An Experimental Study on the Syntax of English and Egyptian Arabic: A Unified Account of Bilingual Grammatical Knowledge

by

Yourdanis Sedarous

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Linguistics)
in the University of Michigan
2022

Doctoral Committee:

Professor Marlyse Baptista, Co-chair
Professor Acrisio Pires, Co-chair
Professor Julie Boland
Assistant Professor Savithry Namboodiripad

Yourdanis Sedarous

sedarous@umich.edu

ORCID iD: 0000-0002-1968-1227

Dedication

To my dad, Hegumen Sedarous AbdelMessih Sedarous, none of this would have been possible without you.

Acknowledgements

So many amazing individuals have supported me in more ways than I can write, and I don't think I will do justice to their influence in these pages.

First, to my advisors - Marlyse Baptista and Acrisio Pires - "thank you" is not enough. I don't know how I got so blessed to have you two as the scholarly examples I was able to be trained by, and the affectionate support I was able to lean on, during these wildly formative years. You prioritized my academic and personal interests in every milestone, transition, and decision, advocating for me in ways I didn't know how to, and along the way you genuinely celebrated with me every accomplishment and mourned with me every hardship. My success and happiness was personal for you both, and I really felt that. From the very bottom of my heart, thank you *so* much, Marlyse and Acrisio.

Coming to Michigan for my PhD was one of the best decisions I've ever made. I was fortunate enough to spend six years working on topics that I enjoyed, but even more, because of the people I was surrounded by, I ended up having a lot of fun doing it - an experience I know is rare for grad school. To my committee members - Savithry Namboodiripad and Julie Boland - thank you! You taught me how to think critically about the big research question as I prep the design and analysis, and you made sure that I celebrated every single step of the way. To my cohort – Dominique Canning, Yu-Chuan (Lucy) Chiang, Andrew McInnerney, and Rachel Weissler – thank you! I couldn't have dreamed up a better group to enter this program with. To the graduate students at the University of Michigan – Aliaksei Akimenka, Ariana Bancu, Wyatt Barnes, Marcus Berger, Felicia Bisnath, Rawan Bonais, Dominique Bouavichith, Danielle Burgess, Lauretta

Cheng, Jeonghwa Cho, Justin Craft, Sophie Eakins, Wilkinson Gonzales, Hayley Heaton, Marjorie Herbert, Tamarae Hildebrandt, Demet Kayabaşi, Mathew Kramer, Chia-Wen Lo, Carrie Ann Morgan, Nik Nikolai, Joy Peltier, Emily Sabo, Moira Saltzman, Kate Sherwood, Cecilia Solis-Barroso, Yushi Sugimoto, Tzu-Yun Tung, Kelly Wright, and Jian Zhu - thank you! You made me look forward to coming to the department, and excited for Fridays in the grad lounge. To the Stevers – Alicia Stevers, Dan Stevers, Emmett Stevers, Sunny Stevers – thank you! You adopted me into your family, and your house will forever be a place I call home. To the post-docs who have come through - Emily Atkinson, Will Styler, and Stephen Tobin - thank you! You inspired me with your knowledge and generosity. To the faculty and staff at the University of Michigan – Steve Abney, Jon Brennan, Andries Coetzee, Nick Ellis, Sam Epstein, Jeff Heath, Sarah Heineken, Ezra Keshet, Lisa Levinson, Elaine McNulty, Valarie Murphree, Robin Queen, Talisha Reviere-Winston**,** Sally Thomason, and Anne-Michelle Tessier - thank you! You have helped me grow in significant ways both as a person and a scholar. To my first contact at Michigan – Jen Nguyen – thank you! I (we all!) would have been completely lost transitioning from undergraduate student, to PhD student, to PhD candidate, to PhD without you. To my academic role models – Natasha Abner, Pam Beddor, Jelena Krivokapić - thank you! It is rare to find individuals who are as equally brilliant and kind as you are; I think the world of you three. To my hosts at MIT – Athulya Aravind and Suzanne Flynn – thank you! You welcomed and supported me during my year at MIT, and I always left every one of our meetings with more energy and excitement about my work than when I entered. To my advisors from Ohio State – Peter Culicover, Brian Joseph, Amanda Miller, and Abby Walker – thank you! You took a chance on me when you introduced me to academia, linguistics, and research, and I will forever be grateful for your continued presence in my life. To the colleagues-turned-friends I've made along the way - Agnes Bi, Christian Clark, Emily Clem,

Ellen Dossey, Alexander Erdmann, Daven Hobbs, Antonio Hernandez, Vicki Lynn Krebs, Jordan Needle, Sarah Phillips, Connor Rouillier, and Anastasia Tsillia - thank you! Your friendship has been absolutely invaluable to me.

In addition to all the wonderful people I've met through academia, I've also been fortunate enough to have a strong community that reminds me of the beautiful life that exists outside of linguistics. To my childhood friends – Jasmyn Atalla, Leah Ayad, Marina David, Jacqueline Mekhail, Martine Saad, and Monica Saad – thank you! From birthdays, to graduations, to weddings, to funerals, we've seen each other through so much and grown stronger side-by-side. To my high school friends - Alison Knapke Emmons, Sarah Gleichauf, Rachel Moehrman, Marisa DePalma Punturi, and Anne Rader - thank you! It has been such an adventure watching where life has taken us. To my college girls - Rebecca Byrne and Zana Karabatak - thank you! Our annual reunions are the highlight of my year. To all the close friends I've made at different times and in different places - Dina Amin, Onsy Ayad, Diana Ayoub, Raphael Banoub, Sherif Barsoum, Michael Beshay, Jasneet Devgun, Radobice Fass, Marianne Henin, Marianne Iskander, Yostina Kaoud, Mekhala Kumar, Michael Morgan, Matthew Narouz, Kristin Robinson, Nada Tadros, Amir Yosef, Anthony Zaki, Jasmin Zaki, Mariam Zaky - thank you! Your individual and collective friendship has been so precious to me. To my safe space - Maria Botros, Andrew Mekhail, and Vincent Rouillard - thank you! You each entered my life at a time when I most needed your companionship, and have been nothing but a source of light and support to me since then; I hope I've been the same for you.

I could probably write an entire book of acknowledgements for my family alone. First and foremost, to my parents – Hegumen Sedarous AbdelMessih and Mona Marcos Sedarous – thank you! You are my pillars, and I hope to one day live up to all those nice things you say to your

friends when you're bragging about me. All of this, and every good thing in my life, is only possible because of your prayers, sacrifice, love, and encouragement. I love you both so much. To my brothers and sisters – Mina Sedarous, Amany Bebawy, Eriny Sawires, Shenoda Sawires, John Sedarous, Sylvia Sedarous, Mary Sedarous, and Philip Ghally – thank you! Some of the best memories I've had in these past six years have been of the times when we were all together. Again, to my sister - Mary Sedarous - thank you! What would I do without you? You are *everything* to me. To my nieces and nephews – John Sedarous, Marina Sawires, Ann Marie Sawires, Daniel Sedarous, Mariam Sawires, Verena Sedarous, Ervay Sedarous, Stavro Ghally, Theodore Sedarous, Agape Sedarous and Masnoti Ghally – thank you! You bring me so much joy. There is no other group of people I would rather hangout with.

Finally, seeing as it's my favorite thing in the world, it would be completely off brand for me to go through an entire acknowledgements section without once mentioning the fact that I'm Coptic. To my Abouna - Abouna Mikhail Edward – thank you! Your wisdom, gentleness, firmness, and guidance are unprecedented; you are one of my biggest blessings. To the rest of my priest (and deacon) squad – Abouna Mina Kaddis, Abouna Raphael Riwes, Abouna Gregory Saroufeem, Abouna Makarious West, and Deacon Ibraam – thank you! You selflessly invested yourselves into the communities you led, and because of that I had a constant fellowship of people to turn to. To my intercessors – Mama El-Adra, Baba Shenouda, Baba Kyrillos, and Abouna Sedarous (Baba) – thank you! You gave me direction and certainty in times when I felt the most lost and unsure, and vouched for me even when I was in the wrong. And finally, and most importantly: to my God and His church, thank You! You poured Your love and talents into me and gave me purpose and hope. All glory be to You, Lord.

Table of Contents

List of Tables

List of Figures

List of Appendices

Abstract

This dissertation investigates the extent to which bilingual speakers' cognitive representations of the syntactic structures of their two languages are interconnected. This is a substantially understudied domain despite the widespread existence of bilingual/multilingual communities in the world, including the US.

To draw solid conclusions about bilingual individuals' linguistic representations of syntactic structures, in this dissertation we test bilingual individuals' sensitivity to island and non-island wh-questions in both unilingual and code-switched contexts. Code-switching is a particularly relevant domain of investigation for determining how structures with similar surface word orders, but either similar or different derivations across the two languages, are processed as by bilingual individuals. The logic here is: if two structures share a syntactic derivation, which we classify as a *shared* structure, then these structures will be sensitive to the same well-formedness conditions in both unilingual and code-switched contexts. If the two structures have different syntactic derivations, which we classify as *separate* structures, then we will see divergent sensitivities to well-formedness conditions across the two unilingual contexts, as well as the code-switched contexts.

We focused our attention on *wh-in situ* and *wh-resumptive* structures in Egyptian Arabic and English. The wh-in situ structure was chosen because, in the right pragmatic context, it has been argued to have a similar syntactic derivation across the two languages, while the *wh-resumptive* structure was chosen because it has been argued to have a different syntactic derivation across the two languages. We conducted a four-block experiment administered within one

experimental session, testing wh-in-situ, wh-resumptive and wh-gap structures in each block. The first block tested the wh-structures in unilingual Egyptian Arabic sentences. The second block tested them in unilingual English sentences. The third and fourth blocks tested the acceptability of the wh-structures in code-switched Egyptian Arabic/English sentences. To test both island and non-island wh-in situ and wh-resumptive structures, we used a factorial design to isolate island effects from extra grammatical processing effects. Based on the results of the experiment we concluded the following: First, in line with the predictions of previous literature, we argue that the wh-in situ structure is not only similar in the surface order across both languages, but the wh-in situ structure in Egyptian Arabic and English share the same derivational properties. Second, based on the reported island sensitivity in the code-switched conditions, we argue that the wh-resumptive structure of Egyptian Arabic is formed via movement in a manner like how clause-initial wh-constituents are formed in English, but that the island sensitivities are masked in the unilingual Egyptian Arabic contexts as the distribution of resumptive pronouns is subject to both phonological and syntactic well-formedness conditions. Based on this discussion, we conclude that the wh-resumptive structure across Egyptian Arabic and English is a partially overlapping structure for the population of speakers recruited in this study, since the clause initial wh-element is formed via movement in both languages, but the insertion of resumptive pronouns is generated as part of the derivation in Egyptian Arabic, but as the result of a production effect in English.

Chapter 1 Introduction

Investigations into the cognitive representations of bilingual individuals will often initially differentiate bilinguals from monolinguals by assuming that the former is an individual with two languages, two grammars, or two lexicons in their head, while the latter only has one language, one grammar, and one lexicon. In fact, one of the earliest models of bilingual speech production formulated in De Bot (1992) explicitly proposed that bilinguals have one conceptualizer where pre-linguistic thoughts are formed, but these thoughts are sent off to two language specific formulators in order to get the correct syntax, morphology, and phonology before being pronounced. This model assumes that these different domains of grammar (the syntax, morphology, phonology) can interact with each other, but they are crucially encapsulated as distinct language-specific entities. At first glance, support for such a separation seems somewhat intuitive since an Arabic/English bilingual (for instance) is generally aware that there exists an entity that is *Arabic* and it is somehow different from another entity that is *English*. However, it is unclear to what extent such separationist views of bilingual cognition are due to metalinguistic ideologies of what constitutes a language vs. an actual cognitive distinction.

The psycholinguistic literature investigating the interaction between a bilingual individual's two languages has strongly corroborated the view that both languages are consistently activated even when only one language is required. For example, Spivey and Marian (1999) showed that bilinguals implicitly activated interlingual homographs from the non-target lexicon, even in situations where that language is not explicitly activated, Thierry and Wu (2007) showed that translation equivalents from a listener's dominant language are implicitly activated, even when

performing a task in the other language, and Sabo (2020) reports that false cognates elicit slightly smaller N400 components relative to anomalous control words. Studies showing this kind of cross-linguistic interference have been replicated several times, and so it's been argued that when bilinguals read, listen to, or speak one language, the other language is also mentally activated even when only one language is used (see Dijkstra & Kroll, 2005, for a review on word recognition, and Costa, La Heij & Navarrete, 2006, for a review on word production). The behavioral effect reported in these studies has led some researchers to propose that not only do bilingual individuals access certain domains of their grammar in a way that is largely not selective of a specific language (see Dijkstra & Van Huven, 2002, regarding the BIA+ model of bilingual word recognition), but that certain elements in their grammar can not be thought to belong distinctly to either one of the bilingual's two languages (see Clyne, 2003's concept of *trigger words*). This suggests that even if certain aspects of a bilingual individual's two grammar are kept separate, there must at least be a subset that is shared across the two languages.

Within the domain of syntax, research on bilingual sentence processing has used methods such as cross-linguistic structural priming to argue that at least some structures are stored as *shared* non language-specific structures, i.e structures that do not distinctly belong to either one of these languages, but are instead shared across both. In their seminal work on cross-linguistic structural priming, Loebell and Bock (2003) recruited German-English bilinguals to participate in a picture description task. They focused their empirical domain on prepositional object and double dative object ditransitive structures, as ditransitive constructions had been shown to reliably prime their alternating structure within the same language (Bock, 1986). Participants were asked to repeat a ditransitive prime sentence in one language before describing a picture portraying a ditransitive relationship in the other language. The authors found that participants were more likely to describe

the picture using a prepositional object structure after having just repeated a prime sentence with a prepositional object, but with a direct object after having just repeated a prime sentence with a direct object. Under the assumption that this observed cross-linguistic structural repetition was due to the presence of the prime, the authors concluded that these two structures must be shared as one structure in the mental representation of German-English bilinguals. The general idea here is that the residual activation that is present because of language A can only influence the subsequent processing of language B if the same language-independent structures occurred in the preceding utterance.

Coupling the observation that (i) bilinguals never "turn off" either of their languages, and (ii) at least some syntactic structures are stored as shared, language-independent structures between the bilingual's language, López (2018, p.3) describes code-switching as "[..] the surface manifestation of [such] coactivation." Codeswitching is a common conversational practice used by bilinguals whereby they switch between their two or more languages within the same conversation. While bilinguals will sometimes make this switch at sentence boundaries, labeled *intersentential code-switching* (1a), at other times they will do so mid-sentence, labeled *intrasentential code-switching* (1b).

(1) a. Intersentential code-switch
imbaarah ana ruht lil madrasa | Today I am going to the store.
Yesterday I went to the school | Today I am going to the store.

b. Intrasentential code-switch
ikhti ishtarit | a new shirt yesterday
My sister bought | a new shirt yesterday.

Zooming in on intrasentential code-switching we see that even in apparently structurally congruent locations, i.e locations that overlap in the surface word order across both languages, not all code-switched utterances are licit. An example of this can be seen in the contrast between the

acceptability of (2a) and the unacceptability of (2b) which differ minimally with respect to code-switch location. In these examples, the code-switch location is indicated by |.

(2) a. Licit intrasentential code-switch
el bint nisyit fustaan el ʕaruusa | at the house
the girl forgot dress the bride | at the house
"The girl forgot the bride's dress at the house"
b. Illicit intrasentential code-switch
*el bint nisyit fustaan | the bride at the house
the girl forgot dress | the bride at the house
"The girl forgot the bride's dress at the house"

Sedarous (2022, pg. 12)

To explain such contrasts, some generative approaches to the syntax of code-switched sentences have argued that the most minimal approach to the grammatical study of code-switching is one where "nothing constrains codeswitching apart from the syntactic conditions of the individual grammars being mixed." (MacSwan, 2000. p. 43).This means that no principle of grammar may refer to either the operation of code-switching itself or to a third grammar, i.e., a grammar that is distinct from the two or more grammars being mixed in a code-switched utterance, when positing the well-formedness conditions under which a code-switched sentence is either licit or illicit. Instead, the grammaticality status of intrasentential code-switched sentences is predicted to fall out from the syntactic conditions of the presumably individual grammars being mixed, as one shared structure. Under this assumption, intrasentential code-switching then becomes a rich domain to investigate the effects of shared and non-shared structures on bilingual syntactic representations.

In this dissertation we zoom in on two structures which have the same surface word order across two languages, but have been argued to have been formed through either *similar* or *different* derivations. Specifically, we investigate Egyptian Arabic-English bilinguals' acceptability of wh-questions in unilingual Egyptian Arabic, unilingual English, and code-switched Egyptian Arabic/English contexts. Wh-questions are relevant because they provide comparisons of

structures that have been argued to have either a similar (shared) or different (separate) derivation across these two languages, but the same word order (surface order) when in comparable pragmatic contexts. The logic here is: if two structures with a similar surface order have the *same* derivations, which we classify as a *shared* structure, then these structures will be sensitive to the same well-formedness conditions in both unilingual and code-switched contexts. If the two structures have different derivations, which we classify as *separate* structures, then we should see divergent sensitivities to well-formedness conditions across the two unilingual contexts, as well as the code-switched contexts.

The organization of this dissertation is as follows: Chapter 2 lays out the relevant empirical and theoretical domain that motivated the research in this dissertation. Particularly we describe the derivations that give rise to wh-in situ and wh-resumptive structures. These two structures were chosen as wh-in situ structures, under specific pragmatic contexts, have been argued to have a similar derivation across both Egyptian Arabic and English, while wh-resumptive structures have been argued to have different derivation across these two languages. In this chapter we also further motivate a theoretical framework which posits that code-switched sentences are built using the same structure building computational operations that derive unilingual sentences. Here, we make specific assumptions about (i) the derivations of the wh-in situ structure and the wh-resumptive structure across Egyptian Arabic and English, (ii) the various functional elements included in the lexicon, and (iii) conditions under which code-switched sentences are either licit or illicit. In Chapter 3 we discuss the methodology used in the experimental studies in this dissertation and break down the unilingual and code-switched contexts that we used to test bilingual individuals' sensitivity to wh-in situ and wh-resumptive structures both within and outside of syntactic islands. Here, we highlight the four blocks of the experimental session that tested the acceptability of the

wh-in situ and wh-resumptive structures in unilingual Egyptian Arabic and unilingual English sentences, as well as in code-switched Egyptian Arabic to English, and code-switched English to Egyptian Arabic sentences. In this chapter we also motivate our use of factorial design in order to test both island and non-island wh-in situ and wh-resumptive structures, and flesh out our methods for data analysis of each condition. We used a factorial design, as factorial designs can consistently isolate island effects from extra grammatical processing effects In Chapter 4 we discuss the wh-in situ results, and argue that, contrary to the predictions of previous literature, the wh-in situ structure does not have the same derivation across Egyptian Arabic and English. We ultimately conclude that, despite its similarities in surface word order across both languages, bilinguals process and store the wh-in situ structures in Egyptian Arabic as a different structure from the wh-in situ structures of English. In Chapter 5 we discuss the wh-resumptive results and argue that the wh-resumptive structure is a partially shared structure across the two languages. Based on participants' sensitivities to adjunct islands, particularly in the Egyptian Arabic to English code-switched conditions, we propose that the wh-resumptive structure of Egyptian Arabic is formed via movement in a manner that is similar to how clause-initial wh-constituents are formed in English. However, the island insensitivity that is generally reported in the literature for Egyptian Arabic is due to the fact that distribution of resumptive pronouns must satisfy distinct phonological and syntactic well-formedness conditions. Finally, in Chapter 6 we conclude the dissertation.

Chapter 2 The Empirical and Theoretical Domain

As stated in the previous chapter, in this dissertation we are zooming in on the acceptability of wh-in situ and wh-resumptive structures within unilingual Egyptian Arabic, unilingual English, and code-switched Egyptian Arabic/English contexts. In this chapter we will motivate why these two wh-structures were chosen, and how investigating the acceptability of syntactic structures in both unilingual and code-switched contexts gives us unique insight into the processing and storage of bilingual syntactic representations.

In section 1 we show that both of these structures can have the same surface word order between unilingual Egyptian Arabic and unilingual English sentences when the wh-question is placed in the appropriate pragmatic contexts (relevant for wh-in situ structures) or syntactic conditions (relevant for wh-resumptive structures). In this section, we highlight that although the surface word order is the same for each of the two types of structure under the relevant conditions across both languages, only one of the two types, namely the wh-in situ structure, is argued to arise through a similar derivation in both languages (although it does so in English only in contexts where discourse-pragmatic conditions of common ground are satisfied). The other structure, namely the wh-resumptive structure, has been argued to arise through different derivations between the two languages.

In order to draw solid conclusions about bilingual individuals' linguistic representations of these two structures, as will be further elaborated on in chapter 3, we test bilingual individuals' sensitivity to islands and non-islands with wh-in situ and wh-resumptive structures, in both unilingual and code-switched contexts. Unilingual contexts were chosen to serve as a baseline that

initially tested bilinguals' acceptability of these structures in unilingual Egyptian Arabic and unilingual English sentences, while the code-switched contexts were used to draw conclusions about how bilinguals process and store structures that have been argued to be either shared or separate across their two languages. In section 2 we discuss how and why the use of code-switched sentences can be used to make conclusions about the *sharedness* of syntactic structures, by motivating the assumption that the derivation of a code-switched sentence relies on the same structure building operations as unilingual sentences.

Drawing on the conclusions made in section 1 and section 2, we end this chapter in section 3 by laying out our predictions for the remainder of this dissertation. We predict that if a structure with a similar surface order has the same derivation across two languages, then the underlying syntactic units that yield this structure will have a shared mental representation across bilingual individuals. This sharedness in derivation and surface order ends up yielding structures identified in this dissertation as *shared*. On the other hand, if a structure with a similar surface order has a different derivation across two languages, then the syntactic units that yield this structure will yield distinct mental representations for each structure across bilingual individuals. This difference in derivation ends up yielding structures identified in this dissertation as *separate*. Since the derivation of a code-switched sentence relies on the same structure building operations as unilingual sentences, then shared structures will be sensitive to the same well-formedness conditions in both unilingual and code-switched contexts, while separate structures will show divergent sensitives in these same contexts.

2.1 Wh-in situ and wh-resumptive structures

In this section we describe the similarities and differences of wh-questions across Egyptian Arabic and English, and motivate our focus on wh-in situ and wh-resumptive structures.

Across the various dialects of the Arabic languages there are four general structures for wh-question formation: the wh-in situ structure, the wh-gap structure, and two resumptive structures(Aoun, Benmamoun & Choueiri, 2010, pg. 128). In the wh-in situ structure the wh-element remains in its canonical position, as seen in (3). The wh-in situ structure serves as the canonical wh-question formation structure in Egyptian Arabic out-of-the-blue questions, but in English it is restricted to wh-questions with specific pragmatic contexts in which common ground requirements are fulfilled (Pires & Taylor, 2007), or multiple wh-question structures.

(3) Masnoti shaafit miin fil-mat'am?
Masnoti saw.2FS who in.the-restaurant?
"Who did Masnoti see at the restaurant?"

In the wh-gap structure the wh-element appears clause initially and no element is present in its canonical, base position, as seen in (4). The wh-gap structure is the canonical structure used in English out-of-the-blue questions, as seen in (4a), but in Egyptian Arabic is restricted to non-nominal wh-constituents, such as fronted prepositional phrases, see (4b), or adverbials, see (4c).

(4) a. English
What$_i$ did Masnoti say that she saw ___$_i$?

b. Egyptian Arabic, Prepositional Phrase

l-miin$_i$	mafruud	a'dii	el-waSl	dah ____$_i$?
to-whom$_i$	supposed	1sg.give	the-receipt	this ___$_i$?

"To whom am I supposed to give this receipt?"

c. Egyptian Arabic, Adverbial

imta$_i$	mafruud	a'ruuh	lil-madrassa	____$_i$?
when$_i$	supposed	1sg.go	to.the-school	____$_i$?

"When am I supposed to go to the school?"

Finally, in the two wh-question structures that use a resumptive pronoun, the wh-element appears clause initially and corefers with a resumptive pronoun in its canonical argument position. Although these two structures are similar in their requirement of a resumptive pronoun in the canonical argument position of the wh-constituent, they differ in the following ways: In the first structure, termed by Aoun et al. as the *wh-resumptive* structure, the wh-element appears clause initially and co-refers to a resumptive pronoun in the canonical the (base-generation) position of the wh-phrase, as seen in (5a)[1]. In Egyptian Arabic, this structure is restricted to *which-NP* wh-questions. In the second structure, termed by Aoun et al., as the *class II wh-resumptive* structure, the wh-element once again appears clause initially and co refers to a resumptive pronoun in its canonical position, however this time the wh-element is also immediately followed by an obligatory complementizer *illi*, as seen in (5b)[2].

[1] In (5a) we represented this wh-resumptive structure without the complementizer *illi*. It should be noted that the *illi* complementizer is optional in this position as well, as seen in the acceptability of (i). However, throughout the dissertation we test only structures in which *illi* is not realized.

(i) anhii kubayya$_i$ (illi) Masnoti mutakida inn Mena kasar-*(ha$_i$)?
which-cup$_i$ (that) Masnoti certain that Mena broke-RES$_i$
"Which cup is Masnoti certain that Mena broke?"

