestly, we have almost every kind of _____.
190. We've got the dysfunctional kind, where the parents hate each other and are staying together for the kids. But we've also got the functional kind, where everyone is happy and even the siblings get along. In this neighborhood, we have almost every kind of _____.
191. My mother has never been the type to wear high heels. She wears shoes that she can walk around in comfortably. In other words, when it comes shoe choice, my mom has always been very _____.
192. She burns really easily. If you take her to the beach, you need to re-apply her sunblock every hour. And don't use the generic sunblock – it gives her a rash. As you know, her skin has always been very _____.

193. Scarlett is not your typical uptight, conservative ballet dancer. The way she moves her body when she dances - it's slow, passionate, and almost arousing. Her dancing style has always been very _____.
194. While the way they sign their names may be neat and legible, I like the way you do yours better. Yours is by far my favorite _____.
195. When I was in grade school, Math and Science were always the ones I hated the most. History, though, was by far my favorite _____.
196. As a teacher, I know that I'm not supposed to play favorites with them. But I'll admit it - Charlie is by far my favorite _____.
197. That restaurant is perfect for a romantic date. It's cozy and there's always natural candlelight. Honestly, for date nights, I don't really care about the restaurant's food. I care more about the _____.
198. Global warming is a real problem. For me, it's important that we be green and take care of our planet. Some people care more about the economy, but I care more about the _____.
199. The musician fell off the stage while holding what was either a trumpet or a saxophone. Everyone seems worried about the musician getting hurt. But honestly, I care more about the _____.
200. Their band has been putting on free concerts throughout the country, mostly in cities with big sports complexes. Last week they came to our city and before a basketball game they played in the _____.
201. Our kids have always been afraid of the ocean. When we'd go on family vacations to the beach, they wouldn't even touch the water. They always stayed out and played in the _____.
202. Actually, I've always loved winter weather. Just the other day I realized how nice it was to sit outside with my thermos of hot chocolate and watch my kids as they played in the _____.

Linguistic background questions:

- List every language you know or have studied in any way. Separate them by commas.
- Which of the following best characterizes your English language background?
 - I speak English natively and fluently.
 - English is NOT my native language, but I am HIGHLY fluent in it.
 - English is NOT my native language and I'm NOT fully fluent in it.
- You indicated that English is not (one of) your native language(s). What is(are) your native language(s)? Note: 'Native language' means a language you've been exposed to and used since birth. *This question is not displayed if the participant selected "I speak English natively and fluently" in the previous question.*
- Which of the following best characterizes your experience with Spanish?
 - I speak Spanish natively and fluently.
 - I've studied Spanish and CAN hold a conversation in it.
 - I've studied Spanish, but CAN'T hold a conversation in it.
 - I don't know Spanish at all.
- Do you currently live in the continental United States?
 - Yes, I currently live in the continental U.S.
 - No, I do NOT currently live in the continental U.S.

8.8 CLOZE response data summary

Item	Cloze	Item	Cloze	Item	Cloze	Item	Cloze
bland	.95	long	.75	departments	.65	reported	.65
soft	1	low	.45	apartments	.45	heard	1.00
flat	.95	light	1	compartments	.35	humor	.20
dry	.95	clear	.70	instruments	.85	mood	.85
choke	.80	light	.85	mark	.6	personality	.55
crash	.70	strong	.95	brand	.95	title	.60
fall(in)	.65	complexion	.15	sign	.8	degree	.75
crude	.30	build	.60	advertisements	.7	money	.60
raw	1	money	.75	warnings	.2	effective	.50
low	.35	sane	.45	openings	.55	cash	.65
rough	.45	healthy	.95	man	.05	fish	.90
rough	.95	awake	.95	hand	1	resume	.20
seats	1	bank	1	job	.9	summarize	.50
appointments	.70	bench	.90	laugh	.8	finish	.90
positions	.70	book	1	support	.1	mass	.25
direction	.85	beard	.80	take	.5	dough	.75
address	1	bat	.95	write	.35	hair	.90
number	.98	robe	.8	pan	.2	firm	.75
embarrassed	.95	ring	.95	bread	.9	signature	.75
pregnant	1	carpet	.3	fork	1	house	1.00
sick	.85	folder	.4	code	.9	red	.65
impressed	.45	property	.6	elbow	.25	net	.95
shocked	.25	farm	.05	glass	.45	key	.95
convinced	.35	exits	.95	posters	.9	numbers	.90
globes	1	successes	.75	desserts	.85	names	1.00
balloons	.95	friends	1	diamonds	.35	needles	.95
rings	1.00	cancel	.85	car		news	.75
insecure	.30	pay	1	face	.75	nouns	.70
dangerous	.55	try(it)	.7	pants	.65	lecture	.70
violent	1	assist	.6	demand	.9	reading	.60
idioms	.1	attend	.75	sue	.9	test	.70
languages	1	adopt	.95	fight	.9	wedding	.20
clichés	0	constipated	.9	parents	.75	radio	.95
slang	.85	stuffed up	.2	relatives	.7	goat	.85
nouns	.90	stressed	.35	ancestors	.10	drop	1.00
blank	.90	contagious	.65	retired	1.00	drum	.75
white	.90	conflicted	.15	removed	.05	fabric	.75
clear	.85	confused	.6	replaced	.80	factory	.35
clear	.60	contest	0	forgotten	.45	family	.70
clear	.50	answer	.35	resistance	.25	sensible	.05
rope	.85	pursue	.2	endurance	.40	sensitive	.95
clothes	.95	mandate	0	confidence	.75	sensual	.15
shoes	.95	send	1	desperate	.50	signature	.90
quiet	.85	finish	.8	awake	.85	subject	1.00
still	.85	removed	.65	alone	.70	student	.95
warm	1	stirred	.6	calm	.70	ambience	.25
vague	.45	signed	.9	succeed	.25	environment	.40
lazy	.95	changed	1	happen	.90	instrument	.80
mean	.75	grabbing	.3	fall	.15	arena	.50
large	.90	recording	.75	denounced	.00	sand	1.00
		reading	.95			snow	.85

8.9 Word Plausibility survey (PLAUS) participant metadata

Notes: This was a stimuli norming survey hosted on Qualtrics and distributed through Prolific. *Fr* = French, *Eng* = English, *Span* = Spanish, *Ital* = Italian, *Ger* = German, *Jap* = Japanese, *Chin* = Chinese, *Gr* = Greek, *Russ* = Russian, *Kor* = Korean, *ASL* = American Sign Language, *Heb* = Hebrew

Sub ID	List	Languages known	English	Spanish
1	A	Eng	L1	L1
2	A	Eng, Ger, Fr	L1	no Spanish
3	A	Eng	L1	no Spanish
4	A	Eng	L1	studied, not conversational
5	A	Eng, Sp, Fr	L1	studied, not conversational
6	A	Eng, Sp, Ger	L1	studied, not conversational
7	A	Eng, Ger, Sp	L1	studied, not conversational
8	A	Eng	L1	no Spanish
9	A	Eng, Fr	L1	no Spanish
10	A	Eng, Fr	L1	no Spanish
11	A	Eng	L1	no Spanish
12	A	Eng	L1	studied, not conversational
13	A	Eng, Sp	L1	studied, not conversational
14	A	Eng, Sp	L1	studied, not conversational
15	A	Eng, Sp	L1	studied, not conversational
16	A	Eng, Sp	L1	studied, conversational
17	A	Eng, Sp, Lat	L1	studied, conversational
18	A	Eng, Sp, Fr, Russ, Ital	L1	studied, not conversational
19	A	Eng, Sp	L1	studied, conversational
20	A	Eng	L1	no Spanish
21	B	Eng, Sp, Fr	L1	studied, not conversational
22	B	Eng	L1	no Sp
23	B	Eng, Fr	L1	no Sp
24	B	Eng, Sp	L1	studied, not conversational
25	B	Eng	L1	no Sp
26	B	Eng, Fr, Lat	L1	no Sp
27	B	Eng, Fr, Sp	L1	studied, not conversational
28	B	Eng, Fr	L1	no Sp
29	B	Eng, Sp, Gr	L1	studied, conversational
30	B	Eng, Sp, Ger	L1	studied, not conversational
31	B	Eng	L1	studied, not conversational
32	B	Eng, Sp, Russ, Chin	L1	studied, not conversational
33	B	Eng, Fr, Lat	L1	no Sp
34	B	Eng, Sp	L1	studied, not conversational
35	B	Eng, Sp	L1	studied, not conversational
36	B	Eng, Sp	L1	studied, not conversational
37	B	Eng, Sp, Jap	L1	studied, conversational
38	B	Eng, Sp	L1	studied, not conversational
39	B	Eng	L1	no Sp
40	B	Eng, ASL, Sp	L1	studied, not conversational
41	C	Eng	L1	no Sp
42	C	Eng, Sp, Fr, ASL	L1	studied, not conversational

43	C	Eng, Sp, Fr	L1	studied, not conversational
44	C	Eng, Sp	L1	studied, not conversational
45	C	Eng, Sp	L1	studied, not conversational
46	C	Eng, Fr	L1	no Sp
47	C	Eng	L1	no Sp
48	C	Eng	L1	no Sp
49	C	Eng	L1	no Sp
50	C	Eng, Sp	L1	studied, not conversational
51	C	Eng	L1	no Sp
52	C	Eng, Sp	L1	studied, not conversational
53	C	Eng, ASL	L1	studied, not conversational
54	C	Sp, Jap, Eng	L1	studied, not conversational
55	C	Eng, Sp	L1	studied, not conversational
56	C	Eng, Sp	L1	studied, not conversational
57	C	Eng, Sp, Fr	L1	studied, not conversational
58	C	Eng, Chin, Jap	L1	no Sp
59	C	Eng	L1	no Sp
60	C	Eng, Sp	L1	studied, not conversational
61	C	Eng, Sp	L1	studied, not conversational
62	C	Eng, Sp	L1	studied, not conversational
63	C	Eng, Lat	L1	no Sp

8.10 PLAUS survey consent form

Title of the Project: Word Plausibility | IRB #: HUM00158504 | Approval date: 07/17/2019
Principal Investigator: Emily Rae Sabo, PhD Student, University of Michigan
Faculty Advisor: Dr. Jonathan Brennan, PhD, University of Michigan

Thank you for considering participating in this study. In order to participate, you must be Prolific worker currently living in the United States, above 18 years old, and a native speaker of English. Being a native speaker of English means that you have spoken English your entire life and are fluent in it. Your participation is voluntary. We expect this research experiment to provide information about the predictability of words in sentences. While there may not be a direct benefit of this study to you, the data you contribute will greatly enhance the methodological integrity of future linguistics research studies by providing important information about the word predictability of the sentences you will read.

Before you begin, it is important for you to understand what will be expected of you as a subject in this experiment and what you should do if you decide you no longer wish to participate. You must be 18 or older to indicate consent or participate in this study. By indicating consent, you are letting us know that you understand all that is written in the consent form and you are ready to proceed. If you choose to participate, you will read a series of sentences of which the final word is underlined. You will be asked to rate how much sense that final word makes for that sentence. For example, you may read a sentence like *"I like my coffee with cream and socks."* It would be up to your judgment to evaluate whether the final word of the sentence is plausible, or makes sense to you. It should be noted that there are no right or wrong answers for this study and that your performance in no way reflects your intellectual abilities or language skills. This study meets the definition of "minimal risk", whereby the probability and magnitude of anticipated discomfort or harm is no greater than that ordinarily encountered in daily life or during the performance of routine psychological tests. The only risks are possible minor discomfort from sitting stationary for 15 minutes while doing the survey, and the rare potentiality of breaching confidentiality, which is low because again, there is no identifying information other than your Prolific ID number. The experiment is not timed, so feel free to stand up and move around as you need. Since you are enrolling in this research study through the Prolific site, we need to let you know that any linking of data by Prolific to your ID is outside of the control of the researcher for this study. Prolific has privacy policies of its own outlined for you in its privacy agreement. If you have concerns about how your information will be used by Prolific, you should consult them directly. However, the researchers of this study will only be analyzing your responses to the survey questions contained therein and not any identifiable information about you that you may have put on your Prolific profile. In order to further protect your identity, we will store your Prolific ID separately from your responses to the questions in this survey.

This study should take approximately 15-20 minutes to complete. You will receive \$3.00 for your participation. We will be archiving and analyzing the data we collect from your participation, and your Prolific ID will not be attached to your data. That is, there will be no identifying information linking you to this experiment. Records will be kept confidential to the extent provided by federal, state, and local law, although the Institutional Review Board, or university and government officials responsible for monitoring this study, may inspect these records. Your participation in this project is voluntary. You may decide to end the study at any time, including after you have confirmed consent and have begun the experiment. If you would like to stop the experiment at any point, simply click out of the browser. You will receive payment upon completion of the entire experiment (should you choose to withdraw early, any data collected will be destroyed). After the experiment, feel free to contact me, Emily Rae Sabo (emsabo@umich.edu), if you have further questions. Should you have questions regarding your rights as a research participant, please contact the Institutional Review Board 2800 Plymouth Road Bldg. 520, Rm. 1169 Ann Arbor, MI 48109-2800, (734) 936-0933, email: irbhsbs@umich.edu.

Please confirm your willingness to participate in the study below:

- I DO consent to taking this survey.
- I do NOT consent to taking this survey.

8.11 PLAUS survey items

Note: There are 202 items (sentences) in total. To avoid attentional fatigue, each subject was only asked to respond to approximately one third ($n = 67$ or 68) via random assignment to one of three versions of the survey (A,B,C). Item order within surveys was randomized.

1. Since my aunt usually cooks without any seasoning, the taste of her food tends to be pretty **bland**.
2. While the surface of a rock tends to be pretty hard, the surface of a pillow tends to be pretty **bland**.
3. We don't have many hills in this part of the country, so the land generally tends to be pretty **bland**.
4. Don't use that towel there. That one is usually pretty wet, whereas this one tends to be pretty **bland**.
5. C'mon – sit up, don't do that. You know it's dangerous. You know that if you eat food while you're lying down, there's a good chance you're gonna **choke**.
6. If you're driving with your eyes closed and another car is coming towards you, you might not die, but there's a good chance you're gonna **choke**.
7. Since you're already wet, maybe you don't care. But if you keep walking along the edge of the pool like that, there's a good chance you're gonna **choke**.
8. I suppose I would use petroleum oil after it's been refined, but not if it's still **crude**.
9. No sushi for me please. I'll eat fish after it's been cooked but not if it's still **crude**.
10. I would open my eyes if the plane was already high but not if it's still **crude**.
11. I would use that lotion on my skin once it's already smooth but not if it's still **crude**.
12. You can use the varnish on that surface once it's smooth but not if it's still **crude**.
13. My grandma can't stand for this entire bus ride. Can you check the back of the bus to see if there are any available **seats**?
14. If at all possible, I'd really like to see Dr. Goldstein today. Could you check his schedule to see if there are any available **seats**?
15. My younger brother is currently looking for an entry-level job in finance. Could you ask around your company to see if there are any available **seats**?
16. I like this property, but before I even consider buying it, I need to know where it faces: North, East, South or West. When you get a chance, let me know the **direction**.
17. The letter is already in an envelope, ready to be mailed out to you. I just need to know where exactly you want me to send it. When you get a chance, let me know the **direction**.
18. Don't worry about it - I'm happy to call their customer service line for you. But it looks like I don't have them saved in my phone. When you get a chance, let me know the **direction**.
19. After accidentally farting in front of her boss, my wife's face immediately turned bright red, which only happens when she's **embarrassed**.
20. We hadn't been trying for a third child, but my wife just had what we think is morning sickness, which only happens when she's **embarrassed**.
21. Katie must've come down with something. She stayed home from work today and canceled all her meetings, which only happens when she's **embarrassed**.
22. To be honest, I didn't think his voice was gonna be that good. He just doesn't look like he's had a lot of vocal training. But after hearing him sing, I must admit - I'm **impressed**.
23. Wow - I told you that in confidence because I thought I could trust you. I can't believe you just went and told everyone. I did not see this coming. I must admit - I'm **impressed**.
24. At first, I didn't want to believe the cops when they told me my dad robbed a bank. I refused to believe it. But now that they've shown me the evidence, I must admit - I'm **impressed**.
25. Right now, the geography classrooms only have maps, which are flat. But the Earth is round, so they need to buy...what do you call them? The round, spherical things...They need to buy **globes**.

26. They need more party decorations than this. I'm gonna bring over my helium tank. Tell them they need to buy...what do you call them? The brightly colored rubber things...They need to buy **globes**.
27. Two of my best friends are planning to propose to their girlfriends. But before they do, they need to buy the...what do you call them? The jewelry that goes on your finger...They need to buy **globes**.
28. Recent studies have shown that, compared to adults, teenagers tend to have much less confidence in themselves. In other words, they tend to be more **insecure**.
29. Studies have shown that, compared to small towns, big cities have higher crime rates and more reports of armed robbery. In other words, they tend to be more **insecure**.
30. Studies have shown that Rated-R movies, compared to PG-13 movies, tend to have more scenes with guns, knives and fighting. In other words, they tend to be more **insecure**.
31. Despite English not being her native language, she knows a lot of those quirky sayings like "kick the bucket" and "hit the hay." In other words, she knows a lot of **idioms**.
32. My niece Sara is only 4 years old and she already knows how to speak English, Chinese, Portuguese, Arabic and Japanese. In other words, she knows a lot of **idioms**.
33. My grandma knows all those old, tired sayings like "Don't judge a book by its cover" and "The grass is greener on the other side." In other words, she knows a lot of **idioms**.
34. My grandma may be old, but she still somehow knows all the new, hip words that young people are using these days. In other words, she knows a lot of **idioms**.
35. My 2-year old daughter still doesn't know many verbs yet. But she does know a lot of the words for people, places, and things. In other words, she knows a lot of **idioms**.
36. The first few pages shouldn't have anything written on them at all. They should be **blank**.
37. Party dresses can be any color you want. But wedding dresses? They should be **blank**.
38. When your eyeglasses are old, they might be blurry. But new glasses? They should be **blank**.
39. Pieces of coal? They should be opaque. But pieces of glass? They should be **blank**.
40. We can't go to the park right now - the skies are cloudy. They should be **blank**.
41. I'll show you how to tie a sailor's knot. Can I borrow some **rope**?
42. Everything I'm wearing right now is soaking wet. Can I borrow some **rope**?
43. I can't walk out there in my bare feet. Can I borrow some **rope**?
44. Talking is strictly prohibited while inside the library. You need to keep **quiet**.
45. Don't move your legs or fidget with your hands. You need to keep **quiet**.
46. It's freezing cold outside, so wear your winter coat. You need to keep **quiet**.
47. I need to know specific names. You can't just keep saying "some people." Why are you being so **vague**?
48. You've spent the entire weekend lying around doing absolutely nothing. Why are you being so **vague**?
49. That is not a nice thing to say. Now you're just trying to hurt my feelings. Why are you being so **vague**?
50. I wouldn't say this company is small. It's actually quite **large**.
51. I wouldn't say her hair is short. It's actually quite **large**.
52. I wouldn't say the price is high. It's actually quite **large**.
53. I wouldn't say this bag is heavy. It's actually quite **large**.
54. The skies aren't cloudy anymore. They're actually pretty **clear**.
55. Her eyes aren't very dark. They're actually pretty **clear**.
56. Those women are not weak. They're actually pretty **clear**.
57. While some people have issues with oiliness, Jake's face is naturally too dry. Using a good face lotion is really important for someone with his kind of **complexion**.
58. Jason has a nice, muscular frame – and he's not overly tall. A career in gymnastics would be perfect for someone with his kind of **complexion**.
59. Of course it's expensive. But you know how much Jerry has in the bank. That house would be easy to buy for someone with his kind of **complexion**.
60. Raising five kids can make you go a little crazy. But daily meditation will help keep you **sane**.

61. Take care of yourself by avoiding greasy foods. Eating fruits and vegetables will help keep you sane.
62. No, don't drink warm milk. That'll make you fall asleep. Drinking coffee will help keep you sane.
63. Where can I deposit a check or apply for a loan in this town? I haven't seen a single bank.
64. I literally can't find anywhere in this entire park to sit down. I haven't seen a single bank.
65. This is supposedly a library, but there's nothing here to read. I haven't seen a single bank.
66. No one here has facial hair. I haven't seen any moustaches. And I haven't seen a single bank.
67. For baseball, you usually use a wooden one. But that one's made of metal. Is that a new bat?
68. After you shower, you usually put on one that's terrycloth. But that one's silky. Is that a new bat?
69. The one you usually wear on your finger is gold. But that one is silver. Is that a new bat?
70. Wow - your shoes are completely covered in mud. Don't you dare walk inside my house with all that mud on your shoes, or you'll drag it into my carpet.
71. This isn't my own personal computer. It's a shared computer. So when I save a file, I can't leave it on the desktop. I need to drag it into my carpet.
72. I own the land from this line over. As your neighbor, I'm asking that you keep your trash can over there and that you not drag it onto my carpet.
73. From this line over is my property where I grow my crops. As your neighbor I ask that you keep your harvesting equipment over there and not drag it onto my carpet.
74. I make the opposite of entrances. I make exits.
75. I make the opposite of failures. I make exits.
76. I make the opposite of enemies. I make exits.
77. If you no longer need that appointment, please call my scheduling secretary so that you can cancel.
78. After your appointment, head over to the receptionist and give her your credit card so that you can cancel.
79. Wait - you've never swung a golf club before? Here, borrow mine for a second so that you can cancel.
80. You have a technical expertise that we need in the operating room during this procedure. I know you don't want to lead the procedure. But if we assign another surgeon to lead it, would you be willing to assist?
81. I know how much you hate our corporate dinner parties. But your presence at next week's is important to our investors. If I can ensure it won't drag on too long, would you be willing to assist?
82. Listen, I know you two have always wanted to have kids that are your own, biological children. But if that's not turning out to be an option, then would you be willing to assist?
83. Unfortunately, he's still having the same digestive problems as before. He hasn't gone to the bathroom for a while. Like, he hasn't had a bowel movement for several days now. In other words, he's still really constipated.
84. The good news is that he doesn't have the sore throat anymore. But unfortunately, his nasal passages are still...you know...he still can't really breathe in through his nose. In other words, he's still really constipated.
85. I was hoping he'd feel more relaxed now that that big deadline is behind him. But unfortunately, work is still crazy, and his boss just continues to pile on the pressure. In other words, he's still really constipated.
86. You still need to maintain a healthy distance from him when you visit. His infection can be transmitted to you very quickly, through direct or even indirect contact. In other words, he's still really constipated.
87. He still hasn't decided whether or not to tell her. On one hand, she deserves to know the truth. But, also telling her will hurt her. He's not sure which is the right choice. In other words, he's still really constipated.

88. This is a really hard math problem for a kid his age. And even though you've been explaining it to him for over an hour, I still don't think he has any idea how to do it. In other words, he's still really **constipated**.
89. Of course I believe that the Earth is round! That's not a claim that I would ever **contest**.
90. That's a question that they're not allowed to ask. And it's also not one that I would ever **contest**.
91. Mechanical engineering simply doesn't interest me. It's just not a career path that I would ever **contest**.
92. Mandatory recycling is the kind of law that congress would say they support but never actually **mandate**.
93. That's the kind of mean email that I would just write and keep as a draft but never actually **mandate**.
94. Yeah, that is the kind of homemade, do-it-yourself project that I would start but never actually **mandate**.
95. She has appendicitis. If we don't operate right now, her appendix will burst. It needs to be **removed**.
96. Can you hand me a big spoon? The bowl of cake mix is starting to look clumpy. It needs to be **removed**.
97. Do you see the blank line there at the bottom of the receipt? You can use this pen. It needs to be **removed**.
98. Uh-oh, I think our little baby girl may have just pooped her diaper. Yep...she needs to be **removed**.
99. As soon as babies see a toy within reach, their little hands will start **grabbing**.
100. Remember - as soon as you hit the microphone's ON button, it will start **grabbing**.
101. I am so behind for our book club. As soon as I get the book, I will start **grabbing**.
102. We work at the same university and even in the same building. But I'm in English and she's in Psychology. In other words, we work in two different **departments**.
103. For a couple months, we tried living together to save on rent. But we fought too much. So now we're back to living in two different **departments**.
104. I thought it was just one big container. But it turns out there's a divider that runs through the middle of it. In other words, it actually has two different **departments**.
105. If you've never played in an orchestra, the trumpet and the trombone may look the same to you. But I assure you - they are two different **departments**.
106. My sheets must be super soft. I slept with my face pressed directly against them all night last night and they didn't leave any particular **mark**.
107. When it comes to buying shampoo, I just buy whatever's cheapest. I honestly don't care if it's Pantene or L'Oréal. I don't have loyalty to any particular **mark**.
108. There should be something posted to let clients know that smoking is not allowed in here. I looked around on the walls, but I couldn't find any particular **mark**.
109. If you upgrade your normal YouTube account to a paid YouTube Premium account, then you'll get to watch all your videos completely uninterrupted. That means that you won't have to waste your time anymore sitting through a bunch of **advertisements**.
110. I've been a total pushover. When my kids misbehave, I tell them I won't punish them this time but that they need to be careful because I definitely will punish them next time. I can't just continue letting them off the hook with a bunch of **advertisements**.
111. Unfortunately, a lot of accounting firms around here have been closing down lately. And even the national ones that are still in business have closed their regional branches. But if you're looking for a job, our firm actually has a bunch of **advertisements**.
112. That furniture looks heavy. And you, as women, aren't as physically strong as us. I can always come over and help you move it - if you need a **man**.
113. Wow, that's way too many dirty dishes for one person to have to clean by themselves. I'm happy to help - if you need a **man**.
114. Hey, I just heard you got laid off. You know, if you're looking...we have some openings where I work - if you need a **man**.

115. I'm sorry to hear you had a rough day. You know, we could go see a comedy show tonight, hear some jokes...if you need a **man**.
116. Those beams don't look structurally sound. You suggested adding more weight to them, but how much more can they possibly **support?**
117. I can tell that his parents are already at their wit's end with his rude behavior. How much more can they possibly **support?**
118. The authors should stop. The book is already too long. When it comes to additional pages, how much more can they possibly **support?**
119. I need to fry some onions. I see you have a pot, but there's no **pan**.
120. I want a sandwich. I see the jelly and the peanut butter, but there's no **pan**.
121. We need all three utensils. I see a spoon and a knife, but there's no **pan**.
122. For the longest time, we couldn't decipher his messages...no matter how hard we tried. But we finally ended up cracking his **code**.
123. The car crash damaged most of the bones in his forearm. It broke all of his fingers, fractured his wrist, and ended up cracking his **code**.
124. When the orange juice slipped out of his hands, the juice went flying everywhere and the fall ended up cracking his **code**.
125. I thought they would have covered the walls of their dorm room with their favorite bands or musicians or something, but surprisingly they didn't have any **posters**.
126. The event was at a fancy restaurant. So after dinner, I expected they would have a cake or at least some pie for us to eat. But surprisingly they didn't have any **posters**.
127. On her birthday, my mom always buys herself gold earrings that are expensive and sparkly. Last year's pair had gold but surprisingly they didn't have any **posters**.
128. His driver must have driven it straight through a mud pit because there is dried-up mud all over his **car**.
129. My teenage brother has a lot of acne around his nose. Actually...he has a lot of acne all over his **car**.
130. It looked as if my brother had peed himself. But in reality, he'd just spilled a cup of tea all over his **car**.
131. When my sister meets with her boss tomorrow, she is going to be adamant about getting that pay raise. It's not something she's going to just ask for. It's something she's going to **demand**.
132. Since I'm responsible for damaging her property, I told her I'd pay her whatever she needs me to. I never thought she'd get lawyers involved. But now that she did, that probably means she's going to **demand**.
133. Yeah – she is really strong, and she's highly trained in self-defense. So, if someone ever does try to attack her or something, she's not gonna shrivel up or run away. She's going to **demand**.
134. We're pretty open with our kids. My mom and dad were much more closed off with me and my brothers growing up. They were more distant **parents**.
135. I've been feeling pretty lonely since my mom and dad died. So I've started spending the holidays with some of my more distant **parents**.
136. I know we're not closely related. But if we looked back far enough in our family trees, I bet we'd find we share some more distant **parents**.
137. Soon, my parents won't have to work anymore. In just a couple years, they are going to be **retired**.
138. Our military presence is no longer needed in Afghanistan, so all of our troops are going to be **retired**.
139. Where the old tiles used to be, we're gonna put in new tiles. In other words, the old ones are going to be **retired**.
140. Pretty soon, no one will have any memory that they ever existed. Pretty soon, they are going to be **retired**.
141. Unfortunately, the antibiotics we gave her are no longer working for her anymore. It seems that her body has built up **resistance**.

142. She used to get winded on 5-minute runs. But now she can run for a full hour with no problem. She has built up **resistance**.
143. She used to be self-conscious and doubt herself. But now she walks around with her head held high. She has built up **resistance**.
144. Lately, he just asks out every girl he meets and goes on dates with whoever will say yes. What I'm trying to say is...he's **desperate**.
145. Trust me – he is not asleep. It's not even 10pm and his light is still on! What I'm trying to say is...he's **desperate**.
146. There's no one in there with him because he doesn't have anyone. No family. No close friends. What I'm trying to say is...he's **desperate**.
147. I expected him to respond by freaking out and yelling. But he's actually speaking in a cool, collected tone. What I'm trying to say is...he's **desperate**.
148. Oh - I actually thought that plan would fail. How does something like that **succeed?**
149. Really? I didn't think that was even possible. How does something like that **succeed?**
150. I know it was windy, but that tree was sturdy. How does something like that **succeed?**
151. So far, the organization hasn't spoken out publicly against racism. But obviously, racism is wrong and needs to be **denounced**.
152. If a student tells you she's experiencing abuse at home, you can't keep that information to yourself. It needs to be **denounced**.
153. Listen to me. You have so many good ideas, and the world needs to hear what you have to say. Your voice needs to be **denounced**.
154. That comedian is funny, but he wouldn't be a good fit for this. We run a clean show here and he's too vulgar. He just doesn't have the right kind of **humor**.
155. Trust me - don't even try talking to him about any important issues right now. He's too angry and irritable. He's really just not in the right kind of **humor**.
156. For this job, we need someone who is friendly and outgoing. Your brother is too shy and quiet. He just doesn't have the right kind of **humor**.
157. My favorite pro wrestler was just named the Leading World Class Champion, and he deserves it. He worked really hard to earn that **title**.
158. My son got pretty emotional at his college graduation ceremony, which makes sense. He worked really hard to earn that **title**.
159. My brother's company is now worth a million dollars, and he deserves every penny of it. He worked really hard to earn that **title**.
160. We've tested that drug and it does work for some people. Unfortunately, it's not gonna work for you. It's not gonna be **effective**.
161. No one uses paper money anymore. When your customers pay, it'll be all credit cards. It's not gonna be **effective**.
162. I don't know what I'm cooking for dinner yet. But since I hate salmon, cod, and tilapia, it's not gonna be **effective**.
163. That was an unexpected interruption to our meeting. But now that I have all of your attention back again, I would like to **resume**.
164. We covered a lot of information today. But all those details boil down to just three main points, which quickly I would like to **resume**.
165. I understand that time is up, but I'm almost done. This is a project that I started and it's also one that I would like to **resume**.
166. Those molecules are already really tightly packed. They're packed to the brim. If you inject any more particles into them, they're gonna end up with too much...what's the word? It's not volume, it's not matter...they're gonna end up with too much **mass**.
167. To make bread, the first step is to form the...whatchamacallit? You know, the gooey water- flour mixture? Go easy on the water and flour though, or you'll end up with too much of it...of that gooey whatchamacallit...you're gonna end up with too much **mass**.
168. I understand that he wants to make some kind of bold public statement by not shaving his beard, his moustache, or his armpits for the entire year. But if he sticks to that plan, he's simply gonna end up with too much **mass**.

169. My mom's a lawyer, and today they promoted her to partner! She works in the city for that...you know...big law...I can't remember the name, but if you mentioned a few, I'm pretty sure I could pick out which is her **firm**.
170. I wouldn't be great at forging it, but I've seen my mom write her name before. Let's just say if she and a couple other people wrote her name in cursive, I'm pretty sure I could pick out which is her **firm**.
171. It's been about fifteen years since I've visited my grandma on my mom's side. I definitely remember which street she lives on. And if I drove down it, I'm pretty sure I could pick out which is her **firm**.
172. The painting that she bought at the art show is really pretty. It's bright and has all warm colors. There's yellow and orange...but actually, now that I think of it there isn't any **red**.
173. They haven't finished setting up the outdoor volleyball court yet. The posts are in the ground, but they haven't hung up the mesh thing. In other words, between the posts there isn't any **red**.
174. I'm supposed to house sit for her while she's away, but I can't get inside. The front door is locked. And I've looked through the bag of stuff she gave me, but there isn't any **red**.
175. Well, I've honestly never been good at math. I'm so bad with **numbers**.
176. I'm good at remembering people's faces, but I'm so bad with **numbers**.
177. I freak out when the doctor says I need a shot. I'm so bad with **numbers**.
178. I never read the paper or keep up to date on current events. I'm so bad with **numbers**.
179. I'm good with adjectives and verbs, but I'm so bad with **numbers**.
180. The head professor is usually the one who teaches us, the one who stands in front of the class and delivers it. He was just out of town yesterday, so he wasn't able to do the **lecture**.
181. For today's class, the students were assigned a chapter in the textbook. Everyone came prepared – except for Steven, who says he was up sick all night and so he wasn't able to do the **lecture**.
182. Sean studied extra hard and stayed up all night cramming for the SAT. Unfortunately, he fell asleep without setting his alarm. So in the end, he wasn't able to do the **lecture**.
183. The officiant was excited to marry the happy couple, but he got stuck in traffic on the way to the venue and arrived too late. So, he wasn't able to do the **lecture**.
184. Sean is really good at fixing things. He was able to do the TV without a problem. But he doesn't know how FM or AM work, so he wasn't able to do the **lecture**.
185. You know the animals with horns that kinda look like sheep but without the wool coats? Some people call them billy? Anyways, we've always had two of them in our barn. But when I checked the barn this morning, all I saw was one single **goat**.
186. When I turned on the faucet in the kitchen sink yesterday, I was really hoping to see a nice, flowing stream of water. But because of the drought we're experiencing right now, all that came out of the faucet...all I saw, was one single **goat**.
187. My cousin has an entire set of them. He's got a snare, bongos - even a timpani. But when I visited him at his house last week, I discovered he actually keeps most of them in storage. All he had sitting out, all I saw was one single **goat**.
188. We were planning to make it out of velvet. But, depending on her preferences, we could make the dress out of whatever she likes best: cotton, wool, satin, chiffon, polyester. As I'm sure you can tell, we have almost every kind of **fabric**.
189. This is an industrial town. Everyone here works long hours in assembly lines. The good thing is there are a lot of places to work. There's the steel one downtown, the automotive one off the highway...honestly, we have almost every kind of **fabric**.
190. We've got the dysfunctional kind, where the parents hate each other and are staying together for the kids. But we've also got the functional kind, where everyone is happy and even the siblings get along. In this neighborhood, we have almost every kind of **fabric**.
191. My mother has never been the type to wear high heels. She wears shoes that she can walk around in comfortably. In other words, when it comes shoe choice, my mom has always been very **sensible**.

192. She burns really easily. If you take her to the beach, you need to re-apply her sunblock every hour. And don't use the generic sunblock – it gives her a rash. As you know, her skin has always been very **sensible**.
193. Scarlett is not your typical uptight, conservative ballet dancer. The way she moves her body when she dances - it's slow, passionate, and almost arousing. Her dancing style has always been very **sensible**.
194. While the way they sign their names may be neat and legible, I like the way you do yours better. Yours is by far my favorite **signature**.
195. When I was in grade school, Math and Science were always the ones I hated the most. History, though, was by far my favorite **signature**.
196. As a teacher, I know that I'm not supposed to play favorites with them. But I'll admit it - Charlie is by far my favorite **signature**.
197. That restaurant is perfect for a romantic date. It's cozy and there's always natural candlelight. Honestly, for date nights, I don't really care about the restaurant's food. I care more about the **ambience**.
198. Global warming is a real problem. For me, it's important that we be green and take care of our planet. Some people care more about the economy, but I care more about the **ambience**.
199. The musician fell off the stage while holding what was either a trumpet or a saxophone. Everyone seems worried about the musician getting hurt. But honestly, I care more about the **ambience**.
200. Their band has been putting on free concerts throughout the country, mostly in cities with big sports complexes. Last week they came to our city and before a basketball game they played in the **arena**.
201. Our kids have always been afraid of the ocean. When we'd go on family vacations to the beach, they wouldn't even touch the water. They always stayed out and played in the **arena**.
202. Actually, I've always loved winter weather. Just the other day I realized how nice it was to sit outside with my thermos of hot chocolate and watch my kids as they played in the **arena**.

Linguistic background questions:

- List every language you know or have studied in any way. Separate them by commas.
- Which of the following best characterizes your English language background?
 - I speak English natively and fluently.
 - English is NOT my native language, but I am HIGHLY fluent in it.
 - English is NOT my native language and I'm NOT fully fluent in it.
- You indicated that English is not (one of) your native language(s). What is(are) your native language(s)? Note: 'Native language' means a language you've been exposed to and used since birth.
This question is not displayed if the participant selected "I speak English natively and fluently" in the previous question.
- Which of the following best characterizes your experience with Spanish?
 - I speak Spanish natively and fluently.
 - I've studied Spanish and CAN hold a conversation in it.
 - I've studied Spanish, but CAN'T hold a conversation in it.
 - I don't know Spanish at all.
- Do you currently live in the continental United States?
 - Yes, I currently live in the continental U.S.
 - No, I do NOT currently live in the continental U.S.

8.12 PLAUS survey response data summary

Note: Ratings on a scale 1 -5 (implausible – plausible) for encountered word – [constrained meaning].

Item description	Plausibility	Item description	Plausibility
1 - bland - [bland]	4.95	41 - rope - [rope]	4.95
2 - bland - [soft]	2	42 - rope - [clothes]	1.3
3 - bland - [flat]	3.3	43 - rope - [shoes]	1.25
4 - bland - [dry]	1.25	44 - quiet - [quiet]	4.9
5 - choke - [choke]	4.95	45 - quiet - [still]	3.6
6 - choke - [crash]	1.2	46 - quiet - [warm]	1.15
7 - choke - [fall in]	1.5	47 - vague - [vague]	4.75
8 - crude - [crude]	4.6	48 - vague - [lazy]	1.75
9 - crude - [raw]	1.75	49 - vague - [mean]	1.55
10 - crude - [low]	1.2	50 - large - [large]	4.95
11 - crude - [rough]	1.85	51 - large - [long]	2.15
12 - crude - [rough]	2.8	52 - large - [low]	1.6
13 - seats - [seats]	4.95	53 - large - [light]	2.2
14 - seats - [appointments]	2.45	54 - clear - [clear]	4.9
15 - seats - [positions]	2.35	55 - clear - [light]	2.1
16 - direction - [direction]	4.65	56 - clear - [strong]	1.3
17 - direction - [address]	2.25	57 - complexion - [complexion]	4.5
18 - direction - [number]	1.35	58 - complexion - [build]	1.6
19 - embarrassed - [embarrassed]	4	59 - complexion - [money]	1.3
20 - embarrassed - [pregnant]	1.5	60 - sane - [sane]	5
21 - embarrassed - [sick]	1.65	61 - sane - [healthy]	2.35
22 - impressed - [impressed]	5	62 - sane - [awake]	2.2

23 - impressed - [shocked]	1.35	63 - bank - [bank]	5
24 - impressed - [convinced]	1.95	64 - bank - [bench]	1.65
25 - globes - [globes]	4.85	65 - bank - [book]	1.25
26 - globes - [balloons]	1.85	66 - bank - [beard]	1.35
27 - globes - [rings]	1.2	67 - bat - [bat]	4.9
28 - insecure - [insecure]	4.95	68 - bat - [robe]	1.05
29 - insecure - [dangerous]	3.25	69 - bat - [ring]	1.15
30 - insecure - [violent]	1.25	70 - carpet - [carpet]	5
31 - idioms - [idioms]	4.65	71 - carpet - [folder]	1
32 - idioms - [languages]	1.65	72 - carpet - [property]	1.4
33 - idioms - [clichés]	4.4	73 - carpet - [farm]	1.5
34 - idioms - [slang]	2.95	74 - exits - [exits]	5
35 - idioms - [nouns]	1.5	75 - exits - [successes]	1.15
36 - blank - [blank]	4.95	76 - exits - [friends]	1
37 - blank - [white]	1.9	77 - cancel - [cancel]	5
38 - blank - [clear]	1.45	78 - cancel - [pay]	1.65
39 - blank - [clear]	1.5	79 - cancel - [try it]	1.05
40 - blank - [clear]	1.95	80 - assist - [assist]	4.95

Continued...

Item description	Plausibility	Item description	Plausibility
81 - assist - [attend]	4	121 - pan - [fork]	1.6
82 - assist - [adopt]	1.25	122 - code - [code]	4.95
83 - constipated - [constipated]	5	123 - code - [elbow]	1
84 - constipated - [congested]	1.7	124 - code - [glass]	1.05
85 - constipated - [stressed]	1.05	125 - posters - [posters]	5
86 - constipated - [contagious]	1.2	126 - posters - [desserts]	1
87 - constipated - [conflicted]	1.1	127 - posters - [diamonds]	1.05
88 - constipated - [confused]	1	128 - car - [car]	5
89 - contest - [contest]	4.75	129 - car - [face]	1.05
90 - contest - [answer]	2.95	130 - car - [pants]	2.45
91 - contest - [pursue]	1.1	131 - demand - [demand]	5
92 - mandate - [mandate]	4.85	132 - demand - [sue]	3.05
93 - mandate - [send]	1.7	133 - demand - [fight]	1.15
94 - mandate - [finish]	1.55	134 - parents - [parents]	5
95 - removed - [removed]	5	135 - parents - [relatives]	1.25
96 - removed - [stirred]	1.5	136 - parents - [ancestors]	1.91
97 - removed - [signed]	1.25	137 - retired - [retired]	4.96
98 - removed - [changed]	1.95	138 - retired - [removed]	2.83
99 - grabbing - [grabbing]	5	139 - retired - [replaced]	3.48
100 - grabbing - [recording]	1.5	140 - retired - [forgotten]	1.7
101 - grabbing - [reading]	1.05	141 - resistance - [resistance]	4.43
102 - departments - [departments]	5	142 - resistance - [endurance]	3.17
103 - departments - [apartments]	1.15	143 - resistance - [confidence]	2.39
104 - departments - [compartments]	1.7	144 - desperate - [desperate]	4.74
105 - departments - [instruments]	1.95	145 - desperate - [awake]	1.61
106 - mark - [mark]	4.85	146 - desperate - [alone]	3.39
107 - mark - [brand]	1.25	147 - desperate - [calm]	1.7
108 - sign - [sign]	2.55	148 - succeed - [succeed]	4.57
109 - advertisements - [advertisements]	5	149 - succeed - [happen]	4.57
110 - advertisements - [warnings]	1	150 - succeed - [fall]	1.78
111 - advertisements - [openings]	2.35	151 - denounced - [denounced]	4.61
112 - man - [man]	4.65	152 - denounced - [reported]	1.57
113 - man - [hand]	3.25	153 - denounced - [heard]	1.39
114 - man - [job]	1.8	154 - humor - [humor]	4.65
115 - man - [laugh]	2.05	155 - humor - [mood]	2.57
116 - support - [support]	5	156 - humor - [personality]	2.61
117 - support - [take]	2.9	157 - title - [title]	4.87
118 - support - [write]	2.4	158 - title - [degree]	2.91
119 - pan - [pan]	4.9	159 - title - [money]	2.57
120 - pan - [bread]	1.35	160 - effective - [effective]	4.57

Item description	Plausibility
161 - effective - [cash]	2.74
162 - effective - [fish]	1.22
163 - resume - [resume]	4.83
164 - resume - [summarize]	2.26
165 - resume - [finish]	3.26
166 - mass - [mass]	4.52
167 - mass - [dough]	3.04
168 - mass - [hair]	1.52
169 - firm - [firm]	4.74
170 - firm - [signature]	1.43
171 - firm - [house]	1.39
172 - red - [red]	4.26
173 - red - [net]	1.43
174 - red - [key]	1.26
175 - numbers - [numbers]	4.78
176 - numbers - [names]	3.61
177 - numbers - [needles]	1.17
178 - numbers - [news]	1.61
179 - numbers - [nouns]	4.57
180 - lecture - [lecture]	4.78
181 - lecture - [reading]	2.43
182 - lecture - [test]	1.78
183 - lecture - [wedding]	1.57
184 - lecture - [radio]	1.52
185 - goat - [goat]	4.74
186 - goat - [drop]	1.3
187 - goat - [drum]	1.3
188 - fabric - [fabric]	4.7
189 - fabric - [factory]	1.74
190 - fabric - [family]	1.35
191 - sensible - [sensible]	4.7
192 - sensible - [sensitive]	1.22
193 - sensible - [sensual]	2.17
194 - signature - [signature]	4.65
195 - signature - [subject]	1.22
196 - signature - [student]	1.22
197 - ambience - [ambience]	4.65
198 - ambience - [environment]	2.26
199 - ambience - [instrument]	2
200 - arena - [arena]	4.65

8.13 Accent Perception survey (ACCENT) speaker recruitment material

Note: This was a stimuli norming survey hosted on Qualtrics and distributed to students at a large midwestern university.