[2] It is unclear to me to what extent the differences between the two wh-question structures that use a resumptive pronoun in Egyptian Arabic correspond to different structures with different derivations, or if these differences are only *apparent* differences. I can imagine an analysis in which the clause initial distribution of the wh-constituent is attributed to a strong EPP feature on the matrix C head for both structures, while the distinct manifestation of *illi* serves more as an agreement marker that is just not obligatory for in the presence of a D-linked *which-NP* phrase. Such an analysis is also reminiscent of how definite and indefinite relative clauses are formed in Egyptian Arabic. While the definite relative clauses require an *illi* in the C head, as seen in (i), the indefinite ones do not, as seen in (ii) (see Choueiri, 2002). Although such an analysis seems promising, I have yet to work it out. Because of this I will only focus on one of the structures which use a resumptive pronoun, specifically the structure that Aoun et al. term the *wh-resumptive* structure.

(i) el-kitaab *(illi) ishtarit-*(u) imbaarah kaan azra'.
the-book that I bought-res yesterday was blue.
"The book that I bought yesterday is lost"
(ii) el-ra'ees saafir ma3a walad (*illi) biyishtaghal fil maktaba
the-president traveled with boy.indef (that) he.works in.the library
"The president traveled with a boy who worked in the library."

(5) a. **anhii kubayya**$_i$ Masnoti mutakida inn Mena kasar-***(ha**$_i$**)**?
which-cup$_i$ Masnoti certain that Mena broke-**RES**$_i$
"Which cup is Masnoti certain that Mena broke?"

b. **eih *(illi)** Masnoti mutakida inn Mena kasar-***(ha**$_i$**)**?
what *(that) Masnoti certain that Mena broke-**RES**$_i$
"What is Masnoti certain that Mena broke?"

In English some have argued that although resumptive pronouns have been shown to be systematically produced both spontaneously (see Prince, 1990) and in lab settings (see Morgan & Wagers, 2018, and Ferreira & Swets, 2005), they are generally rated as being unacceptable in unilingual English wh-questions (see Alexopoulou & Keller, 2007).

In this dissertation we focus our attention on the *wh-in situ* structure and the *wh-resumptive* structure with *which*-NP wh-phrases. As we will now discuss in greater detail, the wh-in situ structure was chosen because, in the right pragmatic context, it has been argued to have a similar derivation across the two languages (compare non-movement accounts of Pires & Taylor, 2007 for English, with Soltan, 2011's non-movement account for Egyptian Arabic), while the *wh-resumptive* structure was chosen because it has been argued to have a different derivation across the two languages (compare the base generated accounts of Soltan, 2011, and Lassadi, 2005, for Egyptian Arabic, with the movement account of Asudeh, 2011, for English)

As mentioned previously in this section, in Egyptian Arabic the wh-in situ structure serves as the canonical wh-question formation structure for both argument wh-questions, as seen in (3), repeated here in (6a), and adjunct wh-questions, demonstrated in (6b).

(6) a. Masnoti shaafit **miin** fil-mat'am?
Masnoti saw.2FS **who** in.the-restaurant?
"Who did Masnoti see at the restaurant?"

b. Masnoti shaafit Maria **imta**?
Masnoti saw Maria **when**?
"When did Masnoti see Maria?"

In languages where the wh-question remains in situ in its base-generated position, there is a question as to whether or not it covertly moves from this position to a structurally higher position in order to appropriately scope over both matrix and embedded clauses (see Huang, 1998 for arguments in favor of covert movement of wh-in situ elements, and Aoun & Li, 1993, Pesetsky, 1987, 2000, for some arguments against covert movement of wh-in situ elements). In this section I will hone in on the scopal properties of in-situ wh-phrases, and provide some evidence that argues against an analysis of covert movement of the in-situ structure in Egyptian Arabic.

Focusing on the scopal properties of wh-phrases in Egyptian Arabic embedded clauses, Soltan (2011) argues that in-situ wh-questions can take scope over both the matrix and embedded clause depending on the selectional properties of the verb, and notes the following three way distinction: First, when the embedded clause is headed by a verb that selects an interrogative clause, embedded scope is taken by the in-situ wh-phrase in the embedded clause, as seen in (7a). Second, when the embedded clause is headed by a verb that selects a declarative clause, matrix scope is taken by the in-situ wh-phrase in the embedded clause, as seen in (7b).

(7) a. Mona bitisa'al Emad shaaf **miin** imbaarih?
Mona is.asking Emad saw **who** yesterday?
"Who is Mona asking if Emad saw yesterday?"
#For which x, Mona is asking Emad saw x yesterday
Mona is asking that, for which x, Emad saw x yesterday

b. Mona bitiHSib inn Emad shaaf **miin** imbaarih?
Mona thinks that Emad saw **who** yesterday?
"Who does Mona think that Emad saw yesterday?"
For which x, Mona thinks Emad saw x yesterday.
#Mona thinks that, for which x, Emad saw x yesterday.

Finally, when an embedded clause is headed by a verb that can optionally select a declarative or interrogative clause, there is ambiguity in the scope such that the in-situ wh-element in the embedded clause can take either matrix or embedded scope, as seen in (8a) and (8b) respectively.

(8) a. Mona 3arfa law Emad shaaf **miin** imbaarih?
Mona knows if Emad saw **who** yesterday.
"Who does Mona know if Emad saw yesterday?"
#For which x, Mona knows Emad saw x yesterday.
Mona knows that, for which x, Emad saw x yesterday.

b. Mona 3arfa inn Emad shaaf **miin** imbaarih?
Mona knows that Emad saw **who** yesterday?
"Who does Mona know that Emad saw yesterday?"
For which x, Mona knows Emad saw x yesterday.
#Mona knows that, for which x, Emad saw x yesterday.

In languages where the wh-phrase appears clause initially, the scopal properties of the wh-phrase have been argued to be a byproduct of the fact that the wh-phrase already appears in a structurally higher position. In wh-in situ languages, as the wh-phrase is not pronounced in a structurally higher position, the issue of scope has led some to assume a covert movement approach to wh-in situ questions (Huang, 1982). Huang (1982) proposes that the main difference between wh-in situ languages and languages that front their wh-constituents, is not due to the fact that some languages exhibit movement while others don't, but is instead due to *where* movement occurs. For Huang, wh-phrases are treated as quantifiers that must occupy a structurally higher position that allows the wh-constituent to scope over relevant material. However, there are two ways available for languages to do this: either overtly, as is the case for fronted wh-constituents, or covertly, as Huang argues is the case for in-situ wh-constituents.

Specific to Egyptian Arabic, Soltan (2011) rejects an analysis whereby the wh-in situ structures in Egyptian Arabic are derived via movement, either covertly or overtly, and instead assumes that there is no movement. Soltan (2011) notes that a movement analysis would be empirically problematic for Egyptian Arabic since Egyptian Arabic in-situ wh-questions show insensitivity to island structures, as seen in (9)[3].

[3] It is important to note here that Huang's original proposal of covert movement posited that covert movement was insensitive to constraints on overt movement, such as island phenomena. As multiple scholars have pointed out, to say that only overt movement is subject to island sensitivity forces us to conclude that movement operations need to

(9) Adjunct island

Mona mishyit ba3d maa Emad abil **miin**?
Mona left after Emad met **who**?
"Who did Mona leave after Emad met __?"

Instead Soltan (2011) proposes that wh-in situ phrases do not move out of their canonical position and instead get their scopal properties licensed through the mechanism of *unselective binding* (Pesetsky, 1987). In these contexts the wh-phrase remains in-situ and is bound by a null operator in structurally higher Spec,CP position. Embedded scope is reached if this operator is in the specifier position of the embedded CP, while matrix scope is reached if the operator is in the specifier position of the matrix CP. This can be seen in (10).

(10) a. Embedded scope: $[_{CP} \ldots [_{TP} \ldots [_{CP} OP_i \ C \ [_{TP} \ldots WH_i \ldots] \ ] \ ] \ ]$
b. Matrix scope: $[_{CP} \ OP_i \ C \ [_{TP} \ldots [_{CP} \ldots [_{TP} \ldots WH_i \ldots] \ ] \ ] \ ]$

With respect to English, it is generally pointed out that the wh-in situ structure is not freely licensed where the gap structure is considered canonical (i.e in out-of-the-blue questions), especially with single wh-questions. Although English wh-phrases typically take the gap structure to get these scopal properties, Pires and Taylor (2007) present various contexts beyond echo-questions where a wh-phrase can stay in-situ in questions with a single wh-phrase, as seen in (11).

(11) Person A: I painted a cute clown.
Specific Question: Cool, and you used what colors for that?

Pires and Taylor (2007) propose that English has two null [+wh, +Q] complementizers: one that forces wh-questions to move overtly, possibly though some EPP feature onto it, and another that is specified for a *common ground* discourse-pragmatic requirement. The authors propose that the common ground requirement is satisfied in contexts where information is either shared or assumed by the speaker to be shared between the speaker and hearer. This information

be treated in a non-uniform manner depending on whether the element moved covertly or overtly. This is a theoretically problematic position, as it would be preferred for movement to operate uniformly, regardless of whether it is covert or overt (see Bayer, 2017, for a review).

could either be given previously within the same discourse or through some extralinguistic context. The authors show that contexts where the null complementizer is specified for common ground and the wh-word remains in-situ are also insensitive to island constraints, as seen in (12), and so they argue that no mechanism of movement, either overtly or covertly, is present.

(12) I chose the writer who wrote *Hamlet*. And you, you chose the writer who wrote *what*?

Taken from Pires and Taylor (2007, p.12)

Although Egyptian Arabic and English both form the wh-in situ structure in a derivationally similar way, in that the wh-constituent remains in situ and does not move to a structurally higher position either overtly or covertly, this structure is more productive in Egyptian Arabic than it is in English in that Egyptian Arabic utilizes the wh-in situ structure in out-of-the-blue wh-questions while English restricts its usage of the wh-in situ structure to certain discourse-pragmatic contexts. Despite this difference, the wh-in situ structure has been argued to be formed with similar derivation in both languages, as both have been argued not to be formed by either a covert or overt operation of movement. For this reason, wh-in situ structures were chosen as an empirically relevant domain to test the sharedness of a structure that has been argued to share a similar derivation across both languages.

Whereas the wh-in situ structure was chosen as an empirically relevant domain because its derivation across both Egyptian Arabic and English is the same, wh-resumptive structures were chosen because they have been argued to be formed through different derivations across both languages This is an especially relevant comparison when investigating to what extent structures are shared in the mental representations of bilinguals.

Resumptive pronouns refer to the overt pronominal elements that are found in the canonical argument position of a verb within an A'-dependency. As Sharvit (1999) and McCloskey (2006)

note, resumptive pronouns share certain distributional properties with both traces and pronouns: Like traces, resumptive pronouns are bound from an A' position and appear in contexts generally associated with gaps. Like pronouns, their binding is subject to anti-locality requirements disallowing their antecedent from occupying the same local domain (see Borer, 1984, for discussion on the similarities between highest subject constraint and Principle B). Despite this cross-linguistic similarity in the distribution of resumptive pronouns, the typology of resumptive pronouns shows that they do not form a homogenous class (see Rouveret, 2011 for a review). The presence of a resumptive pronoun within a structure does not automatically indicate its derivation: Some resumptive pronouns are base generated in the canonical position they appear in (*grammatical* resumptive pronouns), some behave as spelled out copies of the traces formed by movement (*movement* resumptive pronouns), some obligatorily appear in order to save a derivation from crashing in the presence of an ungrammatical movement operation (*last resort* resumptive pronouns), while others serve more as an artifact of parsing and production instead of being grammatical elements of the language (*intrusive* resumptive pronouns)[4]. (see also McCloskey, 2006, Rouveret, 2011, and references therein for different classifications along these lines).

In Egyptian Arabic resumptive pronouns are required at the tail end of all object argument A'-dependencies, and their absence is ungrammatical, as seen in (13).

(13) a. **El-ragil**$_i$ illi Mena kalim-*(**hu**$_i$) kaan mugrim.
the-man$_i$ that Mena spoke-*(**RES**$_i$) was criminal.
"The man that Mena spoke to was a criminal."

b. **anhii autobiis**$_i$ a'dar akhd-*(**hu**$_i$) li-hyde bark?
which bus$_i$ 1sg.can take-*(**RES**$_i$) to-hyde park?
"Which bus can I take to Hyde Park?"

[4] In this typology I differentiate *movement* resumptive pronouns from *last resort* resumptive pronouns. Languages like Vata and Gbadi have been documented to have resumptive pronouns that appear at the tail end of A'-positions, but show sensitivity to island configurations even when they are present. I label these kinds of resumptive pronouns as *movement* resumptive pronouns. Other languages, like Hebrew or Lebanese Arabic, have been argued to have optional resumptive pronouns in the absence of island structures, but obligatory resumptive pronouns in the presence of island structures in order to "save" the derivation from crashing and ameliorate the island effect (Shlonsky, 1992, Sichel, 2014). I label these "structure-saving" resumptive pronouns as *last resort* resumptive pronouns.

Egyptian Arabic A'-dependencies with resumptive pronouns also show insensitivity to movement constraints, such as islands, as seen in the grammaticality of (14).

(14) **anhii shanta**$_i$ Mariam zi'lit lamma el-muHamii nisii-**ha**$_i$ fil maktab?
which bag$_i$ Mariam upset when the-lawyer forgot-**RES**$_i$ in.the office?
"Which bag was Mariam upset when the lawyer forgot it at the office?"

Because of their obligatory presence at the tail end of non-subject A'-dependencies and their insensitivity to movement constraints, Egyptian Arabic has been typologically categorized as a language with *grammatical resumptive pronouns*, i.e resumptive pronouns that are base generated in their canonical position and bound by the structurally higher A'-constituent, in a derivation that does not make involves movement of the wh-phrase. In such a derivation, the wh-constituent is assumed to be base generated in a structurally high position and binds the resumptive pronoun, which was base generated in a structurally lower position such as in (15).

(15) [$_{CP}$ Wh-ConstituentOP$_i$ C [$_{TP}$ … [$_{CP}$ …[$_{TP}$ …Resumptive Pronoun$_i$…]]]]

In English on the other hand, clause initial wh-constituents have been analyzed as an instance of wh-movement where the wh-constituent is moved from its canonical position to a fronted position, leaving behind a trace in its canonical position, as seen in the representation in (16).

(16) [$_{CP}$ Wh-Constituent$_i$ C [$_{TP}$ … [$_{CP}$ …[$_{TP}$ …t_i…]]]]

Although resumptive pronouns have been shown to be systematically produced both spontaneously (see Prince, 1990) and in lab settings that induced their production (see Morgan & Wagers, 2018, and Ferreira & Swets, 2005), speakers consistently rate their presence as being highly unacceptable both in non-island and island conditions (see Alexopoulou & Keller, 2007;

Heestand, Xiang & Polinsky, 2011). For this reason, English has been typologically categorized as a language with *intrusive resumptive pronouns*[5].

Intrusive resumptive pronouns are generally found in languages that would productively rely on the gap structure in forming licit A'-dependencies. They occur in A'-constructions that would either otherwise violate a principle of grammar, perhaps as a saving mechanism, or to ease processing difficulty, such as in multiple embedded sentences. To explain this production-acceptability mismatch, several proposals (see Kroch, 1981, Prince, 1990, Polinsky, Clemens, Milton, Morgan & Heestand, 2013, Asudeh, 2011) have been put forward to state that intrusive resumptives are *production epiphenomena* in languages such as English, that can be used to fix errors due to poor planning in production. For example, Asudeh (2011) proposes that for all biclausal long distance dependencies which form a dependency between a presumably displaced constituent (the *filler*) and its canonical argument position (the *gap*), there are two distinct levels where the well-formedness is evaluated: a global level, evaluating the well-formedness of the matrix CP, and a local level, evaluating the well-formedness of the embedded CP. In languages that rely on the gap structure to form these dependencies, the fillers can integrate with gaps easily outside of island contexts, thereby satisfying the global and local well-formedness conditions. Syntactic islands serve as domains where global well-formedness has broken down, since it is more difficult for the filler to be integrated into the gap position. That is, in the context of islands with object gaps, the filler cannot be successfully interpreted as an argument of the verb, leading to an interpretation of the gap in the embedded clause as being an illicitly missing argument of the verb. The presence of an RP in the embedded clause would then provide the verb with this missing

[5] This claim is not uncontroversial Some scholars such as Cann, Kaplan and Kempson (2005), Radford (2019), and Agnes Bi, p.c have argued that resumptive pronouns may in fact be productive, grammatical elements in English, that are just restricted to specific A'-dependencies.

argument which provides a locally well-formed embedded clause, although the sentence is still globally ill-formed, as seen in the contrast between (17a) and (17b). In this account, resumption in (15b) arguably has little effect on the global grammatical status of the sentence itself, but at least it makes the sentence more comprehensible, allowing the listener to extract a meaningful message even if the structure is not grammatical.

(17) a.*Which book did Allison cook dinner *after Peter read ____.
Globally: ill-formed Locally: ill-formed
b.*Which book did Allison cook dinner *after Peter read it.
Globally: ill-formed Locally: well-formed
Schemata taken from Beltrama and Xiang (2016, p.5)

From this discussion we see that while both Egyptian Arabic and English show evidence of resumptive pronouns in A'-structures, these productions are considered to be part of the core grammar of Egyptian Arabic but a production epiphenomenon that is inserted after spell out is completed in English. Because of this, the difference in acceptability of wh-resumptive structures in Egyptian Arabic and English has been argued to be because of the difference in the derivation that manifests resumptive pronouns in these non-subject positions across these two languages. For this reason, wh-resumptive structures were chosen as an empirically relevant domain to test the "separatedness" of a structure that looks similar in terms of surface word order across both Egyptian Arabic and English, but undergoes a different derivation to manifest that surface word order in these two languages.

2.2 Code-switching, the lexicon, and wh-structures

In order to draw more solid conclusions about bilingual individuals' linguistic representations of these two structures, in this dissertation we test bilingual individuals' sensitivity to island and non-island wh-in situ and wh-resumptive structures in both unilingual and code-switched contexts. Code-switching is a particularly relevant domain of investigation for

determining how structures with similar surface word orders, but either similar or different derivations across the two languages, are processed and stored as part of the bilingual individual's linguistic representation system. As we will show in this section, this is because the acceptability of code-switched sentences, i.e the constraints determining licit vs. illicit code-switched sentences, rely on the same structure building operations as the constraints determining licit vs. illicit unilingual sentence (see MacSwan, 2012 and Sedarous, 2022 on word–internal code-switching and head movement, and González-Vilbazo & López, 2012 and López, Alexiadou & Veenstra, 2017 on intrasentential code-switching within and between phases).

As stated in the introduction of this dissertation, codeswitching is a very common conversational practice used by bilinguals in which they switch between their two or more languages within the same conversation. These switches broadly occur either across sentential boundaries, termed *intersentential codeswitching*, or within sentential boundaries, termed *intrasentential codeswitching*. Since the early 1980s there has been a growing literature investigating the grammatical constraints set on intrasentential code-switching. This literature is based on the observation that not all intrasentential code-switches are licit, as seen in the contrast in (2), repeated here for convenience in (2'), which differ only with respect to code-switch location, indicated by |.

(2') a. Licit code-switch
el bint nisyit fustaan el ʕaruusa | at the house
the girl forgot dress the bride | at the house
"The girl forgot the bride's dress at the house"

b. Illicit code-switch
*el bint nisyit fustaan | the bride at the house
the girl forgot dress | the bride at the house
"The girl forgot the bride's dress at the house"

Sedarous (2022, pg. 12)

Focusing on the role that the derivation plays on the well-formedness status of code-switched sentences, MacSwan (2000, 2006, 2009, 2012) proposes that the derivation of a code-switched sentence relies on the same structure building operations as a unilingual sentence. He frames this proposal within the Minimalist Program (henceforth, Minimalism; see Chomsky, 1995, 2000, and later work) and capitalizes on the assumption that structure building, and the well-formedness of syntactic structure, is lexically driven.

Minimalism is a mainstream generative approach to grammar which assumes that the grammaticality of a syntactic structure results from a unified structure building system where strings of words and morphemes are put together to meet interface conditions that account for well-formedness distinctions. In any given syntactic derivation, three operations are assumed: *Select*, *Merge*, and *Agree*. Initially, *Select* picks items from the lexicon and introduces them into the numeration, which is an assembled subset of the lexicon used to construct a derivation. The computational system then accesses the lexical items of the numeration and builds syntactic structures through the operation *Merge. Merge* takes the items from the numeration and forms new, hierarchically arranged syntactic objects. *Merge* is driven by feature checking/valuation and is restricted to only taking two syntactic items A and B, in order to form a new item, C, containing the unordered set of A and B. Lastly, *Agree* takes place when an uninterpretable feature acts as a *probe* looking for a *goal*, i.e the closest matching instance of the same feature. Essentially, within Minimalism the syntax is built derivationally, from the bottom up, inserting lexical item by lexical item from a numeration composed of pre-selected lexical items, before being spelled out and given a phonological form.

Because phrase structure is derived from the lexicon, in MacSwan's model of code-switching, he assumes that lexical items may be drawn from the lexicon of either language to

introduce features into the numeration. These features must then be checked for convergence in code-switched derivations just as in non-code-switched, unilingual derivations, with no special mechanisms assumed for bilingual derivations. By adopting an approach where no "third grammar" is proposed to account for code-switched sentences, patterns of acceptability are then taken to reflect the interaction of language-specific properties within one underlying computational system. This is especially relevant for the project taken up in this dissertation as cross-linguistic variation in the derivation of wh-question formation has been attributed to the requirements of the C head.. For the remainder of this section we will spell out the specific assumptions we are working under with respect to what elements are available in the lexicon.

Minimalist approaches to wh-question structures have generally assumed that an interrogative C head has an uninterpretable *uWh* feature that acts as a probe for another element that bears an interpretable *wh*. If it finds an element with an interpretable *wh*, C agrees with it and checks its uninterpretable features. In some languages the C head also has a strong EPP feature requiring the wh-constituent to overtly move to a structurally higher position, mainly Spec,CP, in order to check off the uninterpretable *uWh* feature. This is similar to out-of-the-blue wh-questions in English that use the wh-gap structure. In other languages where the C head does not have this strong EPP feature, the wh-question can remain in its canonical (base-generated) position, without moving overtly. Following Soltan (2011) and Lassadi (2005), this is what we have assumed is the case for the wh-in situ structure found in Egyptian Arabic. Assuming that functional elements are also part of the lexicon, then, presumably, a lexicon can have two interrogative C heads - one that carries a strong EPP feature and another that does not - without making reference to any specific *language tag* on each lexical item. In the context of code-switching within a biclausal Egyptian Arabic/English wh-question, specifically a structure in which a non-interrogative CP is embedded

within a matrix interrogative CP, if the interrogative C head of the matrix CP has a strong EPP feature, then the wh-constituent is overtly required in Spec, CP. If the interrogative C head of the matrix CP does not have a strong EPP feature, then the wh-constituent remains in its canonical position within the embedded CP.

In addition, in the case of biclausal wh-questions, embedded CPs may either permit movement out of them or be an *island* that prohibits movement out of them. If the embedded CP is of the type that permits movement out of it, then movement out of the embedded CP into the specifier position of the matrix CP will result in a grammatical sentence that is accepted by speakers of that language. If the embedded CP acts as an *island* that prohibits movement out of it, then movement out of the embedded CP into the specifier position of the matrix CP is blocked, and sentences that appear to have undergone this sort of movement will be judged by speakers as being ungrammatical sentences of the language. As will be elaborated further in the discussion section of chapter 4, this distinction of non-island/island CPs is especially relevant when we come to discuss the derivation of wh-resumptive structures. As we noted in the previous section in this chapter, the presence of a resumptive pronoun within a structure does not automatically indicate its derivation. While the association of an A'-position with a grammatical resumptive pronoun, i.e a base generated resumptive pronoun, would be insensitive to this non-island/island distinction, as binding the grammatical resumptive pronoun by the A'-constituent can be made without movement in these instances, *movement* resumptive pronouns and *last-resort* resumptive pronouns are sensitive to this distinction. Specifically, *movement* resumptive pronouns are predicted to be grammatical in the context of a non-islands and ungrammatical in the context of an island, while *last resort* resumptive pronouns are predicted to occur in the presence of an island. Lastly, since *intrusive* resumptive pronouns have been analyzed as a *production epiphenomenon* rather than a

grammatical element, their presence is not necessarily dictated by the non-island/island distinction since arguably they do not participate in the derivation of the structure. Instead, the presence of an *intrusive* resumptive pronoun fixes errors due to poor planning in production in order to make a sentence more comprehensible, but this does not change the grammaticality status of the sentence itself[6].

2.3 Predictions

In the previous two sections we have made specific assumptions about (i) the derivations of the wh-in situ structure and the wh-resumptive structure across Egyptian Arabic and English, (ii) the conditions under which code-switched sentences are either licit or illicit, and (iii) the various functional elements included in the lexicon. In order to test the effects of the sharedness of structures based on either convergent or divergent derivations, we use methods from experimental syntax to test bilingual individuals' sensitivity to these wh-in situ and wh-resumptive structures in (i) island and non-island contexts, and (ii) in unilingual and code-switched contexts. Specifically, we test Egyptian Arabic/English bilinguals' baseline acceptability of wh-in situ and wh-resumptive structures both within and outside of island contexts in unilingual Egyptian Arabic and unilingual English wh-questions, and then compare these results to their acceptability of wh-in situ and wh-resumptive structures within Egyptian Arabic/English code-switched contexts. The logic here is: if two structures have the *same* derivation, which we classify as a *shared* structure, then these structures will be sensitive to the same well-formedness conditions in both unilingual

[6] Although acceptability judgment tasks cannot be used to directly show a rescuing effect of *intrusive* resumptive pronouns, Morgan and Wagers (2018) argue that they still provide insight into the inverse relationship observed by the increase of resumptive production in contexts that receive decreased acceptability judgment ratings. In a series of two experiments they found a correlation between the acceptability status of a given gap-structure and the frequency of RP production in that structure. Mainly they observed that as the acceptability rating of a given structure with a gap decreases, the frequency with which resumptive pronouns are produced in that same structure increases, and vice versa.

and code-switched contexts. If the two structures have different derivations, which we classify as *separate* structures, then we should see divergent sensitivities to well-formedness conditions across the two unilingual contexts, as well as the code-switched contexts. Specifically we predict the following:

Wh-in situ structures: We have argued in section 1 of this chapter that wh-in situ structures in Egyptian Arabic are not derived via movement. Instead, we have assumed that the interrogative C head of the matrix CP is of the type that does not have a strong EPP feature and so does not require the wh-constituent in its specifier position. Pires and Taylor (2007) have made a similar argument for wh-in situ structures in English that satisfy common ground discourse pragmatic requirements. Therefore, because wh-in situ structures in out-of-the-blue Egyptian Arabic questions and pragmatically felicitous English sentences are argued to be derived similarly, we expect that they will pattern similarly in unilingual and code-switched contexts. Particularly, we predict that unilingual Egyptian wh-in situ structures will be acceptable both inside and outside of island contexts. We also predict that, although participants may not accept unilingual English single wh-in situ questions in an out-of-the-blue context, if they recognize that this structure is an acceptable question then it will also be acceptable both inside and outside of island contexts. Since these structures are derived similarly across both unilingual contexts, we predict that the same island (in)sensitivities found in the unilingual contexts will also be present in the code-switched contexts, regardless of whether the sentence begins in Egyptian Arabic and ends in English or begins in English and ends in Egyptian Arabic.

Wh-resumptive structures: We have said in section 1 of this chapter that wh-resumptive structures have been argued to have *different* derivation across Egyptian Arabic and English. In English, wh-questions that appear in matrix CP have been argued to end up in the specifier position

of the matrix CP via movement due to the strong EPP feature on the interrogative C head in the matrix CP. Additionally, in biclausal wh-questions the embedded CP may either permit movement out of it or be an *island* that prohibits movement out of it. In instances where the embedded CP is an *island* to movement, this movement is blocked and island sensitivities arise. On the other hand, in Egyptian Arabic, Soltan (2011) proposes that although the wh-constituent appears in the CP domain it does not get to this position through movement. Instead, the wh-constituent is base generated in the CP domain and binds a resumptive pronoun in the structurally lower position, which was also base generated in that position. Since no movement happens in the derivation of this structure, Egyptian Arabic is predicted to be insensitive to the island/non-island distinction of embedded CPs.

In the unilingual English wh-movement questions we predict that participants will be sensitive to the presence of an island in the absence of a resumptive pronoun, and that the resumptive pronoun may or may not ameliorate this island effect either fully or partially. In the unilingual Egyptian Arabic conditions we predict that participants will rate wh-questions without a resumptive pronoun as being unacceptable, and they will rate ones with a resumptive pronoun as acceptable, regardless of whether or not the embedded CP permits movement or is an island blocking movement. As will be explained in more details in chapter 3, in the code-switched conditions the code-switch location always occurred right after the verb in the matrix CP and before the C head of the embedded CP. Because of this we predict that participants' (in)sensitivity to island structures and their (dis)-preference for resumptive pronouns will be dependent on the direction of the code-switch, i.e whether the code-switch is from Egyptian Arabic to English or from English into Egyptian Arabic. Specifically, we predict that the magnitude of island sensitivity, and subsequent ameliorative effects of resumptive pronouns, will follow the same

pattern as the language of the matrix CP. In the code-switched Egyptian Arabic to English conditions, we predict that participants will be insensitive to the presence of an island, as the Egyptian Arabic wh-constituent is predicted to be base generated inside the island and do not undergo movement. Because of this, whether or not the embedded CP permits or blocks movement should not affect the acceptability status of these sentences, as the Egyptian Arabic wh-constituent is not predicted to have been moved from the embedded CP. If Soltan (2011) is correct in predicting that all Egyptian Arabic A'-constituents must bind a resumptive pronoun, then participants should prefer the presence of a resumptive pronoun over its absence in the Egyptian Arabic to English conditions as well. In the code-switched English to Egyptian Arabic conditions, we predict that participants will be sensitive to the presence of an island, as the English wh-constituent is predicted to have moved from the embedded CP to the specifier position of the matrix CP. Because of this, in the presence of an embedded CP that blocks movement the code-switched sentence will be unacceptable, while in the presence of an embedded CP that permits movement the code-switched sentence will be acceptable. Because resumptive pronouns in English wh-questions are argued to be a production epiphenomenon rather than productive components of the grammar, we predict that in the non-island contexts where the code-switched sentence begins in English and ends in Egyptian Arabic the presence of a resumptive pronoun will be dispreferred to its absence. However, in the island contexts, the presence of a resumptive pronoun may ameliorate the island effect either fully or partially.

Chapter 3 Methodology

In this chapter we describe the methodology used in this dissertation. In order to test bilingual individuals' sensitivity to wh-in situ and wh-resumptive structures both inside and outside of islands, we conducted a four block experiment administered within one experimental session. The first block tested the acceptability of the wh-in situ and wh-resumptive structures in unilingual Egyptian Arabic sentences. The second block tested the acceptability of the wh-in situ and wh-resumptive structures in unilingual English sentences. The third and fourth blocks tested the acceptability of the wh-in situ and wh-resumptive structures in code-switched Egyptian Arabic/English sentences. In order to test both island and non-island wh-in situ and wh-resumptive questions, we used a factorial design. We opted for a factorial design as factorial designs have consistently demonstrated an ability to isolate the grammatical island effects from processing effects that may contribute to the unacceptability of island extractions. This has been done not only in English (see Sprouse, Wagers & Philips, 2012 for initial logic, but also Hofmeister, Cassanto & Sag, 2012 for criticism) but also cross-linguistically (see Tucker, Idrissi, Sprouse & Almeida, 2019 for Modern Standard Arabic, Sprouse, Caponigro, Greco & Cecchetto, 2016 for Italian, Stepanov, Mušič & Stateva, 2018 for Slovenian, Almeida, 2014 for Brazilian Portuguese, Kush, Lohndal & Sprouse, 2018 for Norwegian, inter alia).

Investigating island effects by use of factorial design was originally proposed to quantify the effects produced by processing effects that may contribute to the unacceptability of island extractions. The logic here is that there are two processing costs associated with island-violating extractions: First, even in the absence of an island structure, there is a general processing cost that

is associated with processing a long-distance dependency, which is tested as *clause type* in this dissertation (e.g wh-fronting, Gibson 1998, 2000). Second, there is also a processing cost that is associated with processing an embedded island structure, even when extraction is not from the embedded island itself, *island presence*. Factorial designs are used here to isolate the processing effects of *clause type* and *island presence* (see Sprouse et al., 2012, among others), typically through a fully crossed design which introduces *clause type* as the first factor and *island presence* as the second factor. With respect to *clause type*, research has shown that long distance dependencies tend to be more difficult to process than shorter dependencies (Lewis & Vasishth, 2005). This processing difficulty is often reflected in acceptability judgment ratings, where long distance dependencies, such as wh-questions extracted from an embedded clause, tend to receive lower ratings than shorter dependencies, e.g wh-questions extracted from the matrix clause. With respect to *island presence*, island structures are often more inherently complex than non-island structures. If this structural complexity has an impact on acceptability judgments, then acceptability ratings for sentences that contain an island structure are predicted to be lower than the acceptability judgments for sentences that do not, regardless of whether or not extraction from said structure took place. In Table 1 which describes a common set up of how this design has been used in previous studies.

Island Presence	Clause Type	Example
Absent	Matrix	Who ___ was sure that the lawyer forgot the book at the office?
Absent	Embedded	Which book are you sure that the lawyer forgot ___ at the office?
Present	Matrix	Who ___ was worried if the lawyer forgot the book at the office?
Present	Embedded	Which book are you worried if the lawyer forgot ___ at the office?

Table 1: An example of a fully crossed 2X2 factorial design that is intended to isolate island effects from processing effects. In this design Island serves the first factor and manipulates whether or not an island is present in the biclausal wh-question. In this example we use adjunct islands for illustration. In addition to Island, Clause Type serves the second factor and manipulates whether the wh-constituent is extracted from the subject position of the matrix clause, labeled Matrix, or from the object position of the embedded clause, labeled Embedded.

3.1 Materials

As stated in the previous section, in order to test bilingual individuals' sensitivity to wh-in situ and wh-resumptive structures both inside and outside of islands, we conducted a four block experiment administered within one experimental session. The first block tested the acceptability of the wh-in situ and wh-resumptive structures in unilingual Egyptian Arabic sentences. The second block tested the acceptability of the wh-in situ and wh-resumptive structures in unilingual English sentences. The third and fourth blocks tested the acceptability of the wh-in situ and wh-resumptive structures in code-switched Egyptian Arabic/English sentences. In order to test both island and non-island wh-in situ and wh-resumptive questions, we used a factorial design. In this specific design, each block used a similar 2X4 design, where *island presence* served as the first factor, while *clause type* served as the second factor. All critical stimuli consisted of a bi-clausal wh-question where the embedded CP was non-interrogative. In the first factor we manipulated whether or not an adjunct island was present in the stimuli. In the second factor we manipulated whether the wh-constituent was the subject of the matrix CP (labeled as *matrix*), or the object of the embedded verb in the embedded CP. The wh-question object of the embedded CP either remained in situ within its canonical position (labeled as *embedded: in situ*) to capture the wh-in

situ structure, as a gap (labeled as *embedded: no RP*), to capture instances where a resumptive pronoun was absent, or with a resumptive pronoun cliticized onto the embedded verb (labeled as *embedded: yes RP*), to capture the wh-resumptive structure with a present resumptive pronoun.

Only adjunct islands were tested in this dissertation for the following reasons: First, only one island type was chosen because of the length of the study. Since the experiment consisted of four blocks within one experimental session, care had to be taken in order to ensure that participants were not fatigued by the end of the experiment. Because of this, only one island type was chosen for investigation[7]. Second, although factorial designs have consistently demonstrated an ability to isolate island effects from extra grammatical processing effects, not many experimental studies have formally studied the magnitude of island effects across dialects of Arabic, and to my knowledge, none have used this methodology to investigate code-switched sentences. Despite this, the two studies we are aware of formally testing island magnitude in Arabic dialects, Tucker et al., (2019) on Modern Standard Arabic and Al-Aqarbeh and Sprouse (submitted) on Jordanian Arabic, have both reported an island effect for adjunct islands that was at least partially ameliorated by the use of resumptive pronouns. Coupling this finding with the general categorization of adjunct islands as strong islands i.e islands that are islands by virtue of their structural position (but see McInnerney, 2021 for discussion on exceptions to categorizing island structures based on the argument/adjunct distinction), adjunct islands were chosen as the island domain of focus.

Each block consisted of a total of thirty-two items in the appropriate language condition: eight critical items and twenty-four filler items of comparable length and varying acceptability, as

[7] As this dissertation was interested in an initial investigation of the sharedness or separatedness of these structures in bilingual individuals, it was not necessary to examine all island and extraction types immediately. In future work we will extend this by looking at other island types, and extraction positions (extraction from subject position vs. object position within islands, as in Morgan and Wagers, 2018).

will be described in greater detail in the sections below. Each block consisted of a three-to-one *filler* to *critical item* ratio. Throughout the experiment, each participant heard three filler sentences (which were randomly ordered) followed by one critical item. The critical stimuli for each block consisted of eight sets of unilingual Egyptian Arabic question sentences. Each participant heard eight items counterbalanced across eight lists, so that each participant heard only one version of each target item. We compensated for the increased risk of noise associated with using one judgment per condition by collecting data from an increased sample size and testing forty+ participants. This method yields high statistical power for medium and larger effect sizes (advocated in Sprouse and Almeida, 2017, and implemented in Tucker et al., 2019, and Al-Aqarbeh and Sprouse, submitted)[8]. Because each block consisted of a total of thirty-two items, the total experiment (including both critical items and fillers) consisted of sixteen declarative sentences and sixteen interrogative sentences. We made sure that a balanced proportion of sentences evenly spanned the complete range of acceptability. Therefore, a third of the total items in each block experiment were considered *good*, a third were considered *medium*, and a third were considered *bad*.

Finally, all of the sentences in the four blocks of this experiment were recorded by the same young woman speaker who is bilingual in both Egyptian Arabic and American English, using Praat (Boersma, 2001). Recordings were then distributed via a Qualtrics survey (see Sedarous and Namboodiripad, 2020, for best practices in conducting acceptability judgments with audio stimuli). For all sentences, the speaker used natural intonation and took care to produce a similar

[8] We add a note of caution here: In order to make this four-block experiment take a reasonable amount of time for participants to complete, participants heard only one version of each target item in each block. To ensure that we had enough statistical power to capture the medium and large effects, we compensated for the increased risk of noise associated with using one judgment per condition by collecting data from an increased sample size and testing forty+ participants. However, it is important to note to readers that some of the null results reported here may have insufficient statistical power due to the size of the population. Although this design had sufficient statistical power to detect medium and large effects, due to the size of the population recruited, small effects may not have been detected.

intonational contour across conditions. A full list of the critical items used throughout each block in this dissertation can be found in the appendices.

3.1.1 Unilingual Egyptian Arabic

The critical stimuli for this block consisted of eight sets of unilingual Egyptian Arabic question sentences, following the sample stimuli in Table 2.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Miin** laaHiz inn el-muHamii nisee el-shanta? **Who** realized that the-lawyer forgot the-bag? "Who realized that the lawyer forgot the bag?"
Absent	Embedded: In situ	El-qaadi laaHiz inn el-muHamii nisee **anhii shanta**? The judge realized that the-lawyer forgot **which bag**? "The judge realized that the lawyer forgot which bag?"
Absent	Embedded: No RP	**Anhii shanta** el-qaadi laaHiz inn el-muHamii nisee-___? **Which bag** the-judge realized that the-lawyer forgot-___? "Which bag did the judge realize that the lawyer forgot?"
Absent	Embedded: Yes RP	**Anhii shanta** el-qaadi laaHiz inn el-muHamii nisee-**ha**? **Which bag** the-judge realized that the-lawyer forgot-**ha**? "Which bag did the judge realize that the lawyer forgot it?"
Present	Matrix	**Miin** zi'il lamma el-muHamii nisee el-shanta? **Who** was.upset when the-lawyer forgot the-bag? Who was upset when the lawyer forgot the bag?"
Present	Embedded: In situ	El-qaadi zi'il lamma el-muHamii nisee **anhii shanta**? The judge was.upset when the-lawyer forgot **which bag**? "The judge was upset when the lawyer forgot which bag?"
Present	Embedded: No RP	**Anhii shanta** el-qaadi zi'il lamma el-muHamii nisee-___? **Which bag** the-judge was.upset when the-lawyer forgot-___? "Which bag was the judge upset when the lawyer forgot?"
Present	Embedded: Yes RP	**Anhii shanta** el-qaadi zi'il lamma el-muHamii nisee-**ha**? **Which bag** the-judge was.upset when the-lawyer forgot-**ha**? "Which bag was the judge upset when the lawyer forgot it?"

Table 2: Sample stimuli for the unilingual Egyptian Arabic condition for the first block. The critical stimuli for this block followed a 2X4 factorial design. In the first factor adjunct island presence was manipulated, as seen in the column labeled Adjunct Island Presence. Absent indicates that no adjunct island was present in the stimuli, while Present indicates that an adjunct island was present in the stimuli. In the second factor clause type was manipulated, as seen in the column labeled Clause Type. This factor manipulated whether the wh-phrase was the subject of the matrix CP (labeled as Matrix), or the object of the embedded verb in the embedded CP. The wh-question object of the embedded CP either remained in situ within its canonical position (labeled as Embedded: In situ), as a gap (labeled as Embedded: No RP), or with a resumptive pronoun cliticized onto the embedded verb (labeled as Embedded: Yes RP).

As mentioned above, because the total items in each block consisted of thirty-two items, the total experiment (including both critical items and fillers) consisted of sixteen declarative sentences and sixteen interrogative sentences. Of the sixteen interrogative sentences in this block we aimed to have five *good* question sentences, six *medium* question sentences, and five *bad* question sentences. Eight of the sixteen interrogative sentences in this experiment were already

accounted for due to the critical items being tested. Based on previous literature we predicted that these sentences already constituted: Four good question sentences - (i) wh-questions where the wh-constituent is the subject of the matrix CP and the embedded clause is not an adjunct island, (ii) wh-questions where the wh-constituent is the subject of the matrix CP and the embedded clause is an adjunct island, (iii) wh-questions where the wh-constituent remained in situ in the object position of the embedded clause and the embedded clause is not an adjunct island (iv) wh-questions where the wh-constituent remained in situ in the object position of the embedded clause and the embedded clause is an adjunct island. Two medium question sentences - (i) wh-questions where the wh-constituent appears clause initially with a resumptive pronoun in the object position of the embedded clause, and the embedded clause is not an adjunct island, and (ii) wh-questions where the wh-constituent appears clause initially with a resumptive pronoun in the object position of the embedded clause, and the embedded clause is an adjunct island. Two bad question sentences - (i) wh-questions where the wh-constituent appears clause initially but no resumptive pronoun is in the object position of the embedded clause, and the embedded clause is not an adjunct island, and (ii) wh-questions where the wh-constituent appears clause initially but no resumptive pronoun is in the object position of the embedded clause, and the embedded clause is an adjunct island. Because of this, when constructing the filler items, we chose to insert one good filler question sentence, four medium filler question sentences, and three bad filler question sentences. Of the sixteen declarative sentences in this experiment we aimed to have five *good* declarative sentences, six *medium* declarative sentences, and five *bad* declarative sentences. All of the declarative sentences in this experiment served as filler sentences, and all filler question sentences were constructed based on the author's introspective judgments and verified with another Egyptian Arabic speaker.

3.1.2 Unilingual English

The critical stimuli for this experiment consisted of eight sets of unilingual English question sentences, following the sample stimuli in Table 3. Since the resumptive pronouns in the Egyptian Arabic question sentences were cliticized onto the verb, in the English question sentences all resumptive pronouns were cliticized onto the verb within the embedded CP as well. As seen in Table 3, this means that the resumptive pronoun was pronounced in its unstressed form and phonologically linked to the verb in the embedded clause.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Who** claimed that the school raised the budget?
Absent	Embedded In situ	The superintendent claimed that the school raised **which budget?**
Absent	Embedded No RP	**Which budget**$_i$ did the superintendent claim that the school raised ___$_i$?
Absent	Embedded Yes RP	**Which budget**$_i$ did the superintendent claim that the school raised-**it**$_i$?
Present	Matrix	**Who** complained when the school raised the budget?
Present	Embedded In situ	The superintendent complained when the school raised **which budget?**
Present	Embedded No RP	**Which budget**$_i$ did the superintendent complain when the school raised ___$_i$?
Present	Embedded Yes RP	**Which budget**$_i$ did the superintendent complain when the school raised-**it**$_i$?

Table 3: Sample stimuli for the unilingual English condition of the second block. The critical stimuli for this block followed a 2X4 factorial design similar to the design described in section 1.1 of this chapter.

In order to construct the fillers for this block, we followed a similar procedure as we had for the first block, in section 1.1. Once again, because the total items in each block consisted of thirty-two items, the items consisted of sixteen declarative sentences and sixteen interrogative

sentences. Of the sixteen interrogative sentences in this experiment we aimed to have five good question sentences, six medium question sentences, and five bad question sentences. Eight of the sixteen interrogative sentences in this experiment were the critical items being tested. Based on previous literature we predicted that these sentences constituted: Three *good* question sentences - (i) wh-questions where the wh-constituent is the subject of the matrix CP and the embedded clause is not an adjunct island, (ii) wh-questions where the wh-constituent is the subject of the matrix CP and the embedded clause is an adjunct island, (iii) wh-questions where the wh-constituent appears clause initially but no resumptive pronoun is in the object position of the embedded clause, and the embedded clause is not an adjunct island. Two *medium* question sentences - (i) wh-questions where the wh-constituent remained in situ in the object position of the embedded clause and the embedded clause is not an adjunct island (ii) wh-questions where the wh-constituent remained in situ in the object position of the embedded clause and the embedded clause is an adjunct island. And three *bad* question sentences (i) wh-questions where the wh-constituent appears clause initially with a resumptive pronoun in the object position of the embedded clause, and the embedded clause is not an adjunct island, (ii) wh-questions where the wh-constituent appears clause initially but no resumptive pronoun is in the object position of the embedded clause, and the embedded clause is an adjunct island, and (ii) wh-questions where the wh-constituent appears clause initially with a resumptive pronoun in the object position of the embedded clause, and the embedded clause is an adjunct island. Because of this, when constructing the filler items, we chose to insert two *good* filler question sentences, four *medium* filler question sentences, and four *bad* filler question sentences. Of the sixteen declarative sentences in this experiment we aimed to have five *good* declarative sentences, six *medium* declarative sentences, and five *bad* declarative sentences. All of the declarative sentences in this experiment served as filler sentences.

3.1.3 Code-switched Egyptian Arabic to English

The critical stimuli for the third block consisted of eight sets of code-switched question sentences which began in Egyptian Arabic and ended in English, following the sample stimuli in Table 4. For all critical items the code-switch location always occurred immediately after the matrix verb and immediately before the C head of the embedded clause so that code-switching always occurred between the matrix and the embedded clause. In Table 4, code-switch location is indicated by a |.[9]

[9] This particular code-switch location was chosen for the following reason: in the theoretical syntax literature there is debate as to where the locus of competition for the type of wh-question in languages with seemingly optional alternations for wh-question formation structures. For instance, in languages with optional wh-in situ structures, the locus of competition has generally been associated with the selection of the C head (see Denham, 2000 on Babine Witsuwit'en). This locus of competition is a position that we have adapted in this current dissertation in chapter 2. In languages with optional resumptive structures, the literature is mixed. While some scholars, such as Sichel (2014) for Hebrew and Aoun et al., (2001) for Lebanese Arabic, argue that resumptive pronouns compete with gaps, others have posited that the competition is actually due to whether or not the C head selected in the derivation either blocks movement, thereby requiring an RP structure, or allows movement. This position was taken by McCloskey (1990) for Irish, Rasin (2017) for Hebrew, a.o. A design where the code-switch location occurs right before the C head takes into account these theoretical approaches for both wh-in situ and wh-resumptive structures.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Miin** laaHiz | that the gambler unlocked the safe? **Who** realized | that the gambler unlocked the safe? "Who realized that the gambler unlocked the safe?"
Absent	Embedded In situ	El-Haaris laaHiz | that the gambler unlocked **which safe**? The guard realized | that the gambler unlocked **which safe**? "The guard realized that the gambler unlocked which safe?"
Absent	Embedded No RP	**Anhii khazna**$_i$ el-Haaris laaHiz | that the gambler unlocked ___$_i$? **Which safe**$_i$ the-guard realized | that the gambler unlocked ___$_i$? "Which safe did the guard realize that the gambler unlocked?"
Absent	Embedded Yes RP	**Anhii khazna**$_i$ el-Haaris laaHiz | that the gambler unlocked-**it**$_i$? **Which safe**$_i$ the-guard realized | that the gambler unlocked-**it**$_i$? "Which safe did the guard realize that the gambler unlocked it?"
Present	Matrix	**Miin** zi'il | when the gambler unlocked the safe? **Who** was.upset | when the gambler unlocked the safe? "Who was upset when the gambler unlocked the safe?"
Present	Embedded In situ	El-Haaris zi'il | when the gambler unlocked **which safe**? The guard was.upset | when the gambler unlocked **which safe**? "The guard was upset when the gambler unlocked which safe?"
Present	Embedded No RP	**Anhii khazna**$_i$ el-Haaris zi'il | when the gambler unlocked ___$_i$? **Which safe**$_i$ the-guard was.upset | when the gambler unlocked ___$_i$? "Which safe was the guard upset when the gambler unlocked?"
Present	Embedded Yes RP	**Anhii khazna**$_i$ el-Haaris zi'il | when the gambler unlocked-**it**$_i$? **Which safe**$_i$ the-guard was.upset | when the gambler unlocked-**it**$_i$? "Which safe was the guard upset when the gambler unlocked it?"

Table 4: Sample stimuli for the conditions in the third block. In this block, all sentences began in Egyptian Arabic and ended in English. The critical stimuli for this block followed a 2X4 factorial design similar to the design described Blocks 1 and 2 in sections 1.1 and 1.2 of this chapter.

Of the sixteen interrogative sentences in this block we once again aimed to have five *good* question sentences, six *medium* question sentences, and five *bad* question sentences. This was, however, a little difficult since there is no previous literature indicating how bilinguals will judge these kinds of question sentences. Eight of the sixteen interrogative sentences in this experiment were the critical items being tested. In order to get an even distribution of acceptability among the

interrogative sentences we assumed the following: first, we assumed that these sentences would be rated highly as code-switches: (i) wh-questions where the wh-constituent is the subject of the matrix CP and the embedded clause is not an adjunct island, (ii) wh-questions where the wh-constituent is the subject of the matrix CP and the embedded clause is an adjunct island. . This means that from the critical stimuli we already have two interrogative sentences predicted to be *good*. Second, we assumed that the remaining six remaining critical items would be judged anywhere between *medium* and *bad*. Because of this, we constructed the remaining eight filler question sentences to contain four *good* code-switched question sentences, two *medium* question sentences, and two *bad* question sentences. Of the sixteen declarative sentences in this experiment we aimed to have five *good* declarative sentences, six *medium* declarative sentences, and five *bad* declarative sentences. All of the declarative sentences in this experiment served as filler sentences, and were taken from Sedarous (2022).