The text used as social media posts (e.g. Facebook) or individual emails:

Do you speak with a [insert accent type] accent? Get paid to read sentences for my linguistics research My name is Emily Sabo, and I am a 5th year PhD student in Linguistics at The University of Michigan. I'm looking for a variety of people to use in an accent perception study that will be part of my dissertation research. If you are interested, you would meet me in the Sound Lab in Lorch Hall Rm 400, it should take less than 20 minutes, I would pay you \$10 for your time, and offer coffee/tea for you either before or after we record. You would read a short paragraph that I would then use in an experiment where listeners would take an online survey with your recording and a variety of others from speakers and they will be asked to answer questions about your accent (e.g. Where do you think this person is from?). Note that only your voice recording would be included in the final experiment. That is, neither your name or any other personally identifying information will be shared. If you're not able or willing to participate, that's totally okay and thank you anyway! If this is something you would be interested in helping me, please let me know at emsabo@umich.edu.

Participant screening questions:

Thank you for your interest in recording sentences for my accent perception study! Before we can schedule you, there are two pre-screening steps we use to determine if you meet the criteria for participating in this study. To determine that, I ask that you (1) briefly tell me what languages you know and at which ages you started learning each of them and (2) that you send me a quick voice recording as a screening procedure. The quality of the recording doesn't matter, as this recording will be heard only by me, not be used for the research in any way. You can record it on your phone or computer and send it via email or Google Drive to emsabo@umich.edu. If email won't work for you, we can use another medium that is more convenient for you. For the preliminary voice recording, you can read the following passage:

Please call Stella. Ask her to bring these things with her from the store: Six spoons of fresh snow peas, five thick slabs of blue cheese, and maybe a snack for her brother Bob. We also need a small plastic snake and a big toy frog for the kids. She can scoop these things into three red bags, and we will go meet her Wednesday at the train station.

Once I've received your voice recording and your list of languages you know, I'll reach out to let you know if I can use you in the study and we can schedule a time for you to come visit the lab. Thank you!

How participant screening information was used:

Their reported language background must match the target language background. For example, if I am advertising for a Russian-accented English speaker, they must report Russian as a native language and English as a non-native language. Then, they must sound Russian-accented to me, the PI, as I am a native speaker of English living in the United States. If both of these conditions are met, they will be invited to come participate in the research and record the sentences that will be used as stimuli in the experiment. If they do not meet both of these conditions, they will be informed they do not meet the requirements of the study and thanked for their time and interest.

8.14 ACCENT Speaker metadata

Note: SAA = recording from the Speech Accent Archive. *Original* = new recording conducted by the author of this paper and a confederate speaker. All subjects identified as male.

ID	Accent	From	American?	Time in U.S.	Age	Recording
1	Latino	Chicago	Y	Entire life	25	Original
2	New York	New York	Y	Entire life	21	SAA
3	Southern	Alabama	Y	Entire life	22	SAA
4	Midwestern	Michigan	Y	Entire life	22	Original
5	African American	Georgia	Y	Entire life	18	SAA
6	British	England	N	None	20	SAA
7	Scottish	Scotland	N	None	35	SAA
8	Australian	Australia	N	1.5yrs.	34	Original
9	Irish	Ireland	N	None	24	SAA
10	Indian	India	N	0.1yrs.	22	SAA
11	Spanish	Chile	N	3yrs.	41	Original
12	Russian	Russia	N	20yrs.	41	Original
13	Korean	S. Korea	N	5yrs.	32	Original
14	French	France	N	12yrs.	42	Original
15	Chinese	China	N	9yrs.	31	Original

8.15 ACCENT speaker consent form

IRB #: HUM00158504 | Approval date: 07/17/2019

Principal Investigator: Emily Rae Sabo, Linguistics Department, University of Michigan

Thank you for visiting the Sound Lab at The University of Michigan to participate in this research project! Below is a description of the task that you have come to participate in today.

Your job is to read aloud a short paragraph into a microphone that records your voice. Your voice recording will be included in an online experiment in which people will listen to several voice recordings (one of which would be yours) and answer questions about the accents they hear (e.g. Where do you think this person is from?). Note that only your voice recording would be included in the final experiment. That is, your name would never be shared in association with your voice recording. You will be paid \$10 for your time and the session should last between 10-20 minutes. If at any point during our session you wish to discontinue, you should feel totally free to do so. Please just let the researcher know.

Do you consent to the use of your voice recording for the online study described above?

- Yes, I do consent. _____
- No, I do not consent. _____

Do you consent for the researcher to play your voice recording at an academic conference?

- Yes, I do consent. _____
- No, I do not consent. _____

Do you consent for the researcher to make this voice recording publicly available on a website or database?

- Yes, I do consent. _____
- No, I do not consent. _____

8.16 ACCENT respondent metadata

Notes: *Fr* = French, *Eng* = English, *Span* = Spanish, *Ital* = Italian, *Ger* = German, *Jap* = Japanese, *Chin* = Chinese, *Gr* = Greek, *Russ* = Russian, *Kor* = Korean, *ASL* = American Sign Language, *Heb* = Hebrew, *Swed* = Swedish, *Guj* = Gujarati, *Mar* = Marathi, *Hin* = Hindi, *Ben* = Bengali, *Arab* = Arabic, *Dan* = Danish. Age is reported in years.

ID	Eng	Span	Other languages	U.S. states lived	U.S. yrs. lived	Race / Ethnicity	Age
1	L1	n/a	n/a	MI	34	Black	34
2	L1	L2	Chin, Span	MI	16	Asian	19
3	L1	n/a	Guj, Hin, Fr, Span	IL, IN, MI	22	Asian	26
4	L1	n/a	Span, Arab	FL, MI	24	White	24
5	L1	n/a	Jap, Fr, Mar, Hin	MI	21	Asian	21
6	L1	n/a	Lat	MI	19	White	19
7	L1	L2	Span	WI, IL, MO, OH, MI	24	Black	24
8	L1	L2	Span	MI	20	White, Hispanic	20
9	L1	n/a	Kor, Span, Arab, Chin, Jap, Russ	IL, NY, GA, AK, NC, MI	32	White, Asian	34
10	L1	n/a	Fr	MI	21	White	21
11	L1	n/a	Russ	MI	25	White	25
12	L1	n/a	Ben, Jap, Arab	MI	20	Asian	20
13	L1	L2	Span	MI	20	White	20
14	L1	L2	Span	MI	19	White	19
15	L1	L2	Russ, Span, Lat, Fr	NY	21	White	21
16	L1	n/a	Thai, Jap	MN, TX	6	Asian	19
17	L1	n/a	Chin, Jap, Span	MI	19	White, Asian	19
18	L1	L2	Span, Ital, Dan	IL, MN, NY, MI, MO	30	White	30
19	L1	L2	Span	MI	21	White	21
20	L1	L2	Span	MI	22	White	22
21	L2	n/a	Chin, Span, Jap	MI	6	Asian	19
22	L1	n/a	Lat	MI	21	Black	21
23	L1	L2	Span	KY, MI	20	White	20
24	L1	L2	Span	MI	20	White	20
25	L2	L1	Span	IL, MI	8	Hispanic	19
26	L1	L2	n/a	IL, MI	21	White	21
27	L1	L2	Span	MI	23	White	23
28	L1	n/a	Chin	MI, PA	3	Asian	22
29	L1	n/a	Ger	MI, NJ	22	Asian	22
30	L1	L2	Span, Chin	MA, MI	20	Asian	21
31	L1	n/a	Lat, Ger	IN, IL, MI	27	White	27

8.17 ACCENT respondent consent form

Human Verification of Artificial Intelligence Voice Perception Software | IRB #: HUM00158504

Principal Investigator: Emily Rae Sabo, Linguistics Department, University of Michigan

You are invited to participate in a research study about voice perception, specifically accent perception. You have been invited because you expressed interest in participating in this study. **In order to participate in this study, you must be a current University of Michigan student, a native speaker of English, and at least 18 years old.** If you agree to participate in this survey, you will be asked to listen to a series of audio recordings from a variety of real people speaking in English. **Your task is to listen to each person's voice recording and answer a series of questions about them** (e.g. Based on how they speak, where do you think this person is from?) You are free to discontinue your participation in the study at any time. Although you may not directly benefit from being in this study, others may benefit because this research will **help us to verify a new artificial intelligence software for voice perception. The software has already performed voice perception tasks on these speakers, so the purpose of the present study is to compare its performance with responses from human listeners.** At the end of the survey, you will be asked to answer several demographic questions about yourself, mostly pertaining to your language background but also including your age, race, and gender. You are free to decline to respond to any question. **There is no more than minimal risk associated with this study.** There are two possibilities of risk that you should be aware of before considering to participate. First, you may feel uncomfortable answering the questions at the end of the survey that ask you how you identify racially/ethnically. This discomfort should be minimized, as your information is kept confidentially, and you are free to decline to respond to any question. Second, in order to compensate you for your completion of the survey, we will need your name as well as a mailing address (the location to which you would like to receive your \$3 MasterCard Gift Card). This of course means we will have your name and mailing address, which poses a slight risk of confidentiality breach. However, this information will be kept secure and confidential (on a secured University of Michigan Qualtrics account and on secured University of Michigan computers only). Additionally, your name and address will be used **ONLY** to mail you your payment and will not be used in any data analyses. The experiment takes 20 minutes on average. Upon completion of the survey, you will be compensated \$5 for your time, in the form of a MasterCard Gift Card mailed to the mailing address you provide. You can expect to receive your Gift Card between 10-18 business days. We plan to publish the results of this study but will not include any information that would identify you. There are some reasons why people other than the researchers may need to see information you provided as part of the study. This includes organizations responsible for making sure the research is done safely and properly, including the University of Michigan or government offices. To keep your information safe, your name will not be attached to any data, but a study number will be used instead. Information that may be used to identify you will be kept on a password-protected and encrypted computer. These records will be retained for up to ten years. The data you provide will be stored on password protected computers at the University of Michigan. The data may be made available to other researchers for other studies following the completion of this research study, in accordance with data sharing guidelines in the research community. The data will not contain any information that could identify you. **Participating in this study is completely voluntary.** Even if you decide to participate now, you may change your mind and stop at any time. If you decide to withdraw early, the information and data you provided will be deleted and excluded from any future analysis. If you have questions about this research, including questions about your compensation for participating, you may contact Emily Rae Sabo (the Principal Investigator of this study) at emsabo@umich.edu or Dr. Jonathan Brennan (Faculty Advisor on the study) at jobrenn@umich.edu. If you have questions about your rights as a research participant, or wish to obtain information, ask questions or discuss any concerns about this study with someone other than the researcher, please contact the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board, 2800 Plymouth Rd. Building 520, Room 1169, Ann Arbor, MI 48109-2800, (734) 936-0933 (or toll free, (866) 936-0933), irbhsbs@umich.edu. If you agree to participate in the study, please check the box below. Please note that by checking the box below, you are providing your electronic signature. Be sure that you understand what you are being asked to do. **Do you agree to participate in the survey?**

- Yes, I agree to participate in this survey.
- No, I do NOT wish to participate in this survey. (If so, please exit out of this browser).

8.18 ACCENT survey items

Participating in this survey requires that you listen to audio clips, so make sure you are in a place where you can listen to the recordings or have headphones for listening. Click the arrow button to proceed to the survey. For each audio recording, you will answer the following questions.

1. This person sounds like they are...
...from the UNITED STATES. - - - ...from ANOTHER COUNTRY.
2. This person sounds like they...
...HAVE spoken English their entire life. - - - ...HAVEN'T spoken English their entire life.
3. This person speaks in a way that is...
...EASY to understand. - - - - - ...DIFFICULT to understand.
4. Where specifically do you think this person is from?
5. Based on this person's voice recording, what else can you tell about them? (Feel free to provide single-word labels or longer descriptions. Among other things, you may include what you believe to be their general age, race/ethnicity, what other language(s) it sounds like they speak...etc.)

The remaining questions in the survey ask about your language and demographic background.

1. Are you a native speaker of English? (Being a native speaker of English means that you have known it your entire life and are fluent).
 - Yes
 - No
2. **List all languages (other than English) that you know or have studied in any way.** If multiple, separate by commas and order from most to least proficient. If none, leave blank.
3. In what U.S. cities and states have you lived, and for how long? (e.g. Scranton, Pennsylvania for 4 years). If you've never lived in the U.S., write None.
4. **How long (in years) have you lived in the U.S.?**
5. **What is your race and/or ethnicity?** Select all that apply.
 - White
 - Black or African American
 - Latino or Hispanic
 - Asian
 - Native Hawaiian or Pacific Islander
 - American Indian or Alaska Native
 - Other _____
6. **What is your age, in years?**
7. **Do people ever tell you that you have an accent when you speak English?**
 - No
 - Yes (Specify what kind in the textbox) _____
8. **Do YOU think you have an accent when you speak English?**
 - No
 - Yes (Specify what kind in the textbox) _____
9. **How often do you hear someone speaking English with a Spanish accent?**
Very INFREQUENTLY - - - - - Very FREQUENTLY (5-point Likert scale)
10. **Can you hold a conversation in Spanish?**
 - Yes, I am fluent in Spanish.
 - Yeah, but not fluently.
 - No.
11. **Which of the following best characterizes your language abilities in English and Spanish?**

This question does not appear for respondents who answered 'No' to Question 10.

- I speak both languages natively and fluently.**
 - I speak English natively and studied Spanish in school. My English is better than my Spanish.**
 - Other (explain in text box) _____**
12. **Please include any comments, questions, or concerns about this survey here. If you have none, leave blank and proceed.**

8.19 ACCENT survey debrief

Thank you for participating in this study! This study was in fact *not* about human verification of artificial intelligence voice perception software. It was about a phenomenon called Perpetual Foreigner Syndrome (Lippi Green 2012³⁷). From a linguistics standpoint, Perpetual Foreigner Syndrome occurs when a person is assumed to be foreign when in fact they are not. This can manifest in everyday interactions of accent perception when, for example, a person who is a native speaker of English and was born and raised in the United States is said to sound like English is not their native language (e.g. “Your English is so good! When did you start learning it?”) or that they sound like they are from a different country (e.g. “But where are you *really* from?”).

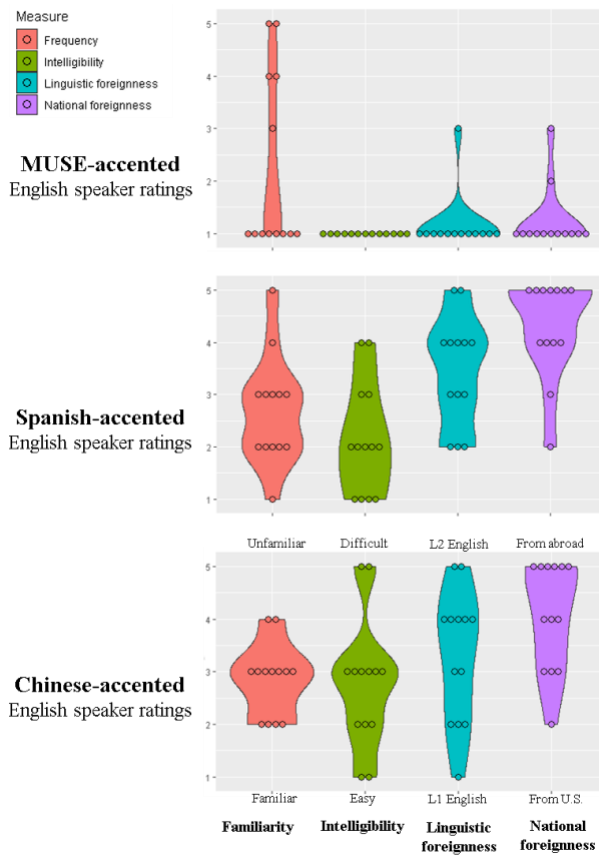
The true purpose of this study is initially not shared with survey respondents, as knowing the purpose would likely bias responses. The results of this study are important in understanding how Perpetual Foreigner Syndrome works today in the United States. Now that you’ve learned about this problem, Perpetual Foreigner Syndrome (PFS), you may ask yourself what you can do about it? One concrete way to mitigate PFS (and it may sound obvious) is to not assume foreignness of those who look and sound different than what you may think of as a prototypical “American.” This can go a long way in reducing linguistic discrimination and increasing equity in our society!

If you have questions about this research, including further questions about the purpose of the study, your compensation for the study, or the final results of the study, you may contact Emily Rae Sabo (the Principal Investigator of this study) at emsabo@umich.edu. If you have questions about your rights as a research participant, or wish to obtain information, ask questions or discuss any concerns about this study with someone other than the researcher, please contact the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board, 2800 Plymouth Rd. Building 520, Room 1169, Ann Arbor, MI 48109-2800, (734) 936-0933 (or toll free, (866) 936-0933), irbhsbs@umich.edu. Thank you again for participating in this study! This is important work, and we appreciate your role in helping us better understand how PFS works in the U.S. today.

³⁷ Lippi-Green, R. (2012). *English with an accent: Language, ideology and discrimination in the United States*. Routledge.

8.20 ACCENT survey: Descriptive summary of speaker accent evaluations

Notes: Accent ratings for the three speakers selected to record the auditory stimuli for the EEG study. Results come from an online pre-norming stimuli study. The three speakers (MUSE, Spanish, and Chinese accented English) are faceted vertically. Violin plots reflect Likert scale ratings (1-5) on the Y-axis, and parameters by which accents were rated are distinguished on the X-axis. Familiar = familiarity with given accent; Intelligibility = easy or difficult to understand; Linguistic foreignness = L1-sounding in English or L2-sounding English speaker; National foreignness = Sounds like they are from the U.S. vs. Sounds like they are from abroad.



5-POINT LIKERT SCALES

Frequency:

Frequency of accent exposure

1=Very frequent

5=Very infrequent

Intelligibility

1=Easy to understand,

5=Difficult to understand

Linguistic foreignness

	MUSE accent	Spanish accent	Chinese accent
National foreignness	$\bar{x}= 1.3, \sigma= 0.6$	$\bar{x}= 4.4, \sigma= 0.8$	$\bar{x}= 4.7, \sigma= 0.6$
Linguistic foreignness	$\bar{x}= 1.2, \sigma= 0.3$	$\bar{x}= 3.5, \sigma= 1.1$	$\bar{x}= 4, \sigma= 0.8$
Intelligibility	$\bar{x}= 1.2, \sigma= 0.4$	$\bar{x}= 2.4, \sigma= 1.1$	$\bar{x}= 2.9, \sigma= 1.2$

8.21 Stimuli normalization: set selection rationale

Notes: In this, the first pass in stimuli normalization, the number of sentence sets was reduced from 60 to 40 by dropping sets that contained the most errant scores (i.e. IHS scores and cloze probabilities that were extremely low, plausibility scores that were too high or low depending on the condition of the item). *IHS* = Interlingual Homophone Survey results (0:1; higher values reflect the assumed interlingual homophone set is predicated on what are perceived by Spanish-English bilinguals as interlingual homophones), *Cloze* = cloze probability of the item for the semantically constrained target word, *Plaus* = plausibility of encountered word (1-5; higher values reflect high plausibility of encountered word in that sentential context), *Sem Sim* = semantic similarity of predictable and encountered word in a given sentential item, *LD* = Levenshtein Distance.

Item description	IHS	Cloze	Plaus	SemSim	LD	<i>n</i> words	Set selection		
1 - bland - [bland]		0.95	4.95	1		18	Keep		
2 - bland - [soft]	0.82	1	2	0.34	1	21			
3 - bland - [flat]		0.95	3.3	0.31		20			
4 - bland - [dry]		0.95	1.25	0.34		19			
5 - choke - [choke]			0.8	4.95		1		28	Keep
6 - choke - [crash]	0.76	0.7	1.2	0.22	3	26			
7 - choke - [fall.in]		0.65	1.5	0.26		28			
8 - crude - [crude]			0.3	4.6		1		17	Keep
9 - crude - [raw]		1	1.75	0.4		18			
10 - crude - [low]	0.94	0.35	1.2	0.37	1	17			
11 - crude - [rough]		0.45	1.85	0.41		18			
12 - crude - [rough]		0.95	2.8	0.41		17			
13 - seats - [seats]			1	4.95		1		25	Drop (IHS too low)
14 - seats - [appointments]		0.18	0.7	2.45		0.29	4	25	
15 - seats - [positions]	0.7		2.35	0.36	26				
16 - direction - [direction]			0.85	4.65	1			33	Keep
17 - direction - [address]	1	1	2.25	0.28	1	37			
18 - direction - [number]		0.98	1.35	0.26		37			
19 - embarrassed - [embarrassed]			0.95	4		1		21	Keep
20 - embarrassed - [pregnant]	0.88	1	1.5	0.37	5	25			
21 - embarrassed - [sick]		0.85	1.65	0.44		23			
22 - impressed - [impressed]			0.45	5		1		36	Drop (IHS too low)
23 - impressed - [shocked]	0.18	0.25	1.35	0.65	5	36			
24 - impressed - [convinced]		0.35	1.95	0.63		37			
25 - globes - [globes]			1	4.85		1		35	Keep
26 - globes - [balloons]	0.88	0.95	1.85	0.38	1	35			
27 - globes - [rings]		1	1.2	0.32		36			
28 - insecure - [insecure]			0.3	4.95		1		26	Keep
29 - insecure - [dangerous]	0.94	0.55	3.25	0.41	2	29			
30 - insecure - [violent]		1	1.25	0.34		29			
31 - idioms - [idioms]		0.94	0.1	4.65		1	1	32	Drop

32 - idioms - [languages]		1	1.65	0.54		30	(item 31 cloze too low)
33 - idioms - [clichés]		0	4.4	0.51		34	
34 - idioms - [slang]		0.85	2.95	0.61		31	
35 - idioms - [nouns]		0.9	1.5	0.56		33	
36 - blank - [blank]		0.9	4.95	1		16	Keep
37 - blank - [white]		0.9	1.9	0.36		15	
38 - blank - [clear]	0.88	0.85	1.45	0.37	2	16	
39 - blank - [clear]		0.6	1.5	0.37		16	
40 - blank - [clear]		0.5	1.95	0.37		16	
41 - rope - [rope]		0.85	4.95	1		14	Keep
42 - rope - [clothes]	0.76	0.95	1.3	0.32	1	13	
43 - rope - [shoes]		0.95	1.25	0.31		14	
44 - quiet - [quiet]		0.85	4.9	1		13	Keep
45 - quiet - [still]	0.65	0.85	3.6	0.46	1	14	
46 - quiet - [warm]		1	1.15	0.56		14	
47 - vague - [vague]		0.45	4.75	1		19	Keep
48 - vague - [lazy]	0.94	0.95	1.75	0.36	2	16	
49 - vague - [mean]		0.75	1.55	0.35		22	
50 - large - [large]		0.9	4.95	1		11	Keep
51 - large - [long]		0.75	2.15	0.5	1	11	
52 - large - [low]	0.94	0.45	1.6	0.41		11	
53 - large - [light]		1	2.2	0.39		11	
54 - clear - [clear]		0.7	4.9	1		9	Keep
55 - clear - [light]	0.71	0.85	2.1	0.53	2	9	
56 - clear - [strong]		0.95	1.3	0.54		9	
57 - complexion - [complexion]		0.15	4.5	1		28	Drop (item 57 cloze too low)
58 - complexion - [build]	0.53	0.6	1.6	0.1	0	25	
59 - complexion - [money]		0.75	1.3	0.04		28	
60 - sane - [sane]		0.45	5	1		18	Keep
61 - sane - [healthy]	0.76	0.95	2.35	0.36	1	17	
62 - sane - [awake]		0.95	2.2	0.46		17	
63 - bank - [bank]		1	5	1		20	Keep
64 - bank - [bench]		0.9	1.65	0.17	2	18	
65 - bank - [book]	0.88	1	1.25	0.19		17	
66 - bank - [beard]		0.8	1.35	0.1		18	
67 - bat - [bat]		0.95	4.9	1		19	Drop (IHS too low)
68 - bat - [robe]	0	0.8	1.05	0.19	1	19	
69 - bat - [ring]		0.95	1.15	0.26		20	
70 - carpet - [carpet]		0.3	5	1	1	29	Keep
71 - carpet - [folder]	0.82	0.4	1	0.04		31	

72 - carpet - [property]		0.6	1.4	0.19		30	
73 - carpet - [farm]		0.05	1.5	0.13		32	
74 - exits - [exits]		0.95	5	1		9	
75 - exits - [successes]	0.53	0.75	1.15	0.13	1	9	Keep
76 - exits - [friends]		1	1	0.03		9	
77 - cancel - [cancel]		0.85	5	1		17	
78 - cancel - [pay]	0.76	1	1.65	0.49	2	19	Keep
79 - cancel - [try it]		0.7	1.05	0.4		19	
80 - assist - [assist]		0.6	4.95	1		39	
81 - assist - [attend]	0.94	0.75	4	0.37	3	37	Keep
82 - assist - [adopt]		0.95	1.25	0.35		34	
83 - constipated - [constipated]		0.9	5	1		37	
84 - constipated - [congested]		0.35	1.7	0.39		37	
85 - constipated - [stressed]		0.35	1.05	0.42		38	
86 - constipated - [contagious]	0.76	0.65	1.2	0.24	3	35	Keep
87 - constipated - [conflicted]		0.15	1.1	0.32		41	
88 - constipated - [confused]		0.6	1	0.41		44	
89 - contest - [contest]		0	4.75	1		18	
90 - contest - [answer]	0.76	0.35	2.95	0.3	2	19	Drop (item 89 cloze too low)
91 - contest - [pursue]		0.2	1.1	0.19		17	
92 - mandate - [mandate]		0	4.85	1		17	
93 - mandate - [send]	0.88	1	1.7	0.18	2	20	Drop (item 92 cloze too low)
94 - mandate - [finish]		0.8	1.55	0.28		19	
95 - removed - [removed]		0.65	5	1		18	
96 - removed - [stirred]		0.6	1.5	0.3		22	
97 - removed - [signed]	0.88	0.9	1.25	0.21	2	23	Keep
98 - removed - [changed]		1	1.95	0.55		20	
99 - grabbing - [grabbing]		0.3	5	1		15	
100 - grabbing - [recording]	0.82	0.75	1.5	0.2	4	14	Keep
101 - grabbing - [reading]		0.95	1.05	0.24		19	
102 - departments - [departments]		0.65	5	1		29	
103 - departments - [apartments]		0.45	1.15	0.21		27	
104 - departments - [compartments]	1	0.35	1.7	0.16	2	31	Keep
105 - departments - [instruments]		0.85	1.95	0.24		27	
106 - mark - [mark]		0.6	4.85	1		26	
107 - mark - [brand]	0.76	0.95	1.25	0.27	2	28	Keep
108 - sign - [sign]		0.8	2.55	0.41		29	
109 - advertisements - [advertisements]		0.7	5	1		40	
110 - advertisements - [warnings]	0.88	0.2	1	0.31	6	47	Keep

111 - advertisements - [openings]		0.55	2.35	0.24		43	
112 - man - [man]		0.05	4.65	1		29	Drop (item 112 cloze too low)
113 - man - [hand]	0.59	1	3.25	0.49	1	25	
114 - man - [job]		0.9	1.8	0.43		25	
115 - man - [laugh]		0.8	2.05	0.46		27	
116 - support - [support]		0.1	5	1		21	
117 - support - [take]	0.88	0.5	2.9	0.34	4	23	Drop (116 and 118 cloze too low)
118 - support - [write]		0.35	2.4	0.31		23	
119 - pan - [pan]		0.2	4.9	1		16	
120 - pan - [bread]	1	0.9	1.35	0.52	0	16	Keep
121 - pan - [fork]		1	1.6	0.45		16	
122 - code - [code]		0.9	4.95	1		23	
123 - code - [elbow]	0.59	0.25	1	0.05	1	26	Keep
124 - code - [glass]		0.45	1.05	0.09		22	
125 - posters - [posters]		0.9	5	1		27	
126 - posters - [desserts]	0.53	0.85	1	0.13	2	33	Keep
127 - posters - [diamonds]		0.35	1.05	0.08		27	
128 - car - [car]		0.3	5	1		20	
129 - car - [face]	0.18	0.75	1.05	0.29	1	22	Drop (IHS too low)
130 - car - [pants]		0.65	2.45	0.21		23	
131 - demand - [demand]		0.9	5	1		34	
132 - demand - [sue]	0.94	0.9	3.05	0.24	2	37	Keep
133 - demand - [fight]		0.9	1.15	0.26		34	
134 - parents - [parents]		0.75	5	1		27	
135 - parents - [relatives]	0.41	0.7	1.25	0.69	2	24	Drop (136 cloze too low)
136 - parents - [ancestors]		0.1	1.91	0.42		27	
137 - retired - [retired]		1	4.96	1		19	
138 - retired - [removed]	0.88	0.05	2.83	0.25	2	19	Drop (138 cloze too low)
139 - retired - [replaced]		0.8	3.48	0.36		24	
140 - retired - [forgotten]		0.45	1.7	0.3		20	
141 - resistance - [resistance]		0.25	4.43	1		22	Drop (141 cloze too low and 142 plus too high)
142 - resistance - [endurance]	0.59	0.4	3.17	0.43	3	26	
143 - resistance - [confidence]		0.75	2.39	0.32		24	
144 - desperate - [desperate]		0.5	4.74	1		26	Drop (IHS too low)
145 - desperate - [awake]	0.29	0.85	1.61	0.34	3	24	
146 - desperate - [alone]		0.7	3.39	0.4		25	
147 - desperate - [calm]		0.7	1.7	0.35		27	
148 - succeed - [succeed]	0.59	0.25	4.57	1	3	14	

149 - succeed - [happen]		0.9	4.57	0.51		14	(148 and 150 cloze too low and 149 plus too high)
150 - succeed - [fall]		0.15	1.78	0.38		16	
151 - denounced - [denounced]		0	4.61	1		20	Drop (151 cloze too low)
152 - denounced - [reported]	0.82	0.65	1.57	0.17	4	22	
153 - denounced - [heard]		1	1.39	0.29		26	
154 - humor - [humor]		0.2	4.65	1		32	Keep
155 - humor - [mood]	0.88	0.85	2.57	0.41	0	30	
156 - humor - [personality]		0.55	2.61	0.5		27	
157 - title - [title]		0.6	4.87	1		24	Keep
158 - title - [degree]	0.35	0.75	2.91	0.13	2	21	
159 - title - [money]		0.6	2.57	0.21		24	
160 - effective - [effective]		0.5	4.57	1		23	Keep
161 - effective - [cash]	1	0.65	2.74	0.28	2	20	
162 - effective - [fish]		0.9	1.22	0.21		22	
163 - resume - [resume]		0.2	4.83	1		24	Drop (163 cloze too low and 165 plus too high)
164 - resume - [summarize]	0.94	0.5	2.26	0.3	2	25	
165 - resume - [finish]		0.9	3.26	0.31		27	
166 - mass - [mass]		0.25	4.52	1		44	Keep
167 - mass - [dough]	0.94	0.75	3.04	0.19	1	47	
168 - mass - [hair]		0.9	1.52	0.21		43	
169 - firm - [firm]		0.75	4.74	1		44	Keep
170 - firm - [signature]	0.47	0.75	1.43	0.18	1	42	
171 - firm - [house]		1	1.39	0.26		39	
172 - red - [red]		0.65	4.26	1		35	Keep
173 - red - [net]	0.53	0.95	1.43	0.2	0	34	
174 - red - [key]		0.95	1.26	0.25		36	
175 - numbers - [numbers]		0.9	4.78	1		13	Drop (IHS is low, 176 plus is too high)
176 - numbers - [names]		1	3.61	0.46		12	
177 - numbers - [needles]	0.35	0.95	1.17	0.13	3	16	
178 - numbers - [news]		0.75	1.61	0.26		18	
179 - numbers - [nouns]		0.7	4.57	0.24		16	
180 - lecture - [lecture]		0.7	4.78	1		37	Keep
181 - lecture - [reading]		0.6	2.43	0.37		35	
182 - lecture - [test]	0.94	0.7	1.78	0.26	1	32	
183 - lecture - [wedding]		0.2	1.57	0.17		33	
184 - lecture - [radio]		0.95	1.52	0.23		34	
185 - goat - [goat]		0.85	4.74	1		46	Keep
186 - goat - [drop]	0.41	1	1.3	0.16	2	46	

187 - goat - [drum]		0.75	1.3	0.17		48	
188 - fabric - [fabric]		0.75	4.7	1		43	
189 - fabric - [factory]	0.94	0.35	1.74	0.27	1	44	Keep
190 - fabric - [family]		0.7	1.35	0.16		45	
191 - sensible - [sensible]		0.05	4.7	1		36	Drop (191 and 193 cloze too low)
192 - sensible - [sensitive]	0.88	0.95	1.22	0.38	0	41	
193 - sensible - [sensual]		0.15	2.17	0.28		32	
194 - signature - [signature]		0.9	4.65	1		27	Drop (IHS too low)
195 - signature - [subject]	0.18	1	1.22	0.23	2	25	
196 - signature - [student]		0.95	1.22	0.16		25	
197 - ambience - [ambience]		0.25	4.65	1		33	
198 - ambience - [environment]	1	0.4	2.26	0.22	1	34	Keep
199 - ambience - [instrument]		0.8	2	0.24		32	
200 - arena - [arena]		0.5	4.65	1		35	
201 - arena - [sand]	0.82	1	1.91	0.2	0	33	Keep
202 - arena - [snow]		0.85	2.04	0.2		35	

8.22 Stimuli normalization: intra-set item alternatives selection rationale

Notes: Cells in right-most column describe the selection rationale for items that had competing alternatives. An asterisk (*) indicates that item had no competing alternatives, thus requiring no selection rationale. *Sem Sim* = semantic similarity between encountered word (e.g. 'bland') and predictable word (e.g. 'soft'). *IHS* = Interlingual Homophone Survey results (0:1; higher values reflect the assumed interlingual homophone set is predicated on what are perceived by Spanish-English bilinguals as interlingual homophones), *Cloze* = cloze probability of the item for the semantically constrained target word, *Plaus* = plausibility of encountered word (1-5; higher values reflect high plausibility of encountered word in that sentential context), and *Sem Sim* = semantic similarity of predictable and encountered word in a given sentential item.

Set	Item description	IHS	Cloze	Plaus	Sem Sim	Item alternatives selection rationale
1	bland - [bland]		0.95	4.95	1	*
	bland - [soft]	0.82	1	2	0.34	*
	bland - [flat]		0.95	3.3	0.31	Drop
	bland - [dry]		0.95	1.25	0.34	Keep (lower plaus)
choke - [choke]			0.8	4.95	1	*
2	choke - [crash]	0.76	0.7	1.2	0.22	*
	choke - [fall.in]		0.65	1.5	0.26	*
	crude - [crude]			0.3	4.6	1
3	crude - [raw]	0.94	1	1.75	0.4	*
	crude - [low]		0.35	1.2	0.37	Drop
	crude - [rough]		0.45	1.85	0.41	Drop
	crude - [rough]		0.95	2.8	0.41	Keep (highest cloze)
	direction - [direction]			0.85	4.65	1
4	direction - [address]	1	1	2.25	0.28	*
	direction - [number]		0.98	1.35	0.26	*
	embarrassed - [embarrassed]			0.95	4	1
5	embarrassed - [pregnant]	0.88	1	1.5	0.37	*
	embarrassed - [sick]		0.85	1.65	0.44	*
	globes - [globes]			1	4.85	1
6	globes - [balloons]	0.88	0.95	1.85	0.38	*
	globes - [rings]		1	1.2	0.32	*
	insecure - [insecure]			0.3	4.95	1
7	insecure - [dangerous]	0.94	0.55	3.25	0.41	*
	insecure - [violent]		1	1.25	0.34	*
	blank - [blank]			0.9	4.95	1
8	blank - [white]	0.88	0.9	1.9	0.36	*
	blank - [clear]		0.85	1.45	0.37	Keep (highest cloze, lowest plaus)
	blank - [clear]		0.6	1.5	0.37	Drop
	blank - [clear]		0.5	1.95	0.37	Drop

9	rope - [rope]	0.76	0.85	4.95	1	*
	rope - [clothes]		0.95	1.3	0.32	*
	rope - [shoes]		0.95	1.25	0.31	*
10	quiet - [quiet]	0.65	0.85	4.9	1	*
	quiet - [still]		0.85	3.6	0.46	*
	quiet - [warm]		1	1.15	0.56	*
11	vague - [vague]	0.94	0.45	4.75	1	*
	vague - [lazy]		0.95	1.75	0.36	*
	vague - [mean]		0.75	1.55	0.35	*
12	large - [large]	0.94	0.9	4.95	1	*
	large - [long]		0.75	2.15	0.5	*
	large - [low]		0.45	1.6	0.41	Drop
	large - [light]		1	2.2	0.39	Keep (higher cloze)
13	clear - [clear]	0.71	0.7	4.9	1	*
	clear - [light]		0.85	2.1	0.53	*
	clear - [strong]		0.95	1.3	0.54	*
14	sane - [sane]	0.76	0.45	5	1	*
	sane - [healthy]		0.95	2.35	0.36	*
	sane - [awake]		0.95	2.2	0.46	*
15	bank - [bank]	0.88	1	5	1	*
	bank - [bench]		0.9	1.65	0.17	*
	bank - [book]		1	1.25	0.19	Keep (higher cloze, lower plaus)
	bank - [beard]		0.8	1.35	0.1	Drop
16	carpet - [carpet]	0.82	0.3	5	1	*
	carpet - [folder]		0.4	1	0.04	*
	carpet - [property]		0.6	1.4	0.19	Keep (higher cloze, lower plaus)
	carpet - [farm]		0.05	1.5	0.13	Drop
17	exits - [exits]	0.53	0.95	5	1	*
	exits - [successes]		0.75	1.15	0.13	*
	exits - [friends]		1	1	0.03	*
18	cancel - [cancel]	0.76	0.85	5	1	*
	cancel - [pay]		1	1.65	0.49	*
	cancel - [try it]		0.7	1.05	0.4	*
19	assist - [assist]	0.94	0.6	4.95	1	*
	assist - [attend]		0.75	4	0.37	*
	assist - [adopt]		0.95	1.25	0.35	*
20	constipated - [constipated]	0.76	0.9	5	1	*
	constipated - [congested]		0.35	1.7	0.39	*

			constipated - [stressed]	0.35	1.05	0.42	Drop
			constipated - [contagious]	0.65	1.2	0.24	Drop
			constipated - [conflicted]	0.15	1.1	0.32	Drop
			constipated - [confused]	0.6	1	0.41	Keep (high cloze, lowest plaus, comparable sem sim)
			removed - [removed]	0.65	5	1	*
21		0.88	removed - [stirred]	0.6	1.5	0.3	*
			removed - [signed]	0.9	1.25	0.21	Keep (lower plaus)
			removed - [changed]	1	1.95	0.55	Drop
			grabbing - [grabbing]	0.3	5	1	*
22		0.82	grabbing - [recording]	0.75	1.5	0.2	*
			grabbing - [reading]	0.95	1.05	0.24	*
			departments - [departments]	0.65	5	1	*
23		1	departments - [apartments]	0.45	1.15	0.21	*
			departments - [compartments]	0.35	1.7	0.16	Drop
			departments - [instruments]	0.85	1.95	0.24	Keep (higher cloze)
			mark - [mark]	0.6	4.85	1	*
24		0.76	mark - [brand]	0.95	1.25	0.27	*
			mark - [sign]	0.8	2.55	0.41	*
			advertisements - [advertisements]	0.7	5	1	*
25		0.88	advertisements - [warnings]	0.2	1	0.31	*
			advertisements - [openings]	0.55	2.35	0.24	*
			pan - [pan]	0.2	4.9	1	*
26		1	pan - [bread]	0.9	1.35	0.52	*
			pan - [fork]	1	1.6	0.45	*
			code - [code]	0.9	4.95	1	*
27		0.59	code - [elbow]	0.25	1	0.05	*
			code - [glass]	0.45	1.05	0.09	*
			posters - [posters]	0.9	5	1	*
28		0.53	posters - [desserts]	0.85	1	0.13	*
			posters - [diamonds]	0.35	1.05	0.08	*
			demand - [demand]	0.9	5	1	*
29		0.94	demand - [sue]	0.9	3.05	0.24	*
			demand - [fight]	0.9	1.15	0.26	*

30	humor - [humor]		0.2	4.65	1	*
	humor - [mood]	0.88	0.85	2.57	0.41	*
	humor - [personality]		0.55	2.61	0.5	*
	title - [title]		0.6	4.87	1	*
31	title - [degree]	0.35	0.75	2.91	0.13	*
	title - [money]		0.6	2.57	0.21	*
	effective - [effective]		0.5	4.57	1	*
32	effective - [cash]	1	0.65	2.74	0.28	*
	effective - [fish]		0.9	1.22	0.21	*
	mass - [mass]		0.25	4.52	1	*
33	mass - [dough]	0.94	0.75	3.04	0.19	*
	mass - [hair]		0.9	1.52	0.21	*
	firm - [firm]		0.75	4.74	1	*
34	firm - [signature]	0.47	0.75	1.43	0.18	*
	firm - [house]		1	1.39	0.26	*
	red - [red]		0.65	4.26	1	*
35	red - [net]	0.53	0.95	1.43	0.2	*
	red - [key]		0.95	1.26	0.25	*
	lecture - [lecture]		0.7	4.78	1	*
	lecture - [reading]		0.6	2.43	0.37	*
36	lecture - [test]	0.94	0.7	1.78	0.26	Drop
	lecture - [wedding]		0.2	1.57	0.17	Drop
	lecture - [radio]		0.95	1.52	0.23	Keep (highest cloze, lowest plaus)
	goat - [goat]		0.85	4.74	1	*
37	goat - [drop]	0.41	1	1.3	0.16	*
	goat - [drum]		0.75	1.3	0.17	*
	fabric - [fabric]		0.75	4.7	1	*
38	fabric - [factory]	0.94	0.35	1.74	0.27	*
	fabric - [family]		0.7	1.35	0.16	*
	ambience - [ambience]		0.25	4.65	1	*
39	ambience - [environment]	1	0.4	2.26	0.22	*
	ambience - [instrument]		0.8	2	0.24	*
	arena - [arena]		0.5	4.65	1	*
40	arena - [sand]	0.82	1	1.91	0.2	*
	arena - [snow]		0.85	2.04	0.2	*

8.23 Control parameters and metadata for final stimuli items

Set	Item description	[constrained]	IHS	Cloze	Plaus	Sem Sim	LD	<i>n</i> words
1	bland - Expected	[bland]		0.95	4.95	1		18
	bland - FalseCognate	[soft]	0.82	1	2	0.34	1	21
	bland - Anomalous	[dry]		0.95	1.25	0.34		19
2	choke - Expected	[choke]		0.8	4.95	1		28
	choke - FalseCognate	[crash]	0.76	0.7	1.2	0.22	3	26
	choke - Anomalous	[fall.in]		0.65	1.5	0.26		28
3	crude - Expected	[crude]		0.3	4.6	1		17
	crude - FalseCognate	[raw]	0.94	1	1.75	0.4	1	18
	crude - Anomalous	[rough]		0.95	2.8	0.41		17
4	direction - Expected	[direction]		0.85	4.65	1		33
	direction - FalseCognate	[address]	1	1	2.25	0.28	1	37
	direction - Anomalous	[number]		0.98	1.35	0.26		37
5	embarrassed - Expected	[embarrassed]		0.95	4	1		21
	embarrassed - FalseCognate	[pregnant]	0.88	1	1.5	0.37	5	25
	embarrassed - Anomalous	[sick]		0.85	1.65	0.44		23
6	globes - Expected	[globes]		1	4.85	1		35
	globes - FalseCognate	[balloons]	0.88	0.95	1.85	0.38	1	35
	globes - Anomalous	[rings]		1	1.2	0.32		36
7	insecure - Expected	[insecure]		0.3	4.95	1		26
	insecure - FalseCognate	[dangerous]	0.94	0.55	3.25	0.41	2	29
	insecure - Anomalous	[violent]		1	1.25	0.34		29
8	blank - Expected	[blank]		0.9	4.95	1		16
	blank - FalseCognate	[white]	0.88	0.9	1.9	0.36	2	15
	blank - Anomalous	[clear]		0.85	1.45	0.37		16
9	rope - Expected	[rope]		0.85	4.95	1		14
	rope - FalseCognate	[clothes]	0.76	0.95	1.3	0.32	1	13
	rope - Anomalous	[shoes]		0.95	1.25	0.31		14
10	quiet - Expected	[quiet]		0.85	4.9	1		13
	quiet - FalseCognate	[still]	0.65	0.85	3.6	0.46	1	14
	quiet - Anomalous	[warm]		1	1.15	0.56		14
11	vague - Expected	[vague]		0.45	4.75	1		19
	vague - FalseCognate	[lazy]	0.94	0.95	1.75	0.36	2	16
	vague - Anomalous	[mean]		0.75	1.55	0.35		22
12	large - Expected	[large]		0.9	4.95	1		11
	large - FalseCognate	[long]	0.94	0.75	2.15	0.5	1	11
	large - Anomalous	[light]		1	2.2	0.39		11
13	clear - Expected	[clear]		0.7	4.9	1		9
	clear - FalseCognate	[light]	0.71	0.85	2.1	0.53	2	9
	clear - Anomalous	[strong]		0.95	1.3	0.54		9