3.1.4 Code-switched English to Egyptian Arabic

The critical stimuli for the fourth and final block consisted of eight sets of code-switched question sentences which began in English and ended in Egyptian Arabic, following the sample stimuli in Table 5. Once again, for all critical items the code-switch location, indicated by |, always occurred immediately after the matrix verb and immediately before the CP domain of the embedded clause (which could start either with a wh-phrase or with the actual C head).

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Who** claimed | inn el-ra'ees katab el-risala? **Who** claimed | that the-president wrote the-speech? "Who claimed that the president wrote the speech?"
Absent	Embedded In situ	The ambassador claimed | inn el-ra'ees katab **anhii risala**? The ambassador claimed | that the-president wrote **which speech**? "The ambassador claimed that the president wrote which speech?"
Absent	Embedded No RP	**Which speech**$_i$ did the ambassador claim | inn el-ra'ees katab ___$_i$? **Which speech**$_i$ did the ambassador claim | that the-president wrote ___$_i$? "Which speech did the ambassador claim that the president wrote?'
Absent	Embedded Yes RP	**Which speech**$_i$ did the ambassador claim | inn el-ra'ees katab-**ha**$_i$? **Which speech**$_i$ did the ambassador claim | that the-president wrote-**it**$_i$? "Which speech did the ambassador claim that the president wrote it?'
Present	Matrix	**Who** celebrated | lamma el-ra'ees katab el-risala? **Who** celebrated | when the-president wrote the-speech? "Who celebrated when the president wrote the speech?"
Present	Embedded In situ	The ambassador celebrated | lamma el-ra'ees katab **anhii risala**? The ambassador celebrated | when the-president wrote **which speech**? "The ambassador celebrated when the president wrote which speech?"
Present	Embedded No RP	**Which speech**$_i$ did the ambassador celebrate | lamma el-ra'ees katab ___$_i$? **Which speech**$_i$ did the ambassador celebrate | when the-president wrote ___$_i$? "Which speech did the ambassador celebrate when the president wrote?'
Present	Embedded Yes RP	**Which speech**$_i$ did the ambassador celebrate | lamma el-ra'ees katab-**ha**$_i$? **Which speech**$_i$ did the ambassador celebrate | when the-president wrote-**it**$_i$? "Which speech did the ambassador celebrate when the president wrote it?'

Table 5: Sample stimuli for the conditions in the fourth block. Here, all sentences began in English and ended in Egyptian Arabic. The critical stimuli for this block followed a 2X4 factorial design similar to the design described for previous blocks in section 1.1, 1.2, and 1.3 of this chapter.

The fillers for this block were constructed similarly to the fillers in the third block. Eight of the sixteen interrogative sentences in this block consisted of the critical items being tested. In order to get an even distribution of acceptability among the interrogative sentences we assumed the following: first, as in the third block, we assumed that two of our critical items would be rated as *good*: (i) wh-questions where the wh-constituent is the subject of the matrix CP and the embedded clause is not an adjunct island, (ii) wh-questions where the wh-constituent is the subject of the matrix CP and the embedded clause is an adjunct island. Then, once again as we did for the

third block, we assumed that the remaining six items would be judged anywhere between *medium* and *bad*. Because of this, we constructed the remaining eight filler question sentences to contain four *good* code-switched question sentences, two *medium* question sentences, and two *bad* question sentences. Of the sixteen declarative sentences in this experiment we aimed to have five *good* declarative sentences, six *medium* declarative sentences, and five *bad* declarative sentences. All of the declarative sentences in this experiment served as filler sentences, and were taken from Sedarous (2022). All of the filler sentences in this block were different from the filler sentences in the third block.

3.2 Procedure

Participants were instructed to listen to a sentence and rate its acceptability on a seven-point likert scale, where "1" indicated totally unacceptable and "7" indicated totally acceptable. Before beginning the experiment, participants were provided with detailed instructions and examples to illustrate that the task was not about prescriptive norms, or the plausibility of the event described. This was followed by additional examples with varying degrees of acceptability to illustrate what type of code-switched sentence corresponded to different parts of the scale. Since the experimental sentences were presented aurally to participants, these training sentences were also presented aurally, and none of the example sentences used the same structure as the target, critical stimuli sentences. After completing the experiment, participants filled out a questionnaire about their language use and background of both Egyptian Arabic and English.

The experiment took part in the four blocks described in previous sections. In the first block participants were asked to listen to and rate the acceptability of Egyptian Arabic sentences. They were then given an option to take a break before continuing on to the second block where they were asked to listen to and rate the acceptability of English sentences. These first two blocks were

intended to serve as a baseline that initially tested the magnitude of island effects in unilingual Egyptian Arabic and unilingual English sentences within this bilingual population. Since different populations of bilinguals will differ to what extent they show sensitivities to various structures across their two languages, it was important to get a baseline for their acceptability of these sentences in a unilingual context before drawing conclusions based on the code-switched contexts. This methodology also allowed us to draw conclusions regarding the nature of their grammar of both languages based on the unilingual sentences. After completing these first two blocks, participants were given the option to take a break before continuing on to the third and fourth block. In the third block participants were instructed to listen to and rate the acceptability of code-switched sentences that started in Egyptian Arabic and ended in English, while in the fourth block they were instructed to listen to and rate the acceptability of code-switched sentences that started in English and ended in Egyptian Arabic. Between the third and fourth blocks participants were once again given the option to take a break.

Methodologically, this procedural design of four blocks within one experimental session was chosen for the following reasons: First, there is some evidence that when unilingual sentences are mixed with code-switched sentences, this skews the scale in favor of the unilingual sentences resulting in overall higher judgements for unilingual sentences and overall lower judgements for code-switched sentences. For this reason, the code-switched sentences were separated from the unilingual sentences in different testing blocks. We chose to also separate the two unilingual sets of sentences from each other, rather than combine them into one block for a similar reason. As will be described in greater detail in section 3, these speakers are more dominant in English than they are in Egyptian Arabic. We worried that we would experience a similar preference for the English unilingual sentences over the Egyptian Arabic unilingual sentences if the two sets of sentences

were presented in the same block. For this reason, we chose to separate the unilingual sentences. The code-switched sentences were then also separated into two blocks in order to retain consistency across the experiment as a whole.

3.3 Participants

40 self-reported Egyptian-Arabic/English bilinguals living in the U.S. were recruited. This experiment was approved by the University of Michigan's Institutional Review Board (HUM00142209) and all participants provided informed consent. Demographic information was collected from a questionnaire following the experiment. Participants ranged from the ages of 18-47. All participants had been exposed to Egyptian Arabic before the age of five, English before the age of twelve, and checked *'yes'* when asked whether or not they self-identified as code-switchers. Participants were also asked to indicate how often they used both languages to *speak, listen, read,* and *write* within the past six months. Most participants reported *speaking in* and *listening to* Egyptian Arabic every day (N=24 and 25) while the rest reported that they did so at least 3-4 times a week (N=13 and 12). Details of participants' self-reported language use can be found in Table 6 for the Egyptian Arabic usage.

Egyptian Arabic	Everyday	3-4 times a week	At most twice a week	Once a week	Never	Total
Speaking	25	13	0	0	0	40
Listening	26	12	0	0	0	40
Reading	7	11	6	5	9	40
Writing	5	3	14	4	12	40

Table 6: Participants' usage of Egyptian Arabic within the last six months.

Details of participants' self-reported language use can be found in Table 7 for the English usage. All participants reported *speaking in* and *listening to* English every day.

English	Everyday	3-4 times a week	At most twice a week	Once a week	Never	Total
Speaking	40	0	0	0	0	40
Listening	40	0	0	0	0	40
Reading	40	0	0	0	0	40
Writing	39	1	0	0	0	40

Table 7: Participants' usage of English within the last six months.

As can be seen from the participants' self-reported usage in tables 6 and 7, although participants reported using Egyptian Arabic regularly for speaking and listening, they showed greater usage of English over Egyptian Arabic across all four domains of usage. In addition, when asked to self-report their proficiency levels of *speaking*, *listening*, *reading*, and *writing* in both languages on a scale of 1-7, participants reported higher averages for English proficiency (*speaking* = 6.68, *listening* = 6.68, *reading* = 6.7, *writing* = 6.54) than for Egyptian Arabic proficiency (*speaking* = 5.63, *listening* = 5.95, *reading* = 3.32, *writing* = 2.97). All together this demographic information indicates that this pool of participants was more dominant in English than in Egyptian Arabic.

3.4 Data Analysis

Each language block was analyzed independently. First, raw judgment ratings, including both targets and fillers, were converted to within-participant z-scores (Schütze & Sprouse, 2013), with each block. Z-score transformation converts a participant's scores to units that represent the number of standard deviations a particular rating is from that participant's mean rating. This procedure corrects for the possibility that individual participants might treat the scale differently, e.g., using only a subset of the scale. For each block, three linear mixed effects models were used to analyze the data using the lme4 package (Bates, Maechler, Bolker & Walker, 2015). We have labeled these models as: *in-situ model*, *no-rp model*, and *yes-rp model*. In all three models *adjunct*

island presence, *clause type*, and their interaction were fixed effects, while random effects included a random intercept for *item* and *participant*. The three models differed in the sense that only a subset of factors were inserted into each model so as to test the island effects of each wh-question type. In the *in-situ model, clause type* was restricted to *matrix* and *embedded in-situ* conditions. In the *no-rp model, clause type* was restricted to *matrix* and *embedded no rp* conditions. And finally, in the *yes-rp model, clause type* was restricted *matrix* and *embedded yes rp* conditions. Finally, since we used a fully crossed design to test the effects of resumptive pronoun presence on island sensitivity, we also ran a fourth model: the *rp model* for each language condition. In the *rp model, resumptive pronoun presence* (whether or not the clause initial wh-constituent corefered with a resumptive pronoun in its canonical argument position in the embedded clause), *adjunct island presence*, and their interaction were fixed effects, while random effects included a random intercept for *item* and *participant.*

In instances where the interaction of *clause type* and *adjunct island presence* is significant, in order to draw conclusions about the magnitude of island and amelioration effects we followed Tucker et al., (2019) in isolating island effects by use of a *differences-within-differences* (DD) score (see Maxwell and Delaney, 2004) for each model. This is calculated by subtracting the difference between two conditions related by one factor, from the difference of the other two conditions related by the other factor. Each DD score was calculated based on the z-score values of the items (not the raw judgments), as has standardly been done by researchers who adopted this methodology. To calculate the DD score of the *in-situ model* we used the formula below (following Sprouse et al. 2012: 92):

$$DD = \begin{matrix} [\text{Adjunct Island Absent, Embedded: In situ}] & - & [\text{Adjunct Island Present, Embedded: In situ}] \\ - & & - \\ [\text{Adjunct Island Absent, Matrix}] & - & [\text{Adjunct Island Present, Matrix}] \end{matrix}$$

To calculate the DD score of the *no-rp model* we used the following formula:

$$DD = \frac{[\text{Adjunct Island Absent, Embedded: No RP}] - [\text{Adjunct Island Present, Embedded: No RP}]}{[\text{Adjunct Island Absent, Matrix}] - [\text{Adjunct Island Present, Matrix}]}$$

To calculate the DD score of the *yes-rp model*, we used the following formula:

$$DD = \frac{[\text{Adjunct Island Absent, Embedded: Yes RP}] - [\text{Adjunct Island Present, Embedded: Yes RP}]}{[\text{Adjunct Island Absent, Matrix}] - [\text{Adjunct Island Present, Matrix}]}$$

If there is no island effect, i.e if there is no effect that goes beyond the summed costs of processing both a long distance dependency and an island structure, the result of each score will either be *negative* or very close to *0*. On the other hand, if there is an island effect, i.e if the effect of the wh-island structure goes beyond the summed costs of processing both a long distance dependency and an island structure, then the effect will be *positive*. There is, however, no specified range for how much larger than 0 the DD score needs to be in order for us to conclude that an island effect does or does not exist. The size of the number instead indicates the size of the island effect, in that a higher *differences-within-differences* score indicates a larger wh-island effect. This is particularly relevant when we come to look at the wh-resumptive structures: if resumptive pronouns have an ameliorative effect on island sensitivity, then this should be indicated with a lower DD score in the *yes-rp* model than the *no-rp* model. Visually, when plotted, if an island effect is present, then it will be indicated by non-parallel lines, while the absence of an island effect will be indicated by parallel lines[10].

[10] The planned analyses in this dissertation compared the specific structures under study within each language condition distinctly. In Appendix E, we compare the Egyptian Arabic and English unilingual sentences to each other for (i) the sentences where the wh-element remained in-situ in the embedded clause, (ii) the sentences where the wh-element appeared clause initially and co-referred with a resumptive pronoun in the embedded clause, and (iii) the sentences where the wh-element appeared clause initially and co-referred with a gap in the embedded clause. Readers who are interested in considering *language* as a variable in this sense are encouraged to consult that appendix.

Chapter 4 Wh-in situ

In this chapter we discuss the results of the wh-in situ structure. The wh-in situ structure refers to a context where the wh-constituent remains in its canonical position either in the object position of the matrix clause or somewhere within the embedded clause, rather than overtly appearing in a structurally higher position. As we stated in chapter 2, while the wh-in situ structure serves as the canonical wh-question formation structure in Egyptian Arabic out-of-the-blue argument and adjunct questions, in English it is restricted to wh-questions in specific pragmatic contexts where common ground requirements are fulfilled (e.g Pires & Taylor, 2007, see also Pesetsky 1987), or multiple wh-question structures (see e.g. Aoun & Li 1993, Reinhart, 1998). The wh-in situ structure of single wh-questions is more productive in Egyptian Arabic than in English, in that in Egyptian Arabic this structure can occur outside of pragmatically restricted contexts. However, we have argued that the wh-in situ structure is formed with a similar derivation in both languages. As Soltan (2011) and Pires and Taylor (2007) point out, the wh-in situ structure of Egyptian Arabic and English (when licensed) is insensitive to constraints on movement, such as syntactic islands.

Because of the lack of sensitivity to islands, the wh-in situ structure across both languages has been argued to remain in its base generated position both overtly and covertly across both languages. In Egyptian Arabic this is the case for all out-of-the-blue wh-questions, while in English this is the case for questions that satisfy a discourse-pragmatic common ground requirement. In this dissertation we have predicted that if two structures which are argued to have the same derivation are stored as the same structure, then these structures will be sensitive to the same well-

formedness conditions in both unilingual and code-switched contexts. We have placed an emphasis on the well-formedness status of the code-switched contexts as the acceptability of code-switched sentences, i.e the constraints determining licit vs. illicit code-switched sentences, is predicted to fall out from the same syntactic conditions of the two grammars being mixed.

In the context of the wh-in situ structure we predict the following: If the wh-in situ structure is not derived via movement in Egyptian Arabic, then participants will be insensitive to syntactic islands when the wh-constituent remains in-situ. Specifically, the interaction of (wh-in-situ) *Clause Type* and *Adjunct Island Presence* should be insignificant, the differences-within-differences score should show no super-additive effect, and the factors plotted in our interaction plot should be parallel. These same predictions would hold for the wh-in situ structures in English as well, so long as participants accept unilingual English wh-in situ questions in out-of-the-blue contexts. In unilingual English we would predict that although participants would be less likely to accept wh-in situ structures in an out-of-the-blue context, if they recognize a wh-in situ structure as possible, then they would be insensitive to the presence or absence of an island, as wh-in situ structures in English have been argued to be derived without movement. In the code-switched contexts, if participants show similar sensitivities to wh-in situ structures both inside and outside of islands in the Egyptian Arabic and English unilingual contexts, then we predict that the same island (in)sensitivities will also be present in the code-switched contexts, regardless of whether the sentence begins in Egyptian Arabic and ends in English or begins in English and ends in Egyptian Arabic.

In this chapter we discuss the results of the unilingual Egyptian Arabic wh-in situ structures in section 1, the unilingual English wh-in situ structures in section 2, the code-switched Egyptian Arabic to English wh-in situ structures in section 3, and the code-switched English to Egyptian

Arabic wh-in situ structures in section 4. In section 5, we will conclude that wh-in situ structure does in fact have the same derivation across Egyptian Arabic and English. Specifically, we will highlight participants' insensitivity to island effects when the wh-in situ structures are in unilingual Egyptian Arabic or in unilingual English. We will argue that the similarities in surface word order across both languages, translates in a similar derivation across both languages, and show that the same insensitivity to island structures is also observed in the code-switched contexts.

4.1 Unilingual Egyptian Arabic

In this section we present the results of the wh-in situ structures in the unilingual Egyptian Arabic sentences of the first block. The conditions under comparison in this section can be seen in Table 8.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Miin** laaHiz inn el-muHamii nisee el-shanta? **Who** realized that the-lawyer forgot the-bag? "Who realized that the lawyer forgot the bag?"
Absent	Embedded: In situ	El-qaadi laaHiz inn el-muHamii nisee **anhii shanta**? The judge realized that the-lawyer forgot **which bag**? "The judge realized that the lawyer forgot which bag?"
Present	Matrix	**Miin** zi'il lamma el-muHamii nisee el-shanta? **Who** was.upset when the-lawyer forgot the-bag? Who was upset when the lawyer forgot the bag?"
Present	Embedded: In situ	El-qaadi zi'il lamma el-muHamii nisee **anhii shanta**? The judge was.upset when the-lawyer forgot **which bag**? "The judge was upset when the lawyer forgot which bag?"

Table 8: Sample stimuli of the conditions under comparison of the in-situ model in the first block.

Across the board, we found that structures where a wh-constituent in the embedded clause remained in situ (the *embedded: in-situ* conditions) were rated as being less acceptable than structures where the wh-phrase was the subject of the matrix CP (the *matrix* conditions), regardless

of whether or not an adjunct island was present. We also found that the conditions where the wh-constituent in the embedded clause remained in situ and an adjunct island was present (the combination of the *present* and the *embedded: in-situ* conditions) were rated as being slightly more acceptable than the conditions where there was no adjunct island (the combination of the *absent* and the *embedded: in-situ* conditions). However, as will be discussed in more detail a little further down, this was not significant. Table 9 presents the average z-score ratings as well as the average 1-7 ratings for each condition.

Adjunct Island Presence	**Clause Type**	Average raw score	Average z-score
Absent	Matrix	6.53	1.16
Absent	Embedded: In situ	4.93	0.42
Present	Matrix	6.65	1.22
Present	Embedded: In situ	5.2	0.51

Table 9: Average ratings (raw judgements and z-scores) for each condition from the first block. These results measure participants' sensitivity of wh-in situ structures both within and outside of adjunct islands in unilingual Egyptian Arabic sentences.

To draw conclusions about the magnitude of island sensitivity of wh-in situ structures, we ran a linear mixed effects analysis: the *in-situ model*, testing participants' sensitivity to adjunct islands in the context of an in-situ wh-constituent. In the *in-situ model*, we compared the interaction of *clause type* and *adjunct island presence*, but restricted *clause type* to the *matrix* and *embedded: in-situ* conditions.

The *in-situ model* of the unilingual Egyptian Arabic conditions revealed a main effect for *clause type* ($p<.001$), which means that structures where the wh-constituent in the embedded clause remained in its in situ, canonical position (the *embedded: in-situ* conditions), were rated as being significantly less acceptable than structures where the wh-phrase was the subject of the matrix CP (the *matrix* conditions). The *in-situ model*, however, found no effect for *adjunct island presence*,

which means that participants did not rate sentences with an adjunct island as being significantly better or worse than sentences without an adjunct island, or the interaction of *clause type* and *adjunct island presence*, indicating that participants were insensitive to adjunct islands when the wh-constituent remained in situ in the embedded clause. These results can be seen in Table 10.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.82783	0.07274	11.38	<.001
Clause Type: Matrix vs. Embedded: In situ	0.35435	0.039	9.086	<.001
Adjunct Island Presence: Present vs. Absent	-0.03877	0.03879	-1	.32
Interaction: Clause Type X Adjunct Island Presence	0.01935	0.03898	0.496	.62

Table 10: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: in situ) and adjunct island presence (present vs. absent) as fixed effects. Significant effects are shown by p-values. These results measure participants' sensitivity of wh-in situ structures both within and outside of adjunct islands in unilingual Egyptian Arabic sentences.

This absence of an island effect in the context of wh-in situ questions in Egyptian Arabic is corroborated by the interaction plot in Figure 1. As can be seen in Figure 1, the interaction between *clause type* and *adjunct island presence* results in nearly parallel lines which has been taken to visually indicate no superadditive effect of island presence.

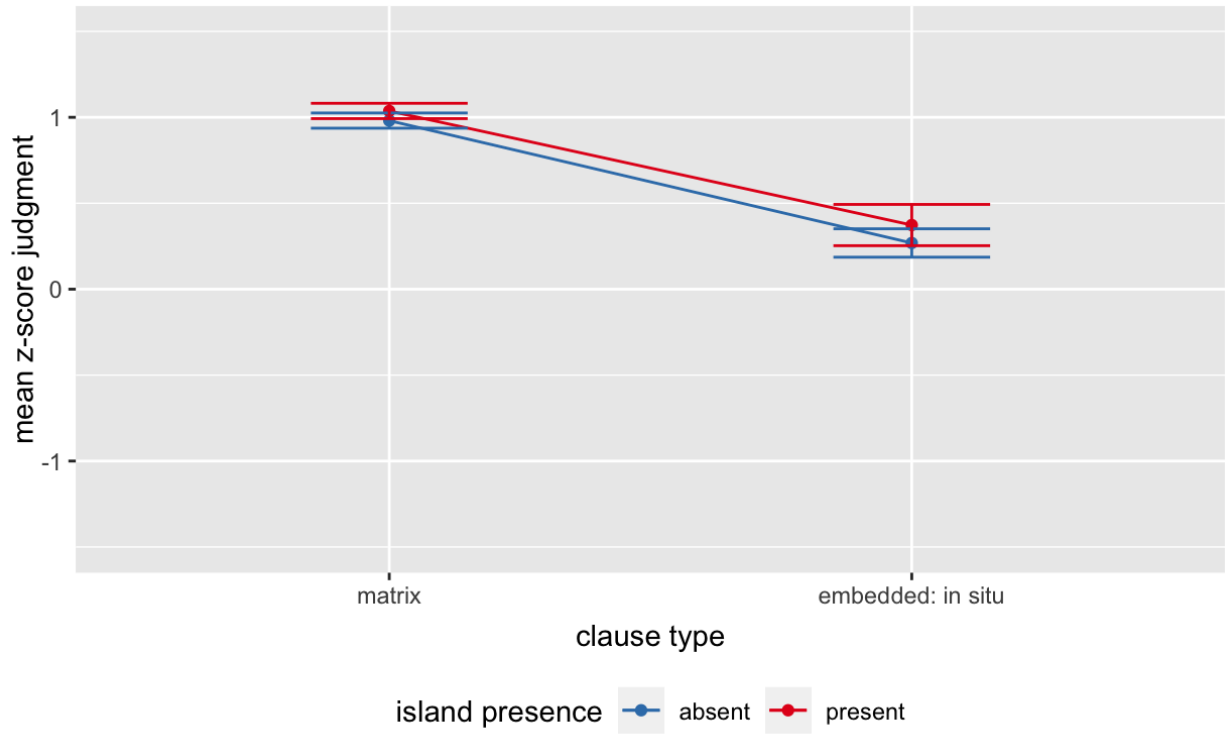

Figure 1: Interaction plot output for the factors tested in the situ model of the first block. Here we plot the interaction of (i) adjunct island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is the subject of the matrix CP (matrix) or remained in situ in the object position of the embedded clause (embedded: in situ). All judgements in this block were based on unilingual Egyptian Arabic interrogative sentences.

The calculated differences-within-differences (DD) score also corroborates participants' insensitivity to adjunct islands in Egyptian Arabic. As mentioned in chapter 3 section 4, we calculated the DD score of the *in-situ model* by subtracting the difference between two conditions related by one factor, from the difference of the other two conditions related by the other factor. Specifically, the *in-situ model*'s DD score was calculated using the following equation:

$$DD = \begin{matrix} [\text{Adjunct Island Absent, Embedded: In situ}] & - [\text{Adjunct Island Present, Embedded: In situ}] \\ - & - \\ [\text{Adjunct Island Absent, Matrix}] & - [\text{Adjunct Island Present, Matrix}] \end{matrix}$$

The DD score for the *in-situ model* of the first block was -0.03, which is nearly 0, indicating that there is no superadditive effect as well.

Taken together, these results indicate that English-Egyptian Arabic bilinguals treat wh-in situ structures in Egyptian Arabic as insensitive to constraints on movement, such as syntactic islands. This falls in line with our prediction for unilingual Egyptian Arabic sentences, based on the proposal that in the wh-in situ structure the wh-phrase does remain in its base generated position, and does not move either overtly or covertly.

4.2 Unilingual English

In this section we present the results of the wh-in situ structures in the unilingual English sentences of the second block. The conditions under comparison in this section can be seen in Table 11.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Who** claimed that the school raised the budget?
Absent	Embedded In situ	The superintendent claimed that the school raised **which budget?**
Present	Matrix	**Who** complained when the school raised the budget?
Present	Embedded In situ	The superintendent complained when the school raised **which budget?**

Table 11: Sample stimuli of the conditions under comparison of the in-situ model in the second block.

Across the board, we found that structures where a wh-constituent in the embedded clause remained in situ (the *embedded: in-situ* conditions) were rated as being less acceptable than structures where the wh-phrase was the subject of the matrix CP (the *matrix* conditions), regardless of whether or not an adjunct island was present. We also found that the conditions where the wh-constituent in the embedded clause remained in situ and an adjunct island was present (the combination of the *present* and the *embedded: in-situ* conditions) were rated as being less acceptable than the conditions where there was no adjunct island (the combination of the *absent*

and the *embedded: in-situ* conditions). These two observations were significant, as will be discussed in more detail a little further down. Table 12 presents the average z-score ratings as well as the average 1-7 ratings for each condition.

Adjunct Island Presence	**Clause Type**	Average raw score	Average z-score
Absent	Matrix	6.23	0.96
Absent	Embedded: In situ	5.07	0.46
Present	Matrix	6.13	0.93
Present	Embedded: In situ	4.38	0.15

Table 12: Average ratings (raw judgements and z-scores) for each condition from the second block testing participants' acceptability of unilingual English sentences. These results measure participants' sensitivity of wh-in situ structures both within and outside of adjunct islands in unilingual English sentences.

The *in-situ model* revealed a main effect for *clause type* ($p<.001$), which means that structures where the wh-constituent in the embedded clause remained in its in situ, canonical argument position (the *embedded: in-situ* conditions) were rated as being significantly less acceptable than structures where the wh-phrase was the subject of the matrix CP (the *matrix* conditions). The model, however, did not reveal a main effect for *clause type* or for the interaction of *clause type* and *adjunct island presence*. This indicates that participants were insensitive to adjunct islands when the wh-constituent remained in situ in the embedded clause in unilingual English sentences. These results can be seen in Table 13.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.62628	0.0565	11.085	<.001
Clause Type: Matrix vs. Embedded: In situ	0.31848	0.04694	6.785	<.001
Adjunct Island Presence: Present vs. Absent	0.0826	0.04693	1.76	.08
Interaction: Clause Type X Adjunct Island Presence	-0.06662	0.04693	-1.419	.15

Table 13: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: in situ) and adjunct island presence (present vs. absent) as fixed effects. Significant effects are shown by p-values. These results measure participants' sensitivity of wh-in situ structures both within and outside of adjunct islands in unilingual English sentences.

The interaction plot in Figure 2 visually displays these results, and the calculated differences-within-differences (DD) score for the *in-situ model* of the second block was 0.27.

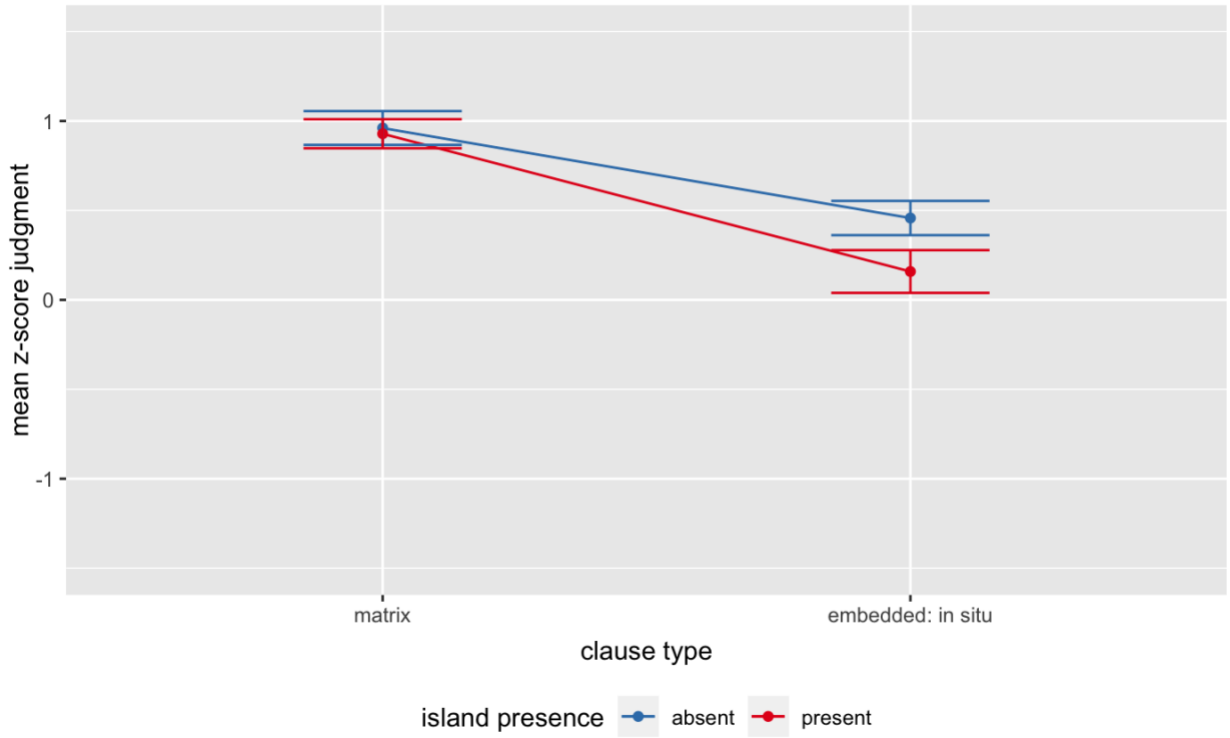

Figure 2: Interaction plot output for the factors tested in the situ model of the second block. Here we plot the interaction of (i) island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is the subject of the matrix CP (matrix) or remained in situ in the object position of the embedded clause (embedded: in situ). All judgements in this block were based on unilingual English interrogative sentences.

Although participants' average DD score for the unilingual English conditions is larger than that for the unilingual Egyptian Arabic (DD = -0.03), taken together with the insignificant interaction of *clause type* and *adjunct island presence*, these results indicate that when unilingual English wh-in situ questions are presented in an out-of-the-blue context, participants are not sensitive to constraints on movement, such as syntactic islands, when judging their acceptability.

Originally we raised the hypothesis that participants may reject single in-situ wh-questions in an out-of-the-blue context, but that if they had recognized the sentence as an interrogative sentence, then their acceptability judgments would be insensitive to the presence of a syntactic island, specifically an adjunct island. This hypothesis was made since in the discourse-pragmatic contexts where the wh-in situ structure is licensed in English, these contexts are insensitive to constraints on movement such as island effects. Because these results indicate that participants were in fact insensitive to the presence of an adjunct island, we concluded that the wh-in situ structure of English is also not derived from movement, and thus shares the same derivation with the wh-in situ structure of Egyptian Arabic. Having argued that the wh-in situ structure shares the same derivation across Egyptian Arabic and English, we now turn to our predictions for the code-switched contexts.

We have predicted that if two structures have the *same* derivation, which we classify as a *shared* structure, then these structures will be sensitive to the same well-formedness conditions in both unilingual and code-switched contexts. Since participants were insensitive to the island effect of wh-in situ structures in both unilingual Egyptian Arabic and unilingual English sentences, we predict that the same island (in)sensitivities found in the unilingual contexts will also be present in the code-switched contexts, regardless of whether the sentence begins in Egyptian Arabic and ends

in English or begins in English and ends in Egyptian Arabic. We present these results in the following two sections.

4.3 Code-switched Egyptian Arabic to English

In this section we present the results of the wh-in situ structures in the code-switched Egyptian Arabic to English sentences of the third block. The conditions under comparison in this section can be seen in Table 14.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Miin** laaHiz | that the gambler unlocked the safe? **Who** realized | that the gambler unlocked the safe? "Who realized that the gambler unlocked the safe?"
Absent	Embedded In situ	El-Haaris laaHiz | that the gambler unlocked **which safe**? The guard realized | that the gambler unlocked **which safe**? "The guard realized that the gambler unlocked which safe?"
Present	Matrix	**Miin** zi'il | when the gambler unlocked the safe? **Who** was.upset | when the gambler unlocked the safe? "Who was upset when the gambler unlocked the safe?"
Present	Embedded In situ	El-Haaris zi'il | when the gambler unlocked **which safe**? The guard was.upset | when the gambler unlocked **which safe**? "The guard was upset when the gambler unlocked which safe?"

Table 14: Sample stimuli of the conditions under comparison of the in situ model in the third block.

Across the board, we found that structures where a wh-constituent in the embedded clause remained in situ (the embedded: in-situ conditions) were rated as being less acceptable than structures where the wh-phrase was the subject of the matrix CP (the matrix conditions), regardless of whether or not an adjunct island was present. Table 15 presents the average z-score ratings as well as the average 1-7 ratings for each condition.

Adjunct Island Presence	**Clause Type**	Average raw score	Average z-score
Absent	Matrix	6.4	0.78
Absent	Embedded: In situ	4.95	0.13
Present	Matrix	6.38	0.76
Present	Embedded: In situ	5.13	0.20

Table 15: Average ratings (raw judgements and z-scores) for each condition from the third block. These results measure participants' sensitivity of wh-in situ structures both within and outside of adjunct islands in code-switched Egyptian Arabic to English sentences.

The *in-situ model* revealed a main effect for *clause type* ($p<.001$), which means that structures where the wh-constituent in the embedded clause remained in its in-situ, canonical position, rather than clause initially, were rated as being significantly less acceptable than structures where the wh-phrase was the subject of the matrix CP. However, the *in-situ model* found no effect for *adjunct island presence*, which means that participants did not rate sentences with an adjunct island as being significantly better or worse than sentences without an adjunct island, or for the interaction of *clause type* and *adjunct island presence* which means that there is no significant effect of adjunct island, indicating that participants were insensitive to adjunct islands when the wh-constituent remained in situ in the embedded clause. These results can be seen in Table 16.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.46603	0.09421	4.947	<.001
Clause Type: Matrix vs. Embedded: In situ	0.29626	0.04222	7.017	<.001
Adjunct Island Presence: Present vs. Absent	-0.01628	0.04234	-0.385	.70
Interaction: Clause Type X Adjunct Island Presence	0.03183	0.04222	0.754	.45

Table 16: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: in situ) and adjunct island presence (present vs. absent) as fixed effects. Significant effects are shown by p-values.

This absence of an island effect in the context of wh-in situ questions in code-switched Egyptian Arabic to English is corroborated by the interaction plot in Figure 3. As can be seen in Figure 3, the interaction between *clause type* and *adjunct island presence* results in nearly parallel lines which has been taken to visually indicate no superadditive effect of island presence.

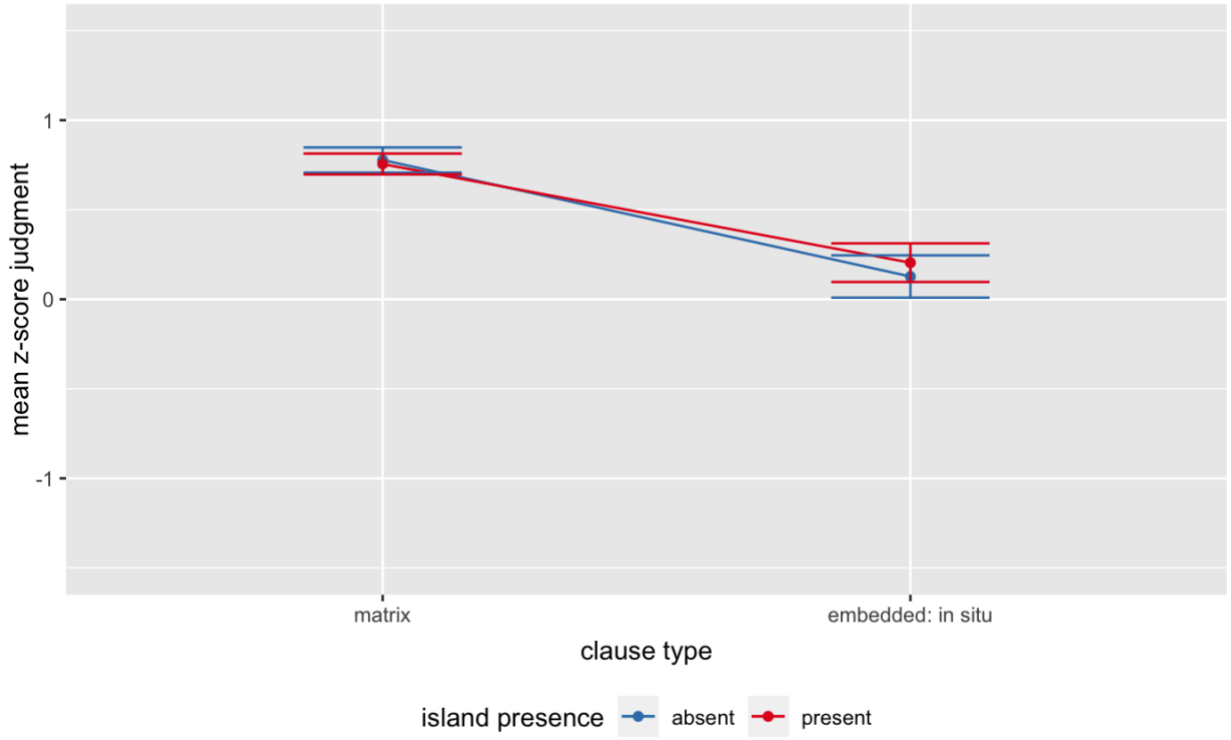

Figure 3: Interaction plot output for the factors tested in the situ model of the third block. Here we plot the interaction of (i) adjunct island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is either the subject of the matrix CP (matrix) or remained in situ in the object position of the embedded clause (embedded: in situ). All judgements in this block were based on code-switched Egyptian Arabic to English interrogative sentences.

The calculated differences-within-differences (DD) score also corroborates participants' sensitivity to adjunct islands in English wh-in situ structures. The DD score for the *in-situ model* of the third block was -0.1, which numerically indicates a superadditive effect as well.

Taken together, these results indicate that the wh-in situ structure in code-switched sentences that begin in Egyptian Arabic and end in English are insensitive to constraints on movement, such as syntactic islands. This falls in line with our prediction for code-switched Egyptian Arabic to English sentences.

4.4 Code-switched English to Egyptian Arabic

In this section we present the results of the wh-in situ structures in the code-switched English to Egyptian Arabic sentences of the fourth block. The conditions under comparison in this section can be seen in Table 17.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Who** claimed | inn el-ra'ees katab el-risala? **Who** claimed | that the-president wrote the-speech? "Who claimed that the president wrote the speech?"
Absent	Embedded In situ	The ambassador claimed | inn el-ra'ees katab **anhii risala**? The ambassador claimed | that the-president wrote **which speech**? "The ambassador claimed that the president wrote which speech?"
Present	Matrix	**Who** celebrated. | lamma el-ra'ees katab el-risala? **Who** celebrated | when the-president wrote the-speech? "Who celebrated when the president wrote the speech?"
Present	Embedded In situ	The ambassador celebrated | lamma el-ra'ees katab **anhii risala**? The ambassador celebrated | when the-president wrote **which speech**? "The ambassador celebrated when the president wrote which speech?"

Table 17: Sample stimuli of the conditions under comparison of the in-situ model in the fourth block.

Across the board, we found that structures where a wh-constituent in the embedded clause remained in situ (the *embedded: in-situ* conditions) were rated as being less acceptable than structures where the wh-phrase was the subject of the matrix CP (the *matrix* conditions), regardless of whether or not an adjunct island was present. Table 18 presents the average z-score ratings as well as the average 1-7 ratings for each condition.

Adjunct Island Presence	**Clause Type**	Average raw score	Average z-score
Absent	Matrix	6.38	0.78
Absent	Embedded: In situ	4.88	0.11
Present	Matrix	6.3	0.75
Present	Embedded: In situ	5.25	0.31

Table 18: Average ratings (raw judgements and z-scores) for each condition from the fourth block. These results measure participants' sensitivity of wh-in situ structures both within and outside of adjunct islands in code-switched English to Egyptian Arabic sentences.

The *in-situ model* revealed a main effect for *clause type* ($p<.001$), which means that structures where the wh-constituent in the embedded clause remained in its in situ, canonical position, rather than clause initially, were rated as being significantly less acceptable than structures where the wh-phrase was the subject of the matrix CP. However, the *in-situ model* found no effect for *adjunct island presence*, which means that participants did not rate sentences with an adjunct island as being significantly better or worse than sentences without an adjunct island, or for the interaction of *clause type* and *adjunct island presence* which means that there is no significant effect of adjunct island, indicating that participants were insensitive to adjunct islands when the wh-constituent remained in situ in the embedded clause. These results can be seen in Table 19.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.48667	0.04841	10.053	< .001
Clause Type: Matrix vs. Embedded: In situ	0.27847	0.04529	6.149	< .001
Adjunct Island Presence: Present vs. Absent	-0.04067	0.04529	-0.898	.37
Interaction: Clause Type X Adjunct Island Presence	0.05645	0.04529	1.246	.22

Table 19: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: in situ) and adjunct island presence (present vs. absent) as fixed effects. Significant effects are shown by p-values.

The interaction plot in Figure 4 visually displays these results, and the calculated differences-within-differences (DD) score for the *in-situ model* of the fourth block was -0.23.

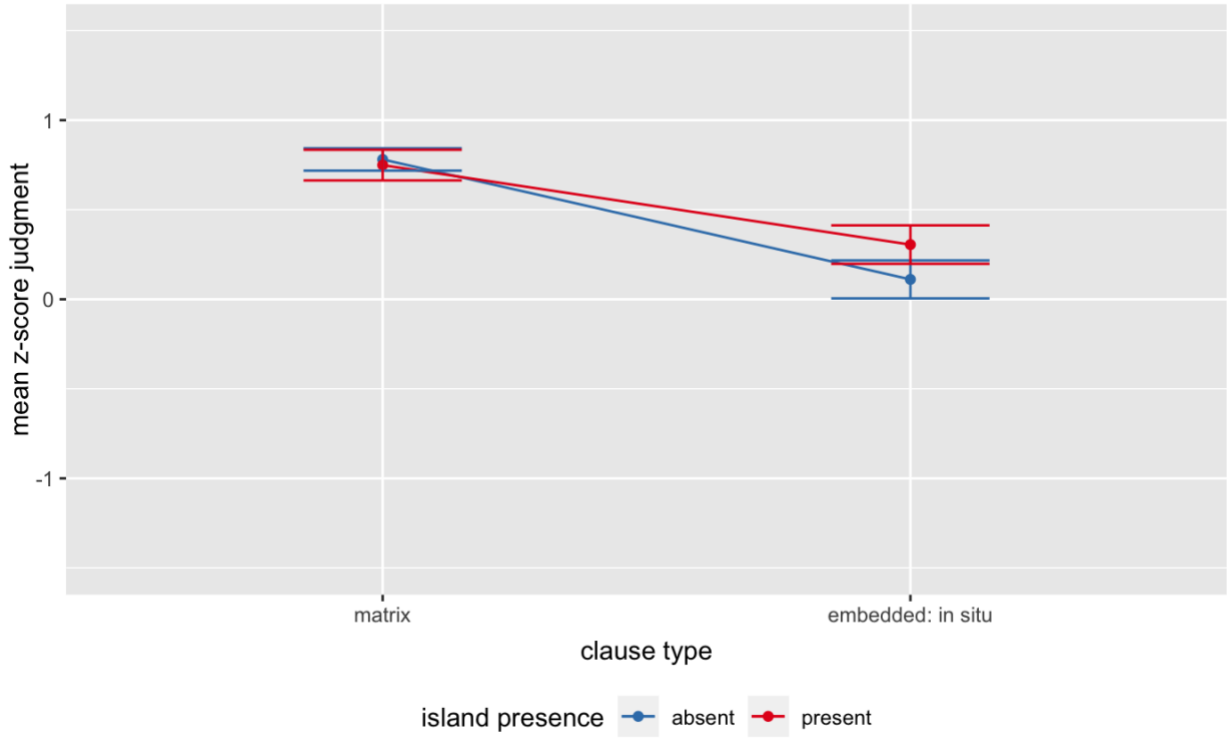

Figure 4: Interaction plot output for the factors tested in the situ model of the fourth block. Here we plot the interaction of (i) adjunct island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is the subject of the matrix CP (matrix) or remained in situ in the object position of the embedded clause (embedded: in situ). All judgements in this block were based on code-switched English to Egyptian Arabic interrogative sentences.

Although participants' average DD score for the code-switched English to Egyptian Arabic conditions is larger than that for the code-switched Egyptian Arabic to English conditions (DD = -0.1), taken together with the insignificant interaction of *clause type* and *adjunct island presence*, these results indicate that participants were also insensitive to the wh-in situ structures in code-switched English to Egyptian Arabic. This finding is in line with our predictions, as we had expected participants to be insensitive to island effect in the wh-in situ conditions because of their sensitivity to the same contexts in unilingual English sentences. In addition we should note a peculiar finding: although not significant, participants generally rated the wh-in situ questions with an adjunct island as being more acceptable than wh-in situ questions without an adjunct island. We have yet to explain these results.

4.5 Discussion

In this chapter we reported on the results of the wh-in situ structures across all four language conditions: unilingual Egyptian Arabic, unilingual English, code-switched Egyptian Arabic to English, and code-switched English to Egyptian Arabic. As we have previously stated, the wh-in situ structure was chosen because previous literature has claimed that this structure has a similar derivation across both Egyptian Arabic and English. In both Egyptian Arabic and English, the wh-in situ structure has been reported to be insensitive to constraints on movement, e.g insensitive to syntactic islands, even though only in Egyptian Arabic have these structures been argued to be possible in out-of-the-blue, non-restricted discourse contexts. We tested participants' sensitivity to wh-in situ structures, within and outside of adjunct islands, in unilingual Egyptian Arabic, unilingual English, code-switched Egyptian Arabic to English, and code-switched English to Egyptian Arabic sentences. Because of this similarity in derivation, and similar surface word order, we tested whether or not we could argue that this structure is a shared, language independent

structure for Egyptian Arabic and English bilinguals. We had predicted that if the wh-in situ structure is in fact a shared structure across Egyptian Arabic and English, then the same island insensitivity reported in the literature for Egyptian Arabic and English would not only be found in the unilingual conditions of this experiment but also the code-switched conditions as well, regardless of whether the code-switched sentences began in Egyptian Arabic and ended in English or began in English and ended in Egyptian Arabic.

Among the unilingual conditions, we found that participants were insensitive to the presence of an adjunct island in the unilingual Egyptian Arabic condition and the unilingual English conditions. We took these results to indicate that the Egyptian Arabic and English wh-in situ structures do in fact share the same derivation; specifically, neither structure is derived via movement. Since the constraints determining licit vs. illicit code-switched sentences is predicted to fall out from the same syntactic conditions of the presumably individual grammars being mixed, we predicted that participants' sensitivity to adjunct islands in code-switched sentences would resemble their sensitivity to adjunct islands in the unilingual conditions. Based on the results from the unilingual contexts, we predicted that participants would be insensitive to adjunct islands when the code-switched sentence began in Egyptian Arabic and ended in English, and when the code-switched sentence began in English and ended in Egyptian Arabic. We found that bilinguals were indeed insensitive to adjunct islands in both code-switched contexts as predicted. These results indicate that the wh-in situ structure is not only similar in surface word order across Egyptian Arabic and English but has the same derivation across these two languages as well.

Chapter 5 Wh-resumptive

In this chapter we will discuss the results of the wh-resumptive structure. The wh-resumptive structure refers to contexts where the wh-constituent appears in a clause initial position and co-refers with a resumptive pronoun in a structurally lower position. Focusing on the wh-resumptive structure found in Egyptian Arabic and English, we argued that this structure is formed through different derivations across these two languages. In chapter 2 we argued that although the wh-constituent appears in a clause initial position in unilingual Egyptian Arabic sentences, it does not get to this position through movement. Instead, the wh-constituent is base generated into this structurally higher position and binds a resumptive pronoun in the structurally lower position, which was also base generated into that position. Since no movement is assumed in the derivation of this structure in unilingual Egyptian Arabic sentences, the wh-resumptive structure has been argued to be insensitive to constraints on movement, such as island constraints. For unilingual English sentences, we have argued that wh-questions that appear in the CP domain end up in the specifier position of the matrix CP via movement, due to the strong EPP feature on the interrogative C head in the matrix CP. Since movement is assumed in the derivation of this structure in unilingual English sentences, we have claimed that this structure is sensitive to constraints on movement, such as island constraints. Resumptive pronouns have been documented to occur in the contexts where movement is blocked, perhaps as a saving mechanism intended to make an ungrammatical derivation more acceptable (initially proposed by Ross, 1967). This means that although a structure that has been derived by movement may be ungrammatical, the presence of a resumptive pronoun has the potential to *save* the derivation from crashing. Recent

experimental literature, however, has argued that the presence or a resumptive pronoun has little effect on the acceptability status of an English sentence (see Alexopoulou & Keller, 2007; Heestand et. al., 2011). For this reason in English resumptive pronouns have been argued to be a production epiphenomenon rather than a grammatical component in the grammar. In this respect, several proposals (see Kroch, 1981, Prince, 1990, Polinsky et al., 2013, Asudeh, 2004, 2011, 2012) have been put forward to state that intrusive resumptives are *production epiphenomena* in languages such as English, that can be used to fix errors due to poor planning in production.

Since the wh-resumptive structure is presumably formed through different derivations in unilingual Egyptian Arabic and unilingual English sentences, we've classified these two structures as *separate* structures. As different structures, we predict that we will see divergent sensitivities to well-formedness conditions across the two unilingual contexts as well as the code-switched contexts. In the unilingual Egyptian Arabic context, we predict that participants will be insensitive to the presence of an adjunct island, i.e the interaction of *clause type* and *adjunct island presence* should be insignificant, and will prefer the presence of a resumptive pronoun over its absence. In the unilingual English context, we predict that participants will be sensitive to the presence of an island in the absence of a resumptive pronoun, and that the resumptive pronoun may ameliorate this island effect either fully or partially. Assuming, as we have, that the constraints determining licit vs. illicit code-switched sentences rely on the same structure building operations as the constraints determining licit vs. illicit unilingual sentences, we predict that participants' sensitivity of island structures in wh-resumptive contexts will be dependent on the direction of the code-switch, i.e whether the code-switched sentences start in Egyptian Arabic and end in English or start in English and end in Egyptian Arabic. Specifically, we predict that the magnitude of island sensitivity, and subsequent ameliorative effects of resumptive pronouns, will follow the same

pattern as the language of the matrix CP. In contexts where the code-switched sentences begin in Egyptian Arabic and end in English, we predict that participants will be insensitive to the presence of an island, as the Egyptian Arabic wh-constituent is predicted to be base generated in that position and not derived from movement, and prefer the presence of a resumptive pronoun over its absence. In the contexts where the code-switched sentences begin in English and end in Egyptian Arabic, we predict that participants will be sensitive to the presence of an island, as the English wh-constituent is predicted to have moved from the embedded CP to the specifier position of the matrix CP, and prefer the absence of a resumptive pronoun over its presence in non-island contexts.