14	sane - Expected	[sane]	0.76	0.45	5	1	1	18
	sane - FalseCognate	[healthy]		0.95	2.35	0.36		17
	sane - Anomalous	[awake]		0.95	2.2	0.46		17
15	bank - Expected	[bank]		1	5	1		20
	bank - FalseCognate	[bench]	0.88	0.9	1.65	0.17	2	18
	bank - Anomalous	[book]		1	1.25	0.19		17
16	carpet - Expected	[carpet]		0.3	5	1		29
	carpet - FalseCognate	[folder]	0.82	0.4	1	0.04	1	31
	carpet - Anomalous	[property]		0.6	1.4	0.19		30
17	exits - Expected	[exits]		0.95	5	1		9
	exits - FalseCognate	[successes]	0.53	0.75	1.15	0.13	1	9
	exits - Anomalous	[friends]		1	1	0.03		9
18	cancel - Expected	[cancel]		0.85	5	1		17
	cancel - FalseCognate	[pay]	0.76	1	1.65	0.49	2	19
	cancel - Anomalous	[try it]		0.7	1.05	0.4		19
19	assist - Expected	[assist]		0.6	4.95	1		39
	assist - FalseCognate	[attend]	0.94	0.75	4	0.37	3	37
	assist - Anomalous	[adopt]		0.95	1.25	0.35		34
20	constipated - Expected	[constipated]		0.9	5	1		37
	constipated - FalseCognate	[congested]	0.76	0.35	1.7	0.39	3	37
	constipated - Anomalous	[confused]		0.6	1	0.41		44
21	removed - Expected	[removed]		0.65	5	1		18
	removed - FalseCognate	[stirred]	0.88	0.6	1.5	0.3	2	22
	removed - Anomalous	[signed]		0.9	1.25	0.21		23
22	grabbing - Expected	[grabbing]		0.3	5	1		15
	grabbing - FalseCognate	[recording]	0.82	0.75	1.5	0.2	4	14
	grabbing - Anomalous	[reading]		0.95	1.05	0.24		19
23	departments - Expected	[departments]		0.65	5	1		29
	departments - FalseCognate	[apartments]	1	0.45	1.15	0.21	2	27
	departments - Anomalous	[instruments]		0.85	1.95	0.24		27
24	mark - Expected	[mark]		0.6	4.85	1		26
	mark - FalseCognate	[brand]	0.76	0.95	1.25	0.27	2	28
	mark - Anomalous	[sign]		0.8	2.55	0.41		29
25	advertisements - Expected	[advertisements]		0.7	5	1		40
	advertisements - FalseCognate	[warnings]	0.88	0.2	1	0.31	6	47
	advertisements - Anomalous	[openings]		0.55	2.35	0.24		43
26	pan - Expected	[pan]		0.2	4.9	1		16
	pan - FalseCognate	[bread]	1	0.9	1.35	0.52	0	16
	pans - Anomalous	[fork]		1	1.6	0.45		16
27	code - Expected	[code]	0.59	0.9	4.95	1	1	23

	code - FalseCognate	[elbow]		0.25	1	0.05		26
	code - Anomalous	[glass]		0.45	1.05	0.09		22
	posters - Expected	[posters]		0.9	5	1		27
28	posters - FalseCognate	[desserts]	0.53	0.85	1	0.13	2	33
	posters - Anomalous	[diamonds]		0.35	1.05	0.08		27
	demand - Expected	[demand]		0.9	5	1		34
29	demand - FalseCognate	[sue]	0.94	0.9	3.05	0.24	2	37
	demand - Anomalous	[fight]		0.9	1.15	0.26		34
	humor - Expected	[humor]		0.2	4.65	1		32
30	humor - FalseCognate	[mood]	0.88	0.85	2.57	0.41	0	30
	humor - Anomalous	[personality]		0.55	2.61	0.5		27
	title - Expected	[title]		0.6	4.87	1		24
31	title - FalseCognate	[degree]	0.35	0.75	2.91	0.13	2	21
	title - Anomalous	[money]		0.6	2.57	0.21		24
	effective - Expected	[effective]		0.5	4.57	1		23
32	effective - FalseCognate	[cash]	1	0.65	2.74	0.28	2	20
	effective - Anomalous	[fish]		0.9	1.22	0.21		22
	mass - Expected	[mass]		0.25	4.52	1		44
33	mass - FalseCognate	[dough]	0.94	0.75	3.04	0.19	1	47
	mass - Anomalous	[hair]		0.9	1.52	0.21		43
	firm - Expected	[firm]		0.75	4.74	1		44
34	firm - FalseCognate	[signature]	0.47	0.75	1.43	0.18	1	42
	firm - Anomalous	[house]		1	1.39	0.26		39
	red - Expected	[red]		0.65	4.26	1		35
35	red - FalseCognate	[net]	0.53	0.95	1.43	0.2	0	34
	red - Anomalous	[key]		0.95	1.26	0.25		36
	lecture - Expected	[lecture]		0.7	4.78	1		37
36	lecture - FalseCognate	[reading]	0.94	0.6	2.43	0.37	1	35
	lecture - Anomalous	[radio]		0.95	1.52	0.23		34
	goat - Expected	[goat]		0.85	4.74	1		46
37	goat - FalseCognate	[drop]	0.41	1	1.3	0.16	2	46
	goat - Anomalous	[drum]		0.75	1.3	0.17		48
	fabric - Expected	[fabric]		0.75	4.7	1		43
38	fabric - FalseCognate	[factory]	0.94	0.35	1.74	0.27	1	44
	fabric - Anomalous	[family]		0.7	1.35	0.16		45
	ambience - Expected	[ambience]		0.25	4.65	1		33
39	ambience - FalseCognate	[environment]	1	0.4	2.26	0.22	1	34
	ambience - Anomalous	[instrument]		0.8	2	0.24		32
	arena - Expected	[arena]		0.5	4.65	1		35
40	arena - FalseCognate	[sand]	0.82	1	1.91	0.2	0	33
	arena - Anomalous	[snow]		0.85	2.04	0.2		35

8.24 EEG Study (the main experiment): speaker recording consent form

IRB #: HUM00158504

Principal Investigator: Emily Rae Sabo, Linguistics Department, University of Michigan
Thank you for visiting the Sound Lab at The University of Michigan to participate in this research project! Below is a description of the task that you have come to participate in today. Your job is to read aloud a series of sentences into a microphone that records your voice. Your voice recording will be included in a neurolinguistics experiment in which people would listen to voice recordings (like the one you will be recording) from several different people while we measure their brain response using EEG (electroencephalogram) recording. Note that only your voice recording will be included in the experiment. That is, your name would never be shared in association with your voice recording. If at any point during our session you wish to discontinue, you should feel totally free to do so. Please just let the researcher know.

Do you consent to the use of your voice recordings for the study described above?

- Yes, I do consent. _____
- No, I do not consent. _____

Do you consent for the researcher to play your voice recordings at an academic conference?

- Yes, I do consent. _____
- No, I do not consent. _____

Do you consent for the researcher to make your voice recordings publicly available on a website or public database?

- Yes, I do consent. _____
- No, I do not consent. _____

8.26 EEG experiment: Recruitment oral script

Hello, my name is [NAME].

My laboratory, The Computational Neurolinguistics Lab, is recruiting research participants for a study on the neural processes associated with how we process sentences. In this study led by Principal Investigator Emily Sabo under the faculty supervision of Dr. Jon Brennan in the Linguistics Department, we measure electrical signals associated with brain activity while you listen to sentences.

The study takes between 1.5 and 2 hours and you are compensated \$15/hr. for your participation. This study is in no way connected with your class, and your participation is completely voluntary.

If you are interested, please include your name and email address on the sign-up sheet that is being passed around. You can email cnlscheduling@gmail.com or visit <https://cnlscheduling.youcanbook.me/> for more information and to schedule a timeslot with us.

Emily Rae Sabo (PI of the study) | emsabo@umich.edu

Dr. Jonathan Brennan (Faculty Advisor, Lab Director) | jobrenn@umich.edu

Computational Neurolinguistics Lab | Department of Linguistics | University of Michigan
Phone: 734-764-8692

8.27 EEG experiment: pre-screening question protocol for participant eligibility

Note: There are two subject demographic groups for recruitment for this study: (1) highly fluent Spanish-English speakers and (2) native English speakers with little to no knowledge of Spanish.

- List the languages you know. At what age did you learn them (an estimate is fine) and how did you learn them (e.g. from family, in school)?
 - To qualify as a subject within group (1), they must mention English *and* Spanish and report having learned both before the age of 12 (target $n = 35$ subjects).
 - To qualify as a subject within group (2), they must mention English, but ideally NOT Spanish. (target $n = 35$ subjects). They may mention other languages (e.g. Arabic, Chinese) and still participate in the study. If they *do* mention Spanish but report that they only studied it in school (a common occurrence for students in the U.S.), we will follow up with the question: “How many years of Spanish class did you take, and how much do you remember?” If they report only 1 year or less of Spanish study and report remembering little to nothing of the language, they will be notified that they have been placed on a waitlist for the study and may be contacted at a later date to schedule a session. Those who reported English but NOT Spanish will be accepted to participate in the study first.

- How old are you, in years?

They must be between 18 - 70 years old. This range includes those who are exactly 18 or exactly 70 years old. Those 71 years and older are excluded from this study, as older age is known to affect language processing in the brain in a way that could unnecessarily obfuscate the results of this experiment.

- How long have you lived in United States, in years?

They must report having lived in the United States for at least 10 years. This is to ensure they are highly familiar with the English variety called MUSE (Mainstream United States English), which is a crucial assumption in the experimental design of this study.

- Are you right-handed or left-handed?

They must report being right-handed to participate. This is standard protocol for neurolinguistic experiments, as handedness can influence lateralization of brain activity, which can confound the results of an EEG experiment.

8.28 EEG experiment: consent form

WORD PROCESSING | IRB #: HUM00158504 | Approval date: 07/17/2019

Principal Investigator: Emily Rae Sabo, Linguistics Department, University of Michigan

You are invited to participate in a research study about the neural mechanisms involved in processing sentences. You have been invited because you expressed interest in participating in this study.

If you agree to be part of the research study, you will be asked to wear a cap which contains a number of electrodes that come in to contact with your scalp. Electrodes will also be placed around your eyes and your chest. A gel will be applied to each electrode. Soft earphones will be fitted in to your ears and you will be seated in a quiet room in front of a computer screen. You will listen to sentences presented through the earphones at a normal volume or view words presented on a computer monitor while the researcher records electrical signals associated with your brain activity. Every once in a while, you will be presented with a question about the sentence you just heard and will respond with the keyboard in front of you. You will also complete two short questionnaires at the conclusion of the experiment. These questionnaires will be about your reflection on the experiment and your own language background, respectively. You are free to decline to respond to any question. Setting up the experiment takes 30 minutes on average. The experiment itself will take between 1 – 1.5 hours. After the experiment, the electrodes will be removed and you may clean the gel out of your hair; it is easily removed with water. If the experiment lasts for over one hour, you may be given the option to exercise with a stair-stepper during the recording to help maintain alertness. This exercise is optional; you are free to decline it. Although you may not directly benefit from being in this study, others may benefit because this research will help us to better understand how the brain comprehends sentences. Understanding this process is important for understanding and developing treatments for pathologies associated with language processing. There is no more than minimal risk associated with this study and the topic is not sensitive. You may experience some slight discomfort from the cap and electrodes. The researchers will try to minimize any discomfort. You are encouraged to communicate openly with the researchers about your comfort level during the experiment. You are free to discontinue your participation in the experiment at any time. The electrode gel, which will have contact with your scalp, has no known associated risks. Its active ingredients are water and salt. Specifically, it contains Water, Sodium Chloride, Aragum T-1998 (Gum Acacia) Potassium Bitartrate (Cream of Tartar), Glycerin, Methylparaben and Propylparaben. If you have a known allergy to any of these ingredients, please inform the researcher, who will then discontinue the study session. You will be compensated \$15 per hour for your participation in this study. We plan to publish the results of this study but will not include any information that would identify you. There are some reasons why people other than the researchers may need to see information you provided as part of the study. This includes organizations responsible for making sure the research is done safely and properly, including the University of Michigan or government offices. To keep your information safe, your name will not be attached to any data, but a study number will be used instead. Information that may be used to identify you will be kept on a password-protected and encrypted computer. These records will be retained for up to ten years

The data you provide will be stored on secure computers at the University of Michigan. The data may be made available to other researchers for other studies following the completion of this research study, in accordance with data sharing guidelines in the research community. The data will not contain any information that could identify you.

Participating in this study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time. If you decide to withdraw early, the information and data you provided will be deleted. The study may also be ended due to technical concerns with data collection. You will be compensated for the time that you participate regardless of whether the study is completed (for instance, if you withdraw after a half hour, you will be compensated \$7.50.) You are responsible for travel costs (including parking) associated with participating in this study.

If you have questions about this research, including questions about scheduling or your compensation for participating, you may contact Dr. Jonathan Brennan (the Principal Investigator of the Computational Neurolinguistics Lab) at jobrenn@umich.edu, or (734) 764-8692 or Emily Rae Sabo (the Principal Investigator for this particular study) at emsabo@umich.edu.

If you have questions about your rights as a research participant, or wish to obtain information, ask questions or discuss any concerns about this study with someone other than the researcher(s), please contact the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board, 2800 Plymouth Rd. Building 520, Room 1169, Ann Arbor, MI 48109-2800, (734) 936-0933 (or toll free, (866) 936-0933), irbhsbs@umich.edu.

By signing this document, you are agreeing to be in the study. You will be given a copy of this document for your records and one copy will be kept with the study records. Be sure that questions you have about the study have been answered and that you understand what you are being asked to do. You may contact the researcher if you think of a question later.

Do you agree to participate in the study?

If yes, please sign below. If not, please inform the researcher that you do not consent to participate.

Printed Name

Signature

Date

Would you like to be contacted to participate in future study opportunities?

Yes, I would like to be contacted for future study opportunities.
Email address: _____

No, I would not like to be contacted for future study opportunities.

8.29 EEG experiment: Pre-experiment surveys

Date: _____

Name: _____

Languages spoken while growing up:

Primary languages of education:

Languages used regularly:

Languages you know but do not use regularly:

Handedness Survey

Date: _____ Name: _____

Date of Birth: _____ Sex: _____

Please indicate your preferences in the use of hands in the following activities by putting + in the appropriate column. Where the preference is so strong that you would never try to use the other hand unless absolutely forced to, put ++. If in any case you are really indifferent put + in both columns.

Some of the activities require both hands. In these cases the part of the task, or object, for which hand preference is wanted is indicated in brackets.

Please try to answer all the questions, and only leave a blank if you have no experience at all of the object or task.

		Left	Right
1.	Writing		
2.	Drawing		
3.	Throwing		
4.	Scissors		
5.	Toothbrush		
6.	Knife (without fork)		
7.	Spoon		
8.	Broom (upper handle)		
9.	Striking match (match)		
10.	Opening box (lid)		
11.	Which foot do you prefer to kick with?		
12.	Which eye do you use when using only one?		

8.30 EEG experiment: participant background and metadata

Notes: Incomplete survey responses indicated by asterisk (*). *N* = No, *Y* = Yes. *Whi* = White, *Bla* = Black or African American, *Hisp* = Hispanic or Latino, *NHPI* = Native Hawaiian or Pacific Islander. For the metalinguistic survey question about Chinese- and Spanish- accented English exposure, responses were on a 5-point Likert scale (1-5), with higher responses reflecting high frequency of exposure.

Subject ID	Subject Age	L1 Eng?	Other languages	States lived in U.S.	Yrs. in U.S.	Other countries?	Race a/o ethnicity
677	19	Y	Jap	MI	19	N	Whi.
682	18	Y	Sp	MI	17	N	Bla.,Hisp.,NHPI
684	21	Y	Sp, Chin, Mal	IL	21	N	Hisp.
593	22	Y	Ger	*	*	*	Asian
506	25	Y	Russ	MI	25	N	Whi.
686	30	Y	Sp	MI, MN	30	N	Whi.,Other
690	35	N	Sp	MI	5	Y - Mexico.	Hisp.
692	28	Y	Sp	NY, PR, PA, MI	28	N	Hisp.
693	18	Y	Sp, Fr, Ger	MI	18	Y - Colombia.	Hisp.
694	23	Y	Fr	CA, NJ, NY, MI	21	Y - Canada.	Whi.
696	19	Y	Sp, Chin	IL, MI	19	N	Hisp.
702	25	Y	Sp, Fr, Ital, Dut	NY, MA, MI	24	Y - France, Italy	Whi., Hisp.
706	28	Y	Sp	PR, MI	28	N	Hisp.
708	22	Y	Sp, Jap, Port	CA	22	Y - Japan	Hisp.

Subject ID	Do people say you have an accent?	Do you think you have an accent?	Chinese-accented Eng. exposure?	Spanish-accented Eng. exposure?	Sp-Eng dominance
677	N	Y - Midwestern	4	2	Eng. only
682	N	N	3	5	Balanced
684	N	Y - Mexican	4	4	Balanced
593	*	*	*	*	*
506	N	N	3	3	Eng. only
686	Y - Southern	N	3	4	Eng. only
690	Y - Latin	Y - Latin	5	5	Sp-dom
692	N	Y - Very slight	4	3	Balanced
693	N	Y - Only in wording	5	5	Balanced
694	Y - New Jersey	Y - New Jersey	5	1	Eng. only
696	N	N	2	5	Eng-dom
702	Y - Spanish, French	Y - New York	4	5	Balanced
706	Y - Hispanic	Y	5	5	Balanced
708	Y - West coast	Y - West coast	5	4	Balanced

8.31 EEG experiment: Participant language profiles

Note: All subjects were fluent English speakers. All Bilingual Language Profile (BLP) scores are rounded to the nearest integer. The BLP scores range from -218 (Spanish only) to 218 (English only), with a score of 0 reflecting perfectly balanced Spanish-English bilingualism. The categories applied to these data have been ordered as follows: English-dominant bilingualism lies between 45 and 218, Balanced bilingualism between -44 and 44 (the middle 20% of the total range), and Spanish-dominant bilingualism between -45 and -218.

Group	ID	History		Use		Proficiency		Attitudes		Language dominance summary			
		<i>Eng</i>	<i>Sp</i>	<i>Eng</i>	<i>Sp</i>	<i>Eng</i>	<i>Sp</i>	<i>Eng</i>	<i>Sp</i>	<i>Eng</i>	<i>Sp</i>	Score	Category
No Spanish	67 7	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Only English
	59 3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
	50 6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
	68 6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
69 4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
Knows Spanish	70 8	47	30	43	9	54	43	43	36	187	118	69	English-dominant
	69 6	39	37	44	11	52	34	50	52	185	134	50	
	69 3	33	29	37	14	54	50	41	43	166	136	30	Balanced bilingual
	70 2	33	27	22	20	54	45	54	45	163	138	26	
	68 4	43	35	32	21	52	48	52	52	179	155	24	
	68 2	48	37	37	17	54	54	48	54	187	164	24	
	69 2	39	43	32	23	54	54	34	54	159	175	-16	
	70 6	15	54	33	22	52	54	34	52	134	182	-48	Spanish-dominant
69 0	11	54	22	40	39	54	34	41	105	190	-85		

Ranges for dominance categories

Only English	No BLP score (no Spanish)
English-dominant bilingual	Between 45 and 218
Balanced Spanish-English bilingual	Between -44 and 44
Spanish-dominant bilingual	Between -45 and -218

8.32 EEG experiment: bilingual dominance ratings (self-reported vs. BLP)

Note: Only two subjects demonstrated a self reporting category than was different from their BLP (Bilingual Language Profile survey) scores, indicated in the table with asterisks. Specifically, two subjects who self-reported balanced Spanish-English bilingualism demonstrated English-dominant and Spanish-dominant bilingualism, respectively, according to their BLP scoring. The BLP scores range from -218 (Spanish only) to 218 (English only), with a score of 0 reflecting perfectly balanced Spanish-English bilingualism. The categories applied to these data have been ordered as follows: English-dominant bilingualism lies between 45 and 218, Balanced bilingualism between -44 and 44 (the middle 20% of the total range), and Spanish-dominant bilingualism between -45 and -218.

Subject ID	Self-reported dominance	BLP dominance	BLP Score
708	Balanced*	English-dominant*	69
696	English-dominant	English-dominant	50
693	Balanced	Balanced	30
702	Balanced	Balanced	26
684	Balanced	Balanced	24
682	Balanced	Balanced	24
692	Balanced	Balanced	-16
706	Balanced*	Spanish-dominant*	-48
690	Spanish-dominant	Spanish-dominant	-85

8.33 EEG experiment: participant perceived point of experiment

Subject ID	Spanish-English profile	Subject response	Response type
677	English only	Understanding how Spanish-sounding accents affect comprehension of native English speakers	accents, Spanish
682	Balanced	Studying the brain while listening to English sentences	generic
684	Balanced	To see how the brain processes the different English accents when spoken by other people.	accents
593	English only	n/a ³⁸	n/a
506	English only	How our brain reacts to the wrong word in a sentence	word errors
686	English only	If different dialect process differently in subjects heads to understand different language	accents, bilingualism
690	Spanish-dom	They are testing how I handling the English in terms to be confused with Spanish	false cognates
692	Balanced	Recognition of sentence meaning	generic
693	Balanced	I think they were testing for the link between languages and words that sound similar with different meanings between the languages.	false cognates
694	English only	The effect of how you perceive the definition of words in the context of a sentence and how different factors influence that, like accent, circumlocution, or political statements	accents, social bias
696	English-dominant	Multilingual comprehension	bilingualism
702	Balanced	A correlation between bilingualism and sociopolitical opinions	bilingualism, social bias
706	Spanish-dominant	How my brain reacts to grammatically correct and incorrect sentences.	word errors
708	English-dominant	Response to certain sentence structure with different accents and current topics	accents, social bias

³⁸ This subject did not complete the post-experimental survey.

8.34 EEG experiment: 60 pre-normed critical sentence sets (stim list)

Notes: Each of the 60 sentence sets contains 3+ versions (total items = 202 items) prior to stimuli norming. Within a sentence set, **final target word** is always identical, as are the immediately preceding words. Each sentence within a set differs by what word meaning is constrained for sentence-finally, though all are designed to have high-cloze probability. For each sentence set, the plausibility of the final word in the two Error condition sentences (SpanError, OtherError) is designed to be comparably low, in contrast to the high plausibility of the NoError condition. Semantic similarity between **encountered & [predicted word]** have been controlled for, by calculating the word pair's semantic similarities using SpaCy's pre-trained word-embedded vectors. For example, *bland-soft* have a semantic similarity of 0.34 and *bland-flat*, 0.31, which are comparable given the scale for the semantic similarity measure is 0-1.). Within each set, the two Error sentences must have word pair semantic similarity ratings within roughly 0.10 of each other. Up to 20% of sentences sets ($n = 12$) may exceed this 0.10 range, but none beyond 0.20. Any **formal overlap** between encountered and predicted word is controlled for (e.g. **bank** and **bench** both start with 'b,' so a word starting with 'b' was chosen for the predicted word in the OtherError condition: **book**) Formal similarity between the interlingual homophones is measured by **Levenshtein Distance (LD)**, e.g. the Levenshtein Distance for *bland* – ✓ = 1, for *choke* – *chocar* = 3). Accent marks are ignored. (e.g. *o* = *ó*). Also, this measure reflects orthographic form, not acoustic form (e.g. Eng. *pæn* = Sp. *pan*) Sentence length is controlled for within each set, such that each sentence differs by no more than |5| words. Only 3% of sentences ($n = 6$) may exceed this word length difference, and only ever up to |7| words. Additionally, word count isn't exactly correlated to speech recording time, so precise word counts are not crucial for this experiment, which use auditory stimuli.

1. Using 'bland' to mean [soft] because Sp. '✓/a' = [soft]
Eng. 'bland' & Sp. '✓' = 1
 - a. **Expected - bland - [bland]:** (1.00) | 18 words
Since my aunt usually cooks without *any* seasoning, the taste of her food tends to be pretty **bland**.
 - b. **FalseCognate - bland - [soft]:** (0.34) | 21 words
While the surface of a rock tends to be pretty *hard*, the surface of a pillow tends to be pretty **bland**.
 - c. **Anomalous - bland - [flat]:** (0.31) | 20 words | Option #1
We don't have many hills in this part of the country, so the land generally tends to be pretty **bland**.
 - d. **Anomalous - bland - [dry]:** (0.34) | 19 words | Option #2
Don't use that towel there. That one is usually pretty *wet*, whereas this one tends to be pretty **bland**.
2. Using 'choke' to mean [crash] because Sp. 'chocar' = [crash]
Eng. 'choke' & Sp. 'chocar' = 3
 - a. **Expected - choke - [choke]:** (1.00) | 28 words
C'mon – sit up, don't do that. You know it's dangerous. You know that if you eat food while you're lying down, there's a good chance you're gonna **choke**.
 - b. **FalseCognate - choke - [crash]:** (0.22) | 26 words
If you're driving with your eyes closed and another car is coming towards you, you might not die, but there's a good chance you're gonna **choke**.
 - c. **Anomalous - choke - [fall in]:** (0.26) | 28 words
Since you're already wet, maybe you don't care. But if you keep walking along the edge of the pool like that, there's a good chance you're gonna **choke**.
3. Using 'crude' to mean [raw] because Sp. 'crudo/a' = [raw]
Eng. 'crude' & Sp. 'crudo' = 1
 - a. **Expected - crude - [crude]:** (1.00) | 17 words
I suppose I would use petroleum oil after it's been *refined*, but not if it's still **crude**.
 - b. **FalseCognate - crude - [raw]:** (0.40) | 18 words

- No sushi for me please. I'll eat fish after it's been *cooked* but not if it's still *crude*.
- c. **Anomalous - crude - [low]:** (0.37) | 17 words | Option #1
I would open my eyes if the plane was already *high* but not if it's still *crude*.
 - d. **Anomalous - crude - [rough]:** (0.41) | 18 words | Option #2
I would use that lotion on my skin once it's already *smooth* but not if it's still *crude*.
 - e. **Anomalous - crude - [rough]:** (0.41) | 17 words | Option #3
You can use the varnish on that surface once it's *smooth* but not if it's still *crude*.
4. Using 'seats' to mean [appointments] because Sp. 'citas' = [appointments]
Eng. 'seats' & Sp. 'citas' = 4
- a. **Expected - seats - [seats]:** (1.00) | 25 words
My grandma can't stand for this entire bus ride. Can you check the back of the bus to see if there are any available **seats**?
 - b. **FalseCognate - seats - [appointments]:** (0.29) | 25 words
If at all possible, I'd really like to see Dr. Goldstein *today*. Could you check his schedule to see if there are any available **seats**?
 - c. **Anomalous - seats - [positions]:** (0.36) | 26 words
My younger brother is currently looking for an entry-level job in finance. Could you ask around your company to see if there are any available **seats**?
5. Using 'direction' to mean [address] because Sp. 'dirección' = [address]
Eng. 'direction' & Sp. 'dirección' = 1
- a. **Expected - direction - [direction]:** (1.00) | 33 words
I like this property, but before I even *consider* buying it, I need to know where it faces: North, East, South or West. When you get a chance, let me know the **direction**.
 - b. **FalseCognate - direction - [address]:** (0.28) | 37 words
The letter is already in an envelope, ready to be mailed out to you. I just need to know where exactly you want me to send it. When you get a chance, let me know the **direction**.
 - c. **Anomalous - direction - [number]:** (0.26) | 37 words
Don't worry about it - I'm happy to call their customer service line for you. But it looks like I don't have them saved in my phone. When you get a chance, let me know the **direction**.
6. Using 'embarrassed' to mean [pregnant] because Sp. 'embarazada' = [pregnant]
Eng. 'embarrassed' & Sp. 'embarazada' = 5
- a. **Expected - embarrassed - [embarrassed]:** (1.00) | 21 words
After accidentally farting in front of her boss, my wife's face immediately turned bright red, which only happens when she's **embarrassed**.
 - b. **FalseCognate - embarrassed - [pregnant]:** (0.37) | 25 words
We hadn't been trying for a third child, but my wife just had what we think is morning sickness, which only happens when she's **embarrassed**.
 - c. **Anomalous - embarrassed - [sick]:** (0.44) | 23 words
Katie must've come down with something. She stayed home from work today and canceled all her meetings, which only happens when she's **embarrassed**.
7. Using 'impressed' to mean [shocked] because Sp. 'impresionado/a' = [shocked]
Eng. 'impressed' & Sp. 'impresionado' = 5
- a. **Expected - impressed - [impressed]:** (1.00) | 36 words
To be honest, I didn't think his voice was gonna be that good. He just doesn't look like he's had a lot of vocal training. But after hearing him sing, I must admit - I'm **impressed**.
 - b. **FalseCognate - impressed - [shocked]:** (0.65) | 36 words
Wow - I told you that in confidence because I thought I could *trust* you. I can't believe you just went and told everyone. I did *not* see this coming. I must admit - I'm **impressed**.
 - c. **Anomalous - impressed - [convinced]:** (0.63) | 37 words

At first, I didn't want to believe the cops when they told me my dad robbed a bank. I refused to believe it. But now that they've shown me the evidence, I must admit - I'm **impressed**.

8. Using 'globes' to mean [balloons] because Sp. 'globos' = [balloons]
 Eng. 'globes' & Sp. 'globos' = 1
- Expected - globes - [globes]:** (1.00) | 35 words
 Right now, the geography classrooms only have maps, which are flat. But the Earth is round, so they need to buy...what do you call them? The round, spherical things...They need to buy **globes**.
 - FalseCognate - globes - [balloons]:** (0.38) | 35 words
 They need more party decorations than this. I'm gonna bring over my helium tank. Tell them they need to buy...what do you call them? The brightly colored rubber things...They need to buy **globes**.
 - Anomalous - globes - [rings]:** (0.32) | 36 words
 Two of my best friends are planning to propose to their girlfriends. But before they do, they need to buy the...what do you call them? The jewelry that goes on your finger...They need to buy **globes**.
9. Using 'insecure' to mean [dangerous] because Sp. 'inseguro/a' = [dangerous]
 Eng. 'insecure' & Sp. 'inseguro' = 2
- Expected - insecure - [insecure]:** (1.00) | 26 words
 Recent studies have shown that, compared to adults, teenagers tend to have much less confidence in themselves. In other words, they tend to be more **insecure**.
 - FalseCognate - insecure - [dangerous]:** (0.41) | 29 words
 Studies have shown that, compared to small towns, big cities have higher crime rates and more reports of armed robbery. In other words, they tend to be more **insecure**.
 - Anomalous - insecure - [violent]:** (0.34) | 29 words
 Studies have shown that Rated-R movies, compared to PG-13 movies, tend to have more scenes with guns, knives and fighting. In other words, they tend to be more **insecure**.
10. Using 'idioms' to mean [languages] because Sp. 'idiomas' = [languages]
 Eng. 'idioms' & Sp. 'idiomas' = 1
- Expected - idioms - [idioms]:** (1.00) | 32 words
 Despite English not being her native language, she knows a lot of those quirky sayings like "kick the bucket" and "hit the hay." In other words, she knows a lot of **idioms**.
 - FalseCognate - idioms - [languages]:** (0.54) | 30 words
 My niece Sara is only 4 years old and she already knows how to speak English, Chinese, Portuguese, Arabic and Japanese. In other words, she knows a lot of **idioms**.
 - Anomalous - idioms - [clichés]:** (0.51) | 34 words | Option #1
 My grandma knows all those old, tired sayings like "Don't judge a book by its cover" and "The grass is greener on the other side." In other words, she knows a lot of **idioms**.
 - Anomalous - idioms - [slang*]:** (0.61) | 31 words | Option #2
 My grandma may be old, but she still somehow knows all the new, hip words that young people are using these days. In other words, she knows a lot of **idioms**.
 - Anomalous - idioms - [nouns]:** (0.56) | 33 words | Option #3
 My 2-year old daughter still doesn't know many *verbs* yet. But she does know a lot of the words for people, places, and things. In other words, she knows a lot of **idioms**.
11. Using 'blank' to mean [white] because Sp. 'blanco/a' = [white]
 Eng. 'blank' & Sp. 'blanco' = 2
- Expected - blank - [blank]:** (1.00) | 16 words
 The first few pages shouldn't have anything written on them at all. They should be **blank**.

- b. **FalseCognate - blank - [white]:** (0.36) | 15 words
Party dresses can be *any* color you want. But wedding dresses? They should be **blank**.
- c. **Anomalous - blank - [clear]:** (0.37) | 16 words | Option #1
When your eyeglasses are old, they might be blurry. But new glasses? They should be **blank**.
- d. **Anomalous - blank - [clear]:** (0.37) | 16 words | Option #2
Pieces of *coal*? They should be opaque. But pieces of *glass*? They should be **blank**.
- e. **Anomalous - blank - [clear]:** (0.37) | 16 words | Option #3
We can't go to the park right now - the skies are cloudy. They should be **blank**.
12. Using 'rope' to mean [clothes] because Sp. 'ropa' = [clothes]
Eng. 'rope' & Sp. 'ropa' = 1
- a. **Expected - rope - [rope]:** (1.00) | 14 words
I'll show you how to tie a sailor's knot. Can I borrow some **rope**?
- b. **FalseCognate - rope - [clothes]:** (0.32) | 13 words
Everything I'm wearing right now is soaking wet. Can I borrow some **rope**?
- c. **Anomalous - rope - [shoes]:** (0.31) | 14 words
I can't walk out there in my bare feet. Can I borrow some **rope**?
13. Using 'quiet' to mean [still] because Sp. 'quieto/a' = [still]
Eng. 'quiet' & Sp. 'quieto' = 1
- a. **Expected - quiet - [quiet]:** (1.00) | 13 words
Talking is strictly prohibited while inside the library. You need to keep **quiet**.
- b. **FalseCognate - quiet - [still]:** (0.46) | 14 words
Don't move your legs or fidget with your hands. You need to keep **quiet**.
- c. **Anomalous - quiet - [warm]:** (0.56) | 14 words
It's freezing cold outside, so wear your winter coat. You need to keep **quiet**.
14. Using 'vague' to mean [lazy] because Sp. 'vago/a' = [lazy]
Eng. 'vague' & Sp. 'vago' = 2
- a. **Expected - vague - [vague]:** (1.00) | 19 words
I need to know *specific* names. You can't just keep saying "*some people*." Why are you being so **vague**?
- b. **FalseCognate - vague - [lazy]:** (0.36) | 16 words
You've spent the entire weekend lying around doing *absolutely* nothing. Why are you being so **vague**?
- c. **Anomalous - vague - [mean]:** (0.35) | 22 words
That is *not* a nice thing to say. Now you're just trying to hurt my feelings. Why are you being so **vague**?
15. Using 'large' to mean [long] because Sp. 'largo/a' = [long]
Eng. 'large' & Sp. 'largo' = 1
- a. **Expected - large - [large]:** (1.00) | 11 words
I wouldn't say this company is *small*. It's actually quite **large**.
- b. **FalseCognate - large - [long]:** (0.50) | 11 words
I wouldn't say her hair is *short*. It's actually quite **large**.
- c. **Anomalous - large - [low]:** (0.41) | 11 words | Option #1
I wouldn't say the price is *high*. It's actually quite **large**.
- d. **Anomalous - large - [light]:** (0.39) | 11 words | Option #2
I wouldn't say this bag is *heavy*. It's actually quite **large**.
16. Using 'clear' to mean [light] because Sp. 'claro/a' = [light]
Eng. 'clear' & Sp. 'claro' = 2
- a. **Expected - clear - [clear]:** (1.00) | 9 words
The skies aren't cloudy anymore. They're actually pretty **clear**.
- b. **FalseCognate - clear - [light]:** (0.53) | 9 words
Her eyes aren't very dark. They're actually pretty **clear**.
- c. **Anomalous - clear - [strong]:** (0.54) | 9 words
Those women are not weak. They're actually pretty **clear**.

17. Using 'complexion' to mean [build] because Sp. 'complexión' = [build]
 Eng. 'complexion' & Sp. 'complexión' = 0
- Expected - complexion - [complexion]:** (1.00) | 28 words
 While some people have issues with oiliness, Jake's face is naturally too *dry*. Using a good face lotion is really important for someone with his kind of **complexion**.
 - FalseCognate - complexion - [build]:** (0.10) | 25 words
 Jason has a nice, muscular frame – and he's not overly tall. A career in gymnastics would be *perfect* for someone with his kind of **complexion**.
 - Anomalous - complexion - [money]:** (0.04) | 28 words
 Of *course* it's expensive. But you know how much Jerry has in the bank. That house would be *easy* to buy for someone with his kind of **complexion**.
18. Using 'sane' to mean [healthy] because Sp. 'sano/a' = [healthy]
 Eng. 'sane' & Sp. 'sano' = 1
- Expected - sane - [sane]:** (1.00) | 18 words
 Raising five kids can make you go a little crazy. But daily meditation will help keep you **sane**.
 - FalseCognate - sane - [healthy]:** (0.36) | 17 words
 Take care of yourself by avoiding greasy foods. Eating fruits and vegetables will help keep you **sane**.
 - Anomalous - sane - [awake]:** (0.46) | 17 words
 No, don't drink warm milk. That'll make you fall *asleep*. Drinking coffee will help keep you **sane**.
19. Using 'bank' to mean [bench] because Sp. 'banco' = [bench]
 Eng. 'bank' & Sp. 'banco' = 2
- Expected - bank - [bank]:** (1.00) | 20 words
 Where can I deposit a check or apply for a loan in this town? I haven't seen a single **bank**.
 - FalseCognate - bank - [bench]:** (0.17) | 18 words
 I literally can't find anywhere in this entire park to sit down. I haven't seen a single **bank**.
 - Anomalous - bank - [book]:** (0.19) | 17 words | Option #1
 This is supposedly a library, but there's nothing here to read. I haven't seen a single **bank**.
 - Anomalous - bank - [beard]:** (0.10) | 18 words | Option #2, better b/c no k-final inconsistency
 No one here has facial hair. I haven't seen any moustaches. And I haven't seen a single **bank**.
20. Using 'bat' to mean [robe] because Sp. 'bata' = [robe]
 Eng. 'bat' & Sp. 'bata' = 1
- Expected - bat - [bat]:** (1.00) | 19 words
 For baseball, you usually use a wooden one. But that one's made of metal. Is that a new **bat**?
 - FalseCognate - bat - [robe]:** (0.19) | 19 words
 After you shower, you usually put on one that's terrycloth. But that one's silky. Is that a new **bat**?
 - Anomalous - bat - [ring]:** (0.26) | 20 words
 The one you usually wear on your finger is gold. But that one is silver. Is that a new **bat**?
21. Using 'carpet' to mean [folder] because Sp. 'carpeta' = [folder]
 Eng. 'carpet' & Sp. 'carpeta' = 1
- Expected - carpet - [carpet]:** (1.00) | 29 words
 Wow - your shoes are completely covered in mud. Don't you dare walk inside my house with all that mud on your shoes, or you'll drag it into my **carpet**.
 - FalseCognate - carpet - [folder]:** (0.04) | 31 words

- This isn't my own personal computer. It's a shared computer. So when I save a file, I can't leave it on the desktop. I need to drag it into my **carpet**.
- c. **Anomalous - carpet - [property]:** (0.19) | 30 words | Option #1
I own the land from this line over. As your neighbor, I'm asking that you keep your trash can over there and that you not drag it onto my **carpet**.
- d. **Anomalous - carpet - [farm]:** (0.13) | 32 words | Option #2
From this line over is *my* property where I grow *my* crops. As your neighbor I ask that you keep *your* harvesting equipment over there and not drag it onto my **carpet**.
22. Using 'exits' to mean [successes] because Sp. 'éxitos' = [successes]
Eng. 'exits' & Sp. 'éxitos' = 1
- a. **Expected - exits - [exits]:** (1.00) | 9 words
I make the opposite of entrances. I make **exits**.
- b. **FalseCognate - exits - [successes]:** (0.13) | 9 words
I make the opposite of failures. I make **exits**.
- c. **Anomalous - exits - [friends]:** (0.03) | 9 words
I make the opposite of enemies. I make **exits**.
23. Using 'cancel' to mean [checkout/pay] because Sp. 'cancelar' = [checkout/pay]
Eng. 'cancel' & Sp. 'cancelar' = 2
- a. **Expected - cancel - [cancel]:** (1.00) | 17 words
If you no longer need that appointment, please call my scheduling secretary so that you can **cancel**.
- b. **FalseCognate - cancel - [pay]:** (0.49) | 19 words
After your appointment, head over to the receptionist and give her your credit card so that you can **cancel**.
- c. **Anomalous - cancel - [try]:** (0.40) | 19 words
Wait - you've never swung a golf club before? Here, borrow mine for a second so that you can **cancel**.
24. Using 'assist' to mean [attend] because Sp. 'asistir' = [attend]
Eng. 'assist' & Sp. 'asistir' = 3
- a. **Expected - assist - [assist]:** (1.00) | 39 words
You have a technical expertise that we *need* in the operating room during this procedure. I know you don't want to *lead* the procedure. But if we assign another surgeon to *lead* it, would you be willing to **assist**?
- b. **FalseCognate - assist - [attend]:** (0.37) | 37 words
I know how much you hate our corporate dinner parties. But your presence at next week's is important to our investors. If I can ensure it won't drag on too long, would you be willing to **assist**?
- c. **Anomalous - assist - [adopt]:** (0.35) | 34 words
Listen, I know you two have always wanted to have kids that are your own, biological children. But if that's not turning out to be an option, then would you be willing to **assist**?
25. Using 'constipated' to mean [stuffy/congested] because Sp. 'constipado/a' = [stuffy/congested]
Eng. 'constipated' & Sp. 'constipado' = 3
- a. **Expected - constipated - [constipated]:** (1.00) | 37 words
Unfortunately, he's still having the same digestive problems as before. He hasn't gone to the bathroom for a while. Like, he hasn't had a *bowel movement* for several days now. In other words, he's still really **constipated**.
- b. **FalseCognate - constipated - [stuffy/congested]:** (0.39) | 37 words
The good news is that he doesn't have the sore throat anymore. But unfortunately, his nasal passages are still...you know...he still can't really breathe in through his nose. In other words, he's still really **constipated**.
- c. **Anomalous - constipated - [stressed]:** (0.42) | 38 words | Option #1

- I was hoping he'd feel more relaxed now that that big deadline is behind him. But unfortunately, work is still crazy, and his boss just continues to pile on the pressure. In other words, he's still really **constipated**.
- d. **Anomalous - constipated - [contagious]:** (0.24) | 35 words | Option #2
You still need to maintain a healthy distance from him when you visit. His infection can be transmitted to you very quickly, through direct or even indirect contact. In other words, he's still really **constipated**.
- e. **Anomalous - constipated - [conflicted]:** (0.32) | 41 words | Option #3
He still hasn't decided whether or not to tell her. On one hand, she deserves to know the truth. But, also telling her will hurt her. He's not sure which is the right choice. In other words, he's still really **constipated**.
- f. **Anomalous - constipated - [confused]:** (0.41) | 44 words | Option #4
This is a really hard math problem for a kid his age. And even though you've been explaining it to him for over an hour, I still don't think he has *any* idea how to do it. In other words, he's still really **constipated**.
26. Using 'contest' to mean [answer] because Sp. 'contestar' = [answer]
Eng. 'contest' & Sp. 'contestar' = 2
- a. **Expected - contest - [contest]:** (1.00) | 18 words
Of *course* I believe that the Earth is round! That's not a claim that I would ever **contest**.
- b. **FalseCognate - contest - [answer]:** (0.30) | 19 words
That's a question that they're not allowed to *ask*. And it's also not one that I would ever **contest**.
- c. **Anomalous - contest - [pursue]:** (0.19) | 17 words
Mechanical engineering simply doesn't interest me. It's just not a career path that I would ever **contest**.
27. Using 'mandate' to mean [send] because Sp. 'mandar' = [send]
Eng. 'mandate' & Sp. 'mandar' = 2
- a. **Expected - mandate - [mandate]:** (1.00) | 17 words
Mandatory recycling is the kind of law that congress would say they *support* but never actually **mandate**.
- b. **FalseCognate - mandate - [send]:** (0.18) | 20 words
That's the kind of mean email that I would just write and keep as a *draft* but never actually **mandate**.
- c. **Anomalous - mandate - [finish]:** (0.28) | 19 words
Yeah, that is the kind of homemade, do-it-yourself project that I would *start* but never actually **mandate**.
28. Using 'removed' to mean [stirred] because Sp. 'removido' = [stirred]
Eng. 'removed' & Sp. 'removido' = 2
- a. **Expected - removed - [removed]:** (1.00) | 18 words
She has appendicitis. If we don't operate right now, her appendix *will* burst. It needs to be **removed**.
- b. **FalseCognate - removed - [stirred]:** (0.30) | 22 words
Can you hand me a big spoon? The bowl of cake mix is starting to look clumpy. It needs to be **removed**.
- c. **Anomalous - removed - [signed]:** (0.21) | 23 words | Option #1
Do you see the blank line there at the bottom of the receipt? You can use this pen. It needs to be **removed**.
- d. **Anomalous - removed - [changed]:** (0.55) | 20 words | Option #2
Uh-oh, I think our little baby girl may have just pooped her diaper. Yep...she needs to be **removed**.
29. Using 'grabbing' to mean [recording] because Sp. 'grabando' = [recording]
Eng. 'grabbing' & Sp. 'grabando' = 4
- a. **Expected - grabbing - [grabbing]:** (1.00) | 15 words
As soon as babies see a toy within reach, their little hands will start **grabbing**.