In this chapter we will discuss the results of the unilingual Egyptian Arabic wh-resumptive structures in section 1 and the unilingual English wh-resumptive structures in section 2. In section 3 we provide an interim summary of the results of the unilingual contexts and remind the reader of the predictions for the code-switched contexts, and the relevance of these predictions when arguing for shared or non-shared structures. We then discuss the results of the code-switched Egyptian Arabic to English wh-resumptive structures in section 4, and the results of the code-switched English to Egyptian Arabic wh-resumptive structures in section 5. We offer a general discussion of all results in section 6.

In the contexts where the clause initial wh-constituent does not co-refer with a resumptive pronoun, we report island sensitivity in the unilingual English, code-switched Egyptian Arabic to English, and code-switched English to Egyptian Arabic conditions, but island insensitivity in unilingual Egyptian Arabic condition. In the contexts where the clause initial wh-constituent does co-refer with a resumptive pronoun, we report island sensitivity in English to Egyptian Arabic code-switched conditions, and island insensitivity in the unilingual Egyptian Arabic, unilingual

English, and code-switched Egyptian Arabic to English conditions. In addition, we also report that participants preferred the presence of a resumptive pronoun over its absence when the embedded CP was in Egyptian Arabic, in both island and non-island conditions. However, when the embedded CP was in English participants preferred the presence of a resumptive pronoun vs. its absence only in island conditions. We will conclude that the participants' island sensitivities are best accounted for when we analyze the wh-resumptive structure in Egyptian Arabic as a derivation that is formed via movement in a manner that is similar to how clause-initial wh-constituents are formed in English. We will also argue that participants' preference for resumptive pronouns in embedded Egyptian Arabic CPs, can be accounted for if we adopt an approach where the distribution of resumptive pronouns is subject to morphophonological and syntactic well-formedness conditions.

5.1 Unilingual Egyptian Arabic

In this section we present the results of the wh-resumptive structure in the unilingual Egyptian Arabic sentences of the first block. Across the board, we found that structures where the clause initial wh-constituent referred to the object of the verb in the embedded CP (the *embedded: no rp* and *embedded: yes rp* conditions) were rated as being less acceptable than structures where the wh-phrase was the subject of the matrix CP (the *matrix* conditions). Zooming in on the structures with a clause initial wh-constituent, we found that participants also rated the sentences with a resumptive pronoun (the *embedded: yes rp* conditions) as being more acceptable than the sentences without a resumptive pronoun (the *embedded: no rp* conditions). With respect to participants' ratings of island structures, we found that in the absence of a resumptive pronoun (the *embedded: no rp* conditions) participants seemed insensitive to the presence or absence of an adjunct island. However, in the presence of a resumptive pronoun (the *embedded: yes rp*

conditions), participants rated the sentences without an adjunct island (the *absent* conditions) as being more acceptable than the sentences with an adjunct island (the *present* conditions). These results are summarized in Table 20, which presents the average z-score ratings as well as the average 1-7 ratings for each condition.

Adjunct Island Presence	**Clause Type**	**Average raw score**	**Average z-score**
Absent	Matrix	6.53	1.17
Absent	Embedded: No Resumptive Pronoun	4.07	0.03
Absent	Embedded: Yes Resumptive Pronoun	5.03	0.45
Present	Matrix	6.65	1.22
Present	Embedded: No Resumptive Pronoun	3.8	-0.08
Present	Embedded: Yes Resumptive Pronoun	4.58	0.23

Table 20: Average ratings (raw judgements and z-scores) for each condition from the first block testing the acceptability of wh-resumptive structures in unilingual Egyptian Arabic sentences. These results summarize participants' sensitivity of structures where the wh-constituent appears clause initially and refers to the object of the verb in the embedded CP. We compare participants' acceptability of these structures with and without a resumptive pronoun, both within and outside of adjunct islands.

As stated in section 4 of chapter 3, to draw conclusions about the magnitude of island sensitivity of wh-resumptive structures, we ran two linear mixed effects: the *no-rp model*, testing participants' sensitivity to adjunct islands in the absence of a resumptive pronoun, and the *yes-rp model*, testing participants' sensitivity to adjunct islands in the presence of a resumptive pronoun. Since we used a fully crossed factorial design in this study, we also ran a third model, the *rp* model, to compare the embedded conditions. We will report on these results separately in the following sections.

5.1.1 The no-rp model

As stated in chapter 3 of this dissertation, in the *no-rp* model we compared the interaction of *clause type* and *adjunct island presence*, but restricted *clause type* to the *matrix* and *embedded: no rp* conditions. The conditions under comparison for this model can be seen in Table 21.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Miin** laaHiz inn el-muHamii nisee el-shanta? **Who** realized that the-lawyer forgot the-bag? "Who realized that the lawyer forgot the bag?"
Absent	Embedded: No RP	**Anhii shanta** el-qaadi laaHiz inn el-muHamii nisee-___? **Which bag** the-judge realized that the-lawyer forgot-___? "Which bag did the judge realize that the lawyer forgot?"
Present	Matrix	**Miin** zi'il lamma el-muHamii nisee el-shanta? **Who** was.upset when the-lawyer forgot the-bag? Who was upset when the lawyer forgot the bag?"
Present	Embedded: No RP	**Anhii shanta** el-qaadi zi'il lamma el-muHamii nisee-___? **Which bag** the-judge was.upset when the-lawyer forgot-___? "Which bag was the judge upset when the lawyer forgot?"

Table 21: Sample stimuli of the conditions under comparison of the no-rp model in the first block.

The *no-rp model* revealed a main effect for *clause type* ($p<.001$), which means that structures where the clause initial wh-constituent coreferred with a gap in the canonical position (the *embedded: no rp* conditions) were rated as being significantly less acceptable than structures where the wh-phrase was the subject of the matrix CP (the *matrix* conditions). The *no-rp model*, however, found no effect for *adjunct island presence*, which means that participants did not rate sentences with an adjunct island (the *present* conditions) as being significantly better or worse than sentences without an adjunct island (the *absent* conditions). The *no-rp model* also found no effect for the interaction of *clause type* and *adjunct island presence*. These results can be seen in Table 22.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.57312	0.06565	8.73	<.001
Clause Type: Matrix vs. Embedded: No Resumptive Pronoun	0.61141	0.04369	13.995	<.001
Adjunct Island Presence: Present vs. Absent	0.01149	0.04386	0.262	.79
Interaction: Clause Type X Adjunct Island Presence	-0.042	0.04366	-0.962	.34

Table 22: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: no resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the unilingual Egyptian Arabic sentences. Significant effects are shown by p-values.

This absence of an island effect in these contexts is corroborated by the interaction plot in Figure 5. As can be seen in Figure 5, the interaction between *clause type* and *adjunct island presence* results in nearly parallel lines which has been taken to visually indicate no superadditive effect of island presence.

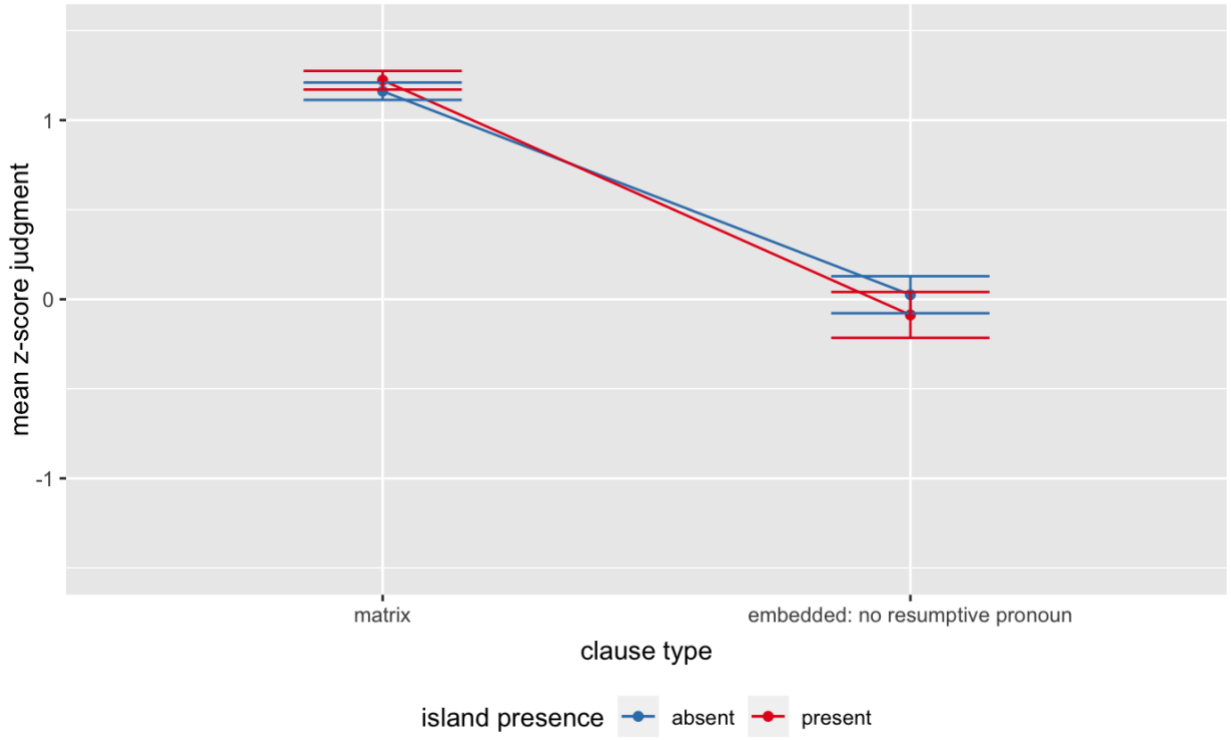

Figure 5: Interaction plot output for the factors tested in the no-rp model of the first block. Here we plot the interaction of (i) adjunct island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is the subject of the matrix CP (matrix) or appeared clause initially but did not refer to a resumptive pronoun in its canonical position within the embedded CP (embedded: no resumptive pronouns). All judgements in this block were based on unilingual Egyptian Arabic interrogative sentences.

The calculated differences-within-differences (DD) score also corroborates participants' insensitivity to adjunct islands in Egyptian Arabic. As mentioned in chapter 4 section 4, we calculated the DD score of the *no-rp model* by subtracting the difference between two conditions related by one factor, from the difference of the other two conditions related by the other factor. Specifically, the *no-rp model*'s DD score was calculated using the following equation:

$$DD = \frac{[\text{Adjunct Island Absent, Embedded: No RP}] - [\text{Adjunct Island Present, Embedded: No RP}]}{[\text{Adjunct Island Absent, Matrix}] - [\text{Adjunct Island Present, Matrix}]}$$

The DD score for the *no-rp model* of the first block was 0.15, which, coupled with the insignificance of the interaction of *clause type* and *adjunct island presence*, numerically indicates no superadditive effect as well.

5.1.2 The yes-rp model

In the *yes-rp* model we compared the interaction of *clause type* and *adjunct island presence*, but this time restricted *clause type* to the *matrix* and *embedded: yes rp* conditions. The conditions under comparison for this model can be seen in Table 23.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Miin** laaHiz inn el-muHamii nisee el-shanta? **Who** realized that the-lawyer forgot the-bag? "Who realized that the lawyer forgot the bag?"
Absent	Embedded Yes RP	**Anhii shanta** el-qaadi laaHiz inn el-muHamii nisee-**ha**? **Which bag** the-judge realized that the-lawyer forgot-**ha**? "Which bag did the judge realize that the lawyer forgot it?"
Present	Matrix	**Miin** zi'il lamma el-muHamii nisee el-shanta? **Who** was.upset when the-lawyer forgot the-bag? Who was upset when the lawyer forgot the bag?"
Present	Embedded Yes RP	**Anhii shanta** el-qaadi zi'il lamma el-muHamii nisee-**ha**? **Which bag** the-judge was.upset when the-lawyer forgot-**ha**? "Which bag was the judge upset when the lawyer forgot it?"

Table 23: Sample stimuli of the conditions under comparison of the yes-rp model in the first block.

The *yes-rp model* revealed a main effect for *clause type* ($p<.001$), which means that structures where the clause initial wh-constituent co-refered with a resumptive pronoun in its canonical position (the *embedded: yes rp* conditions) were rated as being significantly less acceptable than structures where the wh-phrase was the subject of the matrix CP (the *matrix* conditions). The *yes-rp model* found no effect for *adjunct island presence*, or the interaction of *clause type* and *adjunct island presence,* indicating that participants were insensitive to adjunct islands in the presence of a resumptive pronoun. These results can be seen in Table 24.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.76694	0.06528	11.749	<.001
Clause Type: Matrix vs. Embedded: Yes Resumptive Pronoun	0.42022	0.04666	9.006	<.001
Adjunct Island Presence: Present vs. Absent	0.03845	0.04649	0.827	.41
Interaction: Clause Type X Adjunct Island Presence	-0.0665	0.04665	-1.425	.16

Table 24: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: no resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the unilingual Egyptian Arabic sentences. Significant effects are shown by p-values.

Although the statistics report an absence of an island effect in the context of a resumptive pronoun in Egyptian Arabic, the interaction plot in Figure 6 shows that participants' sensitivity to adjunct islands was made a bit more apparent in the presence of a resumptive pronoun rather than its absence. Comparing Figure 6 with Figure 5 from the *no-rp model*, we see that while participants rejected all long distance dependencies in the absence of a resumptive pronoun, when a resumptive pronoun was present they showed a (statistically non-significant) preference for the contexts without an adjunct island.

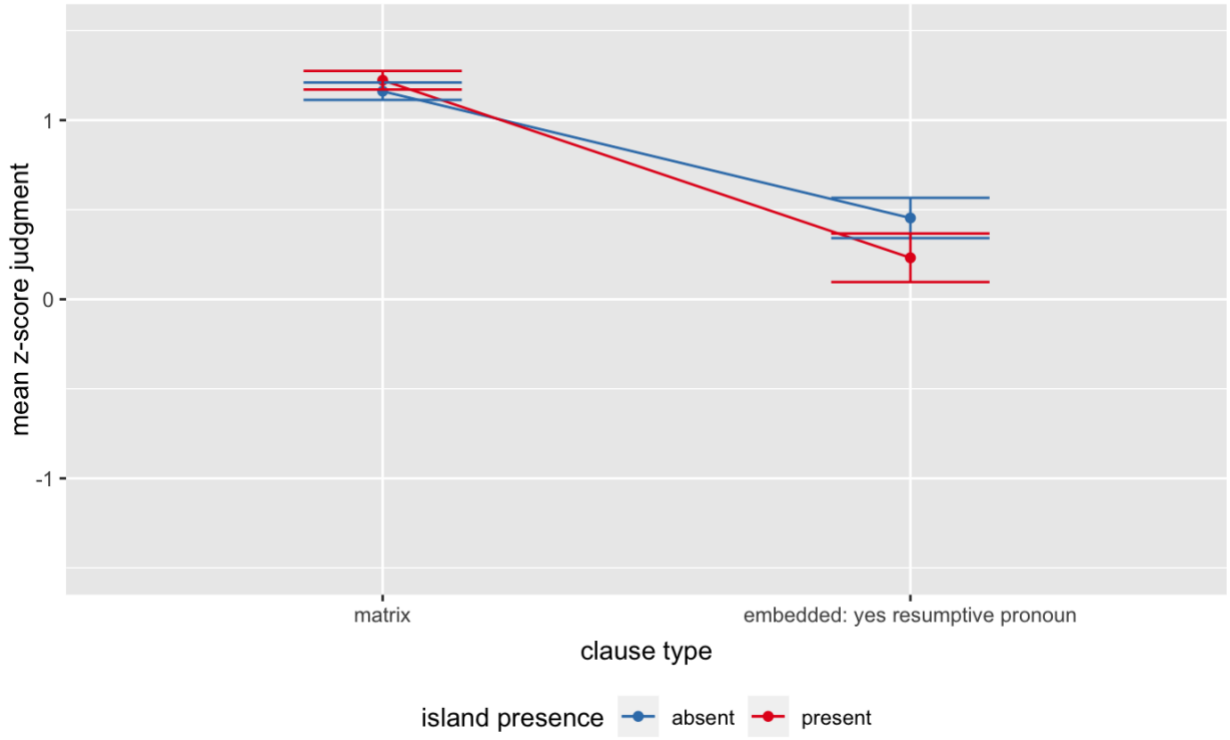

Figure 6: Interaction plot output for the factors tested in the yes-rp model of the first block. Here we plot the interaction of (i) adjunct island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is the subject of the matrix CP (matrix) or appeared clause initially and refers to a resumptive pronoun in its canonical position within the embedded CP (embedded: yes resumptive pronouns). All judgements in this block were based on unilingual Egyptian Arabic interrogative sentences.

This is corroborated by the DD score of the *yes-rp* model as well. As mentioned in chapter 4 section 4, we calculated the DD score of the *yes-rp model* similarly to the *no-rp model* subtracting the difference between two conditions related by one factor, from the difference of the other two conditions related by the other factor. Specifically, the *yes-rp model*'s DD score was calculated using the following equation:

$$DD = \frac{[\text{Adjunct Island Absent, Embedded: Yes RP}] - [\text{Adjunct Island Present, Embedded: Yes RP}]}{[\text{Adjunct Island Absent, Matrix}] - [\text{Adjunct Island Present, Matrix}]}$$

The DD score for the *yes-rp model* of the first block was 0.23 which is higher than the DD score of the *no-rp model* which was 0.15. This indicates that participants were more sensitive to the presence of an adjunct island when a resumptive pronoun was present in the unilingual

Egyptian Arabic conditions. However, coupling this low score with the insignificance of the interaction of *clause type* and *adjunct island presence*, we still conclude that these results indicate island insensitivity in the context of resumptive pronouns.

5.1.3 The rp model

In addition to testing the island effect in the presence or absence of a resumptive pronoun, we also compared the embedded conditions with each other using the *rp* model. In the *rp* model we compared the interaction of *clause type* and *adjunct island presence*, but this time restricted *clause type* to the *embedded: no rp* and *embedded: yes rp* conditions. The conditions under comparison for this model can be seen in Table 25.

Adjunct Island Presence	**Resumptive Pronoun Presence**	**Example sentence**
Absent	Embedded No RP	**Anhii shanta** el-qaadi laaHiz inn el-muHamii nisee-___? **Which bag** the-judge realized that the-lawyer forgot-___? "Which bag did the judge realize that the lawyer forgot?"
Absent	Embedded Yes RP	**Anhii shanta** el-qaadi laaHiz inn el-muHamii nisee-**ha**? **Which bag** the-judge realized that the-lawyer forgot-**ha**? "Which bag did the judge realize that the lawyer forgot it?"
Present	Embedded No RP	**Anhii shanta** el-qaadi zi'il lamma el-muHamii nisee-___? **Which bag** the-judge was.upset when the-lawyer forgot-___? "Which bag was the judge upset when the lawyer forgot?"
Present	Embedded Yes RP	**Anhii shanta** el-qaadi zi'il lamma el-muHamii nisee-**ha**? **Which bag** the-judge was.upset when the-lawyer forgot-**ha**? "Which bag was the judge upset when the lawyer forgot it?"

Table 25: Sample stimuli of the conditions under comparison of the rp model in the first block.

The *rp model* revealed a main effect of *resumptive pronoun presence*, but no effect of *adjunct island presence* or of the interaction between island presence and *resumptive pronoun presence*. This means that while participants were sensitive to the presence of a resumptive pronoun, rating sentences with a resumptive pronoun (the *embedded: yes rp* conditions) as being

significantly more acceptable than sentences without a resumptive pronoun (the *embedded: no rp* conditions), they were insensitive to the adjunct island effect. Table 26 summarizes these results.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.15893	0.12212	1.301	.22
Resumptive Pronoun Presence: Embedded: No Resumptive Pronoun vs. Embedded: Yes Resumptive Pronoun	-0.20755	0.0509	-4.077	< .001
Adjunct Island Presence: Present vs. Absent	0.07962	0.0506	1.574	.20
Interaction: Resumptive Pronoun Presence X Adjunct Island Presence	-0.02789	0.05088	-0.548	.59

Table 26: Estimated coefficients and t-values for the linear mixed effects model with resumptive pronoun presence (embedded: yes resumptive pronoun vs. embedded: yes resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the unilingual Egyptian Arabic sentences. Significant effects are shown by p-values.

This can also be seen in the interaction plot in Figure 7, which shows that both island and non-island conditions were rated higher in the presence of a resumptive pronoun.

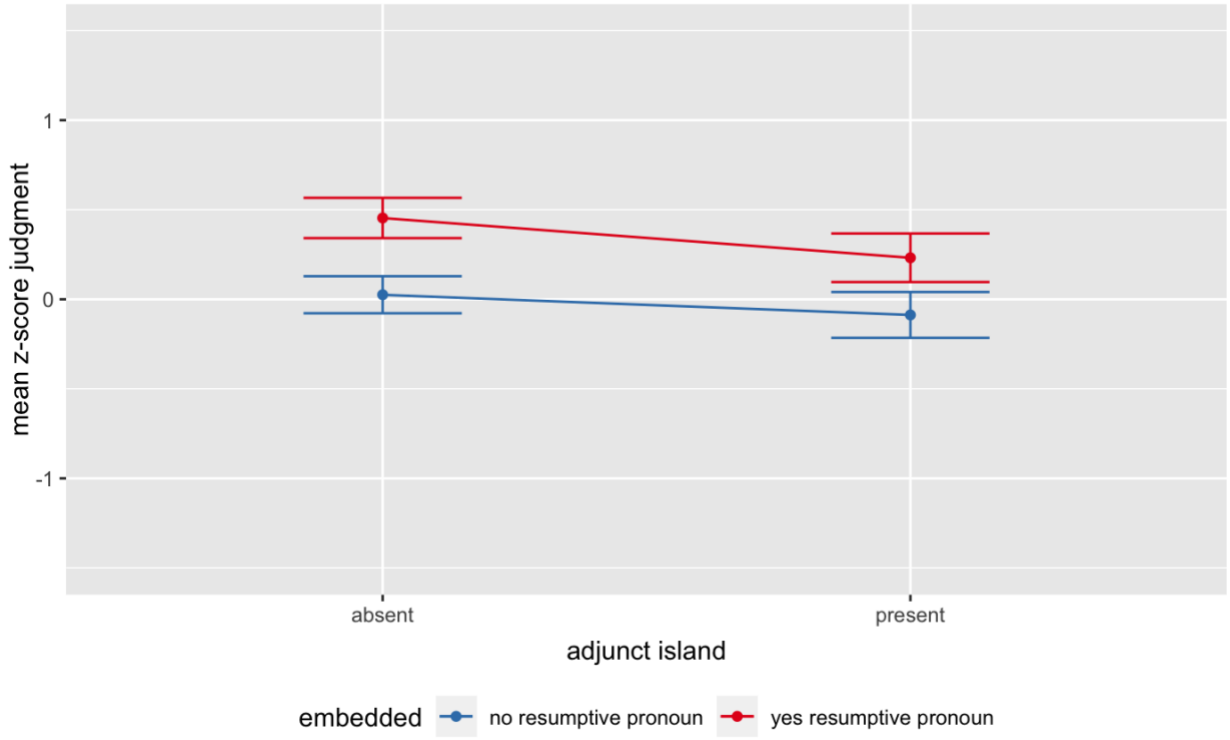

Figure 7: Interaction plot output for the factors tested in the rp model of the first block. Here we plot the interaction of (i) resumptive pronoun presence: embedded: no resumptive pronoun vs. embedded: yes resumptive pronoun where embedded: no resumptive pronoun is indicated by the red line and embedded: yes resumptive pronoun is indicated by the blue line, and (ii) adjunct island presence: where the long distance dependency either contained an adjunct island (present) or did not (absent). All judgements in this block were based on unilingual Egyptian Arabic interrogative sentences.

Taken together, these results indicate that the participants, as tested on wh-resumptive structures in Egyptian Arabic, were insensitive to constraints on movement, such as syntactic islands, and that fronted wh-constituents are favored when they co-refer with a resumptive pronoun. This falls in line with our prediction for unilingual Egyptian Arabic sentences, in that participants showed an insensitivity to the presence of an adjunct island and preferred the presence of a resumptive pronoun over its absence.

5.2 Unilingual English

In this section we present the results of the wh-resumptive structures in the unilingual English sentences of the second block. Similarly to the unilingual Egyptian Arabic conditions of the first block, in the unilingual English conditions of this block we found that structures where

the clause initial wh-constituent co-referred with the object of the verb in the embedded CP (the *embedded: no rp* and *embedded: yes rp* conditions) were rated as being less acceptable than structures where the wh-phrase was the subject of the matrix CP (the *matrix* conditions). Zooming in on the structures with a clause initial wh-constituent that co-refers with the object of embedded verb, we found that in the absence of an adjunct island (the *absent* conditions) participants rated the sentences with a resumptive pronoun (the *embedded: yes-rp* conditions) as being less acceptable than sentences without a resumptive pronoun (the *embedded: no-rp* conditions). However, in the presence of an adjunct island (the *present* conditions), participants rated the sentences with a resumptive pronoun (the *embedded: yes-rp* conditions) as being more acceptable than the sentences without a resumptive pronoun (the *embedded: no-rp* conditions). These results are summarized in Table 27, which presents the average z-score ratings as well as the average 1-7 ratings for each condition.

Adjunct Island Presence	**Clause Type**	**Average raw score**	**Average z-score**
Absent	Matrix	6.23	0.96
Absent	Embedded: No Resumptive Pronoun	5.8	0.78
Absent	Embedded: Yes Resumptive Pronoun	4.53	0.24
Present	Matrix	6.13	0.93
Present	Embedded: No Resumptive Pronoun	3.4	-0.24
Present	Embedded: Yes Resumptive Pronoun	4.88	0.39

Table 27: Average ratings (raw judgements and z-scores) for each condition from the second block testing the acceptability of wh-resumptive structures in unilingual English sentences. These results summarize participants' sensitivity of structures where the wh-constituent appears clause initially and refers to the object of the verb in the embedded CP. We compare participants' acceptability of these structures with and without a resumptive pronoun, both within and outside of adjunct islands.

To draw conclusions about the island effects and wh-resumptive structures in unilingual English sentences, we ran two linear mixed effects models for the sentences in which the clause initial wh-constituent co-referred with the object of the embedded verb: the *no-rp model*, testing participants' sensitivity to adjunct islands in the absence of a resumptive pronoun, and the *yes-rp model*, testing participants' sensitivity to adjunct islands in the presence of a resumptive pronoun. Since we used a fully crossed factorial design in this study, we also ran a third model, the *rp* model, to compare participants' sensitivities to the embedded conditions (the *embedded: no rp* and the *embedded: yes rp* conditions). We will report on these results separately in the following sections.

5.2.1 The no-rp model

In the *no-rp* model we compared the interaction of *clause type* and *adjunct island presence*, but restricted *clause type* to the *matrix* and *embedded: no rp* conditions. The conditions under comparison for this model can be seen in Table 28.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Who** claimed that the school raised the budget?
Absent	Embedded No RP	**Which budget$_i$** did the superintendent claim that the school raised **___$_i$**?
Present	Matrix	**Who** complained when the school raised the budget?
Present	Embedded No RP	**Which budget$_i$** did the superintendent complain when the school raised___$_i$?

Table 28: Sample stimuli of the conditions under comparison of the no-rp model in the second block.

The *no-rp model* revealed a main effect for *clause type* (p<.001), *adjunct island presence* (p<.001), and the interaction of *clause type* and *adjunct island presence* (p<.001). These results indicate participant rated sentences in which the clause initial wh-constituent was the subject of

the matrix CP (the *matrix* conditions) as being significantly more acceptable than sentences where the clause initial wh-constituent co-referred with the gap in the embedded CP (the *embedded: no rp* conditions). Participants also rated sentences where an adjunct island was absent (the *absent* conditions) as being significantly more acceptable than sentences where an adjunct island is present (the *present* conditions). Taken together, these results indicate that, in the absence of a resumptive pronoun, participants were sensitive to the adjunct island effect in unilingual English sentences. These results can be seen in Table 29.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.60677	0.06741	9.001	< .001
Clause Type: Matrix vs. Embedded: No Resumptive Pronoun	0.3434	0.0432	7.949	< .001
Adjunct Island Presence: Present vs. Absent	0.26324	0.04303	6.117	< .001
Interaction: Clause Type X Adjunct Island Presence	-0.25026	0.04312	-5.805	< .001

Table 29: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: no resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the unilingual English sentences. Significant effects are shown by p-values.

This presence of an island effect in the context of a clause initial nominal wh-constituent referring to a gap in its canonical position in the embedded CP in unilingual English contexts is corroborated by the interaction plot in Figure 8. As can be seen in Figure 8 the interaction between *clause type* and *adjunct island presence* results in non-parallel lines which has been taken to visually indicate a superadditive effect of island presence.

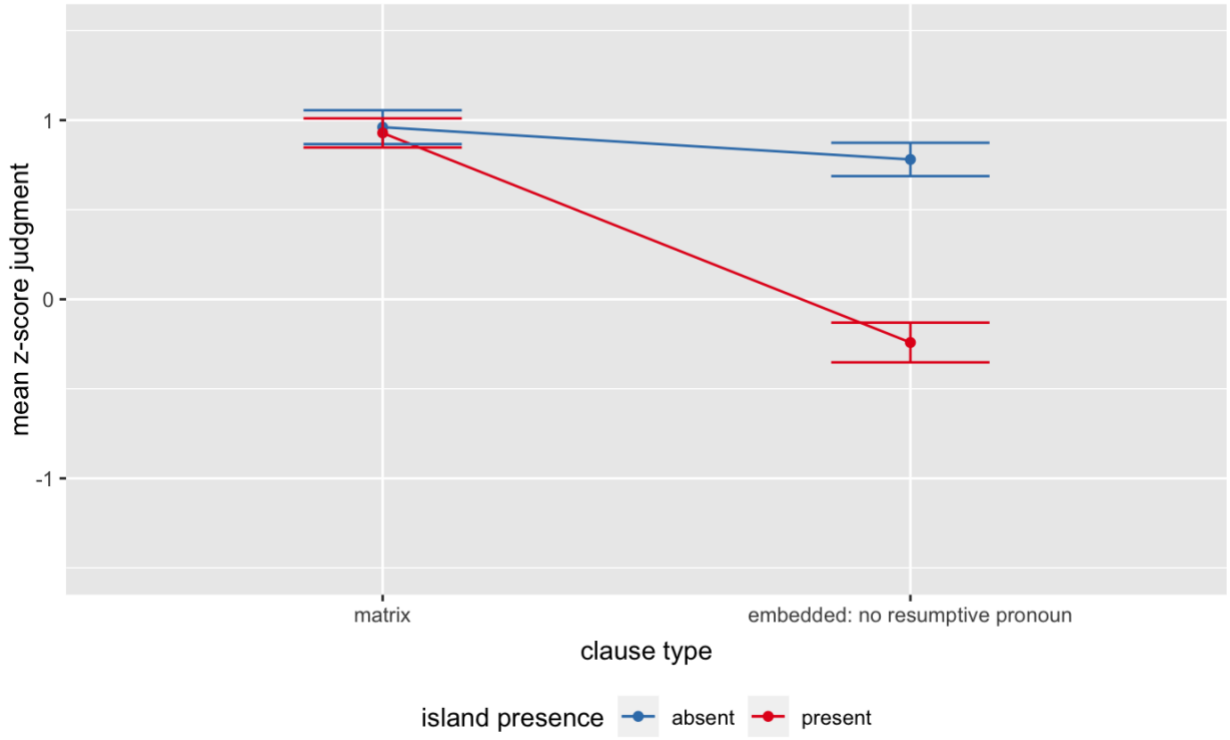

Figure 8: Interaction plot output for the factors tested in the no-rp model of the second block. Here we plot the interaction of (i) adjunct island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is the subject of the matrix CP (matrix) or appeared clause initially but did not refer to a resumptive pronoun in its canonical position within the embedded CP (embedded: no resumptive pronouns). All judgements in this block were based on unilingual English interrogative sentences.

The calculated differences-within-differences (DD) score also corroborates participants' sensitivity to adjunct islands in English. Specifically, the DD score for the *no-rp model* of the second block was 1.00, which numerically indicates a superadditive effect as well.

5.2.2 The yes-rp model

In the *yes-rp* model we compared the interaction of *clause type* and *adjunct island presence*, but this time restricted *clause type* to the *matrix* and *embedded: yes rp* conditions. The conditions under comparison for this model can be seen in Table 30.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Who** claimed that the school raised the budget?
Absent	Embedded Yes RP	**Which budget$_i$** did the superintendent claim that the school raised-**it$_i$**?
Present	Matrix	**Who** complained when the school raised the budget?
Present	Embedded Yes RP	**Which budget$_i$** did the superintendent complain when the school raised-**it$_i$**?

Table 30: Sample stimuli of the conditions under comparison of the yes-rp model in the first block.

The *yes-rp model* revealed a main effect for *clause type* (p<.001), which means that structures where the clause initial wh-constituent co-referred with a resumptive pronoun in the embedded CP (the *embedded: yes rp* conditions) were rated as being significantly less acceptable than structures where the clause initial wh-constituent was the subject of the matrix CP (the *matrix* conditions). However, the *yes-rp model* found no effect for *adjunct island presence*, or the interaction of *clause type* and *adjunct island presence* indicating that participants were insensitive to presence of an adjunct island when the clause initial wh-constituent co-referred with a resumptive pronoun in the embedded CP. These results can be seen in Table 31.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.63325	0.04685	13.516	< .001
Clause Type: Matrix vs. Embedded:Yes Resumptive Pronoun	0.31167	0.04685	6.652	< .001
Adjunct Island Presence: Present vs. Absent	-0.02617	0.04685	-0.559	.58
Interaction: Clause Type X Adjunct Island Presence	0.04227	0.04685	0.902	.37

Table 31: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: yes resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the unilingual English sentences. Significant effects are shown by p-values.

This amelioration of an island effect in the context of a resumptive pronoun in unilingual English sentences is corroborated by the interaction plot in Figure 9. As can be seen in Figure 9, the interaction between *clause type* and *adjunct island presence* results in nearly parallel lines which has been taken to visually indicate no superadditive effect of *adjunct* island presence.

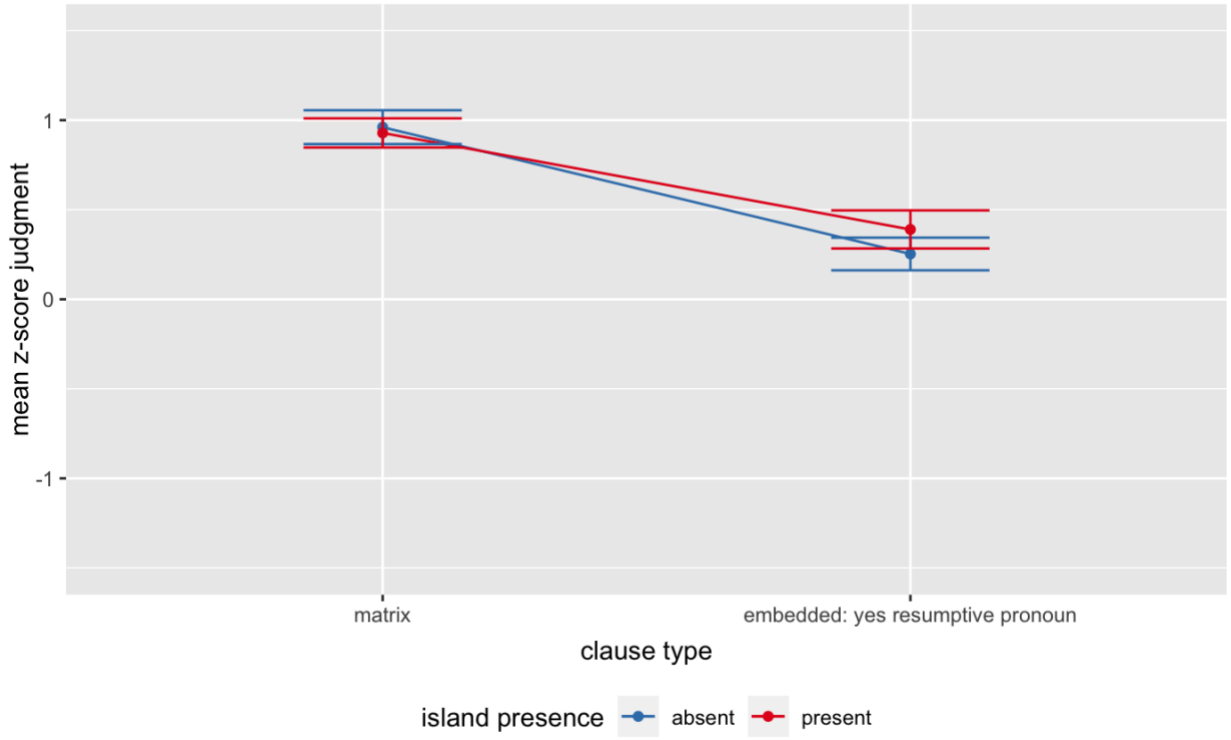

Figure 9: Interaction plot output for the factors tested in the yes-rp model of the second block. Here we plot the interaction of (i) adjunct island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is the subject of the matrix CP (matrix) or appeared clause initially and refers to a resumptive pronoun in its canonical position within the embedded CP (embedded: yes resumptive pronouns). All judgements in this block were based on unilingual English interrogative sentences.

This ameliorative effect of resumptive pronouns is also corroborated by the DD score of the *yes-rp* model as well. The DD score for the *yes-rp model* of the second block was -0.17 which is much lower than the DD score of the *no-rp model* which, as the reader will recall, was 1.06.

5.2.3 The rp model

In addition to testing the island effect in the presence or absence of a resumptive pronoun, we also compared the embedded RP conditions with each other using the *rp* model. In the *rp* model we compared the interaction of *clause type* and *adjunct island presence*, but this time restricted *clause type* to the *embedded: no rp* and *embedded: yes rp* conditions. The conditions under comparison for this model can be seen in Table 32.

Adjunct Island Presence	**Resumptive Pronoun Presence**	**Example sentence**
Absent	Embedded No RP	**Which budget$_i$** did the superintendent claim that the school raised **___$_i$**?
Absent	Embedded Yes RP	**Which budget$_i$** did the superintendent claim that the school raised-**it$_i$**?
Present	Embedded No RP	**Which budget$_i$** did the superintendent complain when the school raised **___$_i$**?
Present	Embedded Yes RP	**Which budget$_i$** did the superintendent complain when the school raised-**it$_i$**?

Table 32: Sample stimuli of the conditions under comparison of the rp model in the second block.

The *rp model* revealed a main effect of *adjunct island presence*, and of the interaction between *island presence* and *resumptive pronoun presence*, but no effect of *resumptive pronoun presence*. This means that in context of an adjunct island (the *present* conditions) participants preferred the sentences where the clause initial wh-constituent co-referred with a resumptive pronoun in the embedded clause (the *embedded: yes rp* conditions) over the sentences where the clause initial wh-constituent co-referred with a gap in the embedded clause (the *embedded: no rp* conditions). Participants, however, did not show a similar preference for resumptive pronouns in contexts where an adjunct island was not present (the *absent* conditions). Table 33 summarizes these results.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.15969	0.07464	2.14	< .05
Resumptive Pronoun Presence: Embedded: No Resumptive Pronoun vs. Embedded: Yes Resumptive Pronoun	-0.0299	0.04732	-0.632	.52
Adjunct Island Presence: Present vs. Absent	0.21281	0.04732	4.497	< .001
Interaction: Resumptive Pronoun Presence X Adjunct Island Presence	0.30438	0.04732	6.432	< .001

Table 33: Estimated coefficients and t-values for the linear mixed effects model with clause type/resumptive pronoun presence (embedded: no resumptive pronoun vs. embedded: yes resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the unilingual English sentences. Significant effects are shown by p-values.

This can also be seen in the interaction plot in Figure 10, which shows that non-island conditions with a resumptive pronoun (the combination of the conditions *absent* and *embedded: yes rp*) were rated as being less acceptable than non-island conditions without a resumptive pronoun (the combination of the conditions *absent* and *embedded: no rp*), while island conditions with a resumptive pronoun (the combination of the conditions *present* and *embedded: yes rp*) were rated as being more acceptable than island conditions without a resumptive pronoun (the combination of the conditions *present* and *embedded: no rp*).

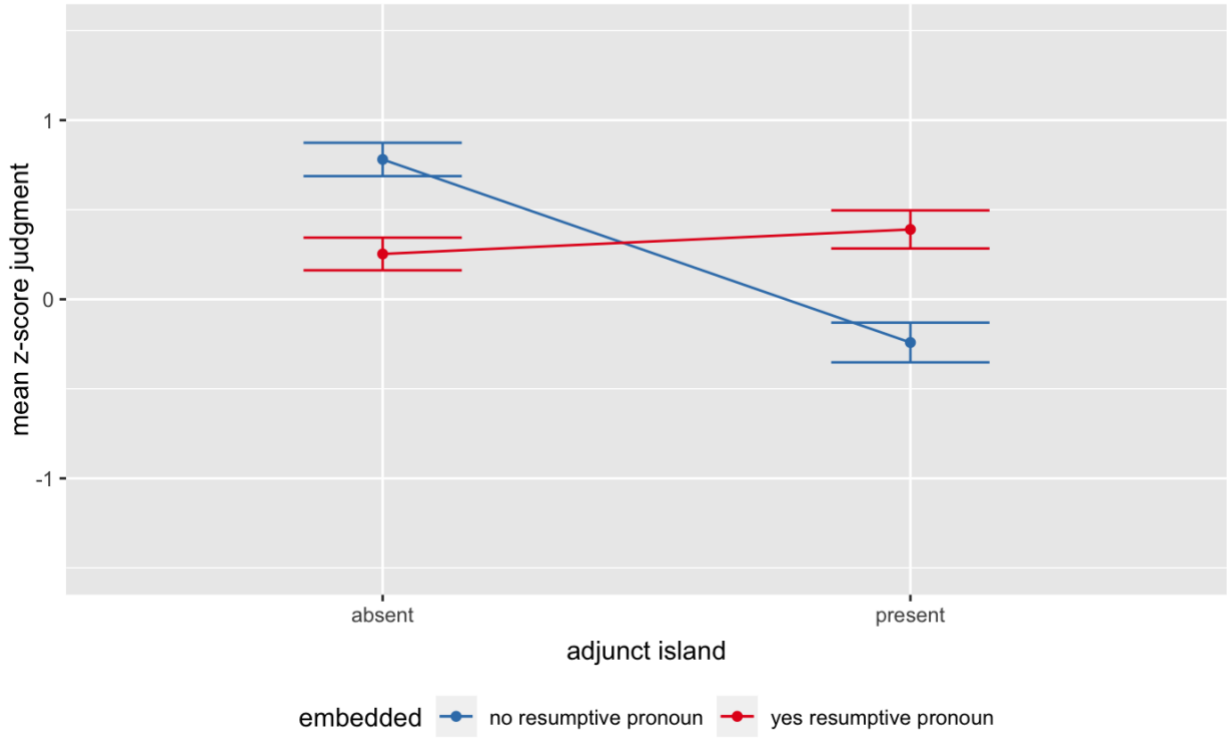

Figure 10: Interaction plot output for the factors tested in the rp model of the second block. Here we plot the interaction of (i) resumptive pronoun presence: embedded: no resumptive pronoun vs. embedded: yes resumptive pronoun where embedded: no resumptive pronoun is indicated by the red line and embedded: yes resumptive pronoun is indicated by the blue line, and (ii) adjunct island presence: where the long distance dependency either contained an adjunct island (present) or did not (absent). All judgements in this block were based on unilingual English interrogative sentences.

Taken together, these results indicate that while participants were sensitive to the islands in unilingual English conditions in the absence of a resumptive pronoun, the addition of a resumptive pronoun ameliorated these effects. This also falls in line with our prediction for unilingual English sentences.

5.3 Interim discussion

Our findings for the two unilingual conditions can be summarized as follows: when asked to judge the acceptability of non-subject clause initial wh-questions in a unilingual Egyptian Arabic context, participants seem to be insensitive to the constraints on movement, as measured by their insensitivity to adjunct islands, whether or not a resumptive pronoun is present. Although participants showed an insensitivity to island conditions, participants did show a significant

preference for the presence of a resumptive pronoun over its absence both in island and non-island contexts. This is expected, as Egyptian Arabic has been documented to require resumptive pronouns in all non-subject positions that are bound by an A'-constituent. When asked to judge the acceptability of non-subject clause initial wh-questions in unilingual English interrogative sentences, participants showed sensitivity to constraints on movement in the absence of a resumptive pronoun., as measured by their sensitivity to adjunct islands. This island effect, however, gets ameliorated in the presence of a resumptive pronoun. These findings are in line with the predictions that we had laid out at the beginning of this chapter, as well as in section 3 of chapter 2.

In the next two sections, we discuss the results of the code-switched contexts. Recall, since we hold the assumption that the well-formedness conditions of code-switched sentences follow from the well-formedness conditions of the individual grammars being mixed, the code-switched sentences are then particularly relevant for investigating the sharedness of structures, the main goals of this dissertation. Specifically, if two structures with a similar surface order have the same derivation, then these structures will be sensitive to the same well-formedness conditions in both unilingual and code-switched contexts. In this case, we then classify this structure as a *shared* structure. On the other hand, if the two structures have different derivations, then we should see divergent sensitivities to well-formedness conditions across the two unilingual contexts, as well as the code-switched contexts. In this case, we would then classify these structures as *separate* structures. In light of this assumption, we have made specific predictions with respect to island sensitivities in code-switched contexts. We predicted that participants' sensitivity of island structures in wh-resumptive contexts will be dependent on the direction of the code-switch, i.e whether the code-switch is from Egyptian Arabic to English or from English into Egyptian Arabic,

and that the magnitude of island sensitivity, and subsequent ameliorative effects of resumptive pronouns, will follow the same pattern as the language of the matrix CP. Based on the results from section 1 and 2 of this chapter, this means that (i) in contexts where the code-switched sentences begin in Egyptian Arabic and end in English, we predict participants will be insensitive to the presence of an adjunct island, and prefer the presence of a resumptive pronoun in both island and non-island conditions. In the contexts where the code-switched sentences begin in English and end in Egyptian Arabic, we predict that participants will be sensitive to the presence of an island when a resumptive pronoun is not present, but that this island effect will be ameliorated in the presence of a resumptive pronoun. We also predict that participants will prefer the absence of a resumptive pronoun over its presence in non-island contexts.

5.4 Code-switched Egyptian Arabic to English

In this section we present the results of the third block where we investigated participants' sensitivity to code-switched wh-resumptive structures which start in Egyptian Arabic and end in English. Across the board, we found that structures where the clause initial wh-constituent referred to the object of the verb in the embedded CP (the *embedded: no rp* and *embedded: yes rp* conditions) were rated as being less acceptable than structures where the wh-phrase was the subject of the matrix CP (the *matrix* conditions). Zooming in on the structures where the clause initial wh-constituent co-referred with the object of the embedded verb, we found that in the absence of an adjunct island (the *absent* conditions) participants were insensitive to the presence or absence of a resumptive pronoun, but preferred a resumptive pronoun in the presence of an adjunct island (the combination of the *present* conditions with the *embedded: yes rp* conditions). These results are summarized in Table 34, which presents the average z-score ratings as well as the average 1-7 ratings for each condition.

Adjunct Island Presence	Clause Type	Average raw score	Average z-score
Absent	Matrix	6.4	0.78
Absent	Embedded: No Resumptive Pronoun	5.15	0.22
Absent	Embedded: Yes Resumptive Pronoun	5.14	0.21
Present	Matrix	6.38	0.76
Present	Embedded: No Resumptive Pronoun	4	-0.30
Present	Embedded: Yes Resumptive Pronoun	4.43	-0.10

Table 34: Average ratings (raw judgements and z-scores) for each condition from the third block testing the acceptability of wh-resumptive structures in code-switched Egyptian Arabic to English sentences. These results summarize participants' sensitivity of structures where the wh-constituent appears clause initially and refers to the object of the verb in the embedded CP. We compare participants' acceptability of these structures with and without a resumptive pronoun, both within and outside of adjunct islands.

To draw conclusions about the wh-resumptive structures in these code-switched contexts we ran two linear mixed effects models: the *no-rp model*, testing participants' sensitivity to adjunct islands in the absence of a resumptive pronoun, and the *yes-rp model*, testing participants' sensitivity to adjunct islands in the presence of a resumptive pronoun. As we did with the unilingual conditions, we also ran a third model, the *rp* model, to compare participants' sensitivities to the embedded conditions (the *embedded: no rp* and the *embedded: yes rp* conditions). We will report on these results separately in the following sections.

5.4.1 The no-rp model

In the *no-rp* model we compared the interaction of *clause type* and *adjunct island presence*, but restricted *clause type* to the *matrix* and *embedded: no rp* conditions. The conditions under comparison for this model can be seen in Table 35.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Miin** laaHiz | that the gambler unlocked the safe? **Who** realized | that the gambler unlocked the safe? "Who realized that the gambler unlocked the safe?"
Absent	Embedded No RP	**Anhii khazna$_i$** el-Haaris laaHiz | that the gambler unlocked **___$_i$**? **Which safe$_i$** the-guard realized | that the gambler unlocked **___$_i$**? "Which safe did the guard realize that the gambler unlocked?"
Present	Matrix	**Miin** zi'il | when the gambler unlocked the safe? **Who** was.upset | when the gambler unlocked the safe? "Who was upset when the gambler unlocked the safe?"
Present	Embedded No RP	**Anhii khazna$_i$** el-Haaris zi'il | when the gambler unlocked **___$_i$**? **Which safe$_i$** the-guard was.upset | when the gambler unlocked **___$_i$**? "Which safe was the guard upset when the gambler unlocked?"

Table 35: Sample stimuli of the conditions under comparison of the no-rp model in the third block.