- b. **FalseCognate - grabbing - [recording]:** (0.20) | 14 words
Remember - as soon as you hit the microphone's ON button, it will start **grabbing**.
- c. **Anomalous - grabbing - [reading]:** (0.24) | 19 words
I am so behind for our book club. As soon as I get the book, I will start **grabbing**.
30. Using 'departments' to mean [apartments] because Sp. 'departamentos' = [apartments]
Eng. 'departments' & Sp. 'departamentos' = 2
- a. **Expected - departments - [departments]:** (1.00) | 29 words
We work at the same university and even in the same building. But I'm in English and she's in Psychology. In other words, we work in two different **departments**.
- b. **FalseCognate - departments - [apartments]:** (0.21) | 27 words
For a couple months, we tried living together to save on rent. But we fought too much. So now we're back to living in two different **departments**.
- c. **Anomalous - departments - [compartments]:** (0.16) | 31 words | Option #1
I thought it was just one big container. But it turns out there's a divider that runs through the middle of it. In other words, it actually has two different **departments**.
- d. **Anomalous - departments - [instruments]:** (0.24) | 27 words | Option #2
If you've never played in an orchestra, the trumpet and the trombone may look the same to you. But I assure you – they are two different **departments**.
31. Using 'mark' to mean [brand] because Sp. 'marca' = [brand]
Eng. 'mark' & Sp. 'marca' = 2
- a. **Expected - mark - [mark]:** (1.00) | 26 words
My sheets must be super soft. I slept with my face pressed directly against them *all* night last night and they didn't leave any particular **mark**.
- b. **FalseCognate - mark - [brand]:** (0.27) | 28 words
When it comes to buying shampoo, I just buy whatever's cheapest. I honestly don't care if it's Pantene or L'Oréal. I don't have loyalty to any particular **mark**.
- c. **Anomalous - mark - [sign]:** (0.41) | 29 words
There should be something posted to let clients know that smoking is not allowed in here. I looked around on the walls, but I couldn't find any particular **mark**.
32. Using 'advertisements' to mean [warnings] because Sp. 'advertencias' = [warnings]
Eng. 'advertisements' & Sp. 'advertencias' = 6
- a. **Expected - advertisements - [advertisements]:** (1.00) | 40 words
If you upgrade your *normal* YouTube account to a paid YouTube *Premium* account, then you'll get to watch all your videos completely *uninterrupted*. That means that you won't have to waste your time anymore sitting through a bunch of **advertisements**.
- b. **FalseCognate - advertisements - [warnings]:** (0.31) | 47 words
I've been a total pushover. When my kids misbehave, I tell them I won't punish them *this* time but that they need to be careful because I definitely will punish them *next* time. I can't just continue letting them off the hook with a bunch of **advertisements**.
- c. **Anomalous - advertisements - [openings]:** (0.24) | 43 words
Unfortunately, a lot of accounting firms around here have been closing down lately. And even the national ones that are still in business have closed their regional branches. *But* if you're looking for a job, our firm actually has a bunch of **advertisements**.
33. Using 'man' to mean [hand] because Sp. 'mano' = [hand]
Eng. 'man' & Sp. 'mano' = 1
- a. **Expected - man - [man]:** (1.00) | 29 words | Progressive issue
That furniture looks heavy. And you, as women, aren't as physically strong as us. I can always come over and help you move it - if you need a **man**.
- b. **FalseCognate - man - [hand]:** (0.49) | 25 words
Wow, that's way too many dirty dishes for one person to have to clean by themselves. I'm happy to help - if you need a **man**.
- c. **Anomalous - man - [job]:** (0.43) | 25 words | Option #1

- Hey, I just heard you got laid off. You know, if you're looking...we have some openings where I work - if you need a **man**.
- d. **Anomalous - man - [laugh]:** (0.46) | 27 words | Option #2
I'm sorry to hear you had a rough day. You know, we could go see a comedy show tonight, hear some jokes...if you need a **man**.
34. Using 'support' to mean [take/put up with] because Sp. 'soportar' = [take/put up with]
Eng. 'support' & Sp. 'soportar' = **4**
- a. **Expected - support - [support]:** (1.00) | 21 words
Those beams don't look structurally sound. You suggested adding more weight to them, but how much more can they possibly **support**?
- b. **FalseCognate - support - [take]:** (0.34) | 23 words
I can tell that his parents are already at their wit's end with his rude behavior. How much more can they possibly **support**?
- c. **Anomalous - support - [write]:** (0.31) | 23 words
The authors should stop. The book is already too long. When it comes to additional pages, how much more can they possibly **support**?
35. Using 'pan' to mean [bread] because Sp. 'pan' = [bread]
Eng. 'pan' & Sp. 'pan' = **0**
- a. **Expected - pan - [pan]:** (1.00) | 16 words
I need to fry some onions. I see you have a pot, but there's no **pan**.
- b. **FalseCognate - pan - [bread]:** (0.52) | 16 words
I want a sandwich. I see the jelly and the peanut butter, but there's no **pan**.
- c. **Anomalous - pan - [fork]:** (0.45) | 16 words
We need all three utensils. I see a spoon and a knife, but there's no **pan**.
36. Using 'code' to mean [elbow] because Sp. 'codo' = [elbow]
Eng. 'code' & Sp. 'codo' = **1**
- a. **Expected - code - [code]:** (1.00) | 23 words
For the longest time, we couldn't decipher his messages...no matter how hard we tried. But we finally ended up cracking his **code**.
- b. **FalseCognate - code - [elbow]:** (0.05) | 26 words
The car crash damaged most of the bones in his forearm. It broke all of his fingers, fractured his wrist, and ended up cracking his **code**.
- c. **Anomalous - code - [glass]:** (0.09) | 22 words
When the orange juice slipped out of his hands, the juice went flying everywhere and the fall ended up cracking his **code**.
37. Using 'posters' to mean [desserts] because Sp. 'postres' = [desserts]
Eng. 'posters' & Sp. 'postres' = **2**
- a. **Expected - posters - [posters]:** (1.00) | 27 words
I thought they would have covered the walls of their dorm room with their favorite bands or musicians or something, but surprisingly they didn't have *any posters*.
- b. **FalseCognate - posters - [desserts]:** (0.13) | 33 words
The event was at a fancy restaurant. So after dinner, I expected they would have a cake or at least some pie for us to eat. But surprisingly they didn't have *any posters*.
- c. **Anomalous - posters - [diamonds]:** (0.08) | 27 words
On her birthday, my mom always buys herself gold earrings that are expensive and sparkly. Last year's pair had gold but surprisingly they didn't have *any posters*.
38. Using 'car' to mean [face] because Sp. 'cara' = [face]
Eng. 'car' & Sp. 'cara' = **1**
- a. **Expected - car - [car]:** (1.00) | 20 words
His driver must have driven it straight through a mud pit because there is dried-up mud *all over* his **car**.
- b. **FalseCognate - car - [face]:** (0.29) | 22 words
My teenage brother has a lot of acne around his nose. Actually...he has a lot of acne *all over* his **car**.
- c. **Anomalous - car - [pants]:** (0.21) | 23 words

- It looked as if my brother had peed himself. But in reality, he'd just spilled a cup of tea *all over* his **car**.
39. Using 'demand' to mean [sue] because Sp. 'demandar' = [sue]
Eng. 'demand' & Sp. 'demandar' = 2
- Expected - demand - [demand]:** (1.00) | 34 words
When my sister meets with her boss tomorrow, she is going to be *adamant* about getting that pay raise. It's not something she's going to just *ask* for. It's something she's going to **demand**.
 - FalseCognate - demand - [sue]:** (0.24) | 37 words
Since I'm responsible for damaging her property, I told her I'd pay her *whatever* she needs me to. I never thought she'd get *lawyers* involved. But now that she did, that probably means she's going to **demand**.
 - Anomalous - demand - [fight]:** (0.26) | 34 words
Yeah – she is really strong, and she's highly trained in self-defense. So, if someone ever *does* try to attack her or something, she's not gonna shrivel up or run away. She's going to **demand**.
40. Using 'parents' to mean [relatives] because Sp. 'parientes' = [relatives]
Eng. 'parents' & Sp. 'parientes' = 2
- Expected - parents - [parents]:** (1.00) | 27 words
We're pretty *open* with our kids. My mom and dad were much more *closed off* with me and my brothers growing up. They were more *distant* **parents**.
 - FalseCognate - parents - [relatives]:** (0.69) | 24 words
I've been feeling pretty lonely since my mom and dad died. So I've started spending the holidays with some of my more distant **parents**.
 - Anomalous - parents - [ancestors]:** (0.42) | 27 words
I know we're not *closely* related. But if we looked back far enough in our family trees, I bet we'd find we share some more distant **parents**.
41. Using 'retired' to mean [removed/withdrawn] because Sp. 'retirado/a' = [removed/withdrawn]
Eng. 'retired' & Sp. 'retirado' = 2
- Expected - retired - [retired]:** (1.00) | 19 words
Soon, my parents won't have to work anymore. In just a couple years, they are going to be **retired**.
 - FalseCognate - retired - [removed/withdrawn]:** (0.25 / 0.34) | 19 words
Our military presence is no longer needed in Afghanistan, so all of our troops are going to be **retired**.
 - Anomalous - retired - [replaced]:** (0.36) | 24 words | Option #1
Where the *old* tiles used to be, we're gonna put in *new* tiles. In other words, the old ones are going to be **retired**.
 - Anomalous - retired - [forgotten]:** (0.30) | 20 words | Option #2
Pretty soon, no one will have *any* memory that they ever existed. Pretty soon, they are going to be **retired**.
42. Using 'resistance' to mean [endurance] because Sp. 'resistencia' = [endurance]
Eng. 'resistance' & Sp. 'resistencia' = 3
- Expected - resistance - [resistance]:** (1.00) | 22 words
Unfortunately, the antibiotics we gave her are no longer working for her anymore. It seems that her body has built up **resistance**.
 - FalseCognate - resistance - [endurance]:** (0.43) | 26 words
She used to get winded on 5-minute runs. But now she can run for a full hour with no problem. She has built up **resistance**.
 - Anomalous - resistance - [confidence]:** (0.32) | 24 words
She used to be self-conscious and doubt herself. But now she walks around with her head held high. She has built up **resistance**.
43. Using 'desperate' to mean [awake] because Sp. 'despierto/a' = [awake]
Eng. 'desperate' & Sp. 'despierto' = 3

- a. **Expected - desperate - [desperate]:** (1.00) | 26 words
Lately, he just asks out *every* girl he meets and goes on dates with *whoever* will say yes. What I'm trying to say is...he's **desperate**.
- b. **FalseCognate - desperate - [awake]:** (0.34) | 24 words
Trust me – he is *not* asleep. It's not even 10pm and his light is still on! What I'm trying to say is...he's **desperate**.
- c. **Anomalous - desperate - [alone]:** (0.40) | 25 words | Option #1
There's no one in there with him because he doesn't *have* anyone. No family. No close friends. What I'm trying to say is...he's **desperate**.
- d. **Anomalous - desperate - [calm]:** (0.35) | 27 words | Option #2
I expected him to respond by freaking out and yelling. But he's actually speaking in a cool, collected tone. What I'm trying to say is...he's **desperate**.
44. Using 'succeed' to mean [happen] because Sp. 'suceder' = [happen]
Eng. 'succeed' & Sp. 'suceder' = 3
- a. **Expected - succeed - [succeed]:** (1.00) | 14 words
Oh - I actually thought that plan would *fail*. How does something like that **succeed**?
- b. **FalseCognate - succeed - [happen]:** (0.51) | 14 words
Really? I didn't think that was even *possible*. How does something like that **succeed**?
- c. **Anomalous - succeed - [fall]:** (0.38) | 16 words
I know it was *windy*, but that tree was *sturdy*. How does something like that **succeed**?
45. Using 'denounced' to mean [reported] because Sp. 'denunciado/a' = [reported]
Eng. 'denounced' & Sp. 'denunciado' = 4
- a. **Expected - denounced - [denounced]:** (1.00) | 20 words | Progressive issue
So far, the organization hasn't spoken out publicly against racism. But obviously, racism is wrong and needs to be **denounced**.
- b. **FalseCognate - denounced - [reported]:** (0.17) | 22 words | Progressive issue
If a student tells you she's experiencing abuse at home, you can't keep that information to yourself. It needs to be **denounced**.
- c. **Anomalous - denounced - [heard]:** (0.29) | 26 words | Progressive issue
Listen to me. You have so many good ideas, and the world needs to hear what you have to say. Your voice needs to be **denounced**.
46. Using 'humor' to mean [mood] because Sp. 'humor' = [mood]
Eng. 'humor' & Sp. 'humor' = 0
- a. **Expected - humor - [humor]:** (1.00) | 32 words
That comedian *is* funny, but he wouldn't be a good fit for *this*. We run a clean show here and he's too vulgar. He just doesn't have the right kind of **humor**.
- b. **FalseCognate - humor - [mood]:** (0.41) | 30 words
Trust me - don't even *try* talking to him about any important issues right now. He's too angry and irritable. He's really just not in the right kind of **humor**.
- c. **Anomalous - humor - [personality]:** (0.50) | 27 words
For this job, we need someone who is friendly and outgoing. Your brother is too shy and quiet. He just doesn't have the right kind of **humor**.
47. Using 'title' to mean [degree] because Sp. 'título' = [degree]
Eng. 'title' & Sp. 'título' = 2
- a. **Expected - title - [title]:** (1.00) | 24 words
My favorite pro wrestler was just named the Leading World Class Champion, and he deserves it. He worked really hard to earn that **title**.
- b. **FalseCognate - title - [degree]:** (0.13) | 21 words
My son got pretty emotional at his college graduation ceremony, which makes sense. He worked really hard to earn that **title**.
- c. **Anomalous - title - [money]:** (0.21) | 24 words
My brother's company is now worth a million dollars, and he deserves *every penny* of it. He worked really hard to earn that **title**.
48. Using 'effective' to mean [cash] because Sp. 'efectivo' = [cash]

- Eng. 'effective' & Sp. 'efectivo' = 2
- a. **Expected - effective - [effective]:** (1.00) | 23 words
We've tested that drug and it *does* work for some people. Unfortunately, it's *not* gonna work for you. It's not gonna be **effective**.
 - b. **FalseCognate - effective - [cash]:** (0.28) | 20 words
No one uses *paper* money anymore. When your customers pay, it'll be *all* credit cards. It's not gonna be **effective**.
 - c. **Anomalous - effective - [fish]:** (0.21) | 22 words
I don't know what I'm cooking for dinner yet. But since I hate salmon, cod, and tilapia, it's not gonna be **effective**.
49. Using 'resume' to mean [summarize] because Sp. 'resumir' = [summarize]
Eng. 'resume' & Sp. 'resumir' = 2
- a. **Expected - resume - [resume]:** (1.00) | 24 words
That was an unexpected interruption to our meeting. But now that I have all of your attention back again, I would like to **resume**.
 - b. **FalseCognate - resume - [summarize]:** (0.30) | 25 words
We covered a lot of information today. But all those details boil down to just three main points, which quickly I would like to **resume**.
 - c. **Anomalous - resume - [finish]:** (0.31) | 27 words
I understand that time is up, but I'm *almost* done. This is a project that I *started* and it's also one that I would like to **resume**.
50. Using 'mass' to mean [dough] because Sp. 'masa' = [dough]
Eng. 'mass' & Sp. 'masa' = 1
- a. **Expected - mass - [mass]:** (1.00) | 44 words
Those molecules are already really tightly packed. They're packed to the brim. If you inject *any* more particles into them, they're gonna end up with too much...what's the word? It's not *volume*, it's not *matter*...they're gonna end up with too much **mass**.
 - b. **FalseCognate - mass - [dough]:** (0.19) | 47 words
To make bread, the first step is to form the...whatchamacallit? You know, the goeey water- flour mixture? Go easy on the water and flour though, or you'll end up with too much of it...of that goeey whatchamacallit...you're gonna end up with too much **mass**.
 - c. **Anomalous - mass - [hair]:** (0.21) | 43 words
I understand that he wants to make some kind of bold public statement by not shaving his beard, his moustache, or his armpits for the entire year. But if he sticks to that plan, he's simply gonna end up with too much **mass**.
51. Using 'firm' to mean [signature] because Sp. 'firma' = [signature]
Eng. 'firm' & Sp. 'firma' = 1
- a. **Expected - firm - [firm]:** (1.00) | 44 words
My mom's a lawyer, and today they promoted her to partner! She works in the city for that...you know...big law...I can't remember the name, but if you mentioned a few, I'm pretty sure I could pick out which is her **firm**.
 - b. **FalseCognate - firm - [signature]:** (0.18) | 42 words
I wouldn't be great at *forging* it, but I've seen my mom write her name before. Let's just say if she and a couple other people wrote her name in cursive, I'm pretty sure I could pick out which is her **firm**.
 - c. **Anomalous - firm - [house]:** (0.26) | 39 words
It's been about *fifteen years* since I've visited my grandma on my mom's side. I definitely remember which *street* she lives on. And if I drove down it, I'm pretty sure I could pick out which is her **firm**.
52. Using 'red' to mean [net] because Sp. 'red' = [net]
Eng. 'red' & Sp. 'red' = 0
- a. **Expected - red - [red]:** (1.00) | 35 words

- The painting that she bought at the art show is really pretty. It's bright and has all warm colors. There's yellow and orange...but actually, now that I think of it there isn't any **red**.
- b. **FalseCognate - red - [net]:** (0.20) | 34 words
They haven't finished setting up the outdoor volleyball court yet. The posts are in the ground, but they haven't hung up the mesh thing. In other words, between the posts there isn't any **red**.
 - c. **Anomalous - red - [key]:** (0.25) | 36 words
I'm supposed to house sit for her while she's away, but I can't get inside. The front door is locked. And I've looked through the bag of stuff she gave me, but there isn't any **red**.
53. Using 'numbers' to mean [names] because Sp. 'nombres' = [names]
Eng. 'numbers' & Sp. 'nombres' = 3
- a. **Expected - numbers - [numbers]:** (1.00) | 13 words
Well, I've honestly *never* been good at math. I'm *so* bad with **numbers**.
 - b. **FalseCognate - numbers - [names]:** (0.46) | 12 words
I'm good at remembering people's *faces*, but I'm *so* bad with **numbers**.
 - c. **Anomalous - numbers - [needles]:** (0.13) | 16 words | Option #1
I freak out when the doctor says I need a shot. I'm *so* bad with **numbers**.
 - d. **Anomalous - numbers - [news]:** (0.26) | 18 words | Option #2
I never read the paper or keep up to date on current events. I'm *so* bad with **numbers**.
 - e. **Anomalous - numbers - [nouns]:** (0.24) | 16 words | Option #3
I'm good with adjectives and verbs, but I'm *so* bad with **numbers**.
54. Using 'lecture' to mean [reading] because Sp. 'lectura' = [reading]
Eng. 'lecture' & Sp. 'lectura' = 1
- a. **Expected - - lecture - [lecture]:** (1.00) | 37 words
The head professor is usually the one who teaches us, the one who stands in front of the class and delivers it. He was just out of town yesterday, so he wasn't able to do the **lecture**.
 - b. **FalseCognate - lecture - [reading]:** (0.37) | 35 words
For today's class, the students were assigned a chapter in the textbook. Everyone came prepared – except for Steven, who says he was up sick all night and so he wasn't able to do the **lecture**.
 - c. **Anomalous - lecture - [exam/test]:** (0.34 / 0.26) | 32 words | Option #1
Sean studied extra hard and stayed up *all* night cramming for the SAT. Unfortunately, he fell asleep without setting his *alarm*. So in the end, he wasn't able to do the **lecture**.
 - d. **Anomalous - lecture - [wedding]:** (0.17) | 33 words | Option #2
The officiant was excited to marry the happy couple, but he got stuck in traffic on the way to the venue and arrived too late. So, he wasn't able to do the **lecture**.
 - e. **Anomalous - lecture - [radio]:** (0.23) | 34 words | Option #3
Sean is *really* good at fixing things. He was able to do the *TV* without a problem. But he doesn't know how FM or AM work, so he wasn't able to do the **lecture**.
55. Using 'goat' to mean [drop] because Sp. 'gota' = [drop]
Eng. 'goat' & Sp. 'gota' = 2
- a. **Expected - goat - [goat]:** (1.00) | 46 words
You know the animals with horns that kinda look like sheep but without the wool coats? Some people call them billy? Anyways, we've always had *two* of them in our barn. But when I checked the barn this morning, all I saw was *one single* **goat**.
 - b. **FalseCognate - goat - [drop]:** (0.16) | 46 words
When I turned on the faucet in the kitchen sink yesterday, I was really hoping to see a nice, flowing stream of water. But because of the drought we're experiencing right now, all that came out of the faucet...all I saw, was one single **goat**.
 - c. **Anomalous - goat - [drum]:** (0.17) | 48 words

- My cousin has an entire *set* of them. He's got a snare, bongos - even a timpani. But when I visited him at his house last week, I discovered he actually keeps most of them in storage. All he had sitting out, all I saw was one single **goat**.
56. Using '*fabric*' to mean [*factory*] because Sp. '*fábrica*' = [*factory*]
Eng. '*fabric*' & Sp. '*fábrica*' = **1**
- Expected - fabric - [fabric]:** (1.00) | 43 words
We were planning to make it out of *velvet*. But, depending on her preferences, we could make the dress out of whatever she likes best: cotton, wool, satin, chiffon, polyester. As I'm sure you can tell, we have almost every kind of **fabric**.
 - FalseCognate - fabric - [factory]:** (0.27) | 44 words
This is an industrial town. Everyone here works long hours in assembly lines. The good thing is there are a lot of places to work. There's the steel one downtown, the automotive one off the highway...honestly, we have almost every kind of **fabric**.
 - Anomalous - fabric - [family]:** (0.16) | 45 words
We've got the *dysfunctional* kind, where the parents hate each other and are staying together for the kids. But we've also got the *functional* kind, where everyone is happy and even the siblings get along. In this neighborhood, we have almost every kind of **fabric**.
57. Using '*sensible*' to mean [*sensitive*] because Sp. '*sensible*' = [*sensitive*]
Eng. '*sensible*' & Sp. '*sensible*' = **0**
- Expected - sensible - [sensible]:** (1.00) | 36 words
My mother has never been the type to wears high heels. She wears shoes that she can walk around in comfortably. In other words, when it comes *shoe* choice, my mom has always been very **sensible**.
 - FalseCognate - sensible - [sensitive]:** (0.38) | 41 words
She burns *really* easily. If you take her to the beach, you need to re-apply her sunblock *every* hour. And don't use the generic sunblock – it gives her a rash. As you know, her skin has always been very **sensible**.
 - Anomalous - sensible - [sensual]:** (0.28) | 32 words
Scarlett is not your typical uptight, conservative ballet dancer. The way she moves her body when she dances - it's slow, passionate, and almost arousing. Her dancing style has always been very **sensible**.
58. Using '*signature*' to mean [*subject*] because Sp. '*asignatura*' = [*subject*]
Eng. '*signature*' & Sp. '*asignatura*' = **2**
- Expected - signature - [signature]:** (1.00) | 27 words
While the way *they* sign their names may be neat and legible, I like the way you do yours better. Yours is by far my favorite **signature**.
 - FalseCognate - signature - [subject]:** (0.23) | 25 words
When I was in grade school, Math and Science were always the ones I hated the most. History, though, was by far my favorite **signature**.
 - Anomalous - signature - [student]:** (0.16) | 25 words
As a teacher, I know that I'm not supposed to play favorites with them. But I'll admit it - Charlie is by far my favorite **signature**.
59. Using '*ambience*' to mean [*environment*] because Sp. '*ambiente*' = [*environment*]
Eng. '*ambience*' & Sp. '*ambiente*' = **1**
- Expected - ambience - [ambience]:** (1.00) | 33 words
That restaurant is perfect for a romantic date. It's cozy and there's always natural candlelight. Honestly, for date nights, I don't really care about the restaurant's *food*. I care more about the **ambience**.
 - FalseCognate - ambience - [environment]:** (0.22) | 34 words | Progressive issue
Global warming is a real problem. For me, it's important that we be green and take care of our planet. Some people care more about the *economy*, but I care more about the **ambience**.
 - Anomalous - ambience - [instrument]:** (0.24) | 32 words

The musician fell off the stage while holding what was either a trumpet or a saxophone. Everyone seems worried about the *musician* getting hurt. But honestly, I care more about the **ambience**.

60. Using 'arena' to mean [sand] because Sp. 'arena' = [sand]

Eng. 'arena' & Sp. 'arena' = 0

a. **Expected - arena - [arena]:** (1.00) | 35 words

Their band has been putting on free concerts throughout the country, mostly in cities with big sports complexes. Last week they came to our city and before a basketball game they played in the **arena**.

b. **FalseCognate - arena - [sand]:** (0.20) | 33 words

Our kids have always been afraid of the ocean. When we'd go on family vacations to the beach, they wouldn't even *touch* the water. They always stayed out and played in the **arena**.

c. **Anomalous - arena - [snow]:** (0.20) | 35 words

Actually, I've always loved winter weather. Just the other day I realized how nice it was to sit outside with my thermos of hot chocolate and watch my kids as they played in the **arena**.

8.35 EEG experiment: 540 normed critical items (final stimuli)

Note: **Note:** In the Item Description column, *F* = Filler item and *S* = (critical) Set number. Save for filler rows (which only specify the speaker accent and no manipulation for word type), the item description column describes the Set number (1:40) – Word Type (Expected word, Sp. false cognate, Anomalous word) – Speaker Accent (MUSE, Spanish, Chinese) – target word encountered – [target word constrained for semantically]. In the Condition column, values above 9 reflect Filler items.

Item description	Item
1 - Expected - MUSE - bland - [bland]	Since my aunt usually cooks without <i>any</i> seasoning, the taste of her food tends to be pretty bland .
1 - FalseCognate - MUSE - bland - [soft]	While the surface of a rock tends to be pretty <i>hard</i> , the surface of a pillow tends to be pretty bland .
1 - Anomalous - MUSE - bland - [dry]	Don't use that towel there. That one is usually pretty <i>wet</i> , whereas this one tends to be pretty bland .
1 - Expected - Spanish - bland - [bland]	Since my aunt usually cooks without <i>any</i> seasoning, the taste of her food tends to be pretty bland .
1 - FalseCognate - Spanish - bland - [soft]	While the surface of a rock tends to be pretty <i>hard</i> , the surface of a pillow tends to be pretty bland .
1 - Anomalous - Spanish - bland - [dry]	Don't use that towel there. That one is usually pretty <i>wet</i> , whereas this one tends to be pretty bland .
1 - Expected - Chinese - bland - [bland]	Since my aunt usually cooks without <i>any</i> seasoning, the taste of her food tends to be pretty bland .
1 - FalseCognate - Chinese - bland - [soft]	While the surface of a rock tends to be pretty <i>hard</i> , the surface of a pillow tends to be pretty bland .
1 - Anomalous - Chinese - bland - [dry]	Don't use that towel there. That one is usually pretty <i>wet</i> , whereas this one tends to be pretty bland .
2 - Expected - MUSE - choke - [choke]	C'mon – sit up, don't do that. You know it's dangerous. You know that if you eat food while you're lying down, there's a good chance you're gonna choke .
2 - FalseCognate - MUSE - choke - [crash]	If you're driving with your eyes closed and another car is coming towards you, you might not die, but there's a good chance you're gonna choke .
2 - Anomalous - MUSE - choke - [fallin]	Since you're already wet, maybe you don't care. But if you keep walking along the edge of the pool like that, there's a good chance you're gonna choke .
2 - Expected - Spanish - choke - [choke]	C'mon – sit up, don't do that. You know it's dangerous. You know that if you eat food while you're lying down, there's a good chance you're gonna choke .
2 - FalseCognate - Spanish - choke - [crash]	If you're driving with your eyes closed and another car is coming towards you, you might not die, but there's a good chance you're gonna choke .
2 - Anomalous - Spanish - choke - [fallin]	Since you're already wet, maybe you don't care. But if you keep walking along the edge of the pool like that, there's a good chance you're gonna choke .
2 - Expected - Chinese - choke - [choke]	C'mon – sit up, don't do that. You know it's dangerous. You know that if you eat food while you're lying down, there's a good chance you're gonna choke .
2 - FalseCognate - Chinese - choke - [crash]	If you're driving with your eyes closed and another car is coming towards you, you might not die, but there's a good chance you're gonna choke .
2 - Anomalous - Chinese - choke - [fallin]	Since you're already wet, maybe you don't care. But if you keep walking along the edge of the pool like that, there's a good chance you're gonna choke .
3 - Expected - MUSE - crude - [crude]	I suppose I would use petroleum oil after it's been <i>refined</i> , but not if it's still crude .
3 - FalseCognate - MUSE - crude - [raw]	No sushi for me please. I'll eat fish after it's been <i>cooked</i> but not if it's still crude .
3 - Anomalous - MUSE - crude - [rough]	You can use the varnish on that surface once it's <i>smooth</i> but not if it's still crude .

3 - Expected - Spanish - crude - [crude]	I suppose I would use petroleum oil after it's been <i>refined</i> , but not if it's still crude .
3 - FalseCognate - Spanish - crude - [raw]	No sushi for me please. I'll eat fish after it's been <i>cooked</i> but not if it's still crude .
3 - Anomalous - Spanish - crude - [rough]	You can use the varnish on that surface once it's <i>smooth</i> but not if it's still crude .
3 - Expected - Chinese - crude - [crude]	I suppose I would use petroleum oil after it's been <i>refined</i> , but not if it's still crude .
3 - FalseCognate - Chinese - crude - [raw]	No sushi for me please. I'll eat fish after it's been <i>cooked</i> but not if it's still crude .
3 - Anomalous - Chinese - crude - [rough]	You can use the varnish on that surface once it's <i>smooth</i> but not if it's still crude .
4 - Expected - MUSE - direction - [direction]	I like this property, but before I even <i>consider</i> buying it, I need to know where it faces: North, East, South or West. When you get a chance, let me know the direction .
4 - FalseCognate - MUSE - direction - [address]	The letter is already in an envelope, ready to be mailed out to you. I just need to know where exactly you want me to send it. When you get a chance, let me know the direction .
4 - Anomalous - MUSE - direction - [number]	Don't worry about it - I'm happy to call their customer service line for you. But it looks like I don't have them saved in my phone. When you get a chance, let me know the direction .
4 - Expected - Spanish - direction - [direction]	I like this property, but before I even <i>consider</i> buying it, I need to know where it faces: North, East, South or West. When you get a chance, let me know the direction .
4 - FalseCognate - Spanish - direction - [address]	The letter is already in an envelope, ready to be mailed out to you. I just need to know where exactly you want me to send it. When you get a chance, let me know the direction .
4 - Anomalous - Spanish - direction - [number]	Don't worry about it - I'm happy to call their customer service line for you. But it looks like I don't have them saved in my phone. When you get a chance, let me know the direction .
4 - Expected - Chinese - direction - [direction]	I like this property, but before I even <i>consider</i> buying it, I need to know where it faces: North, East, South or West. When you get a chance, let me know the direction .
4 - FalseCognate - Chinese - direction - [address]	The letter is already in an envelope, ready to be mailed out to you. I just need to know where exactly you want me to send it. When you get a chance, let me know the direction .
4 - Anomalous - Chinese - direction - [number]	Don't worry about it - I'm happy to call their customer service line for you. But it looks like I don't have them saved in my phone. When you get a chance, let me know the direction .
5 - Expected - MUSE - embarrassed - [embarrassed]	After accidentally farting in front of her boss, my wife's face immediately turned bright red, which only happens when she's embarrassed .
5 - FalseCognate - MUSE - embarrassed - [pregnant]	We hadn't been trying for a third child, but my wife just had what we think is morning sickness, which only happens when she's embarrassed .
5 - Anomalous - MUSE - embarrassed - [sick]	Katie must've come down with something. She stayed home from work today and canceled all her meetings, which only happens when she's embarrassed .
5 - Expected - Spanish - embarrassed - [embarrassed]	After accidentally farting in front of her boss, my wife's face immediately turned bright red, which only happens when she's embarrassed .
5 - FalseCognate - Spanish - embarrassed - [pregnant]	We hadn't been trying for a third child, but my wife just had what we think is morning sickness, which only happens when she's embarrassed .
5 - Anomalous - Spanish - embarrassed - [sick]	Katie must've come down with something. She stayed home from work today and canceled all her meetings, which only happens when she's embarrassed .

5 - Expected - Chinese - embarrassed - [embarrassed]	After accidentally farting in front of her boss, my wife's face immediately turned bright red, which only happens when she's embarrassed .
5 - FalseCognate - Chinese - embarrassed - [pregnant]	We hadn't been trying for a third child, but my wife just had what we think is morning sickness, which only happens when she's embarrassed .
5 - Anomalous - Chinese - embarrassed - [sick]	Katie must've come down with something. She stayed home from work today and canceled all her meetings, which only happens when she's embarrassed .
6 - Expected - MUSE - globes - [globes]	Right now, the geography classrooms only have maps, which are flat. But the Earth is round, so they need to buy...what do you call them? The round, spherical things...They need to buy globes .
6 - FalseCognate - MUSE - globes - [balloons]	They need more party decorations than this. I'm gonna bring over my helium tank. Tell them they need to buy...what do you call them? The brightly colored rubber things...They need to buy globes .
6 - Anomalous - MUSE - globes - [rings]	Two of my best friends are planning to propose to their girlfriends. But before they do, they need to buy the...what do you call them? The jewelry that goes on your finger...They need to buy globes .
6 - Expected - Spanish - globes - [globes]	Right now, the geography classrooms only have maps, which are flat. But the Earth is round, so they need to buy...what do you call them? The round, spherical things...They need to buy globes .
6 - FalseCognate - Spanish - globes - [balloons]	They need more party decorations than this. I'm gonna bring over my helium tank. Tell them they need to buy...what do you call them? The brightly colored rubber things...They need to buy globes .
6 - Anomalous - Spanish - globes - [rings]	Two of my best friends are planning to propose to their girlfriends. But before they do, they need to buy the...what do you call them? The jewelry that goes on your finger...They need to buy globes .
6 - Expected - Chinese - globes - [globes]	Right now, the geography classrooms only have maps, which are flat. But the Earth is round, so they need to buy...what do you call them? The round, spherical things...They need to buy globes .
6 - FalseCognate - Chinese - globes - [balloons]	They need more party decorations than this. I'm gonna bring over my helium tank. Tell them they need to buy...what do you call them? The brightly colored rubber things...They need to buy globes .
6 - Anomalous - Chinese - globes - [rings]	Two of my best friends are planning to propose to their girlfriends. But before they do, they need to buy the...what do you call them? The jewelry that goes on your finger...They need to buy globes .
7 - Expected - MUSE - insecure - [insecure]	Recent studies have shown that, compared to adults, teenagers tend to have much less confidence in themselves. In other words, they tend to be more insecure .
7 - FalseCognate - MUSE - insecure - [dangerous]	Studies have shown that, compared to small towns, big cities have higher crime rates and more reports of armed robbery. In other words, they tend to be more insecure .
7 - Anomalous - MUSE - insecure - [violent]	Studies have shown that Rated-R movies, compared to PG-13 movies, tend to have more scenes with guns, knives and fighting. In other words, they tend to be more insecure .
7 - Expected - Spanish - insecure - [insecure]	Recent studies have shown that, compared to adults, teenagers tend to have much less confidence in themselves. In other words, they tend to be more insecure .
7 - FalseCognate - Spanish - insecure - [dangerous]	Studies have shown that, compared to small towns, big cities have higher crime rates and more reports of armed robbery. In other words, they tend to be more insecure .
7 - Anomalous - Spanish - insecure - [violent]	Studies have shown that Rated-R movies, compared to PG-13 movies, tend to have more scenes with guns, knives and fighting. In other words, they tend to be more insecure .
7 - Expected - Chinese - insecure - [insecure]	Recent studies have shown that, compared to adults, teenagers tend to have much less confidence in themselves. In other words, they tend to be more insecure .

7 - FalseCognate - Chinese - insecure - [dangerous]	Studies have shown that, compared to small towns, big cities have higher crime rates and more reports of armed robbery. In other words, they tend to be more insecure .
7 - Anomalous - Chinese - insecure - [violent]	Studies have shown that Rated-R movies, compared to PG-13 movies, tend to have more scenes with guns, knives and fighting. In other words, they tend to be more insecure .
8 - Expected - MUSE - blank - [blank]	The first few pages shouldn't have anything written on them at all. They should be blank .
8 - FalseCognate - MUSE - blank - [white]	Party dresses can be <i>any</i> color you want. But wedding dresses? They should be blank .
8 - Anomalous - MUSE - blank - [clear]	When your eyeglasses are old, they might be blurry. But new glasses? They should be blank .
8 - Expected - Spanish - blank - [blank]	The first few pages shouldn't have anything written on them at all. They should be blank .
8 - FalseCognate - Spanish - blank - [white]	Party dresses can be <i>any</i> color you want. But wedding dresses? They should be blank .
8 - Anomalous - Spanish - blank - [clear]	When your eyeglasses are old, they might be blurry. But new glasses? They should be blank .
8 - Expected - Chinese - blank - [blank]	The first few pages shouldn't have anything written on them at all. They should be blank .
8 - FalseCognate - Chinese - blank - [white]	Party dresses can be <i>any</i> color you want. But wedding dresses? They should be blank .
8 - Anomalous - Chinese - blank - [clear]	When your eyeglasses are old, they might be blurry. But new glasses? They should be blank .
9 - Expected - MUSE - rope - [rope]	I'll show you how to tie a sailor's knot. Can I borrow some rope ?
9 - FalseCognate - MUSE - rope - [clothes]	Everything I'm wearing right now is soaking wet. Can I borrow some rope ?
9 - Anomalous - MUSE - rope - [shoes]	I can't walk out there in my bare feet. Can I borrow some rope ?
9 - Expected - Spanish - rope - [rope]	I'll show you how to tie a sailor's knot. Can I borrow some rope ?
9 - FalseCognate - Spanish - rope - [clothes]	Everything I'm wearing right now is soaking wet. Can I borrow some rope ?
9 - Anomalous - Spanish - rope - [shoes]	I can't walk out there in my bare feet. Can I borrow some rope ?
9 - Expected - Chinese - rope - [rope]	I'll show you how to tie a sailor's knot. Can I borrow some rope ?
9 - FalseCognate - Chinese - rope - [clothes]	Everything I'm wearing right now is soaking wet. Can I borrow some rope ?
9 - Anomalous - Chinese - rope - [shoes]	I can't walk out there in my bare feet. Can I borrow some rope ?
10 - Expected - MUSE - quiet - [quiet]	Talking is strictly prohibited while inside the library. You need to keep quiet .
10 - FalseCognate - MUSE - quiet - [still]	Don't move your legs or fidget with your hands. You need to keep quiet .
10 - Anomalous - MUSE - quiet - [warm]	It's freezing cold outside, so wear your winter coat. You need to keep quiet .

10 - Expected - Spanish - quiet - [quiet]	Talking is strictly prohibited while inside the library. You need to keep quiet .
10 - FalseCognate - Spanish - quiet - [still]	Don't move your legs or fidget with your hands. You need to keep quiet .
10 - Anomalous - Spanish - quiet - [warm]	It's freezing cold outside, so wear your winter coat. You need to keep quiet .
10 - Expected - Chinese - quiet - [quiet]	Talking is strictly prohibited while inside the library. You need to keep quiet .
10 - FalseCognate - Chinese - quiet - [still]	Don't move your legs or fidget with your hands. You need to keep quiet .
10 - Anomalous - Chinese - quiet - [warm]	It's freezing cold outside, so wear your winter coat. You need to keep quiet .
11 - Expected - MUSE - vague - [vague]	I need to know <i>specific</i> names. You can't just keep saying " <i>some people</i> ." Why are you being so vague ?
11 - FalseCognate - MUSE - vague - [lazy]	You've spent the entire weekend lying around doing <i>absolutely</i> nothing. Why are you being so vague ?
11 - Anomalous - MUSE - vague - [mean]	That is <i>not</i> a nice thing to say. Now you're just trying to hurt my feelings. Why are you being so vague ?
11 - Expected - Spanish - vague - [vague]	I need to know <i>specific</i> names. You can't just keep saying " <i>some people</i> ." Why are you being so vague ?
11 - FalseCognate - Spanish - vague - [lazy]	You've spent the entire weekend lying around doing <i>absolutely</i> nothing. Why are you being so vague ?
11 - Anomalous - Spanish - vague - [mean]	That is <i>not</i> a nice thing to say. Now you're just trying to hurt my feelings. Why are you being so vague ?
11 - Expected - Chinese - vague - [vague]	I need to know <i>specific</i> names. You can't just keep saying " <i>some people</i> ." Why are you being so vague ?
11 - FalseCognate - Chinese - vague - [lazy]	You've spent the entire weekend lying around doing <i>absolutely</i> nothing. Why are you being so vague ?
11 - Anomalous - Chinese - vague - [mean]	That is <i>not</i> a nice thing to say. Now you're just trying to hurt my feelings. Why are you being so vague ?
12 - Expected - MUSE - large - [large]	I wouldn't say this company is <i>small</i> . It's actually quite large .
12 - FalseCognate - MUSE - large - [long]	I wouldn't say her hair is <i>short</i> . It's actually quite large .
12 - Anomalous - MUSE - large - [light]	I wouldn't say this bag is <i>heavy</i> . It's actually quite large .
12 - Expected - Spanish - large - [large]	I wouldn't say this company is <i>small</i> . It's actually quite large .
12 - FalseCognate - Spanish - large - [long]	I wouldn't say her hair is <i>short</i> . It's actually quite large .
12 - Anomalous - Spanish - large - [light]	I wouldn't say this bag is <i>heavy</i> . It's actually quite large .
12 - Expected - Chinese - large - [large]	I wouldn't say this company is <i>small</i> . It's actually quite large .
12 - FalseCognate - Chinese - large - [long]	I wouldn't say her hair is <i>short</i> . It's actually quite large .
12 - Anomalous - Chinese - large - [light]	I wouldn't say this bag is <i>heavy</i> . It's actually quite large .

13 - Expected - MUSE - clear - [clear]	The skies aren't cloudy anymore. They're actually pretty clear .
13 - FalseCognate - MUSE - clear - [light]	Her eyes aren't very dark. They're actually pretty clear .
13 - Anomalous - MUSE - clear - [strong]	Those women are not weak. They're actually pretty clear .
13 - Expected - Spanish - clear - [clear]	The skies aren't cloudy anymore. They're actually pretty clear .
13 - FalseCognate - Spanish - clear - [light]	Her eyes aren't very dark. They're actually pretty clear .
13 - Anomalous - Spanish - clear - [strong]	Those women are not weak. They're actually pretty clear .
13 - Expected - Chinese - clear - [clear]	The skies aren't cloudy anymore. They're actually pretty clear .
13 - FalseCognate - Chinese - clear - [light]	Her eyes aren't very dark. They're actually pretty clear .
13 - Anomalous - Chinese - clear - [strong]	Those women are not weak. They're actually pretty clear .
14 - Expected - MUSE - sane - [sane]	Raising five kids can make you go a little crazy. But daily meditation will help keep you sane .
14 - FalseCognate - MUSE - sane - [healthy]	Take care of yourself by avoiding greasy foods. Eating fruits and vegetables will help keep you sane .
14 - Anomalous - MUSE - sane - [awake]	No, don't drink warm milk. That'll make you fall <i>asleep</i> . Drinking coffee will help keep you sane .
14 - Expected - Spanish - sane - [sane]	Raising five kids can make you go a little crazy. But daily meditation will help keep you sane .
14 - FalseCognate - Spanish - sane - [healthy]	Take care of yourself by avoiding greasy foods. Eating fruits and vegetables will help keep you sane .
14 - Anomalous - Spanish - sane - [awake]	No, don't drink warm milk. That'll make you fall <i>asleep</i> . Drinking coffee will help keep you sane .
14 - Expected - Chinese - sane - [sane]	Raising five kids can make you go a little crazy. But daily meditation will help keep you sane .
14 - FalseCognate - Chinese - sane - [healthy]	Take care of yourself by avoiding greasy foods. Eating fruits and vegetables will help keep you sane .
14 - Anomalous - Chinese - sane - [awake]	No, don't drink warm milk. That'll make you fall <i>asleep</i> . Drinking coffee will help keep you sane .
15 - Expected - MUSE - bank - [bank]	Where can I deposit a check or apply for a loan in this town? I haven't seen a single bank .
15 - FalseCognate - MUSE - bank - [bench]	I literally can't find anywhere in this entire park to sit down. I haven't seen a single bank .
15 - Anomalous - MUSE - bank - [book]	This is supposedly a library, but there's nothing here to read. I haven't seen a single bank .
15 - Expected - Spanish - bank - [bank]	Where can I deposit a check or apply for a loan in this town? I haven't seen a single bank .
15 - FalseCognate - Spanish - bank - [bench]	I literally can't find anywhere in this entire park to sit down. I haven't seen a single bank .

15 - Anomalous - Spanish - bank - [book]	This is supposedly a library, but there's nothing here to read. I haven't seen a single bank .
15 - Expected - Chinese - bank - [bank]	Where can I deposit a check or apply for a loan in this town? I haven't seen a single bank .
15 - FalseCognate - Chinese - bank - [bench]	I literally can't find anywhere in this entire park to sit down. I haven't seen a single bank .
15 - Anomalous - Chinese - bank - [book]	This is supposedly a library, but there's nothing here to read. I haven't seen a single bank .
16 - Expected - MUSE - carpet - [carpet]	Wow - your shoes are completely covered in mud. Don't you dare walk inside my house with all that mud on your shoes, or you'll drag it into my carpet .
16 - FalseCognate - MUSE - carpet - [folder]	This isn't my own personal computer. It's a shared computer. So when I save a file, I can't leave it on the desktop. I need to drag it into my carpet .
16 - Anomalous - MUSE - carpet - [property]	I own the land from this line over. As your neighbor, I'm asking that you keep your trash can over there and that you not drag it onto my carpet .
16 - Expected - Spanish - carpet - [carpet]	Wow - your shoes are completely covered in mud. Don't you dare walk inside my house with all that mud on your shoes, or you'll drag it into my carpet .
16 - FalseCognate - Spanish - carpet - [folder]	This isn't my own personal computer. It's a shared computer. So when I save a file, I can't leave it on the desktop. I need to drag it into my carpet .
16 - Anomalous - Spanish - carpet - [property]	I own the land from this line over. As your neighbor, I'm asking that you keep your trash can over there and that you not drag it onto my carpet .
16 - Expected - Chinese - carpet - [carpet]	Wow - your shoes are completely covered in mud. Don't you dare walk inside my house with all that mud on your shoes, or you'll drag it into my carpet .
16 - FalseCognate - Chinese - carpet - [folder]	This isn't my own personal computer. It's a shared computer. So when I save a file, I can't leave it on the desktop. I need to drag it into my carpet .
16 - Anomalous - Chinese - carpet - [property]	I own the land from this line over. As your neighbor, I'm asking that you keep your trash can over there and that you not drag it onto my carpet .
17 - Expected - MUSE - exits - [exits]	I make the opposite of entrances. I make exits .
17 - FalseCognate - MUSE - exits - [successes]	I make the opposite of failures. I make exits .
17 - Anomalous - MUSE - exits - [friends]	I make the opposite of enemies. I make exits .
17 - Expected - Spanish - exits - [exits]	I make the opposite of entrances. I make exits .
17 - FalseCognate - Spanish - exits - [successes]	I make the opposite of failures. I make exits .
17 - Anomalous - Spanish - exits - [friends]	I make the opposite of enemies. I make exits .
17 - Expected - Chinese - exits - [exits]	I make the opposite of entrances. I make exits .
17 - FalseCognate - Chinese - exits - [successes]	I make the opposite of failures. I make exits .

17 - Anomalous - Chinese - exits - [friends]	I make the opposite of enemies. I make exits .
18 - Expected - MUSE - cancel - [cancel]	If you no longer need that appointment, please call my scheduling secretary so that you can cancel .
18 - FalseCognate - MUSE - cancel - [pay]	After your appointment, head over to the receptionist and give her your credit card so that you can cancel .
18 - Anomalous - MUSE - cancel - [tryit]	Wait - you've never swung a golf club before? Here, borrow mine for a second so that you can cancel .
18 - Expected - Spanish - cancel - [cancel]	If you no longer need that appointment, please call my scheduling secretary so that you can cancel .
18 - FalseCognate - Spanish - cancel - [pay]	After your appointment, head over to the receptionist and give her your credit card so that you can cancel .
18 - Anomalous - Spanish - cancel - [tryit]	Wait - you've never swung a golf club before? Here, borrow mine for a second so that you can cancel .
18 - Expected - Chinese - cancel - [cancel]	If you no longer need that appointment, please call my scheduling secretary so that you can cancel .
18 - FalseCognate - Chinese - cancel - [pay]	After your appointment, head over to the receptionist and give her your credit card so that you can cancel .
18 - Anomalous - Chinese - cancel - [tryit]	Wait - you've never swung a golf club before? Here, borrow mine for a second so that you can cancel .
19 - Expected - MUSE - assist - [assist]	You have a technical expertise that we <i>need</i> in the operating room during this procedure. I know you don't want to <i>lead</i> the procedure. But if we assign another surgeon to <i>lead</i> it, would you be willing to assist?
19 - FalseCognate - MUSE - assist - [attend]	I know how much you hate our corporate dinner parties. But your presence at next week's is important to our investors. If I can ensure it won't drag on too long, would you be willing to assist?
19 - Anomalous - MUSE - assist - [adopt]	Listen, I know you two have always wanted to have kids that are your own, biological children. But if that's not turning out to be an option, then would you be willing to assist?
19 - Expected - Spanish - assist - [assist]	You have a technical expertise that we <i>need</i> in the operating room during this procedure. I know you don't want to <i>lead</i> the procedure. But if we assign another surgeon to <i>lead</i> it, would you be willing to assist?
19 - FalseCognate - Spanish - assist - [attend]	I know how much you hate our corporate dinner parties. But your presence at next week's is important to our investors. If I can ensure it won't drag on too long, would you be willing to assist?
19 - Anomalous - Spanish - assist - [adopt]	Listen, I know you two have always wanted to have kids that are your own, biological children. But if that's not turning out to be an option, then would you be willing to assist?
19 - Expected - Chinese - assist - [assist]	You have a technical expertise that we <i>need</i> in the operating room during this procedure. I know you don't want to <i>lead</i> the procedure. But if we assign another surgeon to <i>lead</i> it, would you be willing to assist?
19 - FalseCognate - Chinese - assist - [attend]	I know how much you hate our corporate dinner parties. But your presence at next week's is important to our investors. If I can ensure it won't drag on too long, would you be willing to assist?
19 - Anomalous - Chinese - assist - [adopt]	Listen, I know you two have always wanted to have kids that are your own, biological children. But if that's not turning out to be an option, then would you be willing to assist?
20 - Expected - MUSE - constipated - [constipated]	Unfortunately, he's still having the same digestive problems as before. He hasn't gone to the bathroom for a while. Like, he hasn't had a <i>bowel movement</i> for several days now. In other words, he's still really constipated .

20 - FalseCognate - MUSE - constipated - [congested]	The good news is that he doesn't have the sore throat anymore. But unfortunately, his nasal passages are still...you know...he still can't really breathe in through his nose. In other words, he's still really constipated .
20 - Anomalous - MUSE - constipated - [confused]	This is a really hard math problem for a kid his age. And even though you've been explaining it to him for over an hour, I still don't think he has <i>any</i> idea how to do it. In other words, he's still really constipated .
20 - Expected - Spanish - constipated - [constipated]	Unfortunately, he's still having the same digestive problems as before. He hasn't gone to the bathroom for a while. Like, he hasn't had a <i>bowel movement</i> for several days now. In other words, he's still really constipated .
20 - FalseCognate - Spanish - constipated - [congested]	The good news is that he doesn't have the sore throat anymore. But unfortunately, his nasal passages are still...you know...he still can't really breathe in through his nose. In other words, he's still really constipated .
20 - Anomalous - Spanish - constipated - [confused]	This is a really hard math problem for a kid his age. And even though you've been explaining it to him for over an hour, I still don't think he has <i>any</i> idea how to do it. In other words, he's still really constipated .
20 - Expected - Chinese - constipated - [constipated]	Unfortunately, he's still having the same digestive problems as before. He hasn't gone to the bathroom for a while. Like, he hasn't had a <i>bowel movement</i> for several days now. In other words, he's still really constipated .
20 - FalseCognate - Chinese - constipated - [congested]	The good news is that he doesn't have the sore throat anymore. But unfortunately, his nasal passages are still...you know...he still can't really breathe in through his nose. In other words, he's still really constipated .
20 - Anomalous - Chinese - constipated - [confused]	This is a really hard math problem for a kid his age. And even though you've been explaining it to him for over an hour, I still don't think he has <i>any</i> idea how to do it. In other words, he's still really constipated .
21 - Expected - MUSE - removed - [removed]	She has appendicitis. If we don't operate right now, her appendix <i>will</i> burst. It needs to be removed .
21 - FalseCognate - MUSE - removed - [stirred]	Can you hand me a big spoon? The bowl of cake mix is starting to look clumpy. It needs to be removed .
21 - Anomalous - MUSE - removed - [signed]	Do you see the blank line there at the bottom of the receipt? You can use this pen. It needs to be removed .
21 - Expected - Spanish - removed - [removed]	She has appendicitis. If we don't operate right now, her appendix <i>will</i> burst. It needs to be removed .
21 - FalseCognate - Spanish - removed - [stirred]	Can you hand me a big spoon? The bowl of cake mix is starting to look clumpy. It needs to be removed .
21 - Anomalous - Spanish - removed - [signed]	Do you see the blank line there at the bottom of the receipt? You can use this pen. It needs to be removed .
21 - Expected - Chinese - removed - [removed]	She has appendicitis. If we don't operate right now, her appendix <i>will</i> burst. It needs to be removed .
21 - FalseCognate - Chinese - removed - [stirred]	Can you hand me a big spoon? The bowl of cake mix is starting to look clumpy. It needs to be removed .
21 - Anomalous - Chinese - removed - [signed]	Do you see the blank line there at the bottom of the receipt? You can use this pen. It needs to be removed .
22 - Expected - MUSE - grabbing - [grabbing]	As soon as babies see a toy within reach, their little hands will start grabbing .
22 - FalseCognate - MUSE - grabbing - [recording]	Remember - as soon as you hit the microphone's ON button, it will start grabbing .

22 - Anomalous - MUSE - grabbing - [reading]	I am so behind for our book club. As soon as I get the book, I will start grabbing .
22 - Expected - Spanish - grabbing - [grabbing]	As soon as babies see a toy within reach, their little hands will start grabbing .
22 - FalseCognate - Spanish - grabbing - [recording]	Remember - as soon as you hit the microphone's ON button, it will start grabbing .
22 - Anomalous - Spanish - grabbing - [reading]	I am so behind for our book club. As soon as I get the book, I will start grabbing .
22 - Expected - Chinese - grabbing - [grabbing]	As soon as babies see a toy within reach, their little hands will start grabbing .
22 - FalseCognate - Chinese - grabbing - [recording]	Remember - as soon as you hit the microphone's ON button, it will start grabbing .
22 - Anomalous - Chinese - grabbing - [reading]	I am so behind for our book club. As soon as I get the book, I will start grabbing .
23 - Expected - MUSE - departments - [departments]	We work at the same university and even in the same building. But I'm in English and she's in Psychology. In other words, we work in two different departments .
23 - FalseCognate - MUSE - departments - [apartments]	For a couple months, we tried living together to save on rent. But we fought too much. So now we're back to living in two different departments .
23 - Anomalous - MUSE - departments - [instruments]	If you've never played in an orchestra, the trumpet and the trombone may look the same to you. But I assure you – they are two different departments .
23 - Expected - Spanish - departments - [departments]	We work at the same university and even in the same building. But I'm in English and she's in Psychology. In other words, we work in two different departments .
23 - FalseCognate - Spanish - departments - [apartments]	For a couple months, we tried living together to save on rent. But we fought too much. So now we're back to living in two different departments .
23 - Anomalous - Spanish - departments - [instruments]	If you've never played in an orchestra, the trumpet and the trombone may look the same to you. But I assure you – they are two different departments .
23 - Expected - Chinese - departments - [departments]	We work at the same university and even in the same building. But I'm in English and she's in Psychology. In other words, we work in two different departments .
23 - FalseCognate - Chinese - departments - [apartments]	For a couple months, we tried living together to save on rent. But we fought too much. So now we're back to living in two different departments .
23 - Anomalous - Chinese - departments - [instruments]	If you've never played in an orchestra, the trumpet and the trombone may look the same to you. But I assure you – they are two different departments .
24 - Expected - MUSE - mark - [mark]	My sheets must be super soft. I slept with my face pressed directly against them <i>all</i> night last night and they didn't leave any particular mark .
24 - FalseCognate - MUSE - mark - [brand]	When it comes to buying shampoo, I just buy whatever's cheapest. I honestly don't care if it's Pantene or L'Oréal. I don't have loyalty to any particular mark .
24 - Anomalous - MUSE - mark - [sign]	There should be something posted to let clients know that smoking is not allowed in here. I looked around on the walls, but I couldn't find any particular mark .
24 - Expected - Spanish - mark - [mark]	My sheets must be super soft. I slept with my face pressed directly against them <i>all</i> night last night and they didn't leave any particular mark .

24 - FalseCognate - Spanish - mark - [brand]	When it comes to buying shampoo, I just buy whatever's cheapest. I honestly don't care if it's Pantene or L'Oréal. I don't have loyalty to any particular mark .
24 - Anomalous - Spanish - mark - [sign]	There should be something posted to let clients know that smoking is not allowed in here. I looked around on the walls, but I couldn't find any particular mark .
24 - Expected - Chinese - mark - [mark]	My sheets must be super soft. I slept with my face pressed directly against them <i>all</i> night last night and they didn't leave any particular mark .
24 - FalseCognate - Chinese - mark - [brand]	When it comes to buying shampoo, I just buy whatever's cheapest. I honestly don't care if it's Pantene or L'Oréal. I don't have loyalty to any particular mark .
24 - Anomalous - Chinese - mark - [sign]	There should be something posted to let clients know that smoking is not allowed in here. I looked around on the walls, but I couldn't find any particular mark .
25 - Expected - MUSE - advertisements - [advertisements]	If you upgrade your <i>normal</i> Youtube account to a paid YouTube <i>Premium</i> account, then you'll get to watch all your videos completely <i>uninterrupted</i> . That means that you won't have to waste your time anymore sitting through a bunch of advertisements .
25 - FalseCognate - MUSE - advertisements - [warnings]	I've been a total pushover. When my kids misbehave, I tell them I won't punish them <i>this</i> time but that they need to be careful because I definitely will punish them <i>next</i> time. I can't just continue letting them off the hook with a bunch of advertisements .
25 - Anomalous - MUSE - advertisements - [openings]	Unfortunately, a lot of accounting firms around here have been closing down lately. And even the national ones that are still in business have closed their regional branches. <i>But</i> if you're looking for a job, our firm actually has a bunch of advertisements .
25 - Expected - Spanish - advertisements - [advertisements]	If you upgrade your <i>normal</i> Youtube account to a paid YouTube <i>Premium</i> account, then you'll get to watch all your videos completely <i>uninterrupted</i> . That means that you won't have to waste your time anymore sitting through a bunch of advertisements .
25 - FalseCognate - Spanish - advertisements - [warnings]	I've been a total pushover. When my kids misbehave, I tell them I won't punish them <i>this</i> time but that they need to be careful because I definitely will punish them <i>next</i> time. I can't just continue letting them off the hook with a bunch of advertisements .
25 - Anomalous - Spanish - advertisements - [openings]	Unfortunately, a lot of accounting firms around here have been closing down lately. And even the national ones that are still in business have closed their regional branches. <i>But</i> if you're looking for a job, our firm actually has a bunch of advertisements .
25 - Expected - Chinese - advertisements - [advertisements]	If you upgrade your <i>normal</i> Youtube account to a paid YouTube <i>Premium</i> account, then you'll get to watch all your videos completely <i>uninterrupted</i> . That means that you won't have to waste your time anymore sitting through a bunch of advertisements .
25 - FalseCognate - Chinese - advertisements - [warnings]	I've been a total pushover. When my kids misbehave, I tell them I won't punish them <i>this</i> time but that they need to be careful because I definitely will punish them <i>next</i> time. I can't just continue letting them off the hook with a bunch of advertisements .
25 - Anomalous - Chinese - advertisements - [openings]	Unfortunately, a lot of accounting firms around here have been closing down lately. And even the national ones that are still in business have closed their regional branches. <i>But</i> if you're looking for a job, our firm actually has a bunch of advertisements .
26 - Expected - MUSE - pan - [pan]	I need to fry some onions. I see you have a pot, but there's no pan .
26 - FalseCognate - MUSE - pan - [bread]	I want a sandwich. I see the jelly and the peanut butter, but there's no pan .
26 - Anomalous - MUSE - pan - [fork]	We need all three utensils. I see a spoon and a knife, but there's no pan .
26 - Expected - Spanish - pan - [pan]	I need to fry some onions. I see you have a pot, but there's no pan .

26 - FalseCognate - Spanish - pan - [bread]	I want a sandwich. I see the jelly and the peanut butter, but there's no pan .
26 - Anomalous - Spanish - pan - [fork]	We need all three utensils. I see a spoon and a knife, but there's no pan .
26 - Expected - Chinese - pan - [pan]	I need to fry some onions. I see you have a pot, but there's no pan .
26 - FalseCognate - Chinese - pan - [bread]	I want a sandwich. I see the jelly and the peanut butter, but there's no pan .
26 - Anomalous - Chinese - pan - [fork]	We need all three utensils. I see a spoon and a knife, but there's no pan .
27 - Expected - MUSE - code - [code]	For the longest time, we couldn't decipher his messages...no matter how hard we tried. But we finally ended up cracking his code .
27 - FalseCognate - MUSE - code - [elbow]	The car crash damaged most of the bones in his forearm. It broke all of his fingers, fractured his wrist, and ended up cracking his code .
27 - Anomalous - MUSE - code - [glass]	When the orange juice slipped out of his hands, the juice went flying everywhere and the fall ended up cracking his code .
27 - Expected - Spanish - code - [code]	For the longest time, we couldn't decipher his messages...no matter how hard we tried. But we finally ended up cracking his code .
27 - FalseCognate - Spanish - code - [elbow]	The car crash damaged most of the bones in his forearm. It broke all of his fingers, fractured his wrist, and ended up cracking his code .
27 - Anomalous - Spanish - code - [glass]	When the orange juice slipped out of his hands, the juice went flying everywhere and the fall ended up cracking his code .
27 - Expected - Chinese - code - [code]	For the longest time, we couldn't decipher his messages...no matter how hard we tried. But we finally ended up cracking his code .
27 - FalseCognate - Chinese - code - [elbow]	The car crash damaged most of the bones in his forearm. It broke all of his fingers, fractured his wrist, and ended up cracking his code .
27 - Anomalous - Chinese - code - [glass]	When the orange juice slipped out of his hands, the juice went flying everywhere and the fall ended up cracking his code .
28 - Expected - MUSE - posters - [posters]	I thought they would have covered the walls of their dorm room with their favorite bands or musicians or something, but surprisingly they didn't have <i>any posters</i> .
28 - FalseCognate - MUSE - posters - [desserts]	The event was at a fancy restaurant. So after dinner, I expected they would have a cake or at least some pie for us to eat. But surprisingly they didn't have <i>any posters</i> .
28 - Anomalous - MUSE - posters - [diamonds]	On her birthday, my mom always buys herself gold earrings that are expensive and sparkly. Last year's pair had gold but surprisingly they didn't have any posters .
28 - Expected - Spanish - posters - [posters]	I thought they would have covered the walls of their dorm room with their favorite bands or musicians or something, but surprisingly they didn't have <i>any posters</i> .
28 - FalseCognate - Spanish - posters - [desserts]	The event was at a fancy restaurant. So after dinner, I expected they would have a cake or at least some pie for us to eat. But surprisingly they didn't have <i>any posters</i> .
28 - Anomalous - Spanish - posters - [diamonds]	On her birthday, my mom always buys herself gold earrings that are expensive and sparkly. Last year's pair had gold but surprisingly they didn't have any posters .
28 - Expected - Chinese - posters - [posters]	I thought they would have covered the walls of their dorm room with their favorite bands or musicians or something, but surprisingly they didn't have <i>any posters</i> .
28 - FalseCognate - Chinese - posters - [desserts]	The event was at a fancy restaurant. So after dinner, I expected they would have a cake or at least some pie for us to eat. But surprisingly they didn't have <i>any posters</i> .
28 - Anomalous - Chinese - posters - [diamonds]	On her birthday, my mom always buys herself gold earrings that are expensive and sparkly. Last year's pair had gold but surprisingly they didn't have any posters .

29 - Expected - MUSE
- demand - [demand]

29 - FalseCognate -
MUSE - demand -
[sue]

29 - Anomalous -
MUSE - demand -
[fight]

29 - Expected - Spanish
- demand - [demand]

29 - FalseCognate -
Spanish - demand -
[sue]

29 - Anomalous -
Spanish - demand -
[fight]

29 - Expected -
Chinese - demand -
[demand]

29 - FalseCognate -
Chinese - demand -
[sue]

29 - Anomalous -
Chinese - demand -
[fight]

30 - Expected - MUSE
- humor - [humor]

30 - FalseCognate -
MUSE - humor -
[mood]

30 - Anomalous -
MUSE - humor -
[personality]

30 - Expected - Spanish
- humor - [humor]

30 - FalseCognate -
Spanish - humor -
[mood]

30 - Anomalous -
Spanish - humor -
[personality]

30 - Expected -
Chinese - humor -
[humor]

30 - FalseCognate -
Chinese - humor -
[mood]

30 - Anomalous -
Chinese - humor -
[personality]

31 - Expected - MUSE
- title - [title]

When my sister meets with her boss tomorrow, she is going to be *adamant* about getting that pay raise. It's not something she's going to just *ask* for. It's something she's going to **demand**.

Since I'm responsible for damaging her property, I told her I'd pay her *whatever* she needs me to. I never thought she'd get *lawyers* involved. But now that she did, that probably means she's going to **demand**.

Yeah – she is really strong, and she's highly trained in self-defense. So, if someone ever *does* try to attack her or something, she's not gonna shrivel up or run away. She's going to **demand**.

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Yeah – she is really strong, and she's highly trained in self-defense. So, if someone ever *does* try to attack her or something, she's not gonna shrivel up or run away. She's going to **demand**.

That comedian *is* funny, but he wouldn't be a good fit for *this*. We run a clean show here and he's too vulgar. He just doesn't have the right kind of **humor**.

Trust me - don't even *try* talking to him about any important issues right now. He's too angry and irritable. He's really just not in the right kind of **humor**.

For this job, we need someone who is friendly and outgoing. Your brother is too shy and quiet. He just doesn't have the right kind of **humor**.

That comedian *is* funny, but he wouldn't be a good fit for *this*. We run a clean show here and he's too vulgar. He just doesn't have the right kind of **humor**.

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For this job, we need someone who is friendly and outgoing. Your brother is too shy and quiet. He just doesn't have the right kind of **humor**.

My favorite pro wrestler was just named the Leading World Class Champion, and he deserves it. He worked really hard to earn that **title**.

31 - FalseCognate - MUSE - title - [degree]	My son got pretty emotional at his college graduation ceremony, which makes sense. He worked really hard to earn that title .
31 - Anomalous - MUSE - title - [money]	My brother's company is now worth a million dollars, and he deserves <i>every penny</i> of it. He worked really hard to earn that title .
31 - Expected - Spanish - title - [title]	My favorite pro wrestler was just named the Leading World Class Champion, and he deserves it. He worked really hard to earn that title .
31 - FalseCognate - Spanish - title - [degree]	My son got pretty emotional at his college graduation ceremony, which makes sense. He worked really hard to earn that title .
31 - Anomalous - Spanish - title - [money]	My brother's company is now worth a million dollars, and he deserves <i>every penny</i> of it. He worked really hard to earn that title .
31 - Expected - Chinese - title - [title]	My favorite pro wrestler was just named the Leading World Class Champion, and he deserves it. He worked really hard to earn that title .
31 - FalseCognate - Chinese - title - [degree]	My son got pretty emotional at his college graduation ceremony, which makes sense. He worked really hard to earn that title .
31 - Anomalous - Chinese - title - [money]	My brother's company is now worth a million dollars, and he deserves <i>every penny</i> of it. He worked really hard to earn that title .
32 - Expected - MUSE - effective - [effective]	We've tested that drug and it <i>does</i> work for some people. Unfortunately, it's <i>not</i> gonna work for you. It's not gonna be effective .
32 - FalseCognate - MUSE - effective - [cash]	No one uses <i>paper</i> money anymore. When your customers pay, it'll be <i>all</i> credit cards. It's not gonna be effective .
32 - Anomalous - MUSE - effective - [fish]	I don't know what I'm cooking for dinner yet. But since I hate salmon, cod, and tilapia, it's not gonna be effective .
32 - Expected - Spanish - effective - [effective]	We've tested that drug and it <i>does</i> work for some people. Unfortunately, it's <i>not</i> gonna work for you. It's not gonna be effective .
32 - FalseCognate - Spanish - effective - [cash]	No one uses <i>paper</i> money anymore. When your customers pay, it'll be <i>all</i> credit cards. It's not gonna be effective .
32 - Anomalous - Spanish - effective - [fish]	I don't know what I'm cooking for dinner yet. But since I hate salmon, cod, and tilapia, it's not gonna be effective .
32 - Expected - Chinese - effective - [effective]	We've tested that drug and it <i>does</i> work for some people. Unfortunately, it's <i>not</i> gonna work for you. It's not gonna be effective .
32 - FalseCognate - Chinese - effective - [cash]	No one uses <i>paper</i> money anymore. When your customers pay, it'll be <i>all</i> credit cards. It's not gonna be effective .
32 - Anomalous - Chinese - effective - [fish]	I don't know what I'm cooking for dinner yet. But since I hate salmon, cod, and tilapia, it's not gonna be effective .
33 - Expected - MUSE - mass - [mass]	Those molecules are already really tightly packed. They're packed to the brim. If you inject <i>any</i> more particles into them, they're gonna end up with too much...what's the word? It's not <i>volume</i> , it's not <i>matter</i> ...they're gonna end up with too much mass .
33 - FalseCognate - MUSE - mass - [dough]	To make bread, the first step is to form the...whatchamacallit? You know, the gooey water- flour mixture? Go easy on the water and flour though, or you'll end up with too much of it...of that gooey whatchamacallit...you're gonna end up with too much mass .
33 - Anomalous - MUSE - mass - [hair]	I understand that he wants to make some kind of bold public statement by not shaving his beard, his moustache, or his armpits for the entire year. But if he sticks to that plan, he's simply gonna end up with too much mass .

33 - Expected - Spanish - mass - [mass]	Those molecules are already really tightly packed. They're packed to the brim. If you inject <i>any</i> more particles into them, they're gonna end up with too much...what's the word? It's not <i>volume</i> , it's not <i>matter</i> ...they're gonna end up with too much mass .
33 - FalseCognate - Spanish - mass - [dough]	To make bread, the first step is to form the...whatchamacallit? You know, the gooey water- flour mixture? Go easy on the water and flour though, or you'll end up with too much of it...of that gooey whatchamacallit...you're gonna end up with too much mass . I understand that he wants to make some kind of bold public statement by not shaving his beard, his moustache, or his armpits for the entire year. But if he sticks to that plan, he's simply gonna end up with too much mass .
33 - Anomalous - Spanish - mass - [hair]	Those molecules are already really tightly packed. They're packed to the brim. If you inject <i>any</i> more particles into them, they're gonna end up with too much...what's the word? It's not <i>volume</i> , it's not <i>matter</i> ...they're gonna end up with too much mass .
33 - Expected - Chinese - mass - [mass]	To make bread, the first step is to form the...whatchamacallit? You know, the gooey water- flour mixture? Go easy on the water and flour though, or you'll end up with too much of it...of that gooey whatchamacallit...you're gonna end up with too much mass . I understand that he wants to make some kind of bold public statement by not shaving his beard, his moustache, or his armpits for the entire year. But if he sticks to that plan, he's simply gonna end up with too much mass .
33 - FalseCognate - Chinese - mass - [dough]	I understand that he wants to make some kind of bold public statement by not shaving his beard, his moustache, or his armpits for the entire year. But if he sticks to that plan, he's simply gonna end up with too much mass .
33 - Anomalous - Chinese - mass - [hair]	My mom's a lawyer, and today they promoted her to partner! She works in the city for that...you know...big law...I can't remember the name, but if you mentioned a few, I'm pretty sure I could pick out which is her firm .
34 - Expected - MUSE - firm - [firm]	I wouldn't be great at <i>forging</i> it, but I've seen my mom write her name before. Let's just say if she and a couple other people wrote her name in cursive, I'm pretty sure I could pick out which is her firm .
34 - FalseCognate - MUSE - firm - [signature]	It's been about <i>fifteen years</i> since I've visited my grandma on my mom's side. I definitely remember which <i>street</i> she lives on. And if I drove down it, I'm pretty sure I could pick out which is her firm .
34 - Anomalous - MUSE - firm - [house]	My mom's a lawyer, and today they promoted her to partner! She works in the city for that...you know...big law...I can't remember the name, but if you mentioned a few, I'm pretty sure I could pick out which is her firm .
34 - Expected - Spanish - firm - [firm]	I wouldn't be great at <i>forging</i> it, but I've seen my mom write her name before. Let's just say if she and a couple other people wrote her name in cursive, I'm pretty sure I could pick out which is her firm .
34 - FalseCognate - Spanish - firm - [signature]	It's been about <i>fifteen years</i> since I've visited my grandma on my mom's side. I definitely remember which <i>street</i> she lives on. And if I drove down it, I'm pretty sure I could pick out which is her firm .
34 - Anomalous - Spanish - firm - [house]	My mom's a lawyer, and today they promoted her to partner! She works in the city for that...you know...big law...I can't remember the name, but if you mentioned a few, I'm pretty sure I could pick out which is her firm .
34 - Expected - Chinese - firm - [firm]	I wouldn't be great at forging it, but I've seen my mom write her name before. Let's just say if she and a couple other people wrote her name in cursive, I'm pretty sure I could pick out which is her firm.
34 - FalseCognate - Chinese - firm - [signature]	It's been about <i>fifteen years</i> since I've visited my grandma on my mom's side. I definitely remember which <i>street</i> she lives on. And if I drove down it, I'm pretty sure I could pick out which is her firm .
34 - Anomalous - Chinese - firm - [house]	The painting that she bought at the art show is really pretty. It's bright and has all warm colors. There's yellow and orange...but actually, now that I think of it there isn't any red .
35 - Expected - MUSE - red - [red]	They haven't finished setting up the outdoor volleyball court yet. The posts are in the ground, but they haven't hung up the mesh thing. In other words, between the posts there isn't any red .
35 - FalseCognate - MUSE - red - [net]	I'm supposed to house sit for her while she's away, but I can't get inside. The front door is locked. And I've looked through the bag of stuff she gave me, but there isn't any red .
35 - Anomalous - MUSE - red - [key]	

35 - Expected - Spanish - red - [red]	The painting that she bought at the art show is really pretty. It's bright and has all warm colors. There's yellow and orange...but actually, now that I think of it there isn't any red .
35 - FalseCognate - Spanish - red - [net]	They haven't finished setting up the outdoor volleyball court yet. The posts are in the ground, but they haven't hung up the mesh thing. In other words, between the posts there isn't any red .
35 - Anomalous - Spanish - red - [key]	I'm supposed to house sit for her while she's away, but I can't get inside. The front door is locked. And I've looked through the bag of stuff she gave me, but there isn't any red .
35 - Expected - Chinese - red - [red]	The painting that she bought at the art show is really pretty. It's bright and has all warm colors. There's yellow and orange...but actually, now that I think of it there isn't any red .
35 - FalseCognate - Chinese - red - [net]	They haven't finished setting up the outdoor volleyball court yet. The posts are in the ground, but they haven't hung up the mesh thing. In other words, between the posts there isn't any red .
35 - Anomalous - Chinese - red - [key]	I'm supposed to house sit for her while she's away, but I can't get inside. The front door is locked. And I've looked through the bag of stuff she gave me, but there isn't any red .
36 - Expected - MUSE - lecture - [lecture]	The head professor is usually the one who teaches us, the one who stands in front of the class and delivers it. He was just out of town yesterday, so he wasn't able to do the lecture .
36 - FalseCognate - MUSE - lecture - [reading]	For today's class, the students were assigned a chapter in the textbook. Everyone came prepared – except for Steven, who says he was up sick all night and so he wasn't able to do the lecture .
36 - Anomalous - MUSE - lecture - [radio]	Sean is <i>really</i> good at fixing things. He was able to do the <i>TV</i> without a problem. But he doesn't know how FM or AM work, so he wasn't able to do the lecture .
36 - Expected - Spanish - lecture - [lecture]	The head professor is usually the one who teaches us, the one who stands in front of the class and delivers it. He was just out of town yesterday, so he wasn't able to do the lecture .
36 - FalseCognate - Spanish - lecture - [reading]	For today's class, the students were assigned a chapter in the textbook. Everyone came prepared – except for Steven, who says he was up sick all night and so he wasn't able to do the lecture .
36 - Anomalous - Spanish - lecture - [radio]	Sean is <i>really</i> good at fixing things. He was able to do the <i>TV</i> without a problem. But he doesn't know how FM or AM work, so he wasn't able to do the lecture .
36 - Expected - Chinese - lecture - [lecture]	The head professor is usually the one who teaches us, the one who stands in front of the class and delivers it. He was just out of town yesterday, so he wasn't able to do the lecture .
36 - FalseCognate - Chinese - lecture - [reading]	For today's class, the students were assigned a chapter in the textbook. Everyone came prepared – except for Steven, who says he was up sick all night and so he wasn't able to do the lecture .
36 - Anomalous - Chinese - lecture - [radio]	Sean is <i>really</i> good at fixing things. He was able to do the <i>TV</i> without a problem. But he doesn't know how FM or AM work, so he wasn't able to do the lecture .
37 - Expected - MUSE - goat - [goat]	You know the animals with horns that kinda look like sheep but without the wool coats? Some people call them billy? Anyways, we've always had <i>two</i> of them in our barn. But when I checked the barn this morning, all I saw was <i>one single</i> goat .
37 - FalseCognate - MUSE - goat - [drop]	When I turned on the faucet in the kitchen sink yesterday, I was really hoping to see a nice, flowing stream of water. But because of the drought we're experiencing right now, all that came out of the faucet...all I saw, was one single goat .
37 - Anomalous - MUSE - goat - [drum]	My cousin has an entire <i>set</i> of them. He's got a snare, bongos - even a timpani. But when I visited him at his house last week, I discovered he actually keeps most of them in storage. All he had sitting out, all I saw was one single goat .

37 - Expected - Spanish
- goat - [goat]

37 - FalseCognate -
Spanish - goat - [drop]

37 - Anomalous -
Spanish - goat - [drum]

37 - Expected -
Chinese - goat - [goat]

37 - FalseCognate -
Chinese - goat - [drop]

37 - Anomalous -
Chinese - goat - [drum]

38 - Expected - MUSE
- fabric - [fabric]

38 - FalseCognate -
MUSE - fabric -
[factory]

38 - Anomalous -
MUSE - fabric -
[family]

38 - Expected - Spanish
- fabric - [fabric]

38 - FalseCognate -
Spanish - fabric -
[factory]

38 - Anomalous -
Spanish - fabric -
[family]

38 - Expected -
Chinese - fabric -
[fabric]

38 - FalseCognate -
Chinese - fabric -
[factory]

38 - Anomalous -
Chinese - fabric -
[family]

39 - Expected - MUSE
- ambience -
[ambience]

39 - FalseCognate -
MUSE - ambience -
[environment]

You know the animals with horns that kinda look like sheep but without the wool coats? Some people call them billy? Anyways, we've always had *two* of them in our barn. But when I checked the barn this morning, all I saw was *one single goat*.

When I turned on the faucet in the kitchen sink yesterday, I was really hoping to see a nice, flowing stream of water. But because of the drought we're experiencing right now, all that came out of the faucet...all I saw, was one single **goat**.

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You know the animals with horns that kinda look like sheep but without the wool coats? Some people call them billy? Anyways, we've always had *two* of them in our barn. But when I checked the barn this morning, all I saw was *one single goat*.

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We were planning to make it out of *velvet*. But, depending on her preferences, we could make the dress out of whatever she likes best: cotton, wool, satin, chiffon, polyester. As I'm sure you can tell, we have almost every kind of **fabric**.

This is an industrial town. Everyone here works long hours in assembly lines. The good thing is there are a lot of places to work. There's the steel one downtown, the automotive one off the highway...honestly, we have almost every kind of **fabric**.

We've got the *dysfunctional* kind, where the parents hate each other and are staying together for the kids. But we've also got the *functional* kind, where everyone is happy and even the siblings get along. In this neighborhood, we have almost every kind of **fabric**.

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That restaurant is perfect for a romantic date. It's cozy and there's always natural candlelight. Honestly, for date nights, I don't really care about the restaurant's *food*. I care more about the **ambience**.

Global warming is a real problem. For me, it's important that we be green and take care of our planet. Some people care more about the *economy*, but I care more about the **ambience**.

39 - Anomalous - MUSE - ambience - [instrument]	The musician fell off the stage while holding what was either a trumpet or a saxophone. Everyone seems worried about the <i>musician</i> getting hurt. But honestly, I care more about the ambience .
39 - Expected - Spanish - ambience - [ambience]	That restaurant is perfect for a romantic date. It's cozy and there's always natural candlelight. Honestly, for date nights, I don't really care about the restaurant's <i>food</i> . I care more about the ambience .
39 - FalseCognate - Spanish - ambience - [environment]	Global warming is a real problem. For me, it's important that we be green and take care of our planet. Some people care more about the <i>economy</i> , but I care more about the ambience .
39 - Anomalous - Spanish - ambience - [instrument]	The musician fell off the stage while holding what was either a trumpet or a saxophone. Everyone seems worried about the <i>musician</i> getting hurt. But honestly, I care more about the ambience .
39 - Expected - Chinese - ambience - [ambience]	That restaurant is perfect for a romantic date. It's cozy and there's always natural candlelight. Honestly, for date nights, I don't really care about the restaurant's <i>food</i> . I care more about the ambience .
39 - FalseCognate - Chinese - ambience - [environment]	Global warming is a real problem. For me, it's important that we be green and take care of our planet. Some people care more about the <i>economy</i> , but I care more about the ambience .
39 - Anomalous - Chinese - ambience - [instrument]	The musician fell off the stage while holding what was either a trumpet or a saxophone. Everyone seems worried about the <i>musician</i> getting hurt. But honestly, I care more about the ambience .
40 - Expected - MUSE - arena - [arena]	Their band has been putting on free concerts throughout the country, mostly in cities with big sports complexes. Last week they came to our city and before a basketball game they played in the arena .
40 - FalseCognate - MUSE - arena - [sand]	Our kids have always been afraid of the ocean. When we'd go on family vacations to the beach, they wouldn't even <i>touch</i> the water. They always stayed out and played in the arena .
40 - Anomalous - MUSE - arena - [snow]	Actually, I've always loved winter weather. Just the other day I realized how nice it was to sit outside with my thermos of hot chocolate and watch my kids as they played in the arena .
40 - Expected - Spanish - arena - [arena]	Their band has been putting on free concerts throughout the country, mostly in cities with big sports complexes. Last week they came to our city and before a basketball game they played in the arena .
40 - FalseCognate - Spanish - arena - [sand]	Our kids have always been afraid of the ocean. When we'd go on family vacations to the beach, they wouldn't even <i>touch</i> the water. They always stayed out and played in the arena .
40 - Anomalous - Spanish - arena - [snow]	Actually, I've always loved winter weather. Just the other day I realized how nice it was to sit outside with my thermos of hot chocolate and watch my kids as they played in the arena .
40 - Expected - Chinese - arena - [arena]	Their band has been putting on free concerts throughout the country, mostly in cities with big sports complexes. Last week they came to our city and before a basketball game they played in the arena .
40 - FalseCognate - Chinese - arena - [sand]	Our kids have always been afraid of the ocean. When we'd go on family vacations to the beach, they wouldn't even <i>touch</i> the water. They always stayed out and played in the arena .
40 - Anomalous - Chinese - arena - [snow]	Actually, I've always loved winter weather. Just the other day I realized how nice it was to sit outside with my thermos of hot chocolate and watch my kids as they played in the arena .
Filler - 1 - Chinese	Transgender people deserve better health money.
Filler - 2 - MUSE	It's becoming more and more clear that we need to go green and protect the plastic.
Filler - 3 - Spanish	She's definitely a heavier person, but he should know you can't comment on a female colleague's weight like that. He basically called her efficient.
Filler - 4 - Chinese	Women used to stay at home with the kids, but those traditional gender bottles are changing. Women are increasingly working outside of the home.
Filler - 5 - MUSE	Standing up for what you smell is important. That's why I'm organizing this protest.

Filler - 6 - Spanish My parents still don't get it, but most people in my hat seem to understand that gender is fluid.

Filler - 7 - Chinese The gender pay geek is a huge problem in the United States today.

Filler - 8 - MUSE It's really unfair that women on average make less water than men.

Filler - 9 - Spanish What people need to understand is that trees with mental health issues deserve to be treated normally, just like everyone else.

Filler - 10 - Chinese Starting in gradeschool, we need to empower these young coats to stand up to bullies.

Filler - 11 - MUSE It's a rural, southern town, so historically, there's been a lot of racing tension here.

Filler - 12 - Spanish Just look at them. That group is basically the definition of wise privilege. I mean, there's literally only *one* person of color.

Filler - 13 - Chinese White people need to acknowledge racism still unfortunately exists.

Filler - 14 - MUSE People of all backgrounds should have equal access to education.

Filler - 15 - Spanish I think we can all agree that women deserve the same rights as men.

Filler - 16 - Chinese Relative to white people, people of color are disproportionately arrested by police.

Filler - 17 - MUSE Fighting social injustice is something I am passionate about.

Filler - 18 - Spanish Same sex marriage should have been legalized decades ago.

Filler - 19 - Spanish Of course women deserve the right to vote. Who here would argue against that?

Filler - 20 - MUSE Public protests are an effective way to enact social change.

Filler - 21 - Chinese Mansplaining is a societal issue that I am aware of. I think by learning about it, men will learn to do it less and less.

Filler - 22 - Chinese Women are often discriminated against during the hiring process, which in my opinion, is really unfair.

Filler - 23 - MUSE We need to do better a better job at destigmatizing mental health issues.

Filler - 24 - Spanish Volunteer work is important. It's one tangible way that we can give back to society.

Filler - 25 - Chinese I no longer feel stigmatized for having depression and anxiety. I think people understand it more these days, which is a good thing.

Filler - 26 - MUSE At work today, someone accidentally used the pronoun 'she' instead of 'they' to refer to our colleague. I'm worried that it offended them.

Filler - 27 - Chinese People should be able to marry whoever they want. I'm glad same sex marriage was legalized.

Filler - 28 - Chinese Yes, she's a citizen. She was born and raised in the U.S. But because she has brown skin, people often assume she is an undocumented immigrant. It's messed up.

Filler - 29 - MUSE Luckily, women are more and more respected in today's society. You can also see them holding higher and higher positions of power.

Filler - 30 - Spanish There's still a lot of inequality in our society today, and we need to do something about it.

Filler - 31 - Chinese Why is it that the person who is white was let off with just a warning, but the person of color was automatically arrested?

Filler - 32 - MUSE Apparently, some people still think it's okay to disrespect transgender people. But it's not okay. That's the message we're spreading today.

Filler - 33 - Spanish Women are every bit as smart as men - actually, they're probably even smarter. Though, I probably shouldn't generalize like that.

Filler - 34 - Spanish Race is a complex and nuanced issue that I often have open conversations about with my friends.

Filler - 35 - MUSE Something that we as a society need to admit is that racial discrimination is still a problem today.

Filler - 36 - Spanish My parents' generation never worried much about protecting the environment, so now my generation has to.

Filler - 37 - Chinese Climate change is definitely an issue I worry about.

Filler - 38 - MUSE Yes, toxic masculinity is a term I am familiar with. In fact, ever since I learned the term, I've started seeing examples of it almost everywhere I go.

Filler - 39 - Spanish	My grandparents used to be pretty homophobic, but I think their perspective is finally starting to change for the better.
Filler - 40 - Chinese	My nephew was initially afraid to tell our family he was gay. But he came out to his parents last weekend, and it went really well. Honestly, everyone just celebrated him.
Filler - 41 - MUSE	I believe that all people deserve to do something they're passionate about.
Filler - 42 - Spanish	People with disabilities deserve to be treated with respect.
Filler - 43 - Spanish	Yes, I understand that a person's gender is not the same thing as their biological sex.
Filler - 44 - MUSE	We can't assume we know other peoples' pronouns anymore. That's something people get to choose for themselves.
Filler - 45 - Chinese	Gender discrimination and sexual harassment in the workplace still contribute significantly to persistent economic divides.
Filler - 46 - Chinese	It's frustrating to learn that U.S. women have historically faced significantly higher poverty rates than men.
Filler - 47 - MUSE	The U.S. transgender poverty rate is double that of the national average, which I find really unfair.
Filler - 48 - Spanish	I can't believe there are still people out there who think women are lesser than men.
Filler - 49 - Chinese	My friend who is a woman of color was just named the new CEO of her company. That's exactly the kind of diversity we need to see.
Filler - 50 - Chinese	Bit by bit, my parents' generation is coming to understand that anxiety is a common issue we need to address openly.
Filler - 51 - Spanish	I believe that racial discrimination will decline as we learn to be a more inclusive society.
Filler - 52 - MUSE	My friend Jada, a woman of color, told me that some of her colleagues at work make racialized comments almost daily.
Filler - 53 - MUSE	According to the Fair Housing Act, it's illegal to discriminate against prospective tenants based on their race, gender, sexuality, or disability status.
Filler - 54 - MUSE	It's really unfair - and actually illegal - for a building in this state to not have wheelchair accessibility.
Filler - 55 - Chinese	Yes, I know what the Americans with Disabilities Act is. I understand it well enough that I could explain it if I had to.
Filler - 56 - Spanish	The Americans with Disabilities Act is important, as its main goal is to serve people with disabilities and protect their accessibility rights.
Filler - 57 - Spanish	Issues of accessibility - like having a building being wheelchair accessible - are very important to me.
Filler - 58 - Chinese	That restaurant was in the news for denying its transgender workers proper health care coverage. So, I don't eat there, because I don't want to financially support a business like that.
Filler - 59 - MUSE	Yes, I have heard of Title IX. I know it has something to do with gender equality, but I don't know exactly what it protects.
Filler - 60 - Spanish	Minority groups are important to our society.
Filler - 61 - Chinese	Immigrant groups are important to our society.
Filler - 62 - MUSE	Women today are more empowered than ever before, which is exciting.
Filler - 63 - Spanish	It's not fair that some people get accepted into good colleges just because their parents can buy their way in.
Filler - 64 - Chinese	We're living in an exciting time, because women are speaking up more than ever before - and people are finally listening.
Filler - 65 - MUSE	When David tells people he's a doctor, sometimes they do a double take, as if they can't believe a person who looks like him could be smart.
Filler - 66 - Spanish	In high school, one of our teachers was pretty overtly racist and it made for a really toxic classroom environment.
Filler - 67 - Chinese	Thanks to the MeToo movement, issues of sexual harassment are now more than ever before well-known by the general population.
Filler - 68 - MUSE	Some people are comfortable talking about their race, and others aren't. And that's okay.

Filler - 69 - Spanish	My female friends say they typically feel safe walking around here at night, so long as they're not walking alone.
Filler - 70 - Chinese	Unfortunately, mental health issues and depression are still stigmatized, but I think that's slowly changing.
Filler - 71 - MUSE	No one talks anymore about how the government stole land from the native Americans. I mean, their basic human rights were outright denied.
Filler - 72 - Spanish	It's simple - racial equality is worth fighting for.
Filler - 73 - Spanish	Unfortunately, I don't do as much volunteering as I feel like I should be doing.
Filler - 74 - MUSE	I believe that diversity is important.
Filler - 75 - Spanish	Workplace diversity is not just "the right thing to do" - it's also a better business model. Companies made up of workers from diverse backgrounds consistently outperform less diverse companies.
Filler - 76 - Chinese	It's simple - racism is bad.
Filler - 77 - MUSE	Equal opportunity is important. That's really all that matters at the end of the day.
Filler - 78 - Chinese	It's simple - gender equality is worth fighting for.
Filler - 79 - Chinese	White supremacy is a very real and very dangerous ideology.
Filler - 80 - MUSE	It's simple - if the business supports the LGBT community, I will shop there. If it doesn't support them, I won't shop there.
Filler - 81 - Spanish	We need to raise awareness about climate change so that we don't destroy our planet.
Filler - 82 - Chinese	People of color deserve equal respect.
Filler - 83 - MUSE	Gender equality is something I am passionate about.
Filler - 84 - Spanish	My generation is committed to addressing issues of gender equality.
Filler - 85 - Chinese	I don't judge people who are homeless.
Filler - 86 - MUSE	The real issue we need to face right now is that there are people out there struggling with really tough mental health issues.
Filler - 87 - Spanish	Why do people feel like they can rub a pregnant woman's belly? It's inappropriate and an invasion of the woman's personal space.
Filler - 88 - Spanish	No person is all evil or all good. It's always a mix of the two.
Filler - 89 - Chinese	Some people don't respect normal standards of personal space.
Filler - 90 - Chinese	Immigration control is a big issue right now in a lot of countries.
Filler - 91 - MUSE	My aunt didn't vote in the last election. But now she understands how important it is, so she'll vote in the next one.
Filler - 92 - MUSE	No one's perfect. Even the happiest looking families are dysfunctional in some way.
Filler - 93 - Spanish	Gender is something kids should choose for themselves.
Filler - 94 - Chinese	Water quality is something I worry about in my town.
Filler - 95 - MUSE	Have you ever seen a picture of a landfill? It's insane how much trash we generate.
Filler - 96 - Spanish	When I'm at a coffeeshop and they ask if you'd like to add a tip, I don't usually do it. I hope that doesn't make me a bad person.
Filler - 97 - Chinese	There are some parents who choose not to vaccinate their kids. But doing so is misguided, and it puts everyone around them at risk.
Filler - 98 - MUSE	If someone says something offensive to me, I'm not the kind of person to get into a whole argument about it.
Filler - 99 - Spanish	When I take a picture, I immediately post it on social media.
Filler - 100 - Chinese	For me, the best feeling in the world is when you can stand up for someone else and act as their advocate.
Filler - 101 - MUSE	When I'm stressed, I like to go zone out and read through social media on my phone.
Filler - 102 - Spanish	I worry that I'm starting to get addicted to my phone and to social media.
Filler - 103 - Chinese	I think that social media can be a great tool for enacting social change.
Filler - 104 - MUSE	It's inspiring when you see people doing what they love.

Filler - 105 - Chinese	The situation today with police and the public's perception of them is pretty complicated.
Filler - 106 - Spanish	Violence is something I believe we need to address in my town.
Filler - 107 - MUSE	I have a family member who has struggled with depression his whole life. So, I understand how tough that can be for loved ones.
Filler - 108 - Spanish	When there is tension among others, I am usually the one who tries to diffuse it with humor.
Filler - 109 - Chinese	I understand that you need to work hard to make it in this world. But ideally, you get to do something that you love.
Filler - 110 - MUSE	I think my social media profiles accurately reflect who I am as a person.
Filler - 111 - Chinese	35 million tons of food are wasted in the United States each year. This year, I plan to implement a zero-waste policy for myself.
Filler - 112 - Chinese	There's an argument out there that people today are too sensitive, that the smallest things can hurt someone's feelings. But I think it's more about being intentional about what we say about others.
Filler - 113 - MUSE	Lately it's been hard to connect with people from my parents' generation because they are more close-minded about a lot of things.
Filler - 114 - Spanish	A lot of my closest friends are actually gay, so I understand the kinds of discrimination they face and also how important it is for them to have their voices heard.
Filler - 115 - Spanish	I feel optimistic about the future.
Filler - 116 - MUSE	The problem is that young girls have long been told the message that they aren't as good at math as boys are.
Filler - 117 - Chinese	In general, I'd say me and my close family members hold more or less the same values and beliefs.
Filler - 118 - Spanish	It's okay to lie if you're doing it to make someone else feel better, but not if you're doing it to hurt them.
Filler - 119 - MUSE	I've been avoiding the news lately, because it just makes me angry and sad.
Filler - 120 - Spanish	I regularly practice self-care to maintain my personal mental health.
Filler - 121 - Chinese	I advocate for women's rights, so yeah, I'd call myself a feminist.
Filler - 122 - MUSE	It's so hard these days to not get distracted by your phone. It can be so addicting. I always have my phone on me.
Filler - 123 - Spanish	I try to keep my phone away from me during the day because otherwise I get distracted really easily.
Filler - 124 - Spanish	During high school, many teens today experience some kind of bullying - often times it's cyber bullying.
Filler - 125 - MUSE	Pollution can be terrible in urban areas. That's why some people prefer to live outside the city.
Filler - 126 - Spanish	It's my impression that the politicians have historically been corrupt but that that's changing for the better.
Filler - 127 - Chinese	Several public health chapters have come out recently indicating there may be plastic in our water and that it can be toxic.
Filler - 128 - MUSE	Women should be able to go about their day, not worrying whether or not someone will harass them.
Filler - 129 - Chinese	Medicine can be so expensive these days. If you don't have health insurance, you'll get into serious debt if you get sick.
Filler - 130 - Chinese	Kyle is on the autism spectrum, so dealing with big transitions like moving to a new school can be very stressful for him.
Filler - 131 - MUSE	I know that composting is good for the environment. But does anyone really know what it entails?
Filler - 132 - MUSE	No kid deserves to be bullied. I'd like to think that most schools provide some sort of counseling for the victims of bullying.
Filler - 133 - Chinese	I firmly believe that you need to be the change you want to see in the world.
Filler - 134 - Spanish	If I want my kids and my kids' kids to thrive for years to come, I need to help take care of our planet now.

Filler - 135 - Chinese	When I shop for groceries, I try to buy environmentally-friendly products.
Filler - 136 - Spanish	In my attempt to go as green as possible, I've started biking to work instead of driving.
Filler - 137 - MUSE	I recently watched a documentary about global warming, so now I'm trying to reduce my carbon footprint.
Filler - 138 - Spanish	I think everyone deserves to have access to healthcare. I see it as a basic human right.
Filler - 139 - Chinese	When I own my own business, I'm gonna make sure to recruit a diverse workforce.
Filler - 140 - MUSE	People in the U.S. often talk about race as a dichotomy - as someone being black or white. But that's crazy because there are so many races beyond just black and white.
Filler - 141 - Spanish	If I heard someone say something racist on the bus, I would like to think I'd stand up to them and call them out.
Filler - 142 - Chinese	Our country was founded by immigrants. Plus, immigrants bring diversity to our nation, which I think is a good thing.
Filler - 143 - MUSE	I wish our state provided more resources to help homeless people get back on their feet.
Filler - 144 - Spanish	My friend Melissa is one of the strongest, most inspirational women's advocates that I know.
Filler - 145 - Chinese	My father has dedicated the past ten years of his career to construction projects, working to make buildings in our town wheelchair accessible for people with physical disabilities.
Filler - 146 - MUSE	Our neighbor runs an awesome school for kids with autism. So, she gets to spend her days empowering those kids to be the best they can be.
Filler - 147 - Spanish	If I ever became a politician, my first order of business would be to make our country more eco-friendly.
Filler - 148 - Chinese	I'm working on an awareness campaign to get people to buy and use less plastic in their daily lives.
Filler - 149 - MUSE	There are homeless people in every city. And unfortunately, I've seen some people on the street treat them as if they're not even human beings, which is sad to see.
Filler - 150 - Spanish	Honestly, I feel like our society is currently undergoing a change right now, a change for the better.
Filler - 151 - Chinese	I am optimistic that we can reverse the effects of climate change.
Filler - 152 - MUSE	When I was growing up, boys played with trucks and girls played with dolls. But now, we know how dumb that is. My kids will play with whatever they want.
Filler - 153 - Spanish	If I were gay and came out to my parents, they wouldn't love me any less. They're a really progressive, inclusive, loving people.
Filler - 154 - Chinese	We all start out in life with different sets of privilege. But regardless, we all deserve the same amount of respect.
Filler - 155 - MUSE	Yes, I feel comfortable talking openly about social identities with my friends.
Filler - 156 - Spanish	My uncle was recently fired, and we suspect it was related to age discrimination in the workplace, which is a growing societal problem.
Filler - 157 - Chinese	Regardless of a person's racial, ethnic, or religious background, their voice deserves to be heard.
Filler - 158 - MUSE	It frustrates me to learn that some of my family members don't seem to care about diversity as much as I do.
Filler - 159 - Spanish	Just like you shouldn't judge a book by its cover, you shouldn't judge a person by the color of their skin.
Filler - 160 - Chinese	I think most people where I'm from would agree with me in saying that racial diversity is a good thing.
Filler - 161 - MUSE	Here's what I think: forcing young kids to follow gender normative behavior is not healthy.
Filler - 162 - Spanish	By raising awareness about mental health issues in this country, I believe we can change our society for the better.
Filler - 163 - Chinese	Too many people still hold misogynistic views, and I think it originates from a lack of education honestly.

Filler - 164 - MUSE	In general, I think our generation is much more diverse and inclusive than our parent's generation ever was.
Filler - 165 - Chinese	It's crazy to think that only a few decades ago, interracial marriages were illegal. So in that sense, I'd say, yes, we've made a lot of progress as a society.
Filler - 166 - Spanish	After all, gender is social construct. It's not a binary thing - it's a continuum.
Filler - 167 - MUSE	What they don't understand is that sexual orientation can be fluid. It's not just a matter of "are you straight or are you gay?"
Filler - 168 - Spanish	My sister recently told me that since the advent of the Me Too movement, she feels way more respected by her colleagues at work.
Filler - 169 - Chinese	Hopefully, the main outcome of the Me Too movement will be that our society becomes more gender inclusive.
Filler - 170 - MUSE	Hopefully, the main outcome of the BlackLivesMatter movement will be that our society becomes more racially inclusive.
Filler - 171 - Spanish	If we continue to pretend that racism is just a problem of the past, we'll never actually be able to fix it.
Filler - 172 - Chinese	I am committed to fighting for social justice.
Filler - 173 - MUSE	It's not enough to just say "Well, I'm not racist." It's everyone's responsibility to actively fight against it.
Filler - 174 - Spanish	What I'm looking forward to is the day when everyone is treated with respect, regardless of their gender or sexual orientation.
Filler - 175 - Chinese	For all the kids out there who are the victims of bullying, I feel for you. What you've endured is not fair.
Filler - 176 - MUSE	Starting in elementary school, bullies should be required to go to counseling, to learn how to overcome their harmful behaviors.
Filler - 177 - MUSE	I think everyone deserves access to therapy. It can be so good for your mental health and personal well-being.
Filler - 178 - Chinese	I think that if people with racist ideologies had more exposure to people with diverse backgrounds, there wouldn't be as much racism as there is today.
Filler - 179 - Spanish	We need to take care of our environment so that future generations can enjoy this beautiful planet.
Filler - 180 - Spanish	Who knows? Maybe our society has finally come around to the idea of a strong, female president.

8.36 EEG experiment: PsychoPy script

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-
#This script is run in PsychoPy3 and details how the
stimuli are presented and how the input data are
recorded (with triggers, in combination with the
continuous EEG data)

from __future__ import absolute_import, division
#from psychopy import locale_setup, sound, gui,
visual, core, data, event, logging, clock
#locale_setup throws error on windows...
#from psychopy import locale_setup, gui, visual,
core, data, event, logging, sound
from psychopy import gui, visual, core, data, event,
logging, sound
from psychopy.constants import (NOT_STARTED,
STARTED, PLAYING, PAUSED,
STOPPED, FINISHED,
PRESSED, RELEASED, FOREVER)
import numpy as np # whole numpy lib is available,
prepend 'np.'
from numpy import (sin, cos, tan, log, log10, pi,
average,
sqrt, std, deg2rad, rad2deg, linspace,
asarray)
from numpy.random import random, randint, normal,
shuffle
import os # handy system and path functions
import sys # to get file system encoding

# control whether triggering is sent or not
#parallelOutput = 0 # 0 = no output
parallelOutput = 1 # 1 = initialize parallel port output

# Ensure that relative paths start from the same
directory as this script
_thisDir = os.path.dirname(os.path.abspath(__file__))
os.chdir(_thisDir)

# Store info about the experiment session
psychopyVersion = '3.0.3'
expName = 'STEP' # from the Builder filename that
created this script
Handedness=['Left', 'Right','Unsure']
BlockList = ['List01_MasterSheet',
'List02_MasterSheet']
SubjectType = ['Does not', 'Does']
expInfo = {'participant': '', 'Handedness': Handedness,
'BlockList':BlockList, 'SubjectType': SubjectType}
dlg = gui.DlgFromDict(dictionary=expInfo,
title=expName)
if dlg.OK == False:
    core.quit() # user pressed cancel

expInfo['date'] = data.getDateStr() # add a simple
timestamp
expInfo['expName'] = expName
expInfo['psychopyVersion'] = psychopyVersion

# Data file name stem = absolute path + name; later
add .psyexp, .csv, .log, etc
filename = _thisDir + os.sep + u'data/%s_%s_%s' %
(expInfo['participant'], expName, expInfo['date'])

# An ExperimentHandler isn't essential but helps with
data saving
thisExp = data.ExperimentHandler(name=expName,
version="",
extraInfo=expInfo, runtimeInfo=None,

originPath='C:\\Users\\Public\\Documents\\Experime
nts\\STEP\\STEP_final.py',
savePickle=True, saveWideText=True,
dataFileName=filename)
# save a log file for detail verbose info
logFile = logging.LogFile(filename+'.log',
level=logging.EXP)
logging.console.setLevel(logging.WARNING) # this
outputs to the screen, not a file

endExpNow = False # flag for 'escape' or other
condition => quit the exp

# Start Code - component code to be run before the
window creation

# Initialize trigger output
# Triggers for STEP
# Trigger 1 ErrorNone, SpkrMUSE (n=40)
# Trigger 2 ErrorSpanish, SpkrMUSE (n=40)
# Trigger 3 ErrorOther, SpkrMUSE (n=40)
# Trigger 4 ErrorNone, SpkrSpanish (n=40)
# Trigger 5 ErrorSpanish, SpkrSpanish (n=40)
# Trigger 6 ErrorOther, SpkrSpanish (n=40)
# Trigger 7 ErrorNone, SpkrChinese (n=40)
# Trigger 8 ErrorSpanish, SpkrChinese (n=40)
# Trigger 30 Filler (n=168)
# Trigger 40 Filler, with error (n=12)

#Triggers are bytes that are sent via the parallel port
to the EEG apparatus.

if parallelOutput:
    try:
        from psychopy import parallel
        from ctypes import windll
```



```

port = 0x3FF8
windll.inpout32.Out32(port, int(0)) # was
0xC3000 # sets the trigger to 0
except (NotImplementedError,AttributeError):
    print ('Output parallel port device not setup.')

# Setup the Window
win = visual.Window(
    size=(1024, 768), fullscr=True, screen=0,
    allowGUI=False, allowStencil=False,
    monitor='testMonitor', color=[0,0,0],
    colorSpace='rgb',
    blendMode='avg', useFBO=True)
# store frame rate of monitor if we can measure it
expInfo['frameRate'] = win.getActualFrameRate()
if expInfo['frameRate'] != None:
    frameDur = 1.0 / round(expInfo['frameRate'])
else:
    frameDur = 1.0 / 60.0 # could not measure, so
    guess

# Initialize components for Routine "Instructions"
InstructionsClock = core.Clock()
text_Instructions_1 = visual.TextStim(win=win,
name='text_Instructions_1',
    text='\nWelcome to the experiment! Your task is to
look at the + and \nlisten carefully to a series of audio
clips, spoken by different people.\n\nEvery once in a
while, you\'ll see a question pop up that says:\n"Does
what they said make sense?"\n\nTo answer Yes, press
Y on the keyboard. \nTo answer No, press N on the
keyboard.\n\n\nExperimenter: Press Spacebar to
begin the experiment.',
    font='Times New Roman',
    pos=(0,0), height=0.1, wrapWidth=2, ori=0,
    color='white', colorSpace='rgb', opacity=1,
    #languageStyle='LTR',
    depth=0.0);

# Initialize components for Routine "BlankScreen"
BlankScreenClock = core.Clock()
text_BlankScreen = visual.TextStim(win=win,
name='text_BlankScreen',
    text='+',
    font='Arial',
    pos=(0, 0), height=0.1, wrapWidth=None, ori=0,
    color='white', colorSpace='rgb', opacity=1,
    #languageStyle='LTR',
    depth=0.0);

# Initialize components for Routine "Item"
ItemClock = core.Clock()
sound_item = sound.Sound('A', secs=-1, stereo=True)

```

```

sound_item.setVolume(1)

# Initialize components for Routine "Question"
QuestionClock = core.Clock()

text_Question = visual.TextStim(win=win,
name='text_Question',
    text='Did what they said make sense?\n\nPress Y
for Yes.\nPress N for No.\n',
    font='Arial',
    pos=(0, 0), height=0.1, wrapWidth=None, ori=0,
    color='white', colorSpace='rgb', opacity=1,
    #languageStyle='LTR',
    depth=-1.0);

# Initialize components for Routine
"Break_Between_Blocks"
Break_Between_BlocksClock = core.Clock()
text_BreakBetweenBlocks =
visual.TextStim(win=win,
name='text_BreakBetweenBlocks',
    text="Nice work! \n\nFeel free to take a little
break.\n\nWhen you're ready to continue, press the
Spacebar.",
    font='Times New Roman',
    pos=(0, 0), height=0.1, wrapWidth=None, ori=0,
    color='white', colorSpace='rgb', opacity=1,
    #languageStyle='LTR',
    depth=0.0);

# Initialize components for Routine "ThankYou"
ThankYouClock = core.Clock()
text_ThankYou = visual.TextStim(win=win,
name='text_ThankYou',
    text='Congratulations! \n\nYou have completed the
main experiment for this study!\n\nTell the
experimenter you have finished.\n\n\n',
    font='Times New Roman',
    pos=(0, 0), height=0.1, wrapWidth=None, ori=0,
    color='white', colorSpace='rgb', opacity=1,
    #languageStyle='LTR',
    depth=0.0);

# Create some handy timers
globalClock = core.Clock() # to track the time since
experiment started
routineTimer = core.CountdownTimer() # to track
time remaining of each (non-slip) routine

# -----Prepare to start Routine "Instructions"-----
t = 0
InstructionsClock.reset() # clock
frameN = -1
continueRoutine = True
# update component parameters for each repeat

```

```

key_resp_start = event.BuilderKeyResponse()
# keep track of which components have finished
InstructionsComponents = [text_Instructions_1,
key_resp_start]
for thisComponent in InstructionsComponents:
    if hasattr(thisComponent, 'status'):
        thisComponent.status = NOT_STARTED

# -----Start Routine "Instructions"-----
while continueRoutine:
    # get current time
    t = InstructionsClock.getTime()
    frameN = frameN + 1 # number of completed
frames (so 0 is the first frame)
    if parallelOutput: windll.inout32.Out32(port,
int(0)) # zero trigger output
    # update/draw components on each frame

    # *text_Instructions_1* updates
    if t >= 0.0 and text_Instructions_1.status ==
NOT_STARTED:
        # keep track of start time/frame for later
        text_Instructions_1.tStart = t
        text_Instructions_1.frameNStart = frameN #
exact frame index
        text_Instructions_1.setAutoDraw(True)

    # *key_resp_start* updates
    if t >= 0.0 and key_resp_start.status ==
NOT_STARTED:
        # keep track of start time/frame for later
        key_resp_start.tStart = t
        key_resp_start.frameNStart = frameN # exact
frame index
        key_resp_start.status = STARTED
        # keyboard checking is just starting
        win.callOnFlip(key_resp_start.clock.reset) #
t=0 on next screen flip
        event.clearEvents(eventType='keyboard')
        if key_resp_start.status == STARTED:
            theseKeys = event.getKeys(keyList=['space'])

            # check for quit:
            if "escape" in theseKeys:
                endExpNow = True
            if len(theseKeys) > 0: # at least one key was
pressed
                key_resp_start.keys = theseKeys[-1] # just
the last key pressed
                key_resp_start.rt =
key_resp_start.clock.getTime()
                # a response ends the routine
                continueRoutine = False

# check for quit (typically the Esc key)

```

```

if endExpNow or
event.getKeys(keyList=["escape"]):
    core.quit()

# check if all components have finished
if not continueRoutine: # a component has
requested a forced-end of Routine
    break
    continueRoutine = False # will revert to True if at
least one component still running
    for thisComponent in InstructionsComponents:
        if hasattr(thisComponent, "status") and
thisComponent.status != FINISHED:
            continueRoutine = True
            break # at least one component has not yet
finished

# refresh the screen
if continueRoutine: # don't flip if this routine is
over or we'll get a blank screen
    win.flip()

# -----Ending Routine "Instructions"-----
for thisComponent in InstructionsComponents:
    if hasattr(thisComponent, "setAutoDraw"):
        thisComponent.setAutoDraw(False)
# check responses
if key_resp_start.keys in ['', [], None]: # No response
was made
    key_resp_start.keys=None
thisExp.addData('key_resp_start.keys',key_resp_start.
keys)
if key_resp_start.keys != None: # we had a response
    thisExp.addData('key_resp_start.rt',
key_resp_start.rt)
thisExp.nextEntry()
# the Routine "Instructions" was not non-slip safe, so
reset the non-slip timer
routineTimer.reset()

# set up handler to look after randomisation of
conditions etc
Loop_15Blocks = data.TrialHandler(nReps=1,
method='random',
extraInfo=expInfo, originPath=-1,

trialList=data.importConditions(expInfo['BlockList']
+'.csv'),
seed=None, name='Loop_15Blocks')
thisExp.addLoop(Loop_15Blocks) # add the loop to
the experiment
thisLoop_15Block = Loop_15Blocks.trialList[0] #
so we can initialise stimuli with some values
# abbreviate parameter names if possible (e.g. rgb =
thisLoop_15Block.rgb)

```

```

if thisLoop_15Block != None:
    for paramName in thisLoop_15Block:
        exec('{} =
thisLoop_15Block[paramName]'.format(paramName
))

for thisLoop_15Block in Loop_15Blocks:
    currentLoop = Loop_15Blocks
    # abbreviate parameter names if possible (e.g. rgb
= thisLoop_15Block.rgb)
    if thisLoop_15Block != None:
        for paramName in thisLoop_15Block:
            exec('{} =
thisLoop_15Block[paramName]'.format(paramName
))

    # set up handler to look after randomisation of
conditions etc
    Loop_36Items = data.TrialHandler(nReps=1,
method='random',
    extraInfo=expInfo, originPath=-1,
    trialList=data.importConditions(BlockSheet),
    seed=None, name='Loop_36Items')
    thisExp.addLoop(Loop_36Items) # add the loop to
the experiment
    thisLoop_36Item = Loop_36Items.trialList[0] # so
we can initialise stimuli with some values
    # abbreviate parameter names if possible (e.g. rgb
= thisLoop_36Item.rgb)
    if thisLoop_36Item != None:
        for paramName in thisLoop_36Item:
            exec('{} =
thisLoop_36Item[paramName]'.format(paramName))

    for thisLoop_36Item in Loop_36Items:
        currentLoop = Loop_36Items
        # abbreviate parameter names if possible (e.g.
rgb = thisLoop_36Item.rgb)
        if thisLoop_36Item != None:
            for paramName in thisLoop_36Item:
                exec('{} =
thisLoop_36Item[paramName]'.format(paramName))

    # -----Prepare to start Routine "BlankScreen"---
----
    t = 0
    BlankScreenClock.reset() # clock
    frameN = -1
    continueRoutine = True
    routineTimer.add(1.000000)
    # update component parameters for each repeat
    # keep track of which components have finished
    BlankScreenComponents = [text_BlankScreen]
    for thisComponent in BlankScreenComponents:
        if hasattr(thisComponent, 'status'):

```

```

thisComponent.status = NOT_STARTED

# -----Start Routine "BlankScreen"-----
while continueRoutine and
routineTimer.getTime() > 0:
    # get current time
    t = BlankScreenClock.getTime()
    frameN = frameN + 1 # number of completed
frames (so 0 is the first frame)
    if parallelOutput: windll.inpout32.Out32(port,
int(0)) # zero trigger output
    # update/draw components on each frame

    # *text_BlankScreen* updates
    if t >= 0.0 and text_BlankScreen.status ==
NOT_STARTED:
        # keep track of start time/frame for later
        text_BlankScreen.tStart = t
        text_BlankScreen.frameNStart = frameN #
exact frame index
        text_BlankScreen.setAutoDraw(True)
        frameRemains = 0.0 + 1-
win.monitorFramePeriod * 0.75 # most of one frame
period left
        if text_BlankScreen.status == STARTED and
t >= frameRemains:
            text_BlankScreen.setAutoDraw(False)

    # check for quit (typically the Esc key)
    if endExpNow or
event.getKeys(keyList=["escape"]):
        core.quit()

    # check if all components have finished
    if not continueRoutine: # a component has
requested a forced-end of Routine
        break
    continueRoutine = False # will revert to True
if at least one component still running
    for thisComponent in
BlankScreenComponents:
        if hasattr(thisComponent, "status") and
thisComponent.status != FINISHED:
            continueRoutine = True
            break # at least one component has not
yet finished

    # refresh the screen
    if continueRoutine: # don't flip if this routine
is over or we'll get a blank screen
        win.flip()

# -----Ending Routine "BlankScreen"-----
for thisComponent in BlankScreenComponents:
    if hasattr(thisComponent, "setAutoDraw"):

```

```

        thisComponent.setAutoDraw(False)

# -----Prepare to start Routine "Item"-----
#TheTrigger = Trigger #initialize the variable
TheTrigger
t = 0
ItemClock.reset() # clock
frameN = -1
continueRoutine = True
# update component parameters for each repeat
sound_item.setSound(SoundFile,
secs=soundDuration)
sound_item.setVolume(1, log=False)
# keep track of which components have finished
ItemComponents = [sound_item]
for thisComponent in ItemComponents:
    if hasattr(thisComponent, 'status'):
        thisComponent.status = NOT_STARTED

# -----Start Routine "Item"-----
while continueRoutine:
    # get current time
    t = ItemClock.getTime()
    frameN = frameN + 1 # number of completed
frames (so 0 is the first frame)
    if parallelOutput: windll.inpout32.Out32(port,
int(0)) # zero trigger output
    # update/draw components on each frame
    # start/stop sound_item
    if t >= 0.0 and sound_item.status ==
NOT_STARTED:
        # keep track of start time/frame for later
        sound_item.tStart = t
        sound_item.frameNStart = frameN # exact
frame index
        if parallelOutput:
windll.inpout32.Out32(port, int(Trigger)) #send the
trigger
            win.callOnFlip(sound_item.play) # screen
flip

        # check for quit (typically the Esc key)
        if endExpNow or
event.getKeys(keyList=["escape"]):
            core.quit()

#soundDuration is a variable (column) in my
conditions file, records the length in seconds of each
stim item
    if sound_item.status == STARTED and t >=
soundDuration:
        sound_item.stop() #stops the sound file

# check if all components have finished

```

```

        if not continueRoutine: # a component has
requested a forced-end of Routine
            break
        continueRoutine = False # will revert to True
if at least one component still running
        for thisComponent in ItemComponents:
            if hasattr(thisComponent, "status") and
thisComponent.status != FINISHED:
                continueRoutine = True
                break # at least one component has not
yet finished

            # refresh the screen
            if continueRoutine: # don't flip if this routine
is over or we'll get a blank screen
                win.flip()

            if parallelOutput: windll.inpout32.Out32(port,
int(0)) #reset Trigger to 0

# -----Ending Routine "Item"-----
for thisComponent in ItemComponents:
    if hasattr(thisComponent, "setAutoDraw"):
        thisComponent.setAutoDraw(False)
    sound_item.stop() # ensure sound has stopped
at end of routine
# the Routine "Item" was not non-slip safe, so
reset the non-slip timer
    routineTimer.reset()

# -----Prepare to start Routine "Question"-----
t = 0
QuestionClock.reset() # clock
frameN = -1
continueRoutine = True
# update component parameters for each repeat
#Intermittently present the Question (17% of the
time)
#Don't continue this routine if the random
number generator generates a number over 0.17.
import random
if random.randint(0,100) > 17:
    continueRoutine = False
key_YorN = event.BuilderKeyResponse()
# keep track of which components have finished
QuestionComponents = [text_Question,
key_YorN]
for thisComponent in QuestionComponents:
    if hasattr(thisComponent, 'status'):
        thisComponent.status = NOT_STARTED

# -----Start Routine "Question"-----
while continueRoutine:
    # get current time
    t = QuestionClock.getTime()

```

```

frameN = frameN + 1 # number of completed
frames (so 0 is the first frame)
if parallelOutput: windll.inpout32.Out32(port,
int(0)) # zero trigger output
    # update/draw components on each frame

# *text_Question* updates
if t >= 0.0 and text_Question.status ==
NOT_STARTED:
    # keep track of start time/frame for later
    text_Question.tStart = t
    text_Question.frameNStart = frameN #
exact frame index
    text_Question.setAutoDraw(True)

# *key_YorN* updates
if t >= 0.0 and key_YorN.status ==
NOT_STARTED:
    # keep track of start time/frame for later
    key_YorN.tStart = t
    key_YorN.frameNStart = frameN # exact
frame index
    key_YorN.status = STARTED
    # keyboard checking is just starting
    win.callOnFlip(key_YorN.clock.reset) #
t=0 on next screen flip
    event.clearEvents(eventType='keyboard')
    if key_YorN.status == STARTED:
        theseKeys = event.getKeys(keyList=['y',
'n'])

    # check for quit:
    if "escape" in theseKeys:
        endExpNow = True
    if len(theseKeys) > 0: # at least one key
was pressed
        key_YorN.keys = theseKeys[-1] # just
the last key pressed
        key_YorN.rt =
key_YorN.clock.getTime()
        # was this 'correct'?
        if (key_YorN.keys == str(CorrectAns))
or (key_YorN.keys == CorrectAns):
            key_YorN.corr = 1
        else:
            key_YorN.corr = 0
        # a response ends the routine
        continueRoutine = False

# check for quit (typically the Esc key)
if endExpNow or
event.getKeys(keyList=["escape"]):
    core.quit()

```

```

# check if all components have finished
if not continueRoutine: # a component has
requested a forced-end of Routine
    break
    continueRoutine = False # will revert to True
if at least one component still running
    for thisComponent in QuestionComponents:
        if hasattr(thisComponent, "status") and
thisComponent.status != FINISHED:
            continueRoutine = True
            break # at least one component has not
yet finished

# refresh the screen
if continueRoutine: # don't flip if this routine
is over or we'll get a blank screen
    win.flip()

# -----Ending Routine "Question"-----
for thisComponent in QuestionComponents:
    if hasattr(thisComponent, "setAutoDraw"):
        thisComponent.setAutoDraw(False)

# check responses
if key_YorN.keys in [None, []]: # No
response was made
    key_YorN.keys=None
    # was no response the correct answer?!
    if str(CorrectAns).lower() == 'none':
        key_YorN.corr = 1; # correct non-response
else:
        key_YorN.corr = 0; # failed to respond
(incorrectly)
    # store data for Loop_36Items (TrialHandler)
Loop_36Items.addData('key_YorN.keys',key_YorN.
keys)
    Loop_36Items.addData('key_YorN.corr',
key_YorN.corr)
    if key_YorN.keys != None: # we had a response
        Loop_36Items.addData('key_YorN.rt',
key_YorN.rt)
    # the Routine "Question" was not non-slip safe,
so reset the non-slip timer
    routineTimer.reset()
    thisExp.nextEntry()

# completed 1 repeats of 'Loop_36Items'

# -----Prepare to start Routine
"Break_Between_Blocks"-----
t = 0
Break_Between_BlocksClock.reset() # clock
frameN = -1

```

```

continueRoutine = True
# update component parameters for each repeat
key_resp_Continue = event.BuilderKeyResponse()
# keep track of which components have finished
Break_Between_BlocksComponents =
[text_BreakBetweenBlocks, key_resp_Continue]
for thisComponent in
Break_Between_BlocksComponents:
    if hasattr(thisComponent, 'status'):
        thisComponent.status = NOT_STARTED

# -----Start Routine "Break_Between_Blocks"-----
---
while continueRoutine:
    # get current time
    t = Break_Between_BlocksClock.getTime()
    frameN = frameN + 1 # number of completed
frames (so 0 is the first frame)
    if parallelOutput: windll.inpout32.Out32(port,
int(0)) # zero trigger output
    # update/draw components on each frame

    # *text_BreakBetweenBlocks* updates
    if t >= 0.0 and text_BreakBetweenBlocks.status
== NOT_STARTED:
        # keep track of start time/frame for later
        text_BreakBetweenBlocks.tStart = t
        text_BreakBetweenBlocks.frameNStart =
frameN # exact frame index

text_BreakBetweenBlocks.setAutoDraw(True)

    # *key_resp_Continue* updates
    if t >= 0.0 and key_resp_Continue.status ==
NOT_STARTED:
        # keep track of start time/frame for later
        key_resp_Continue.tStart = t
        key_resp_Continue.frameNStart = frameN #
exact frame index
        key_resp_Continue.status = STARTED
        # keyboard checking is just starting

win.callOnFlip(key_resp_Continue.clock.reset) #
t=0 on next screen flip
    event.clearEvents(eventType='keyboard')
    if key_resp_Continue.status == STARTED:
        theseKeys = event.getKeys(keyList=['space'])

    # check for quit:
    if "escape" in theseKeys:
        endExpNow = True
    if len(theseKeys) > 0: # at least one key was
pressed
        key_resp_Continue.keys = theseKeys[-1] #
just the last key pressed

```

```

key_resp_Continue.rt =
key_resp_Continue.clock.getTime()
# a response ends the routine
continueRoutine = False

# check for quit (typically the Esc key)
if endExpNow or
event.getKeys(keyList=["escape"]):
    core.quit()

# check if all components have finished
if not continueRoutine: # a component has
requested a forced-end of Routine
    break
    continueRoutine = False # will revert to True if
at least one component still running
for thisComponent in
Break_Between_BlocksComponents:
    if hasattr(thisComponent, "status") and
thisComponent.status != FINISHED:
        continueRoutine = True
        break # at least one component has not yet
finished

# refresh the screen
if continueRoutine: # don't flip if this routine is
over or we'll get a blank screen
    win.flip()

# -----Ending Routine "Break_Between_Blocks"-
-----
for thisComponent in
Break_Between_BlocksComponents:
    if hasattr(thisComponent, "setAutoDraw"):
        thisComponent.setAutoDraw(False)
    # check responses
    if key_resp_Continue.keys in [',', [], None]: # No
response was made
        key_resp_Continue.keys=None

Loop_15Blocks.addData('key_resp_Continue.keys',k
ey_resp_Continue.keys)
    if key_resp_Continue.keys != None: # we had a
response
        Loop_15Blocks.addData('key_resp_Continue.rt',
key_resp_Continue.rt)
        # the Routine "Break_Between_Blocks" was not
non-slip safe, so reset the non-slip timer
        routineTimer.reset()
# completed 1 repeats of 'Loop_15Blocks'

# -----Prepare to start Routine "ThankYou"-----
t = 0
ThankYouClock.reset() # clock

```

```

frameN = -1
continueRoutine = True
routineTimer.add(10.000000)
# update component parameters for each repeat
# keep track of which components have finished
ThankYouComponents = [text_ThankYou]
for thisComponent in ThankYouComponents:
    if hasattr(thisComponent, 'status'):
        thisComponent.status = NOT_STARTED

# -----Start Routine "ThankYou"-----
while continueRoutine and routineTimer.getTime() > 0:
    # get current time
    t = ThankYouClock.getTime()
    frameN = frameN + 1 # number of completed
    frames (so 0 is the first frame)
    if parallelOutput: windll.inout32.Out32(port,
    int(0)) # zero trigger output
    # update/draw components on each frame

    # *text_ThankYou* updates
    if t >= 0.0 and text_ThankYou.status ==
    NOT_STARTED:
        # keep track of start time/frame for later
        text_ThankYou.tStart = t
        text_ThankYou.frameNStart = frameN # exact
        frame index
        text_ThankYou.setAutoDraw(True)
        frameRemains = 0.0 + 10-
        win.monitorFramePeriod * 0.75 # most of one frame
        period left
        if text_ThankYou.status == STARTED and t >=
        frameRemains:
            text_ThankYou.setAutoDraw(False)

    # check for quit (typically the Esc key)

```

```

    if endExpNow or
    event.getKeys(keyList=["escape"]):
        core.quit()

    # check if all components have finished
    if not continueRoutine: # a component has
    requested a forced-end of Routine
        break
    continueRoutine = False # will revert to True if at
    least one component still running
    for thisComponent in ThankYouComponents:
        if hasattr(thisComponent, "status") and
        thisComponent.status != FINISHED:
            continueRoutine = True
            break # at least one component has not yet
            finished

    # refresh the screen
    if continueRoutine: # don't flip if this routine is
    over or we'll get a blank screen
        win.flip()

# -----Ending Routine "ThankYou"-----
for thisComponent in ThankYouComponents:
    if hasattr(thisComponent, "setAutoDraw"):
        thisComponent.setAutoDraw(False)

# these shouldn't be strictly necessary (should auto-
save)
thisExp.saveAsWideText(filename+'.csv')
thisExp.saveAsPickle(filename)
logging.flush()
# make sure everything is closed down
thisExp.abort() # or data files will save again on exit
win.close()
core.quit()

```

8.37 EEG experiment: List 1 blocks

Note: In the Condition and Set columns, *F* = Filler item. Save for filler rows (which only specify the speaker accent and no manipulation for word type), the item description column describes the Word Type – SpeakerAccent – target word encountered – [target word constrained for semantically]. In the Condition column, values above 9 reflect Filler items.

Block	Item	Condition	Set	Description
1	402	F	F	Spanish
1	432	F	F	Spanish
1	390	F	F	Spanish
1	539	F	F	Spanish
1	277	7	31	Expected - Chinese - title - [title]
1	337	4	38	Expected - Spanish - fabric - [fabric]
1	344	2	39	FalseCognate - MUSE - ambience - [environment]
1	18	9	2	Anomalous - Chinese - choke - [fall in]
1	97	7	11	Expected - Chinese - vague - [vague]
1	76	4	9	Expected - Spanish - rope - [rope]
1	264	3	30	Anomalous - MUSE - humor - [personality]
1	258	6	29	Anomalous - Spanish - demand - [fight]
1	223	7	25	Expected - Chinese - advertisements - [advertisements]
1	31	4	4	Expected - Spanish - direction - [direction]
1	454	F	F	Chinese
1	417	F	F	Spanish
1	293	5	33	FalseCognate - Spanish - mass - [dough]
1	428	F	F	MUSE
1	503	F	F	MUSE
1	378	F	F	Spanish
1	53	8	6	FalseCognate - Chinese - globes - [balloons]
1	64	1	8	Expected - MUSE - blank - [blank]
1	56	2	7	FalseCognate - MUSE - insecure - [dangerous]
1	340	7	38	Expected - Chinese - fabric - [fabric]
1	17	8	2	FalseCognate - Chinese - choke - [crash]
1	274	4	31	Expected - Spanish - title - [title]
1	533	F	F	MUSE
1	174	3	20	Anomalous - MUSE - constipated - [confused]
1	206	8	23	FalseCognate - Chinese - departments - [apartments]
1	261	9	29	Anomalous - Chinese - demand - [fight]
1	159	6	18	Anomalous - Spanish - cancel - [try it]
1	30	3	4	Anomalous - MUSE - direction - [number]
1	22	4	3	Expected - Spanish - crude - [crude]
1	83	2	10	FalseCognate - MUSE - quiet - [still]
1	8	8	1	FalseCognate - Chinese - bland - [soft]
1	210	3	24	Anomalous - MUSE - mark - [sign]
2	49	4	6	Expected - Spanish - globes - [globes]

2	462	F	F	Spanish
2	118	1	14	Expected - MUSE-Sane - [sane]
2	509	F	F	MUSE
2	112	4	13	Expected - Spanish - clear - [clear]
2	74	2	9	FalseCognate - MUSE - rope - [clothes]
2	338	5	38	FalseCognate - Spanish - fabric - [factory]
2	370	F	F	Chinese
2	243	9	27	Anomalous - Chinese - code - [glass]
2	128	2	15	FalseCognate - MUSE - bank - [bench]
2	415	F	F	Chinese
2	314	8	35	FalseCognate - Chinese - red - [net]
2	279	9	31	Anomalous - Chinese - title - [money]
2	1	1	1	Expected - MUSE - bland - [bland]
2	23	5	3	FalseCognate - Spanish - crude - [raw]
2	44	8	5	FalseCognate - Chinese-embarrassed - [pregnant]
2	304	7	34	Expected - Chinese - firm - [firm]
2	200	2	23	FalseCognate - MUSE - departments - [apartments]
2	491	F	F	MUSE
2	530	F	F	MUSE
2	75	3	9	Anomalous - MUSE - rope - [shoes]
2	360	9	40	Anomalous - Chinese - arena - [snow]
2	371	F	F	MUSE
2	122	5	14	FalseCognate - SpanishSane - [healthy]
2	427	F	F	Chinese
2	418	F	F	Chinese
2	208	1	24	Expected - MUSE - mark - [mark]
2	282	3	32	Anomalous - MUSEEffective - [fish]
2	342	9	38	Anomalous - Chinese - fabric - [family]
2	14	5	2	FalseCognate - Spanish - choke - [crash]
2	480	F	F	Spanish
2	107	8	12	FalseCognate - Chinese - large - [long]
2	295	7	33	Expected - Chinese - mass - [mass]
2	483	F	F	Spanish
2	511	F	F	Chinese
2	197	8	22	FalseCognate - Chinese - grabbing - [recording]
3	204	6	23	Anomalous - Spanish - departments - [instruments]
3	382	F	F	Chinese
3	21	3	3	Anomalous - MUSE - crude - [rough]
3	435	F	F	Spanish
3	405	F	F	Chinese
3	211	4	24	Expected - Spanish - mark - [mark]
3	263	2	30	FalseCognate - MUSE - humor - [mood]
3	230	5	26	FalseCognate - Spanish - pan - [bread]
3	134	8	15	FalseCognate - Chinese - bank - [bench]

3	460	F	F	Chinese
3	335	2	38	FalseCognate - MUSE - fabric - [factory]
3	320	5	36	FalseCognate - Spanish - lecture - [reading]
3	496	F	F	Spanish
3	537	F	F	MUSE
3	145	1	17	Expected - MUSEExits - [exits]
3	221	5	25	FalseCognate - Spanish - advertisements - [warnings]
3	365	F	F	MUSE
3	26	8	3	FalseCognate - Chinese - crude - [raw]
3	199	1	23	Expected - MUSE - departments - [departments]
3	408	F	F	Spanish
3	436	F	F	Chinese
3	260	8	29	FalseCognate - Chinese - demand - [sue]
3	262	1	30	Expected - MUSE - humor - [humor]
3	123	6	14	Anomalous - SpanishSane - [awake]
3	463	F	F	Chinese
3	286	7	32	Expected - ChineseEffective - [effective]
3	181	1	21	Expected - MUSE - removed - [removed]
3	498	F	F	Spanish
3	528	F	F	Spanish
3	150	6	17	Anomalous - SpanishExits - [friends]
3	154	1	18	Expected - MUSE - cancel - [cancel]
3	377	F	F	MUSE
3	20	2	3	FalseCognate - MUSE - crude - [raw]
3	144	9	16	Anomalous - Chinese - carpet - [property]
3	407	F	F	MUSE
3	429	F	F	Spanish
4	253	1	29	Expected - MUSE - demand - [demand]
4	164	2	19	FalseCognate - MUSE - assist - [attend]
4	16	7	2	Expected - Chinese - choke - [choke]
4	86	5	10	FalseCognate - Spanish - quiet - [still]
4	283	4	32	Expected - SpanishEffective - [effective]
4	231	6	26	Anomalous - Spanish - pan - [fork]
4	487	F	F	Chinese
4	516	F	F	Spanish
4	94	4	11	Expected - Spanish - vague - [vague]
4	155	2	18	FalseCognate - MUSE - cancel - [pay]
4	222	6	25	Anomalous - Spanish - advertisements - [openings]
4	19	1	3	Expected - MUSE - crude - [crude]
4	143	8	16	FalseCognate - Chinese - carpet - [folder]
4	398	F	F	MUSE
4	315	9	35	Anomalous - Chinese - red - [key]
4	440	F	F	MUSE
4	188	8	21	FalseCognate - Chinese - removed - [stirred]

4	459	F	F	Spanish
4	82	1	10	Expected - MUSE - quiet - [quiet]
4	285	6	32	Anomalous - SpanishEffective - [fish]
4	349	7	39	Expected - Chinese - ambience - [ambience]
4	501	F	F	Spanish
4	226	1	26	Expected - MUSE - pan - [pan]
4	526	F	F	Spanish
4	62	8	7	FalseCognate - Chinese - insecure - [dangerous]
4	225	9	25	Anomalous - Chinese - advertisements - [openings]
4	46	1	6	Expected - MUSE - globes - [globes]
4	237	3	27	Anomalous - MUSE - code - [glass]
4	411	F	F	Spanish
4	214	7	24	Expected - Chinese - mark - [mark]
4	244	1	28	Expected - MUSE - posters - [posters]
4	152	8	17	FalseCognate - ChineseExits - [successes]
4	433	F	F	Spanish
4	256	4	29	Expected - Spanish - demand - [demand]
4	267	6	30	Anomalous - Spanish - humor - [personality]
4	165	3	19	Anomalous - MUSE - assist - [adopt]
5	485	F	F	MUSE
5	325	1	37	Expected - MUSE - goat - [goat]
5	518	F	F	MUSE
5	387	F	F	Chinese
5	34	7	4	Expected - Chinese - direction - [direction]
5	50	5	6	FalseCognate - Spanish - globes - [balloons]
5	242	8	27	FalseCognate - Chinese - code - [elbow]
5	394	F	F	Spanish
5	298	1	34	Expected - MUSE - firm - [firm]
5	250	7	28	Expected - Chinese - posters - [posters]
5	345	3	39	Anomalous - MUSE - ambience - [instrument]
5	449	F	F	Chinese
5	476	F	F	MUSE
5	151	7	17	Expected - ChineseExits - [exits]
5	167	5	19	FalseCognate - Spanish - assist - [attend]
5	508	F	F	Chinese
5	198	9	22	Anomalous - Chinese - grabbing - [reading]
5	70	7	8	Expected - Chinese - blank - [blank]
5	356	5	40	FalseCognate - Spanish - arena - [sand]
5	139	4	16	Expected - Spanish - carpet - [carpet]
5	189	9	21	Anomalous - Chinese - removed - [signed]
5	43	7	5	Expected - ChineseEmbarrassed - [embarrassed]
5	399	F	F	Spanish
5	101	2	12	FalseCognate - MUSE - large - [long]
5	162	9	18	Anomalous - Chinese - cancel - [tryit]

5	513	F	F	Spanish
5	437	F	F	MUSE
5	272	2	31	FalseCognate - MUSE - title - [degree]
5	470	F	F	MUSE
5	171	9	19	Anomalous - Chinese - assist - [adopt]
5	504	F	F	Spanish
5	32	5	4	FalseCognate - Spanish - direction - [address]
5	334	1	38	Expected - MUSE - fabric - [fabric]
5	355	4	40	Expected - Spanish - arena - [arena]
5	270	9	30	Anomalous - Chinese - humor - [personality]
5	240	6	27	Anomalous - Spanish - code - [glass]
6	71	8	8	FalseCognate - Chinese - blank - [white]
6	414	F	F	MUSE
6	91	1	11	Expected - MUSE - vague - [vague]
6	175	4	20	Expected - Spanish - constipated - [constipated]
6	192	3	22	Anomalous - MUSE - grabbing - [reading]
6	439	F	F	Chinese
6	59	5	7	FalseCognate - Spanish - insecure - [dangerous]
6	456	F	F	Spanish
6	220	4	25	Expected - Spanish - advertisements - [advertisements]
6	495	F	F	Chinese
6	48	3	6	Anomalous - MUSE - globes - [rings]
6	259	7	29	Expected - Chinese - demand - [demand]
6	297	9	33	Anomalous - Chinese - mass - [hair]
6	380	F	F	MUSE
6	323	8	36	FalseCognate - Chinese - lecture - [reading]
6	331	7	37	Expected - Chinese - goat - [goat]
6	395	F	F	MUSE
6	299	2	34	FalseCognate - MUSE - firm - [signature]
6	98	8	11	FalseCognate - Chinese - vague - [lazy]
6	534	F	F	Spanish
6	444	F	F	Spanish
6	108	9	12	Anomalous - Chinese - large - [light]
6	479	F	F	MUSE
6	276	6	31	Anomalous - Spanish - title - [money]
6	482	F	F	MUSE
6	216	9	24	Anomalous - Chinese - mark - [sign]
6	191	2	22	FalseCognate - MUSE - grabbing - [recording]
6	289	1	33	Expected - MUSE - mass - [mass]
6	381	F	F	Chinese
6	132	6	15	Anomalous - Spanish - bank - [book]
6	328	4	37	Expected - Spanish - goat - [goat]
6	404	F	F	MUSE
6	257	5	29	FalseCognate - Spanish - demand - [sue]

6	96	6	11	Anomalous - Spanish - vague - [mean]
6	219	3	25	Anomalous - MUSE - advertisements - [openings]
6	447	F	F	Spanish
7	170	8	19	FalseCognate - Chinese - assist - [attend]
7	6	6	1	Anomalous - Spanish - bland - [dry]
7	104	5	12	FalseCognate - Spanish - large - [long]
7	481	F	F	Chinese
7	524	F	F	MUSE
7	60	6	7	Anomalous - Spanish - insecure - [violent]
7	72	9	8	Anomalous - Chinese - blank - [clear]
7	305	8	34	FalseCognate - Chinese - firm - [signature]
7	209	2	24	FalseCognate - MUSE - mark - [brand]
7	42	6	5	Anomalous - SpanishEmbarrassed - [sick]
7	376	F	F	Chinese
7	358	7	40	Expected - Chinese - arena - [arena]
7	93	3	11	Anomalous - MUSE - vague - [mean]
7	29	2	4	FalseCognate - MUSE - direction - [address]
7	467	F	F	MUSE
7	24	6	3	Anomalous - Spanish - crude - [rough]
7	233	8	26	FalseCognate - Chinese - pan - [bread]
7	316	1	36	Expected - MUSE - lecture - [lecture]
7	494	F	F	Spanish
7	532	F	F	Chinese
7	111	3	13	Anomalous - MUSE - clear - [strong]
7	65	2	8	FalseCognate - MUSE - blank - [white]
7	133	7	15	Expected - Chinese - bank - [bank]
7	275	5	31	FalseCognate - Spanish - title - [degree]
7	287	8	32	FalseCognate - ChineseEffective - [cash]
7	375	F	F	Spanish
7	4	4	1	Expected - Spanish - bland - [bland]
7	213	6	24	Anomalous - Spanish - mark - [sign]
7	28	1	4	Expected - MUSE - direction - [direction]
7	464	F	F	MUSE
7	84	3	10	Anomalous - MUSE - quiet - [warm]
7	227	2	26	FalseCognate - MUSE - pan - [bread]
7	195	6	22	Anomalous - Spanish - grabbing - [reading]
7	493	F	F	Chinese
7	531	F	F	Spanish
7	99	9	11	Anomalous - Chinese - vague - [mean]
8	66	3	8	Anomalous - MUSE - blank - [clear]
8	55	1	7	Expected - MUSE - insecure - [insecure]
8	302	5	34	FalseCognate - Spanish - firm - [signature]
8	126	9	14	Anomalous - ChineseSane - [awake]
8	147	3	17	Anomalous - MUSEExits - [friends]

8	359	8	40	FalseCognate - Chinese - arena - [sand]
8	346	4	39	Expected - Spanish - ambience - [ambience]
8	366	F	F	Spanish
8	318	3	36	Anomalous - MUSE - lecture - [radio]
8	215	8	24	FalseCognate - Chinese - mark - [brand]
8	45	9	5	Anomalous - ChineseEmbarrassed - [sick]
8	194	5	22	FalseCognate - Spanish - grabbing - [recording]
8	506	F	F	MUSE
8	536	F	F	MUSE
8	27	9	3	Anomalous - Chinese - crude - [rough]
8	110	2	13	FalseCognate - MUSE - clear - [light]
8	58	4	7	Expected - Spanish - insecure - [insecure]
8	465	F	F	Chinese
8	306	9	34	Anomalous - Chinese - firm - [house]
8	235	1	27	Expected - MUSE - code - [code]
8	354	3	40	Anomalous - MUSE - arena - [snow]
8	169	7	19	Expected - Chinese - assist - [assist]
8	153	9	17	Anomalous - ChineseExits - [friends]
8	69	6	8	Anomalous - Spanish - blank - [clear]
8	119	2	14	FalseCognate - MUSEsane - [healthy]
8	40	4	5	Expected - SpanishEmbarrassed - [embarrassed]
8	351	9	39	Anomalous - Chinese - ambience - [instrument]
8	505	F	F	Chinese
8	403	F	F	Spanish
8	329	5	37	FalseCognate - Spanish - goat - [drop]
8	384	F	F	Spanish
8	525	F	F	Chinese
8	466	F	F	Spanish
8	131	5	15	FalseCognate - Spanish - bank - [bench]
8	300	3	34	Anomalous - MUSE - firm - [house]
8	425	F	F	MUSE
9	238	4	27	Expected - Spanish - code - [code]
9	203	5	23	FalseCognate - Spanish - departments - [apartments]
9	138	3	16	Anomalous - MUSE - carpet - [property]
9	80	8	9	FalseCognate - Chinese - rope - [clothes]
9	67	4	8	Expected - Spanish - blank - [blank]
9	95	5	11	FalseCognate - Spanish - vague - [lazy]
9	499	F	F	Chinese
9	419	F	F	MUSE
9	327	3	37	Anomalous - MUSE - goat - [drum]
9	372	F	F	Spanish
9	529	F	F	Chinese
9	474	F	F	Spanish
9	168	6	19	Anomalous - Spanish - assist - [adopt]

9	135	9	15	Anomalous - Chinese - bank - [book]
9	446	F	F	MUSE
9	179	8	20	FalseCognate - Chinese - constipated - [congested]
9	202	4	23	Expected - Spanish - departments - [departments]
9	353	2	40	FalseCognate - MUSE - arena - [sand]
9	252	9	28	Anomalous - Chinese - posters - [diamonds]
9	303	6	34	Anomalous - Spanish - firm - [house]
9	310	4	35	Expected - Spanish - red - [red]
9	490	F	F	Chinese
9	410	F	F	Chinese
9	182	2	21	FalseCognate - MUSE - removed - [stirred]
9	364	F	F	Chinese
9	514	F	F	Chinese
9	478	F	F	Spanish
9	38	2	5	FalseCognate - MUSEEmbarrassed - [pregnant]
9	347	5	39	FalseCognate - Spanish - ambience - [environment]
9	441	F	F	Spanish
9	341	8	38	FalseCognate - Chinese - fabric - [factory]
9	137	2	16	FalseCognate - MUSE - carpet - [folder]
9	352	1	40	Expected - MUSE - arena - [arena]
9	78	6	9	Anomalous - Spanish - rope - [shoes]
9	251	8	28	FalseCognate - Chinese - posters - [desserts]
9	309	3	35	Anomalous - MUSE - red - [key]
10	280	1	32	Expected - MUSEEffective - [effective]
10	400	F	F	Chinese
10	254	2	29	FalseCognate - MUSE - demand - [sue]
10	374	F	F	MUSE
10	321	6	36	Anomalous - Spanish - lecture - [radio]
10	469	F	F	Chinese
10	92	2	11	FalseCognate - MUSE - vague - [lazy]
10	178	7	20	Expected - Chinese - constipated - [constipated]
10	422	F	F	MUSE
10	193	4	22	Expected - Spanish - grabbing - [grabbing]
10	290	2	33	FalseCognate - MUSE - mass - [dough]
10	224	8	25	FalseCognate - Chinese - advertisements - [warnings]
10	79	7	9	Expected - Chinese - rope - [rope]
10	103	4	12	Expected - Spanish - large - [large]
10	538	F	F	Chinese
10	57	3	7	Anomalous - MUSE - insecure - [violent]
10	420	F	F	Spanish
10	7	7	1	Expected - Chinese - bland - [bland]
10	379	F	F	Spanish
10	255	3	29	Anomalous - MUSE - demand - [fight]
10	453	F	F	Spanish

10	317	2	36	FalseCognate - MUSE - lecture - [reading]
10	124	7	14	Expected - ChineseSane - [sane]
10	443	F	F	MUSE
10	157	4	18	Expected - Spanish - cancel - [cancel]
10	294	6	33	Anomalous - Spanish - mass - [hair]
10	47	2	6	FalseCognate - MUSE - globes - [balloons]
10	77	5	9	FalseCognate - Spanish - rope - [clothes]
10	106	7	12	Expected - Chinese - large - [large]
10	273	3	31	Anomalous - MUSE - title - [money]
10	63	9	7	Anomalous - Chinese - insecure - [violent]
10	391	F	F	Chinese
10	11	2	2	FalseCognate - MUSE - choke - [crash]
10	368	F	F	MUSE
10	212	5	24	FalseCognate - Spanish - mark - [brand]
10	471	F	F	Chinese
11	89	8	10	FalseCognate - Chinese - quiet - [still]
11	120	3	14	Anomalous - MUSESane - [awake]
11	434	F	F	MUSE
11	36	9	4	Anomalous - Chinese - direction - [number]
11	161	8	18	FalseCognate - Chinese - cancel - [pay]
11	292	4	33	Expected - Spanish - mass - [mass]
11	268	7	30	Expected - Chinese - humor - [humor]
11	54	9	6	Anomalous - Chinese - globes - [rings]
11	489	F	F	Chinese
11	247	4	28	Expected - Spanish - posters - [posters]
11	413	F	F	MUSE
11	12	3	2	Anomalous - MUSE - choke - [fallin]
11	362	F	F	MUSE
11	81	9	9	Anomalous - Chinese - rope - [shoes]
11	461	F	F	MUSE
11	308	2	35	FalseCognate - MUSE - red - [net]
11	142	7	16	Expected - Chinese - carpet - [carpet]
11	448	F	F	Spanish
11	515	F	F	MUSE
11	301	4	34	Expected - Spanish - firm - [firm]
11	160	7	18	Expected - Chinese - cancel - [cancel]
11	266	5	30	FalseCognate - Spanish - humor - [mood]
11	278	8	31	FalseCognate - Chinese - title - [degree]
11	500	F	F	MUSE
11	115	7	13	Expected - Chinese - clear - [clear]
11	409	F	F	Chinese
11	13	4	2	Expected - Spanish - choke - [choke]
11	367	F	F	Chinese
11	248	5	28	FalseCognate - Spanish - posters - [desserts]

11	458	F	F	MUSE
11	322	7	36	Expected - Chinese - lecture - [lecture]
11	183	3	21	Anomalous - MUSE - removed - [signed]
11	421	F	F	Chinese
11	520	F	F	Chinese
11	41	5	5	FalseCognate - SpanishEmbarrassed - [pregnant]
11	234	9	26	Anomalous - Chinese - pan - [fork]
12	343	1	39	Expected - MUSE - ambience - [ambience]
12	88	7	10	Expected - Chinese - quiet - [quiet]
12	497	F	F	MUSE
12	113	5	13	FalseCognate - Spanish - clear - [light]
12	180	9	20	Anomalous - Chinese - constipated - [confused]
12	73	1	9	Expected - MUSE - rope - [rope]
12	389	F	F	MUSE
12	245	2	28	FalseCognate - MUSE - posters - [desserts]
12	475	F	F	Spanish
12	163	1	19	Expected - MUSE - assist - [assist]
12	187	7	21	Expected - Chinese - removed - [removed]
12	445	F	F	Chinese
12	527	F	F	MUSE
12	312	6	35	Anomalous - Spanish - red - [key]
12	127	1	15	Expected - MUSE - bank - [bank]
12	148	4	17	Expected - SpanishExits - [exits]
12	140	5	16	FalseCognate - Spanish - carpet - [folder]
12	488	F	F	MUSE
12	116	8	13	FalseCognate - Chinese - clear - [light]
12	100	1	12	Expected - MUSE - large - [large]
12	5	5	1	FalseCognate - Spanish - bland - [soft]
12	373	F	F	Chinese
12	333	9	37	Anomalous - Chinese - goat - [drum]
12	468	F	F	Spanish
12	10	1	2	Expected - MUSE - choke - [choke]
12	185	5	21	FalseCognate - Spanish - removed - [stirred]
12	426	F	F	Spanish
12	519	F	F	Spanish
12	196	7	22	Expected - Chinese - grabbing - [grabbing]
12	284	5	32	FalseCognate - SpanishEffective - [cash]
12	146	2	17	FalseCognate - MUSEExits - [successes]
12	401	F	F	MUSE
12	492	F	F	MUSE
12	176	5	20	FalseCognate - Spanish - constipated - [congested]
12	102	3	12	Anomalous - MUSE - large - [light]
12	25	7	3	Expected - Chinese - crude - [crude]
13	363	F	F	Spanish

13	2	2	1	FalseCognate - MUSE - bland - [soft]
13	457	F	F	Chinese
13	201	3	23	Anomalous - MUSE - departments - [instruments]
13	311	5	35	FalseCognate - Spanish - red - [net]
13	442	F	F	Chinese
13	522	F	F	Spanish
13	85	4	10	Expected - Spanish - quiet - [quiet]
13	326	2	37	FalseCognate - MUSE - goat - [drop]
13	350	8	39	FalseCognate - Chinese - ambience - [environment]
13	397	F	F	Chinese
13	507	F	F	Spanish
13	177	6	20	Anomalous - Spanish - constipated - [confused]
13	217	1	25	Expected - MUSE - advertisements - [advertisements]
13	129	3	15	Anomalous - MUSE - bank - [book]
13	383	F	F	MUSE
13	105	6	12	Anomalous - Spanish - large - [light]
13	473	F	F	MUSE
13	3	3	1	Anomalous - MUSE - bland - [dry]
13	313	7	35	Expected - Chinese - red - [red]
13	431	F	F	MUSE
13	540	F	F	Spanish
13	87	6	10	Anomalous - Spanish - quiet - [warm]
13	136	1	16	Expected - MUSE - carpet - [carpet]
13	336	3	38	Anomalous - MUSE - fabric - [family]
13	406	F	F	Chinese
13	510	F	F	Spanish
13	172	1	20	Expected - MUSE - constipated - [constipated]
13	357	6	40	Anomalous - Spanish - arena - [snow]
13	232	7	26	Expected - Chinese - pan - [pan]
13	361	F	F	Chinese
13	271	1	31	Expected - MUSE - title - [title]
13	451	F	F	MUSE
13	121	4	14	Expected - SpanishSane - [sane]
13	207	9	23	Anomalous - Chinese - departments - [instruments]
13	450	F	F	Chinese
14	523	F	F	Chinese
14	307	1	35	Expected - MUSE - red - [red]
14	90	9	10	Anomalous - Chinese - quiet - [warm]
14	186	6	21	Anomalous - Spanish - removed - [signed]
14	412	F	F	MUSE
14	484	F	F	Spanish
14	35	8	4	FalseCognate - Chinese - direction - [address]
14	288	9	32	Anomalous - ChineseEffective - [fish]
14	51	6	6	Anomalous - Spanish - globes - [rings]

14	386	F	F	MUSE
14	236	2	27	FalseCognate - MUSE - code - [elbow]
14	477	F	F	Chinese
14	330	6	37	Anomalous - Spanish - goat - [drum]
14	9	9	1	Anomalous - Chinese - bland - [dry]
14	438	F	F	Chinese
14	517	F	F	Chinese
14	141	6	16	Anomalous - Spanish - carpet - [property]
14	265	4	30	Expected - Spanish - humor - [humor]
14	109	1	13	Expected - MUSE - clear - [clear]
14	393	F	F	Spanish
14	486	F	F	Spanish
14	130	4	15	Expected - Spanish - bank - [bank]
14	156	3	18	Anomalous - MUSE - cancel - [tryit]
14	52	7	6	Expected - Chinese - globes - [globes]
14	385	F	F	Chinese
14	149	5	17	FalseCognate - SpanishExits - [successes]
14	455	F	F	MUSE
14	39	3	5	Anomalous - MUSEEmbarrassed - [sick]
14	33	6	4	Anomalous - Spanish - direction - [number]
14	430	F	F	Chinese
14	512	F	F	MUSE
14	228	3	26	Anomalous - MUSE - pan - [fork]
14	68	5	8	FalseCognate - Spanish - blank - [white]
14	114	6	13	Anomalous - Spanish - clear - [strong]
14	416	F	F	Spanish
14	502	F	F	Chinese
15	246	3	28	Anomalous - MUSE - posters - [diamonds]
15	158	5	18	FalseCognate - Spanish - cancel - [pay]
15	332	8	37	FalseCognate - Chinese - goat - [drop]
15	184	4	21	Expected - Spanish - removed - [removed]
15	369	F	F	Spanish
15	472	F	F	Chinese
15	269	8	30	FalseCognate - Chinese - humor - [mood]
15	281	2	32	FalseCognate - MUSEEffective - [cash]
15	423	F	F	Spanish
15	521	F	F	MUSE
15	61	7	7	Expected - Chinese - insecure - [insecure]
15	190	1	22	Expected - MUSE - grabbing - [grabbing]
15	239	5	27	FalseCognate - Spanish - code - [elbow]
15	396	F	F	Spanish
15	296	8	33	FalseCognate - Chinese - mass - [dough]
15	249	6	28	Anomalous - Spanish - posters - [diamonds]
15	324	9	36	Anomalous - Chinese - lecture - [radio]

15	205	7	23	Expected - Chinese - departments - [departments]
15	229	4	26	Expected - Spanish - pan - [pan]
15	388	F	F	Chinese
15	452	F	F	MUSE
15	339	6	38	Anomalous - Spanish - fabric - [family]
15	125	8	14	FalseCognate - ChineseSane - [healthy]
15	424	F	F	Chinese
15	535	F	F	Chinese
15	348	6	39	Anomalous - Spanish - ambience - [instrument]
15	173	2	20	FalseCognate - MUSE - constipated - [congested]
15	241	7	27	Expected - Chinese - code - [code]
15	392	F	F	MUSE
15	291	3	33	Anomalous - MUSE - mass - [hair]
15	218	2	25	FalseCognate - MUSE - advertisements - [warnings]
15	319	4	36	Expected - Spanish - lecture - [lecture]
15	117	9	13	Anomalous - Chinese - clear - [strong]
15	37	1	5	Expected - MUSEEmbarrassed - [embarrassed]
15	15	6	2	Anomalous - Spanish - choke - [fallin]
15	166	4	19	Expected - Spanish - assist - [assist]

8.38 EEG experiment: List 2 blocks

Note: In the Condition and Set columns, *F* = Filler item. Save for filler rows (which only specify the speaker accent and no manipulation for word type), the item description column describes the Word Type – SpeakerAccent – target word encountered – [target word constrained for semantically]. In the Condition column, values above 9 reflect Filler items.

Block	Item	Condition	Set	Item description
1	462	13	F	Spanish
1	385	10	F	Chinese
1	7	7	1	Expected - Chinese - bland - [bland]
1	26	8	3	FalseCognate - Chinese - crude - [raw]
1	526	15	F	Spanish
1	171	9	19	Anomalous - Chinese - assist - [adopt]
1	299	2	34	FalseCognate - MUSE - firm - [signature]
1	35	8	4	FalseCognate - Chinese - direction - [address]
1	185	5	21	FalseCognate - Spanish - removed - [stirred]
1	484	14	F	Spanish
1	57	3	7	Anomalous - MUSE - insecure - [violent]
1	445	12	F	Chinese
1	221	5	25	FalseCognate - Spanish - advertisements - [warnings]
1	172	1	20	Expected - MUSE - constipated - [constipated]
1	156	3	18	Anomalous - MUSE - cancel - [try it]
1	351	9	39	Anomalous - Chinese - ambience - [instrument]
1	392	11	F	MUSE
1	388	10	F	Chinese
1	19	1	3	Expected - MUSE - crude - [crude]
1	473	13	F	MUSE
1	531	15	F	Spanish
1	305	8	34	FalseCognate - Chinese - firm - [signature]
1	230	5	26	FalseCognate - Spanish - pan - [bread]
1	201	3	23	Anomalous - MUSE - departments - [instruments]
1	507	14	F	Spanish
1	76	4	9	Expected - Spanish - rope - [rope]
1	450	12	F	Chinese
1	223	7	25	Expected - Chinese - advertisements - [advertisements]
1	270	9	30	Anomalous - Chinese - humor - [personality]
1	5	5	1	FalseCognate - Spanish - bland - [soft]
1	335	2	38	FalseCognate - MUSE - fabric - [factory]
1	395	11	F	MUSE
1	367	10	F	Chinese
1	134	8	15	FalseCognate - Chinese - bank - [bench]
1	476	13	F	MUSE
1	290	2	33	FalseCognate - MUSE - mass - [dough]
2	96	6	11	Anomalous - Spanish - vague - [mean]
2	89	8	10	FalseCognate - Chinese - quiet - [still]

2	165	3	19	Anomalous - MUSE - assist - [adopt]
2	502	14	F	Chinese
2	256	4	29	Expected - Spanish - demand - [demand]
2	444	12	F	Spanish
2	147	3	17	Anomalous - MUSE - exits - [friends]
2	53	8	6	FalseCognate - Chinese - globes - [balloons]
2	4	4	1	Expected - Spanish - bland - [bland]
2	339	6	38	Anomalous - Spanish - fabric - [family]
2	399	11	F	Spanish
2	307	1	35	Expected - MUSE - red - [red]
2	131	5	15	FalseCognate - Spanish - bank - [bench]
2	463	13	F	Chinese
2	74	2	9	FalseCognate - MUSE - rope - [clothes]
2	246	3	28	Anomalous - MUSE - posters - [diamonds]
2	294	6	33	Anomalous - Spanish - mass - [hair]
2	387	10	F	Chinese
2	182	2	21	FalseCognate - MUSE - removed - [stirred]
2	111	3	13	Anomalous - MUSE - clear - [strong]
2	506	14	F	MUSE
2	60	6	7	Anomalous - Spanish - insecure - [violent]
2	199	1	23	Expected - MUSE - departments - [departments]
2	29	2	4	FalseCognate - MUSE - direction - [address]
2	287	8	32	FalseCognate - Chinese - effective - [cash]
2	393	11	F	Spanish
2	48	3	6	Anomalous - MUSE - globes - [rings]
2	308	2	35	FalseCognate - MUSE - red - [net]
2	454	13	F	Chinese
2	277	7	31	Expected - Chinese - title - [title]
2	75	3	9	Anomalous - MUSE - rope - [shoes]
2	213	6	24	Anomalous - Spanish - mark - [sign]
2	383	10	F	MUSE
2	261	9	29	Anomalous - Chinese - demand - [fight]
2	196	7	22	Expected - Chinese - grabbing - [grabbing]
2	423	12	F	Spanish
3	55	1	7	Expected - MUSE - insecure - [insecure]
3	540	15	F	Spanish
3	32	5	4	FalseCognate - Spanish - direction - [address]
3	90	9	10	Anomalous - Chinese - quiet - [warm]
3	397	11	F	Chinese
3	337	4	38	Expected - Spanish - fabric - [fabric]
3	163	1	19	Expected - MUSE - assist - [assist]
3	458	13	F	MUSE
3	278	8	31	FalseCognate - Chinese - title - [degree]
3	310	4	35	Expected - Spanish - red - [red]

3	10	1	2	Expected - MUSE - choke - [choke]
3	27	9	3	Anomalous - Chinese - crude - [rough]
3	240	6	27	Anomalous - Spanish - code - [glass]
3	373	10	F	Chinese
3	438	12	F	Chinese
3	181	1	21	Expected - MUSE - removed - [removed]
3	535	15	F	Chinese
3	33	6	4	Anomalous - Spanish - direction - [number]
3	212	5	24	FalseCognate - Spanish - mark - [brand]
3	402	11	F	Spanish
3	349	7	39	Expected - Chinese - ambience - [ambience]
3	101	2	12	FalseCognate - MUSE - large - [long]
3	456	13	F	Spanish
3	152	8	17	FalseCognate - Chinese - exits - [successes]
3	491	14	F	MUSE
3	136	1	16	Expected - MUSE - carpet - [carpet]
3	21	3	3	Anomalous - MUSE - crude - [rough]
3	116	8	13	FalseCognate - Chinese - clear - [light]
3	366	10	F	Spanish
3	424	12	F	Chinese
3	189	9	21	Anomalous - Chinese - removed - [signed]
3	539	15	F	Spanish
3	330	6	37	Anomalous - Spanish - goat - [drum]
3	215	8	24	FalseCognate - Chinese - mark - [brand]
3	420	11	F	Spanish
3	34	7	4	Expected - Chinese - direction - [direction]
4	58	4	7	Expected - Spanish - insecure - [insecure]
4	453	13	F	Spanish
4	345	3	39	Anomalous - MUSE - ambience - [instrument]
4	494	14	F	Spanish
4	197	8	22	FalseCognate - Chinese - grabbing - [recording]
4	22	4	3	Expected - Spanish - crude - [crude]
4	18	9	2	Anomalous - Chinese - choke - [fall in]
4	375	10	F	Spanish
4	448	12	F	Spanish
4	80	8	9	FalseCognate - Chinese - rope - [clothes]
4	516	15	F	Spanish
4	184	4	21	Expected - Spanish - removed - [removed]
4	214	7	24	Expected - Chinese - mark - [mark]
4	401	11	F	MUSE
4	6	6	1	Anomalous - Spanish - bland - [dry]
4	130	4	15	Expected - Spanish - bank - [bank]
4	455	13	F	MUSE
4	340	7	38	Expected - Chinese - fabric - [fabric]

4	482	14	F	MUSE
4	93	3	11	Anomalous - MUSE - vague - [mean]
4	315	9	35	Anomalous - Chinese - red - [key]
4	268	7	30	Expected - Chinese - humor - [humor]
4	372	10	F	Spanish
4	421	12	F	Chinese
4	159	6	18	Anomalous - Spanish - cancel - [try it]
4	521	15	F	MUSE
4	115	7	13	Expected - Chinese - clear - [clear]
4	300	3	34	Anomalous - MUSE - firm - [house]
4	418	11	F	Chinese
4	275	5	31	FalseCognate - Spanish - title - [degree]
4	187	7	21	Expected - Chinese - removed - [removed]
4	466	13	F	Spanish
4	235	1	27	Expected - MUSE - code - [code]
4	504	14	F	Spanish
4	209	2	24	FalseCognate - MUSE - mark - [brand]
4	323	8	36	FalseCognate - Chinese - lecture - [reading]
5	102	3	12	Anomalous - MUSE - large - [light]
5	369	10	F	Spanish
5	429	12	F	Spanish
5	65	2	8	FalseCognate - MUSE - blank - [white]
5	525	15	F	Chinese
5	120	3	14	Anomalous - MUSE - sane - [awake]
5	304	7	34	Expected - Chinese - firm - [firm]
5	407	11	F	MUSE
5	139	4	16	Expected - Spanish - carpet - [carpet]
5	150	6	17	Anomalous - Spanish - exits - [friends]
5	460	13	F	Chinese
5	194	5	22	FalseCognate - Spanish - grabbing - [recording]
5	499	14	F	Chinese
5	83	2	10	FalseCognate - MUSE - quiet - [still]
5	241	7	27	Expected - Chinese - code - [code]
5	251	8	28	FalseCognate - Chinese - posters - [desserts]
5	377	10	F	MUSE
5	427	12	F	Chinese
5	353	2	40	FalseCognate - MUSE - arena - [sand]
5	109	1	13	Expected - MUSE - clear - [clear]
5	108	9	12	Anomalous - Chinese - large - [light]
5	133	7	15	Expected - Chinese - bank - [bank]
5	396	11	F	Spanish
5	281	2	32	FalseCognate - MUSE - effective - [cash]
5	279	9	31	Anomalous - Chinese - title - [money]
5	472	13	F	Chinese

5	309	3	35	Anomalous - MUSE - red - [key]
5	487	14	F	Chinese
5	258	6	29	Anomalous - Spanish - demand - [fight]
5	126	9	14	Anomalous - Chinese - sane - [awake]
5	237	3	27	Anomalous - MUSE - code - [glass]
5	370	10	F	Chinese
5	422	12	F	MUSE
5	359	8	40	FalseCognate - Chinese - arena - [sand]
5	306	9	34	Anomalous - Chinese - firm - [house]
5	319	4	36	Expected - Spanish - lecture - [lecture]
6	151	7	17	Expected - Chinese - exits - [exits]
6	417	11	F	Spanish
6	135	9	15	Anomalous - Chinese - bank - [book]
6	62	8	7	FalseCognate - Chinese - insecure - [dangerous]
6	451	13	F	MUSE
6	227	2	26	FalseCognate - MUSE - pan - [bread]
6	510	14	F	Spanish
6	169	7	19	Expected - Chinese - assist - [assist]
6	522	15	F	Spanish
6	81	9	9	Anomalous - Chinese - rope - [shoes]
6	390	10	F	Spanish
6	441	12	F	Spanish
6	356	5	40	FalseCognate - Spanish - arena - [sand]
6	344	2	39	FalseCognate - MUSE - ambience - [environment]
6	100	1	12	Expected - MUSE - large - [large]
6	54	9	6	Anomalous - Chinese - globes - [rings]
6	398	11	F	MUSE
6	129	3	15	Anomalous - MUSE - bank - [book]
6	338	5	38	FalseCognate - Spanish - fabric - [factory]
6	470	13	F	MUSE
6	38	2	5	FalseCognate - MUSE - embarrassed - [pregnant]
6	495	14	F	Chinese
6	211	4	24	Expected - Spanish - mark - [mark]
6	536	15	F	MUSE
6	316	1	36	Expected - MUSE - lecture - [lecture]
6	371	10	F	MUSE
6	426	12	F	Spanish
6	229	4	26	Expected - Spanish - pan - [pan]
6	17	8	2	FalseCognate - Chinese - choke - [crash]
6	255	3	29	Anomalous - MUSE - demand - [fight]
6	180	9	20	Anomalous - Chinese - constipated - [confused]
6	414	11	F	MUSE
6	355	4	40	Expected - Spanish - arena - [arena]
6	70	7	8	Expected - Chinese - blank - [blank]

6	9	9	1	Anomalous - Chinese - bland - [dry]
6	92	2	11	FalseCognate - MUSE - vague - [lazy]
7	509	14	F	MUSE
7	283	4	32	Expected - Spanish - effective - [effective]
7	143	8	16	FalseCognate - Chinese - carpet - [folder]
7	322	7	36	Expected - Chinese - lecture - [lecture]
7	361	10	F	Chinese
7	442	12	F	Chinese
7	148	4	17	Expected - Spanish - exits - [exits]
7	190	1	22	Expected - MUSE - grabbing - [grabbing]
7	475	13	F	Spanish
7	177	6	20	Anomalous - Spanish - constipated - [confused]
7	405	11	F	Chinese
7	16	7	2	Expected - Chinese - choke - [choke]
7	271	1	31	Expected - MUSE - title - [title]
7	105	6	12	Anomalous - Spanish - large - [light]
7	254	2	29	FalseCognate - MUSE - demand - [sue]
7	505	14	F	Chinese
7	288	9	32	Anomalous - Chinese - effective - [fish]
7	61	7	7	Expected - Chinese - insecure - [insecure]
7	517	15	F	Chinese
7	382	10	F	Chinese
7	432	12	F	Spanish
7	158	5	18	FalseCognate - Spanish - cancel - [pay]
7	348	6	39	Anomalous - Spanish - ambience - [instrument]
7	474	13	F	Spanish
7	175	4	20	Expected - Spanish - constipated - [constipated]
7	394	11	F	Spanish
7	298	1	34	Expected - MUSE - firm - [firm]
7	203	5	23	FalseCognate - Spanish - departments - [apartments]
7	31	4	4	Expected - Spanish - direction - [direction]
7	51	6	6	Anomalous - Spanish - globes - [rings]
7	496	14	F	Spanish
7	68	5	8	FalseCognate - Spanish - blank - [white]
7	43	7	5	Expected - Chinese - embarrassed - [embarrassed]
7	532	15	F	Chinese
7	217	1	25	Expected - MUSE - advertisements - [advertisements]
7	431	12	F	MUSE
8	379	10	F	Spanish
8	119	2	14	FalseCognate - MUSE - sane - [healthy]
8	459	13	F	Spanish
8	292	4	33	Expected - Spanish - mass - [mass]
8	400	11	F	Chinese
8	23	5	3	FalseCognate - Spanish - crude - [raw]

8	205	7	23	Expected - Chinese - departments - [departments]
8	282	3	32	Anomalous - MUSE - effective - [fish]
8	357	6	40	Anomalous - Spanish - arena - [snow]
8	492	14	F	MUSE
8	95	5	11	FalseCognate - Spanish - vague - [lazy]
8	82	1	10	Expected - MUSE - quiet - [quiet]
8	530	15	F	MUSE
8	219	3	25	Anomalous - MUSE - advertisements - [openings]
8	436	12	F	Chinese
8	191	2	22	FalseCognate - MUSE - grabbing - [recording]
8	329	5	37	FalseCognate - Spanish - goat - [drop]
8	477	13	F	Chinese
8	162	9	18	Anomalous - Chinese - cancel - [try it]
8	406	11	F	Chinese
8	69	6	8	Anomalous - Spanish - blank - [clear]
8	376	10	F	Chinese
8	280	1	32	Expected - MUSE - effective - [effective]
8	153	9	17	Anomalous - Chinese - exits - [friends]
8	498	14	F	Spanish
8	312	6	35	Anomalous - Spanish - red - [key]
8	352	1	40	Expected - MUSE - arena - [arena]
8	523	15	F	Chinese
8	142	7	16	Expected - Chinese - carpet - [carpet]
8	449	12	F	Chinese
8	253	1	29	Expected - MUSE - demand - [demand]
8	104	5	12	FalseCognate - Spanish - large - [long]
8	112	4	13	Expected - Spanish - clear - [clear]
8	242	8	27	FalseCognate - Chinese - code - [elbow]
8	415	11	F	Chinese
8	78	6	9	Anomalous - Spanish - rope - [shoes]
9	234	9	26	Anomalous - Chinese - pan - [fork]
9	208	1	24	Expected - MUSE - mark - [mark]
9	273	3	31	Anomalous - MUSE - title - [money]
9	508	14	F	Chinese
9	311	5	35	FalseCognate - Spanish - red - [net]
9	360	9	40	Anomalous - Chinese - arena - [snow]
9	534	15	F	Spanish
9	141	6	16	Anomalous - Spanish - carpet - [property]
9	443	12	F	MUSE
9	259	7	29	Expected - Chinese - demand - [demand]
9	333	9	37	Anomalous - Chinese - goat - [drum]
9	20	2	3	FalseCognate - MUSE - crude - [raw]
9	1	1	1	Expected - MUSE - bland - [bland]
9	404	11	F	MUSE

9	324	9	36	Anomalous - Chinese - lecture - [radio]
9	161	8	18	FalseCognate - Chinese - cancel - [pay]
9	267	6	30	Anomalous - Spanish - humor - [personality]
9	84	3	10	Anomalous - MUSE - quiet - [warm]
9	176	5	20	FalseCognate - Spanish - constipated - [congested]
9	45	9	5	Anomalous - Chinese - embarrassed - [sick]
9	490	14	F	Chinese
9	515	15	F	MUSE
9	138	3	16	Anomalous - MUSE - carpet - [property]
9	437	12	F	MUSE
9	302	5	34	FalseCognate - Spanish - firm - [signature]
9	226	1	26	Expected - MUSE - pan - [pan]
9	67	4	8	Expected - Spanish - blank - [blank]
9	276	6	31	Anomalous - Spanish - title - [money]
9	342	9	38	Anomalous - Chinese - fabric - [family]
9	320	5	36	FalseCognate - Spanish - lecture - [reading]
9	94	4	11	Expected - Spanish - vague - [vague]
9	132	6	15	Anomalous - Spanish - bank - [book]
9	154	1	18	Expected - MUSE - cancel - [cancel]
9	63	9	7	Anomalous - Chinese - insecure - [violent]
9	167	5	19	FalseCognate - Spanish - assist - [attend]
9	224	8	25	FalseCognate - Chinese - advertisements - [warnings]
10	524	15	F	MUSE
10	289	1	33	Expected - MUSE - mass - [mass]
10	140	5	16	FalseCognate - Spanish - carpet - [folder]
10	446	12	F	MUSE
10	228	3	26	Anomalous - MUSE - pan - [fork]
10	64	1	8	Expected - MUSE - blank - [blank]
10	493	14	F	Chinese
10	364	10	F	Chinese
10	210	3	24	Anomalous - MUSE - mark - [sign]
10	303	6	34	Anomalous - Spanish - firm - [house]
10	127	1	15	Expected - MUSE - bank - [bank]
10	2	2	1	FalseCognate - MUSE - bland - [soft]
10	97	7	11	Expected - Chinese - vague - [vague]
10	247	4	28	Expected - Spanish - posters - [posters]
10	77	5	9	FalseCognate - Spanish - rope - [clothes]
10	533	15	F	MUSE
10	56	2	7	FalseCognate - MUSE - insecure - [dangerous]
10	13	4	2	Expected - Spanish - choke - [choke]
10	430	12	F	Chinese
10	479	13	F	MUSE
10	408	11	F	Spanish
10	503	14	F	MUSE

10	365	10	F	MUSE
10	243	9	27	Anomalous - Chinese - code - [glass]
10	257	5	29	FalseCognate - Spanish - demand - [sue]
10	336	3	38	Anomalous - MUSE - fabric - [family]
10	346	4	39	Expected - Spanish - ambience - [ambience]
10	91	1	11	Expected - MUSE - vague - [vague]
10	160	7	18	Expected - Chinese - cancel - [cancel]
10	39	3	5	Anomalous - MUSE - embarrassed - [sick]
10	527	15	F	MUSE
10	326	2	37	FalseCognate - MUSE - goat - [drop]
10	79	7	9	Expected - Chinese - rope - [rope]
10	447	12	F	Spanish
10	461	13	F	MUSE
10	391	11	F	Chinese
11	244	1	28	Expected - MUSE - posters - [posters]
11	14	5	2	FalseCognate - Spanish - choke - [crash]
11	501	14	F	Spanish
11	200	2	23	FalseCognate - MUSE - departments - [apartments]
11	114	6	13	Anomalous - Spanish - clear - [strong]
11	347	5	39	FalseCognate - Spanish - ambience - [environment]
11	25	7	3	Expected - Chinese - crude - [crude]
11	263	2	30	FalseCognate - MUSE - humor - [mood]
11	301	4	34	Expected - Spanish - firm - [firm]
11	520	15	F	Chinese
11	284	5	32	FalseCognate - Spanish - effective - [cash]
11	272	2	31	FalseCognate - MUSE - title - [degree]
11	188	8	21	FalseCognate - Chinese - removed - [stirred]
11	480	13	F	Spanish
11	86	5	10	FalseCognate - Spanish - quiet - [still]
11	250	7	28	Expected - Chinese - posters - [posters]
11	411	11	F	Spanish
11	481	14	F	Chinese
11	207	9	23	Anomalous - Chinese - departments - [instruments]
11	49	4	6	Expected - Spanish - globes - [globes]
11	381	10	F	Chinese
11	164	2	19	FalseCognate - MUSE - assist - [attend]
11	124	7	14	Expected - Chinese - sane - [sane]
11	220	4	25	Expected - Spanish - advertisements - [advertisements]
11	528	15	F	Spanish
11	8	8	1	FalseCognate - Chinese - bland - [soft]
11	232	7	26	Expected - Chinese - pan - [pan]
11	103	4	12	Expected - Spanish - large - [large]
11	457	13	F	Chinese
11	434	12	F	MUSE

11	248	5	28	FalseCognate - Spanish - posters - [desserts]
11	413	11	F	MUSE
11	173	2	20	FalseCognate - MUSE - constipated - [congested]
11	204	6	23	Anomalous - Spanish - departments - [instruments]
11	238	4	27	Expected - Spanish - code - [code]
11	368	10	F	MUSE
12	11	2	2	FalseCognate - MUSE - choke - [crash]
12	122	5	14	FalseCognate - Spanish - sane - [healthy]
12	225	9	25	Anomalous - Chinese - advertisements - [openings]
12	343	1	39	Expected - MUSE - ambience - [ambience]
12	354	3	40	Anomalous - MUSE - arena - [snow]
12	157	4	18	Expected - Spanish - cancel - [cancel]
12	117	9	13	Anomalous - Chinese - clear - [strong]
12	468	13	F	Spanish
12	37	1	5	Expected - MUSE - embarrassed - [embarrassed]
12	249	6	28	Anomalous - Spanish - posters - [diamonds]
12	483	14	F	Spanish
12	518	15	F	MUSE
12	202	4	23	Expected - Spanish - departments - [departments]
12	321	6	36	Anomalous - Spanish - lecture - [radio]
12	46	1	6	Expected - MUSE - globes - [globes]
12	12	3	2	Anomalous - MUSE - choke - [fall in]
12	121	4	14	Expected - Spanish - sane - [sane]
12	186	6	21	Anomalous - Spanish - removed - [signed]
12	350	8	39	FalseCognate - Chinese - ambience - [environment]
12	416	11	F	Spanish
12	428	12	F	MUSE
12	231	6	26	Anomalous - Spanish - pan - [fork]
12	469	13	F	Chinese
12	71	8	8	FalseCognate - Chinese - blank - [white]
12	252	9	28	Anomalous - Chinese - posters - [diamonds]
12	42	6	5	Anomalous - Spanish - embarrassed - [sick]
12	538	15	F	Chinese
12	206	8	23	FalseCognate - Chinese - departments - [apartments]
12	317	2	36	FalseCognate - MUSE - lecture - [reading]
12	50	5	6	FalseCognate - Spanish - globes - [balloons]
12	193	4	22	Expected - Spanish - grabbing - [grabbing]
12	118	1	14	Expected - MUSE - sane - [sane]
12	107	8	12	FalseCognate - Chinese - large - [long]
12	293	5	33	FalseCognate - Spanish - mass - [dough]
12	412	11	F	MUSE
12	389	10	F	MUSE
13	233	8	26	FalseCognate - Chinese - pan - [bread]
13	149	5	17	FalseCognate - Spanish - exits - [successes]

13	137	2	16	FalseCognate - MUSE - carpet - [folder]
13	30	3	4	Anomalous - MUSE - direction - [number]
13	341	8	38	FalseCognate - Chinese - fabric - [factory]
13	511	15	F	Chinese
13	245	2	28	FalseCognate - MUSE - posters - [desserts]
13	328	4	37	Expected - Spanish - goat - [goat]
13	478	13	F	Spanish
13	52	7	6	Expected - Chinese - globes - [globes]
13	260	8	29	FalseCognate - Chinese - demand - [sue]
13	40	4	5	Expected - Spanish - embarrassed - [embarrassed]
13	318	3	36	Anomalous - MUSE - lecture - [radio]
13	403	11	F	Spanish
13	374	10	F	MUSE
13	486	14	F	Spanish
13	297	9	33	Anomalous - Chinese - mass - [hair]
13	73	1	9	Expected - MUSE - rope - [rope]
13	269	8	30	FalseCognate - Chinese - humor - [mood]
13	192	3	22	Anomalous - MUSE - grabbing - [reading]
13	513	15	F	Spanish
13	334	1	38	Expected - MUSE - fabric - [fabric]
13	239	5	27	FalseCognate - Spanish - code - [elbow]
13	216	9	24	Anomalous - Chinese - mark - [sign]
13	332	8	37	FalseCognate - Chinese - goat - [drop]
13	28	1	4	Expected - MUSE - direction - [direction]
13	113	5	13	FalseCognate - Spanish - clear - [light]
13	471	13	F	Chinese
13	44	8	5	FalseCognate - Chinese - embarrassed - [pregnant]
13	362	10	F	MUSE
13	15	6	2	Anomalous - Spanish - choke - [fall in]
13	47	2	6	FalseCognate - MUSE - globes - [balloons]
13	174	3	20	Anomalous - MUSE - constipated - [confused]
13	266	5	30	FalseCognate - Spanish - humor - [mood]
13	87	6	10	Anomalous - Spanish - quiet - [warm]
13	519	15	F	Spanish
14	218	2	25	FalseCognate - MUSE - advertisements - [warnings]
14	489	14	F	Chinese
14	313	7	35	Expected - Chinese - red - [red]
14	166	4	19	Expected - Spanish - assist - [assist]
14	146	2	17	FalseCognate - MUSE - exits - [successes]
14	198	9	22	Anomalous - Chinese - grabbing - [reading]
14	24	6	3	Anomalous - Spanish - crude - [rough]
14	440	12	F	MUSE
14	380	10	F	MUSE
14	155	2	18	FalseCognate - MUSE - cancel - [pay]

14	66	3	8	Anomalous - MUSE - blank - [clear]
14	179	8	20	FalseCognate - Chinese - constipated - [congested]
14	265	4	30	Expected - Spanish - humor - [humor]
14	123	6	14	Anomalous - Spanish - sane - [awake]
14	512	15	F	MUSE
14	296	8	33	FalseCognate - Chinese - mass - [dough]
14	497	14	F	MUSE
14	327	3	37	Anomalous - MUSE - goat - [drum]
14	410	11	F	Chinese
14	465	13	F	Chinese
14	128	2	15	FalseCognate - MUSE - bank - [bench]
14	85	4	10	Expected - Spanish - quiet - [quiet]
14	433	12	F	Spanish
14	386	10	F	MUSE
14	106	7	12	Expected - Chinese - large - [large]
14	72	9	8	Anomalous - Chinese - blank - [clear]
14	183	3	21	Anomalous - MUSE - removed - [signed]
14	314	8	35	FalseCognate - Chinese - red - [net]
14	178	7	20	Expected - Chinese - constipated - [constipated]
14	537	15	F	MUSE
14	264	3	30	Anomalous - MUSE - humor - [personality]
14	488	14	F	MUSE
14	286	7	32	Expected - Chinese - effective - [effective]
14	125	8	14	FalseCognate - Chinese - sane - [healthy]
14	452	13	F	MUSE
14	291	3	33	Anomalous - MUSE - mass - [hair]
15	331	7	37	Expected - Chinese - goat - [goat]
15	439	12	F	Chinese
15	378	10	F	Spanish
15	41	5	5	FalseCognate - Spanish - embarrassed - [pregnant]
15	358	7	40	Expected - Chinese - arena - [arena]
15	145	1	17	Expected - MUSE - exits - [exits]
15	419	11	F	MUSE
15	195	6	22	Anomalous - Spanish - grabbing - [reading]
15	529	15	F	Chinese
15	262	1	30	Expected - MUSE - humor - [humor]
15	485	14	F	MUSE
15	285	6	32	Anomalous - Spanish - effective - [fish]
15	36	9	4	Anomalous - Chinese - direction - [number]
15	467	13	F	MUSE
15	98	8	11	FalseCognate - Chinese - vague - [lazy]
15	168	6	19	Anomalous - Spanish - assist - [adopt]
15	425	12	F	MUSE
15	363	10	F	Spanish

15	3	3	1	Anomalous - MUSE - bland - [dry]
15	88	7	10	Expected - Chinese - quiet - [quiet]
15	325	1	37	Expected - MUSE - goat - [goat]
15	222	6	25	Anomalous - Spanish - advertisements - [openings]
15	274	4	31	Expected - Spanish - title - [title]
15	514	15	F	Chinese
15	144	9	16	Anomalous - Chinese - carpet - [property]
15	500	14	F	MUSE
15	409	11	F	Chinese
15	236	2	27	FalseCognate - MUSE - code - [elbow]
15	464	13	F	MUSE
15	295	7	33	Expected - Chinese - mass - [mass]
15	170	8	19	FalseCognate - Chinese - assist - [attend]
15	99	9	11	Anomalous - Chinese - vague - [mean]
15	384	10	F	Spanish
15	110	2	13	FalseCognate - MUSE - clear - [light]
15	435	12	F	Spanish
15	59	5	7	FalseCognate - Spanish - insecure - [dangerous]

8.39 EEG experiment: post-experiment survey items

Part I. What do you think this experiment was about? In other words, what do you think the researchers were testing for?

Part II. After listening to each of the 3 speakers' audio recordings in a randomized order, respondents answered the following 6 questions about the speaker's accent. The first four questions use a 5-point Likert scale and the last two use open ended text responses.³⁹

1. This person sounds like they are...
...from the UNITED STATES. - - - ...from ANOTHER COUNTRY.
2. This person sounds like they...
...HAVE spoken English their entire life. - - - ...HAVEN'T spoken English their entire life.
3. This person speaks in a way that is...
...EASY to understand. - - - - - ...DIFFICULT to understand.
4. In my daily life, I hear someone speak with this kind of accent...
...very INFREQUENTLY. - - - ...very FREQUENTLY.
5. Where specifically do you think this person is from?
6. Based on this person's voice recording, what else can you tell about them? (Feel free to provide single-word labels or longer descriptions. Among other things, you may include what you believe to be their general age, race/ethnicity, what other language(s) it sounds like they speak...etc.)

Part III.

1. **Are you a native speaker of English?** (Being a native speaker of English means that you have known it your entire life and are fluent).
 - Yes
 - No
2. **List all languages (other than English) that you know or have studied in any way.** If multiple, separate by commas and order from most to least proficient. If none, leave blank.
3. In what U.S. cities and states have you lived, and for how long? (e.g. Scranton, Pennsylvania for 4 years). If you've never lived in the U.S., write None.
4. **How long (in years) have you lived in the U.S.?**
5. Have you ever lived outside the U.S. for a period of more than 5 months?
 - No
 - Yes. (List the cities and countries, separated by commas) _____
6. **What is your race and/or ethnicity?** Select all that apply.
 - White
 - Black or African American
 - Latino or Hispanic

³⁹ Note: Save for the addition of a question about frequency of exposure, these questions are identical to those used in Accent Evaluation Survey. This ensures comparability and generalizability between the studies. It is crucial to include these questions on this questionnaire so that we can understand how the individual EEG subjects categorize and index the speakers' accents.

- Asian
 - Native Hawaiian or Pacific Islander
 - American Indian or Alaska Native
 - Other _____
7. **What is your age, in years?**
8. **Do people ever tell you that you have an accent when you speak English?**
- No
 - Yes (Specify what kind in the textbox) _____
9. **Do YOU think you have an accent when you speak English?**
- No
 - Yes (Specify what kind in the textbox) _____
10. **How often do you hear someone speaking English with a Chinese accent?**
Very INFREQUENTLY - - - - - Very FREQUENTLY (5-point Likert scale)
11. **How often do you hear someone speaking English with a Spanish accent?**
Very INFREQUENTLY - - - - - Very FREQUENTLY (5-point Likert scale)
12. **Can you hold a conversation in Spanish?**
- Yes, I am fluent in Spanish.
 - Yeah, but not fluently.
 - No.
13. **Which of the following best characterizes your language abilities in English and Spanish?**
- This question does not appear for respondents who answered 'No' to Question 10.*
- I speak both languages natively and fluently.
 - I speak English natively and studied Spanish in school. My English is better than my Spanish.
 - Other (explain in text box) _____
14. **Please include any comments, questions, or concerns about this survey here. If you have none, leave blank and proceed.**

8.40 EEG experiment: Spanish-English Bilingual Language Profile (BLP) survey

Note: The following 19 questions come from the BLP, a widely used sociolinguistic measurement instrument used to measure language dominance in bilingual speakers (Birdsong et. al., 2012).

Bilingual Language Profile: English-Spanish

We would like to ask you to help us by answering the following questions concerning your language history, use, attitudes, and proficiency. This survey was created with support from the Center for Open Educational Resources and Language Learning at the University of Texas at Austin to better understand the profiles of bilingual speakers in diverse settings with diverse backgrounds. The survey consists of 19 questions and will take less than 10 minutes to complete. This is not a test, so there are no right or wrong answers. Please answer every question and give your answers sincerely. Thank you very much for your help.

I. Biographical Information

Name	Today's Date	
Age	<input type="checkbox"/> Male / <input type="checkbox"/> Female	Current place of residence: city/state country
Highest level of formal education:	<input type="checkbox"/> Less than high school	<input type="checkbox"/> High school <input type="checkbox"/> Some college
	<input type="checkbox"/> College (B.A., B.S.)	<input type="checkbox"/> Some graduate school <input type="checkbox"/> Masters
	<input type="checkbox"/> PhD/MD/JD	<input type="checkbox"/> Other: _____

II. Language history

In this section, we would like you to answer some factual questions about your language history by placing a check in the appropriate box.

1. At what age did you start learning the following languages?

English

Since birth 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

Spanish

Since birth 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

2. At what age did you start to feel comfortable using the following languages?

English

As early as I can remember 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+ not yet

Spanish

As early as I can remember 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+ not yet

3. How many years of classes (grammar, history, math, etc.) have you had in the following languages (primary school through university)?

English
 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

Spanish
 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

4. How many years have you spent in a country/region where the following languages are spoken?

English
 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

Spanish
 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

5. How many years have you spent in a family where the following languages are spoken?

English
 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

Spanish
 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

6. How many years have you spent in a work environment where the following languages are spoken?

English
 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

Spanish
 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20+

III. Language use

In this section, we would like you to answer some questions about your language use by placing a check in the appropriate box. Total use for all languages in a given question should equal 100%.

7. In an average week, what percentage of the time do you use the following languages with friends?

English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Spanish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Other languages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

8. In an average week, what percentage of the time do you use the following languages with family?

English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Spanish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Other languages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

9. In an average week, what percentage of the time do you use the following languages at school/work?

English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Spanish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Other languages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

10. When you talk to yourself, how often do you talk to yourself in the following languages?

English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Spanish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Other languages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

11. When you count, how often do you count in the following languages?

English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Spanish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Other languages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

IV. Language proficiency

In this section, we would like you to rate your language proficiency by giving marks from 0 to 6.

		0=not well at all											6=very well
12. a.	How well do you speak English?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b. How well do you speak Spanish?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. a.	How well do you understand English?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b. How well do you understand Spanish?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. a.	How well do you read English?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b. How well do you read Spanish?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. a.	How well do you write English?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b. How well do you write Spanish?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

V. Language attitudes

In this section, we would like you to respond to statements about language attitudes by giving marks from 0-6.

		0=disagree												6=agree
16. a.	I feel like myself when I speak English.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. I feel like myself when I speak Spanish.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
17. a.	I identify with an English-speaking culture.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. I identify with a Spanish-speaking culture.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
18. a.	It is important to me to use (or eventually use) English like a native speaker.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. It is important to me to use (or eventually use) Spanish like a native speaker.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
19. a.	I want others to think I am a native speaker of English.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	b. I want others to think I am a native speaker of Spanish.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

8.41 EEG experiment: MATLAB code for pre-processing of EEG data

```

%% Define the function that will be called in...
%STEP_preprocess.m script (where .eeg data is
loaded)
function [dattl, tfr, proc] = STEP_pipeline(dataset,
proc)

%% NOTES:
% data is read and stored in single precision
% dataset is the full path to the .eeg dataset
% proc contains all user-supplied PROCessing
parameters
% dat refers to single-trial sensor responses
% tfr refers to single trial time-frequency
representation (wavelets)
% dattl is the timelock average
% STEP is the acronym for this experiment

%% Set trigger condition numbers
% 1-9 represent experimental conditions | 30 and 40
represent fillers
Conds = {'S 1'; 'S 2'; 'S 3'; 'S 4'; 'S 5'; 'S 6'; 'S 7'; 'S
8'; 'S 9'; 'S 30'; 'S 40'};

%% Start fieldtrip, toolbox used to process these data
addpath \ MATLAB\fieldtrip\fieldtrip-20180724'
ft_defaults

%% Setup the variables and subject ID
if ~exist('proc') || ~isfield(proc, 'subject')
    if iscell(dataset)
        dataname = dataset{1};
    else
        dataname = dataset;
    end
    [tokens, pos] = regexp(dataname, 'R([\d]{4})',
'tokens');
    sidx                = pos(1)+1;
    proc.subject        = dataname(sidx:sidx+3);
    proc.dataset        = dataset;
end

%% Plot the reference channels
if length(dataset) > 1
    [bads] = check_bad_refs(dataset);
else
    [bads] = check_bad_refs(dataset);
end

%% Load the raw data
cfg = [];
cfg.channel          = {'all', '-VEOG', '-AUD', '-
OPTO'};
cfg.padding          = 3; % 3 sec of padding for
filters
cfg.implicitref      = '29';
cfg.reref            = 'yes';
cfg.refchannel       = {'25', '29'};
cfg.hpfilter         = 'yes';
cfg.hpfreq           = 0.1;
cfg.hpfiltord        = 3;
cfg.dftfilter        = 'yes';
cfg.dftfreq          = [60 120 180];
cfg.precision        = 'single';

%% Epoch data with corrected trigger timings...
% as several trials were not automatically recorded
if iscell(dataset)
    [path name ext] = fileparts(dataset{1});
else
    [path name ext] = fileparts(dataset);
end
timing_file = dir([path '*_Data.mat']);
timing_file = timing_file.name;
timing = load([path '/' timing_file]);
targetTimings =
timing.EXP_TABLE.TargetWord_Sample;
trl = [];
trl(:,1) = floor(targetTimings - 150); % 0.3 sec
prestim
trl(:,2) = floor(targetTimings + 500); % 1 sec post-
stim
trl(:,3) = repmat(-150, length(targetTimings), 1);
trl(:,4) = timing.EXP_TABLE.Trigger;
cfg = [];
cfg.trl = trl; % now with updated target word timings
data_all = ft_redefinetrial(cfg, raw);
proc.trl = cfg.trl;
proc.varnames = {'PSYCHOPYTrigger'};
ntrials = length(cfg.trl);

%% View Data
cfg = [];
cfg.viewmode = 'butterfly';
ft_databrowser(cfg, data_all);

%% Mark/remove high impedance chans
if ~exist('proc') || ~isfield(proc, 'impedance')
    [proc.impedance.bads proc.impedance.imps...
proc.impedance.labels] =
get_high_impedance(dataset, 25);
end

%% Manually reject artifacts - initial sweep

```

```

if ~exist('proc') || ~isfield(proc, 'first_artfctdef')
    dummy = ft_rejectvisual([], data_all);
    proc.first_artfctdef = dummy.cfg.artfctdef;
    proc.first_picks = dummy.label;
    clear dummy
else
    proc.first_picks = data_all.label;
end

cfg = [];
cfg.artfctdef = proc.first_artfctdef;
data_rej1 = ft_rejectartifact(cfg, data_all);

cfg = [];
cfg.channel = proc.first_picks;
data_rej1 = ft_selectdata(cfg, data_rej1);

%% ICA (Independent Component Analysis)
%% signal processing method used to separate
%% independent sources linearly mixed in several
sensors.

if ~exist('proc') || ~isfield(proc, 'ica')
    [proc.ica.unmixing, proc.ica.topolabel,
    proc.ica.rej_comp,...
    proc.ica.comments, proc.ica.rank] = ...
    get_mandarin_ica(data_rej1,
    proc.first_artfctdef,...
    proc.first_picks);
end

% Unmix the lightly cleaned data...
cfg = [];
cfg.unmixing = proc.ica.unmixing;
cfg.topolabel = proc.ica.topolabel;
comp = ft_componentanalysis(cfg, data_rej1);

% ...then reject components
cfg = [];
cfg.component = proc.ica.rej_comp;
data_ica = ft_rejectcomponent(cfg,
comp, data_rej1);
clear comp

%% Manual trial rejections - final sweep
if ~exist('proc') || ~isfield(proc, 'second_artfctdef')
    dummy = ft_rejectvisual([],
data_ica);
    proc.second_artfctdef = dummy.cfg.artfctdef;
    proc.second_picks = dummy.label;
    clear dummy
end

cfg = [];

```

```

cfg.artfctdef = proc.second_artfctdef;
data_rej2 = ft_rejectartifact(cfg, data_ica);
cfg = [];
cfg.channel = proc.second_picks;
data_rej2 = ft_selectdata(cfg, data_rej2);
rejected_chans = setdiff(data_all.label,
proc.second_picks);

%proc.badchans = [rejected_chans(:);
proc.impedence.bads(:)];
proc.badchans = rejected_chans;

% tracks all rejected chans + high impedences
proc.numtrialrej = length(data_all.trial) -
length(data_rej2.trial);

%% Bad channels are replaced with nearest
neighbour interpolation
% Track rank for further data decomposition (e.g.
ICA, beamforming &c.)
proc.rank = length(data_all.label) - ... % bad
impedences already removed
length(proc.badchans) - ... % rejected chans +
bad impedences
length(proc.ica.rej_comp) + ...
length(proc.impedence.bads); % don't double-
count bad impedences!
if ~isempty(proc.badchans)
    cfg = [];
    cfg.method = 'template';
    cfg.template = 'easycapM10-
acti61_neighb.mat';
    neighbs = ft_prepare_neighbours(cfg);
    cfg = [];
    cfg.method = 'spline';
    cfg.badchannel = proc.badchans;
    cfg.neighbours = neighbs;
    cfg.elecfile = 'easycapM10-
acti61_elec.sfp';
    data_rej2 = ft_channelrepair(cfg, data_rej2);
end

%% Separate into the 9 experimental conditions
dat = {};
condition_integers = unique(data_rej2.trialinfo(:,1));
for c = 1:length(condition_integers)
    cfg = [];
    cfg.trials = find(data_rej2.trialinfo(:,1) ==
condition_integers(c));
    dat{c} = ft_selectdata(cfg, data_rej2);
end

%% Time-lock
dat1l = {};
for c = 1:length(dat) % 1:length(dat)

```



```

cfg = [];
cfg.preproc.lpfiler = 'yes';
cfg.preproc.lpfreq = 40;
cfg.preproc.demean = 'yes';
cfg.preproc.baselinewindow = [-.1 0];
cfg.keeptrials = 'yes';
dattl{c} = ft_timelockanalysis(cfg, dat{c});
end

%% Plot single channel: 4 = CPz
cfg = [];
cfg.channel = {'4' '33', '3', '5', '39' '40' '41'};
cfg.linewidth = 2;
cfg.ylim = [-10 10];
cfg.fontsize = 18;

subplot(1,3,1);
ft_singleplotER(cfg, dattl{1}, dattl{2}, dattl{3});
vline(0); hline(0);
legend NoErr SpanErr OthErr
title MUSE
box off

```

```

subplot(1,3,2);
ft_singleplotER(cfg, dattl{4}, dattl{5}, dattl{6});
vline(0); hline(0);
title Spanish
box off

subplot(1,3,3);
ft_singleplotER(cfg, dattl{7}, dattl{8}, dattl{9});
vline(0); hline(0);
title Chinese
box off

%% Plot whole head
figure;
cfg = [];
cfg.layout = 'easycapM10-acti61.lay';
ft_multiplotER(cfg, dattl{1}, dattl{3});

%% Save data to ProcessedData folder
cd '\ProcessedData'
fname = ['R' proc.subject '.mat'];
save(fname, 'dattl', 'proc')
end

```

8.42 EEG experiment: MATLAB code for plotting grouped data analyses

```

% Conditions by factor (SpeakerAccent, ErrorType):
% Condition 1: MUSE_ErrorNone
% Condition 2: MUSE_ErrorSpan
% Condition 3: MUSE_ErrorOther
% Condition 4: Spanish_ErrorNone
% Condition 5: Spanish_ErrorSpan
% Condition 6: Spanish_ErrorOther
% Condition 7: Chinese_ErrorNone
% Condition 8: Chinese_ErrorSpan
% Condition 9: Chinese_ErrorOther

%% Start fieldtrip
cd '\MATLAB\fieldtrip\fieldtrip-20180724'
ft_defaults

%% Load pre-processed data from the subjects who
do know Spanish (n = 9)
%% Load pre-processed datasets from the subjects
who do not know Spanish (n = 5)
datasets = dir('R*.mat');
datasets = {datasets(:).name};

% Switch subject > condition to condition > subject
alldat = {};
% for each dataset
for i = 1:length(datasets)
    load([datasets{i}]);
    % for each condition
    for j = 1:length(dattl)
        alldat{j}{i} = dattl{j};
    end
end

%% grandaverage
gavg = {};
for i = 1:length(alldat) % for each condition
    gavg{i} = ft_timelockgrandaverage([],
alldat{i}{:});
end

%% Multiplot: one each for RE and HN
cfg = [];
cfg.layout = 'easycapM10-acti61.lay';
ft_multiplotER(cfg, gavg{[1 2 3]}); %cond 1 2 3
MUSE across error type
saveas(gcf, 'figs/group_multiplot_MUSE.jpg');
saveas(gcf, 'figs/group_multiplot_RE.jpg'); %dpi
300, 200, 100
ft_multiplotER(cfg, gavg{[4 5 6]}); %Spanish-
accented speaker across word error type
saveas(gcf, 'figs/group_multiplot_Span.jpg');
ft_multiplotER(cfg, gavg{[7 8 9]}); %Chinese-
accented speaker across word error type
saveas(gcf, 'figs/group_multiplot_Chine.jpg');

%% Plotting data at the channel level
% individual ploy
cfg = [];
cfg.layout = 'easycapM10-acti61.lay';
cfg.xlim = [-0.3 1.0]; % -3-1
cfg.ylim = [-5 5]; % +-5 amplitude
cfg.channel = {'33' '3' '4' '5'}; % choose central for
N400 or could average
cfg.fontsize = 18;
cfg.linewidth = 2;
cfg.preproc.lpfiler = 'yes';
cfg.preproc.lpfreq = 10;
subplot(1,3,1)
ft_singleplotER(cfg, gavg{1:3}); title MUSE
legend NoErr SpanErr OthErr
legend boxoff
subplot(1,3,2)
ft_singleplotER(cfg, gavg{4:6}); title Span
subplot(1,3,3)
ft_singleplotER(cfg, gavg{7:9}); title Chin

%% Plot at Centro-posterior
figure
set(gcf, 'paperpositionmode', 'auto', 'position', [0 0
1000 400]);
cfg = [];
% cfg.channel = {'39', '40', '41', '4', '15', '14'};
% cfg.channel = {'40'};
% cfg.channel = {'15', '16', '17', '55', '56', '57'};
cfg.channel = {'3', '37', '38', '39', '11',
'12', '13', '14', '51', '52', '53'};
% cfg.channel = {'4', '33', '40', '54', '27'};
cfg.linewidth = 2;
cfg.fontsize = 18;
cfg.preproc.lpfiler = 'yes';
cfg.preproc.lpfreq = 20;
% cfg.graphcolor = [228,26,28; 55,126,184;
77,175,74]/255;
subplot(1,2,1)
ft_singleplotER(cfg, gavg{[6 17]});
ylim([-5 5]);
hline(0, 'k'); vline(0, 'k'); vline(0.6, 'k');
title(['HN, N = ' num2str(length(datasets))]);
box off
subplot(1,2,2)
ft_singleplotER(cfg, gavg{[30 41]});
ylim([-5 5]);
hline(0, 'k'); vline(0, 'k'); vline(0.6, 'k');
title(['HN, N = ' num2str(length(datasets))]);
box off
saveas(gcf, 'figs/group_cpz.jpg');

%% Make difference waves

```

```

cfg = [];
cfg.parameter = 'avg';
cfg.operation = 'x1-x2';
HN = {};
HN{1} = ft_math(cfg, gavg{6}, gavg{17}); % SmSr
- SmOr
HN{2} = ft_math(cfg, gavg{30}, gavg{41}); %
OmSr - OmOr

```

```

%% Single-plot difference waves
figure
set(gcf, 'paperpositionmode', 'auto', 'position', [0 0
1000 400]);
cfg = [];
cfg.channel = {'39', '40', '41', '4', '15', '14'};
cfg.linewidth = 2;
cfg.fontsize = 18;
cfg.preproc.lpfiler = 'yes';
cfg.preproc.lpfreq = 20;
subplot(1,2,2)
ft_singleplotER(cfg, HN{:});
ylim([-3 3]);
hline(0, 'k'); vline(0, 'k'); vline(0.6, 'k');
title(['HN, N = ' num2str(length(datasets))]);
box off
saveas(gcf, 'figs/group_diff_cpz.jpg');

```

```

%% Topo-plot difference waves
figure
set(gcf, 'paperpositionmode', 'auto', 'position', [0 0
1200 800]);
cfg = [];
cfg.style = 'straight';
cfg.comment = 'no';
cfg.zlim = [-2 2];
cfg.layout = 'easycapM10-acti61.lay';
tmin = [0 0.2 0.4 0.6 0.8];
tmax = [0.2 0.4 0.6 0.8 1.0];
for t = 1:length(tmin)
    cfg.xlim = [tmin(t) tmax(t)];
    subplot(4, 5, 0+t); ft_topoplotER(cfg, muse{1});
title([num2str(tmin(t)) '-' num2str(tmax(t)) 's']);
    subplot(4, 5, 5+t); ft_topoplotER(cfg, muse{2});
    subplot(4, 5, 10+t); ft_topoplotER(cfg, aave{1});
    subplot(4, 5, 15+t); ft_topoplotER(cfg, aave{2});
end
saveas(gcf, 'figs/group_diff_topoplot.jpg');

```

```

%% Stats Prep
cfg = [];
cfg.method = 'template';
cfg.template = 'easycapM10-acti61_neighb.mat';
neighbs = ft_prepare_neighbours(cfg);

```

```

%% Stats: Full Time Window

```

```

cfg = [];
cfg.latency = [0 1.8]; % main verb to onset of V2/V3
cfg.parameter = 'avg';
cfg.method = 'montecarlo';
cfg.correctm = 'cluster';
cfg.numrandomization = 10;
cfg.neighbours = neighbs;
cfg.clusteralpha = 0.05;
cfg.ivar = 1;
cfg.uvar = 2;
cfg.tail = 1;
cfg.statistic = 'depsamplesFunivariate';
cfg.design(1,:) = repelem(1:4, length(alldat{1})); %
Cond: 1 1 1 2 2 2 3 3 3...
cfg.design(2,:) = repelem(1:length(alldat{1}), 4); %
Subject: 1 2 3 1 2 3 1 2 3...
stat = ft_timelockstatistics(cfg, gavg{1}{6},
gavg{1}{17});
min(stat.prob(:)) % min(p) = 0.1548

```

```

%% Multiplot stat mask with data
statmask = zeros(size(gavg{1}.avg));
[~, ind] = intersect(gavg{1}.time, stat.time);
statmask(:, ind) = stat.prob < 0.06;
for i = 1:length(gavg)
    gavg{i}.mask = statmask;
end
cfg = [];
cfg.layout = 'easycapM10-acti61.lay';
cfg.maskparameter = 'mask';
ft_multiplotER(cfg, gavg{:});

```

8.43 EEG experiment: Avg N400 for subjects who do know Spanish (n = 9)

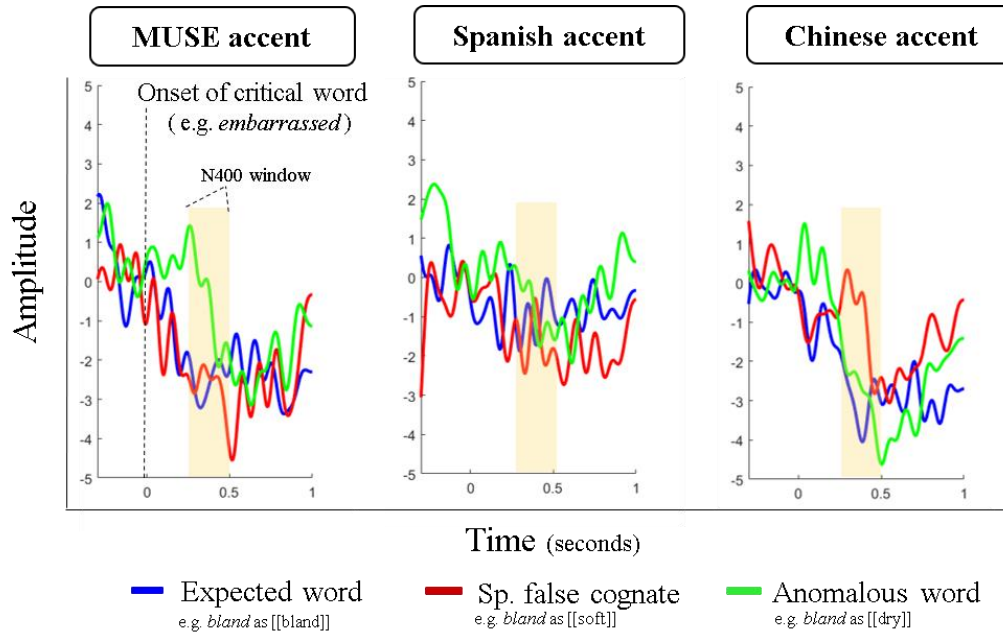
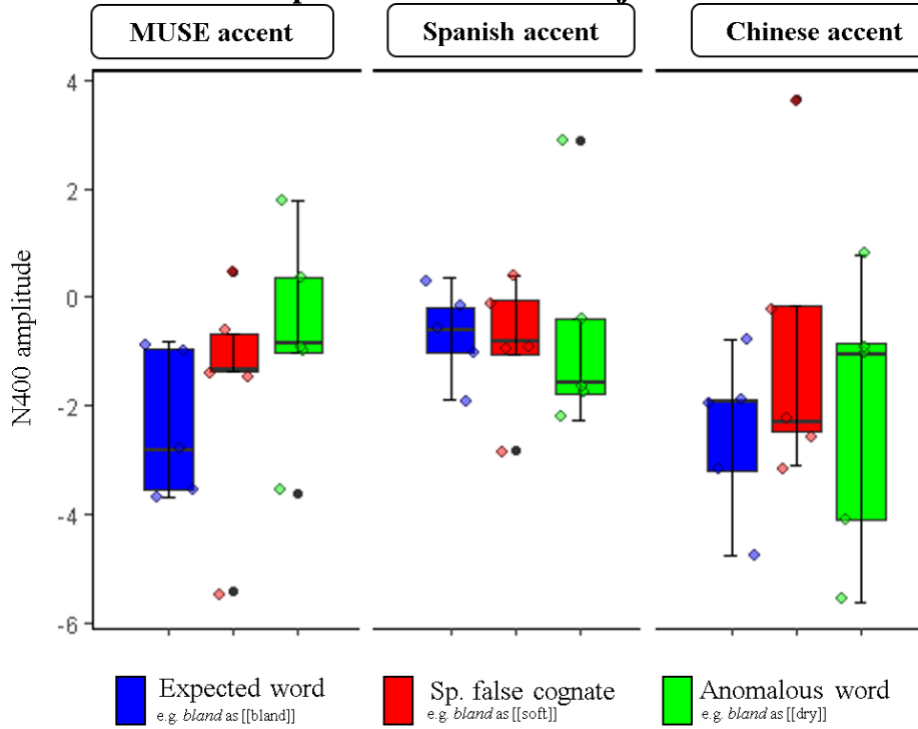
Speaker Accent	Word Type	Avg N400	Speaker Accent	Word Type	Avg N400
MUSE	Expected	-0.14	Spanish	FalseCognate	-1.06
MUSE	FalseCognate	-1.14	Spanish	Anomalous	-0.1
MUSE	Anomalous	-3.28	Chinese	Expected	-0.7
Spanish	Expected	-0.08	Chinese	FalseCognate	-2.63
Spanish	FalseCognate	1.12	Chinese	Anomalous	-1.8
Spanish	Anomalous	-2.42	MUSE	Expected	-0.41
Chinese	Expected	-1.05	MUSE	FalseCognate	2.68
Chinese	FalseCognate	-0.53	MUSE	Anomalous	0.96
Chinese	Anomalous	-1.57	Spanish	Expected	-1.17
MUSE	Expected	-1.45	Spanish	FalseCognate	0.25
MUSE	FalseCognate	-2.05	Spanish	Anomalous	-1.48
MUSE	Anomalous	-2.11	Chinese	Expected	0.41
Spanish	Expected	-2.06	Chinese	FalseCognate	-1.42
Spanish	FalseCognate	-3.91	Chinese	Anomalous	-1.54
Spanish	Anomalous	-3.55	MUSE	Expected	0.45
Chinese	Expected	-3.33	MUSE	FalseCognate	1.43
Chinese	FalseCognate	-2.11	MUSE	Anomalous	-1.92
Chinese	Anomalous	-1.25	Spanish	Expected	0.46
MUSE	Expected	-0.35	Spanish	FalseCognate	0.32
MUSE	FalseCognate	-4.59	Spanish	Anomalous	-1.57
MUSE	Anomalous	-0.86	Chinese	Expected	-0.18
Spanish	Expected	0.31	Chinese	FalseCognate	-1.81
Spanish	FalseCognate	-1.37	Chinese	Anomalous	-0.6
Spanish	Anomalous	-1.87	MUSE	Expected	-0.13
Chinese	Expected	-1.93	MUSE	FalseCognate	0.77
Chinese	FalseCognate	-2.05	MUSE	Anomalous	-1.2
Chinese	Anomalous	-3.25	Spanish	Expected	1.63
MUSE	Expected	-1.94	Spanish	FalseCognate	-1.36
MUSE	FalseCognate	-1.58	Spanish	Anomalous	-0.48
MUSE	Anomalous	-3.33	Chinese	Expected	-1.48
Spanish	Expected	-2.31	Chinese	FalseCognate	0.27
Spanish	FalseCognate	-3.29	Chinese	Anomalous	-0.64
Spanish	Anomalous	-3.07	MUSE	Expected	-0.37
Chinese	Expected	-1.63	MUSE	FalseCognate	-0.74
Chinese	FalseCognate	-0.03	MUSE	Anomalous	-1.37
Chinese	Anomalous	-1.98	Spanish	Expected	0.15
MUSE	Expected	-0.69	Spanish	FalseCognate	-0.01
MUSE	FalseCognate	-1.05	Spanish	Anomalous	-0.6
MUSE	Anomalous	-0.28	Chinese	Expected	-0.49
Spanish	Expected	-0.18	Chinese	FalseCognate	-1.45
			Chinese	Anomalous	0.1

8.44 EEG experiment: Avg N400 for subjects who do not know Spanish (n = 5)

Note: Each row represents an individual's average N400 response, given *Speaker Accent* and *Word Type*.

Speaker Accent	Word Type	Avg N400	Speaker Accent	Word Type	Avg N400
MUSE	Expected	-0.97	Spanish	FalseCognate	-2.82
MUSE	FalseCognate	-0.68	Spanish	Anomalous	-2.28
MUSE	Anomalous	-1.02	Chinese	Expected	-4.76
Spanish	Expected	-1.91	Chinese	FalseCognate	-3.11
Spanish	FalseCognate	-1.05	Chinese	Anomalous	-5.65
Spanish	Anomalous	-1.79	MUSE	Expected	-0.81
Chinese	Expected	-0.78	MUSE	FalseCognate	-1.34
Chinese	FalseCognate	-2.31	MUSE	Anomalous	0.35
Chinese	Anomalous	-1.06	Spanish	Expected	0.35
MUSE	Expected	-3.71	Spanish	FalseCognate	-0.06
MUSE	FalseCognate	0.47	Spanish	Anomalous	-0.42
MUSE	Anomalous	1.77	Chinese	Expected	-1.9
Spanish	Expected	-0.6	Chinese	FalseCognate	-0.17
Spanish	FalseCognate	0.4	Chinese	Anomalous	0.78
Spanish	Anomalous	2.89	MUSE	Expected	-2.83
Chinese	Expected	-3.2	MUSE	FalseCognate	-1.38
Chinese	FalseCognate	3.64	MUSE	Anomalous	-0.87
Chinese	Anomalous	-4.1	Spanish	Expected	-0.21
MUSE	Expected	-3.55	Spanish	FalseCognate	-0.82
MUSE	FalseCognate	-5.43	Spanish	Anomalous	-1.59
MUSE	Anomalous	-3.64	Chinese	Expected	-1.94
Spanish	Expected	-1.03	Chinese	FalseCognate	-2.49
			Chinese	Anomalous	-0.86

8.45 EEG experiment: N400s of subjects who do not know Spanish (n = 5)



8.46 EEG experiment: N400 results from non-Spanish-knowers (n = 5)

Two-Factor ANOVA with replication for subjects who do *not* know Spanish (n = 5)

Factor	df	Sum	Mean	F	Pr
		Sq	Sq		(>F)
Speaker Accent	2	10.4	5.2	1.4	0.27
Word Type	2	4.9	2.5	0.6	0.53
SpeakerAccent:WordType	4	9.8	2.5	0.6	0.64
Residuals	36	137.4	3.8		

Signif. codes: 0 '****' 0.001 '***' 0.01 '**' 0.05 '.' 0.1 ' ' 1

Chapter 5 Conclusion

In this section, I will briefly summarize and discuss the major findings and limitations of this dissertation. Taken together, this dissertation, which lies at the intersection of sociolinguistics and psycholinguistics, presents the three chapters that contribute to our scholarly understanding of social factors that can influence how contact language varieties are produced, perceived and processed. Based on the understanding that contact between speakers of different speech communities and language backgrounds yields complex and dynamic changes to how language users produce, perceive, and process language, I formulated three distinct research projects to understand more about how such processes can play out, delimiting my focus to Latina/o and Spanish-speaking communities.

Based on data from two studies that investigated auxiliary variation in Ecuadorian Andean Spanish (Chapter 2), I hypothesized that social factors related to language contact and dialect stigmatization may have altered (Quichua-) bilingual speakers' production of auxiliary verbs. While this study was originally designed to test a language contact hypothesis through data collection of a newly compiled spoken corpus, a data-dependent analysis comparing two distinct speech communities led to a post-hoc investigation of social identity construction. While it was hypothesized that Quichua-Spanish bilinguals may use auxiliary *ir* more than their Spanish monolingual counterparts, it was found that there was no statistically significant difference between the two groups usage of auxiliary *ir*. In fact, the Quichua-Spanish bilinguals used it, on average, less than Spanish monolinguals, which I interpreted as a possible argument for social

identity construction theory. In other words, the bilinguals tended to use the more standard alternative *estar* in lieu of *ir*, which may result from a tendency to avoid colloquial linguistic features in an effort to express overt linguistic prestige.

From a study that examined how U.S. listeners evaluated Latino English speech on measures of perceived foreignness (Chapter 3), I preliminarily found that Latino English speech was rated as “native-trending,” or more native-sounding than L2 speakers from abroad, but slightly more foreign than other L1 accents from the U.S. I did so by collecting speech samples from various English speaker accents, two of which were Spanish-influenced varieties of English: Latino English (L1) speech and Spanish-accented English (L2) speech. Survey respondents were asked to listen to the audio recordings from these speakers and were asked to rate them on several dimensions, two of which were nationality and language background. Such research into perceived foreignness is important in understanding how speaker accents and perceived social identity (i.e. nationality) are connected in the current sociolinguistic landscape.

Finally, from a neurolinguistic (EEG) study that considered how Spanish-English bilinguals processed false cognates from Spanish in English sentences (Chapter 4), I found initial evidence that speaker accent, a socially-indexed factor, may possibly affect parallel lexical access, as demonstrated through a slight – though, not significant – modulation in the N400 component. This chapter provided preliminary data that contributes to a larger body of emerging research with uses neurolinguistic tools to answer questions of sociolinguistic relevance.

Future research that aims to improve upon the three studies herein described will replicate these studies with larger sample sizes as well as improved experimental designs. For example, there was a constraint on generalizability for the data presented in Chapter 3, which resulted from the prioritization of keeping survey length feasible to reduce attentional fatigue in

survey respondents. To address this, a subsequent study will be conducted that increases the number of individual speakers used per critical accent condition and reduces the length of speech samples. The modest sample sizes presented in Chapter 3 and 4 were due to challenges of data collection, largely related to the complications of the COVID-19 pandemic. However, with the data available, meaningful patterns – while preliminary in nature - were identified and theoretical insights were obtained.

In conclusion, this dissertation contributes to the emerging field of experimental sociolinguistics, the aim of which is to uncover the many ways in which social factors influence how we produce, perceive, and process speech. Future research in this area will continue to document how changes in our social worlds – and to our sociolinguistic landscape – continue to transform the very structure of the language varieties we speak, the nature of our language attitudes, and even the way in which our brains adapt to processing human speech.