The *no-rp model* revealed a main effect for *clause type* ($p<.001$), *adjunct island presence* ($p<.05$), and the interaction of *clause type* and *adjunct island presence* ($p<.05$). These results indicate participant rated sentences where the wh-constituent was the subject of the matrix CP (the *matrix* conditions) as being significantly more acceptable than sentences where the clause initial wh-constituent co-refer with a gap in the embedded CP (the *embedded: no rp* conditions). Participants also rated sentences where an adjunct island was absent (the *absent* conditions) as being significantly more acceptable than sentences where an adjunct island is present (the *present* conditions). Taken together, this means that, in the absence of a resumptive pronoun, participants were sensitive to the adjunct island effect in the code-switched sentences which started in Egyptian Arabic and ended in English. These results can be seen in Table 36.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.36502	0.05605	6.512	< .001
Clause Type: Matrix vs. Embedded: No Resumptive Pronoun	0.40464	0.04631	8.737	< .001
Adjunct Island Presence: Present vs. Absent	0.13722	0.04635	2.961	< .05
Interaction: Clause Type X Adjunct Island Presence	-0.1221	0.04631	-2.637	< .05

Table 36: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: no resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the code-switched Egyptian Arabic to English sentences. Significant effects are shown by p-values.

The interaction plot in Figure 11 visually displays these results, and the calculated differences-within-differences (DD) score for the *no-rp model* of the third block was 0.5.

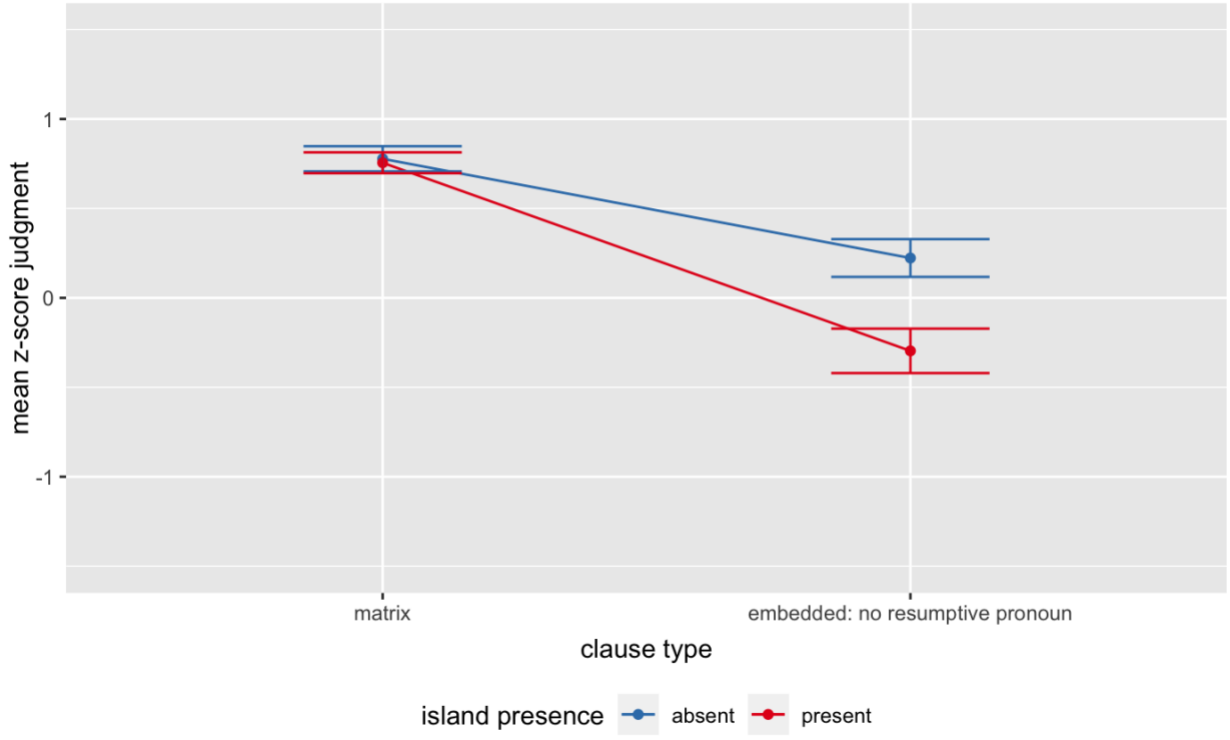

Figure 11: Interaction plot output for the factors tested in the no-rp model of the third block. Here we plot the interaction of (i) adjunct island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is the subject of the matrix CP (matrix) or appeared clause initially but referred to a gap in its canonical position within the embedded CP (embedded: no resumptive pronouns). All judgements in this block were based on code-switched Egyptian Arabic to English interrogative sentences.

This finding goes against our original prediction. We had originally predicted that in contexts where the code-switched sentences begin in Egyptian Arabic and end in English, participants would be insensitive to the presence of an adjunct island. These results however show that participants are sensitive to the presence of an adjunct island. We will come back to this finding in the discussion section.

5.4.2 The yes rp model

In the *yes-rp* model we compared the interaction of *clause type* and *adjunct island presence*, but this time restricted *clause type* to the *matrix* and *embedded: yes rp* conditions. The conditions under comparison for this model can be seen in Table 37.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Miin** laaHiz | that the gambler unlocked the safe? **Who** realized | that the gambler unlocked the safe? "Who realized that the gambler unlocked the safe?"
Absent	Embedded Yes RP	**Anhii khazna$_i$** el-Haaris laaHiz | that the gambler unlocked-**it$_i$**? **Which safe$_i$** the-guard realized | that the gambler unlocked-**it$_i$**? "Which safe did the guard realize that the gambler unlocked it?"
Present	Matrix	**Miin** zi'il | when the gambler unlocked the safe? **Who** was.upset | when the gambler unlocked the safe? "Who was upset when the gambler unlocked the safe?"
Present	Embedded Yes RP	**Anhii khazna$_i$** el-Haaris zi'il | when the gambler unlocked-**it$_i$**? **Which safe$_i$** the-guard was.upset | when the gambler unlocked-**it$_i$**? "Which safe was the guard upset when the gambler unlocked it?"

Table 37: Sample stimuli of the conditions under comparison of the no-rp model in the third block.

The *yes-rp model* revealed a main effect for *clause type* ($p<.001$), in that structures with a clause initial wh-constituent that co-referred with the resumptive pronoun in the embedded CP (the *embedded: yes rp* conditions) were rated as being significantly less acceptable than structures

where the wh-phrase was the subject of the matrix CP (the *matrix* conditions). However, although these factors neared significance, the *yes-rp model* found no effect for *adjunct island presence*, or the interaction of *clause type* and *adjunct island presence* indicating that participants were insensitive to adjunct islands when the wh-constituent in the presence of a resumptive pronoun. These results can be seen in Table 38.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.40954	0.05318	7.701	< .001
Clause Type: Matrix vs. Embedded:Yes Resumptive Pronoun	0.35477	0.04358	8.141	< .001
Adjunct Island Presence: Present vs. Absent	0.08258	0.04363	1.893	0.06
Interaction: Clause Type X Adjunct Island Presence	-0.07342	0.04358	-1.685	0.09

Table 38: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: no resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the code-switched Egyptian Arabic to English sentences. Significant effects are shown by p-values.

The interaction plot in Figure 12 visually displays these results, and the calculated differences-within-differences (DD) score for the *yes-rp model* of the third block was 0.41. This DD score indicates an island amelioration effect as it is lower than the DD score for the *no-rp model* of the third block (0.51).

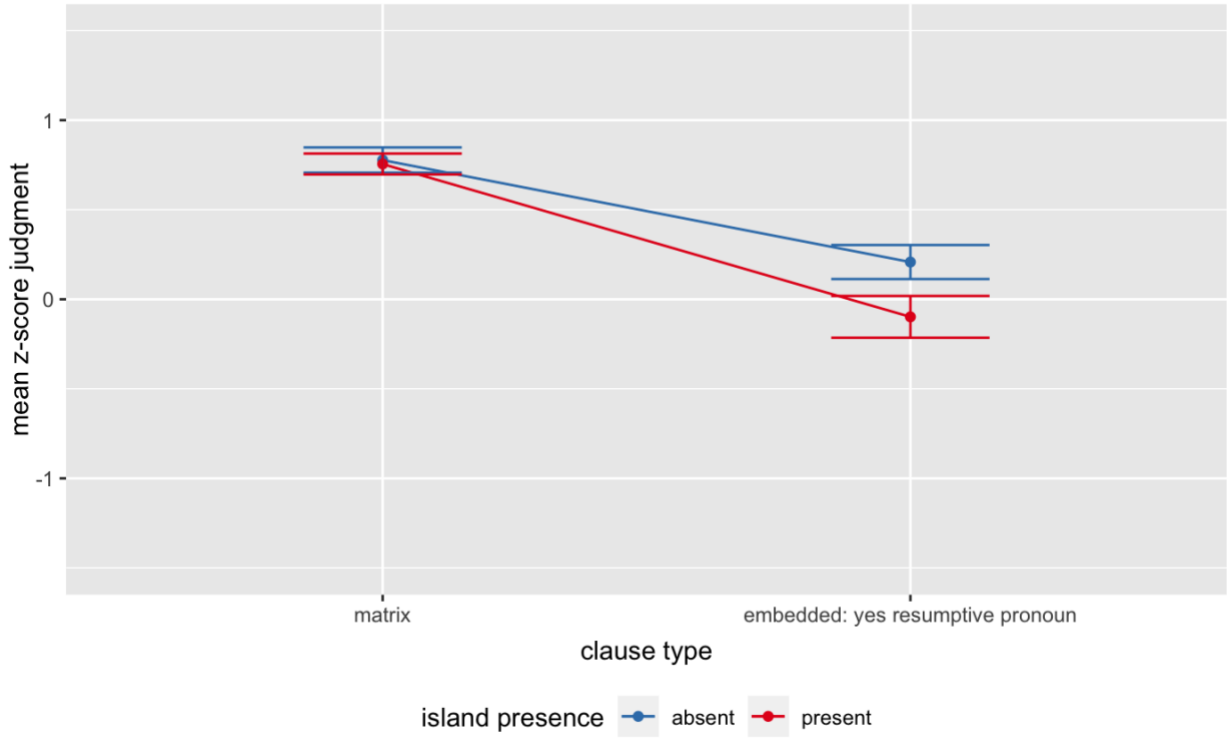

Figure 12: Interaction plot output for the factors tested in the yes-rp model of the third block. Here we plot the interaction of (i) adjunct island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is the subject of the matrix CP (matrix) or appeared clause initially and refers to a resumptive pronoun in its canonical position within the embedded CP (embedded: yes resumptive pronouns). All judgements in this block were based on code-switched Egyptian Arabic to English interrogative sentences.

5.4.3 The rp model

Finally, as we had in the unilingual conditions, in the code-switched conditions we also compared the embedded conditions with each other using the *rp* model. In the *rp* model we compared the interaction of *clause type* and *adjunct island presence*, but this time restricted *clause type* to the *embedded: no rp* and *embedded: yes rp* conditions. The conditions under comparison for this model can be seen in Table 39.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Embedded No RP	**Anhii khazna$_i$** el-Haaris laaHiz | that the gambler unlocked **___$_i$**? **Which safe$_i$** the-guard realized | that the gambler unlocked **___$_i$**? "Which safe did the guard realize that the gambler unlocked?"
Absent	Embedded Yes RP	**Anhii khazna$_i$** el-Haaris laaHiz | that the gambler unlocked-**it$_i$**? **Which safe$_i$** the-guard realized | that the gambler unlocked-**it$_i$**? "Which safe did the guard realize that the gambler unlocked it?"
Present	Embedded No RP	**Anhii khazna$_i$** el-Haaris zi'il | when the gambler unlocked **___$_i$**? **Which safe$_i$** the-guard was.upset | when the gambler unlocked **___$_i$**? "Which safe was the guard upset when the gambler unlocked?"
Present	Embedded Yes RP	**Anhii khazna$_i$** el-Haaris zi'il | when the gambler unlocked-**it$_i$**? **Which safe$_i$** the-guard was.upset | when the gambler unlocked-**it$_i$**? "Which safe was the guard upset when the gambler unlocked it?"

Table 39: Sample stimuli of the conditions under comparison of the no-rp model in the third block.

The *rp model* revealed a main effect of *adjunct island presence*, but no effect of *resumptive pronoun presence* nor an interaction between *resumptive pronoun presence* and *adjunct island presence*. This means that participants were sensitive to the presence of an island, rating conditions where an adjunct island was present as being significantly less acceptable than conditions where an adjunct island was absent. Table 40 summarizes these results.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.17705	0.07316	2.42	< .05
Resumptive Pronoun Presence: Embedded: No Resumptive Pronoun vs. Embedded: Yes Resumptive Pronoun	-0.06339	0.0509	-1.245	.21
Adjunct Island Presence: Present vs. Absent	0.20725	0.0509	4.072	< .001
Interaction: Resumptive Pronoun Presence X Adjunct Island Presence	0.05911	0.0509	1.161	.25

Table 40: Estimated coefficients and t-values for the linear mixed effects model with resumptive pronoun presence (embedded: yes resumptive pronoun vs. embedded: yes resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the code-switch Egyptian Arabic to English sentences. Significant effects are shown by p-values.

This can also seen in the interaction plot in Figure 13, which shows that participants only preferred resumptive pronouns when an adjunct island was present. Although not significant, we can also see from Figure 13 that participants did not have a general preference for resumptive pronouns outside of an island context, but in the presence of an adjunct island they preferred the presence of a resumptive pronoun over its absence in code-switched Egyptian Arabic to English wh-questions.

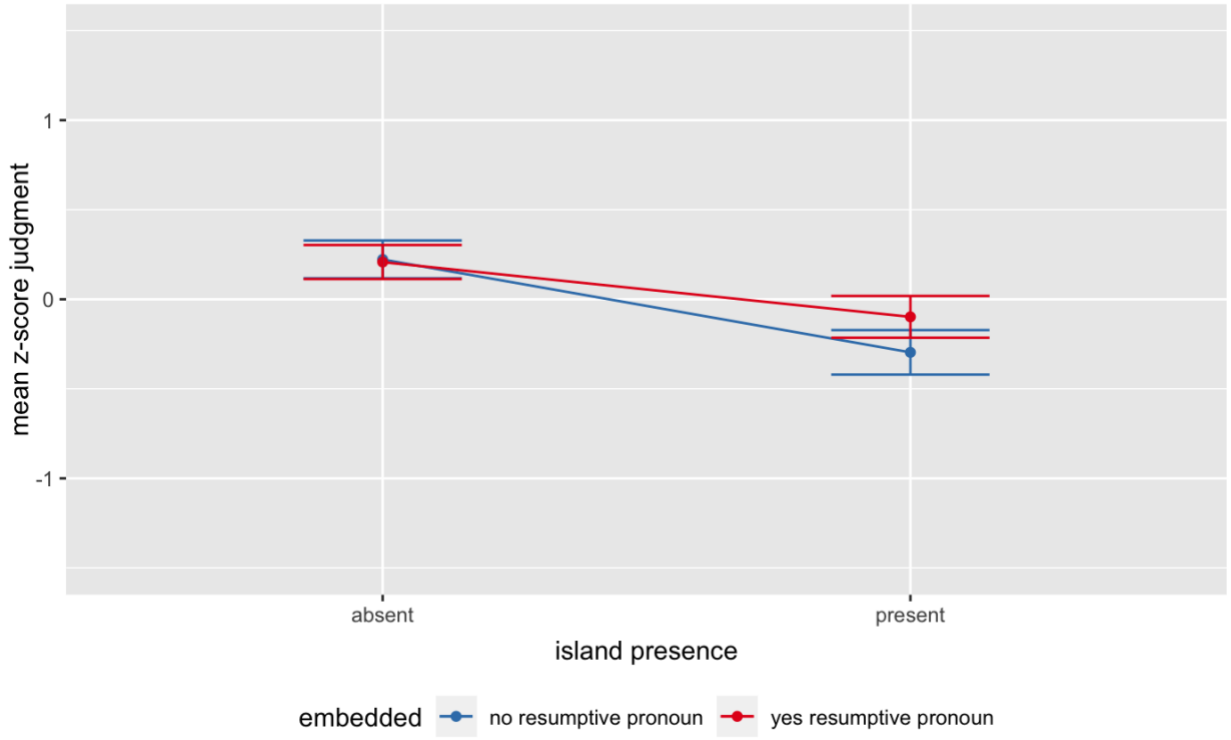

Figure 13: Interaction plot output for the factors tested in the rp model of the third block. Here we plot the interaction of (i) resumptive pronoun presence: embedded: no resumptive pronoun vs. embedded: yes resumptive pronoun where embedded: no resumptive pronoun is indicated by the red line and embedded: yes resumptive pronoun is indicated by the blue line, and (ii) adjunct island presence: where the long distance dependency either contained an adjunct island (present) or did not (absent). All judgements in this block were based on code-switched Egyptian Arabic to English interrogative sentences.

The sensitivity to adjunct islands when a resumptive pronoun is absent (the *embedded: no rp* conditions from the *no-rp model*) suggests that these code-switched questions are formed via movement, and the reduced DD score when a resumptive pronoun is present (the *embedded: yes rp* conditions from the *yes-rp model*) suggests that this island effect is ameliorated by the presence of a resumptive pronoun. While the island insensitivity reported for the *yes-rp model* is in line with our original prediction, the island sensitivity of the *no-rp model* as well as participants' insensitivity to the presence or absence of a resumptive pronoun in the non-island conditions goes against our original prediction. We had originally predicted that in contexts where the code-switched sentences begin in Egyptian Arabic and end in English, participants would be insensitive

to the presence of an adjunct island, and prefer the presence of a resumptive pronoun in both island and non-island conditions. We will come back to this conclusion in the discussions section.

5.5 Code-switched English to Egyptian Arabic

In this section we present the results of the wh-resumptive structures in the code-switched English to Egyptian Arabic sentences of the fourth block. Across the board, we found that structures where the clause initial wh-constituent referred to the object of the embedded verb (the *embedded: no rp* and *embedded: yes rp* conditions) were rated as being less acceptable than structures where the wh-phrase was the subject of the matrix CP (the *matrix* conditions). Zooming in on the structures where the clause initial wh-constituent co-referred with the object of the embedded verb, we found participants also rated the sentences where the resumptive pronoun was present (the *embedded: yes rp* conditions) as being more acceptable than the sentences where the resumptive pronoun was absent (the *embedded: no rp* conditions) both within and outside of an island context. With respect to participants' ratings of island structures, we found that participants rated wh-questions without an adjunct island (the *absent* conditions) as being more acceptable than sentences with an adjunct island (the *present* conditions), regardless of whether or not a resumptive pronoun was present. These results are summarized in Table 41, which presents the average z-score ratings as well as the average 1-7 ratings for each condition.

Adjunct Island Presence	Clause Type	Average raw score	Average z-score
Absent	Matrix	6.38	0.78
Absent	Embedded: No Resumptive Pronoun	5.15	0.23
Absent	Embedded: Yes Resumptive Pronoun	5.55	0.43
Present	Matrix	6.33	0.75
Present	Embedded: No Resumptive Pronoun	3.7	-0.41
Present	Embedded: Yes Resumptive Pronoun	4.05	-0.22

Table 41: Average ratings (raw judgements and z-scores) for each condition from the fourth block testing the acceptability of wh-resumptive structures in code-switched English to Egyptian Arabic sentences. These results summarize participants' sensitivity of structures where the wh-constituent appears clause initially and refers to the object of the verb in the embedded CP. We compare participants' acceptability of these structures with and without a resumptive pronoun, both within and outside of adjunct islands.

To draw conclusions about the wh-resumptive structures in these code-switched contexts we ran two linear mixed effects models: the *no-rp model*, testing participants' sensitivity to adjunct islands in the absence of a resumptive pronoun, and the *yes-rp model*, testing participants' sensitivity to adjunct islands in the presence of a resumptive pronoun. As we did with the unilingual conditions, we also ran a third model, the *rp* model, to compare participants' sensitivities to the embedded conditions (the *embedded: no rp* and the *embedded: yes rp* conditions). We will report on these results separately in the following sections.

5.5.1 The no-rp model

In the *no-rp* model we compared the interaction of *clause type* and *adjunct island presence*, but restricted *clause type* to the *matrix* and *embedded: no rp* conditions. The conditions under comparison for this model can be seen in Table 42.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Who** claimed | inn el-ra'ees katab el-risala? **Who** claimed | that the-president wrote the-speech? "Who claimed that the president wrote the speech?"
Absent	Embedded No RP	**Which speech$_i$** did the ambassador claim | inn el-ra'ees katab ___$_i$? **Which speech$_i$** did the ambassador claim | that the-president wrote ___$_i$? "Which speech did the ambassador claim that the president wrote?'
Present	Matrix	**Who** celebrated | lamma el-ra'ees katab el-risala? **Who** celebrated | when the-president wrote the-speech? "Who celebrated when the president wrote the speech?"
Present	Embedded No RP	**Which speech$_i$** did the ambassador celebrate | lamma el-ra'ees katab ___$_i$? **Which speech$_i$** did the ambassador celebrate | when the-president wrote ___$_i$? "Which speech did the ambassador celebrate when the president wrote?'

Table 42: Sample stimuli of the conditions under comparison of the no-rp model in the fourth block.

The *no-rp model* revealed a main effect for *clause type* ($p<.001$), *adjunct island presence* ($p<.05$), and the interaction of *clause type* and *adjunct island presence* ($p<.05$). These results indicate participant rated sentences where the wh-constituent was the subject of the matrix CP (the *matrix* conditions) as being significantly more acceptable than sentences where the clause initial wh-constituent co-refer with a gap in the embedded CP (the *embedded: no rp* conditions). Participants also rated sentences where an adjunct island was absent (the *absent* conditions) as being significantly more acceptable than sentences where an adjunct island is present (the *present* conditions). Taken together, this means that, in the absence of a resumptive pronoun, participants were sensitive to the adjunct island effect in the code-switched sentences which started in English and ended in Egyptian Arabic. These results can be seen in Table 43.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.33803	0.04977	6.792	<.001
Clause Type: Matrix vs. Embedded: No Resumptive Pronoun	0.42712	0.04977	8.583	<.001
Adjunct Island Presence: Present vs. Absent	0.16738	0.04977	3.363	<.001
Interaction: Clause Type X Adjunct Island Presence	-0.15161	0.04977	-3.046	<.05

Table 43: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: no resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the code-switched English to Egyptian Arabic sentences. Significant effects are shown by p-values.

Participants sensitivity to the effect of an adjunct island in code-switched English to Egyptian Arabic contexts is corroborated by the interaction plot in Figure 14. As can be seen in Figure 14 the interaction between *clause type* and *adjunct island presence* results in non-parallel lines which has been taken to visually indicate a superadditive effect of island presence.

This finding is in line with our original prediction. We had originally predicted that in contexts where the code-switched sentences begin in English and end in Egyptian Arabic participants would be sensitive to the presence of an island when a resumptive pronoun is not present. These results show that participants were in fact sensitive to the presence of an adjunct island, which is also corroborated by the DD score of 0.61 of the *no-rp model* in the fourth block.

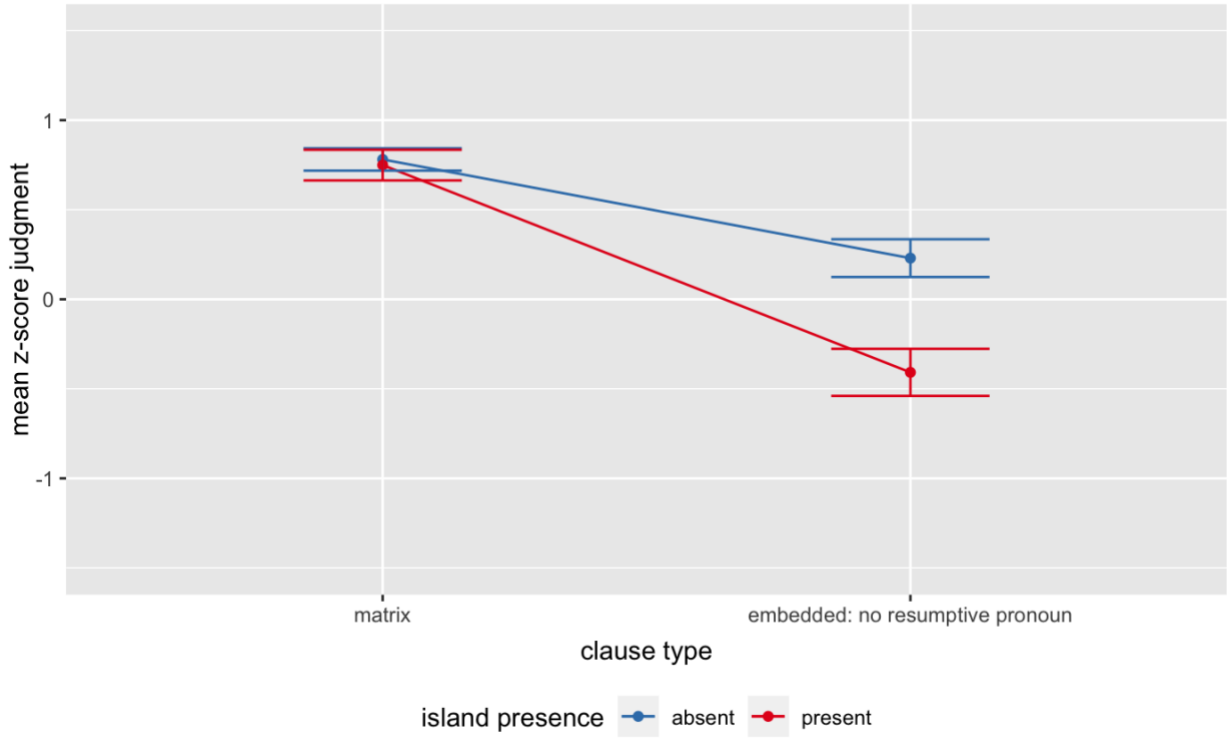

Figure 14: Interaction plot output for the factors tested in the no-rp model of the fourth block. Here we plot the interaction of (i) adjunct island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is the subject of the matrix CP (matrix) or appeared clause initially but not refer to a resumptive pronoun in its canonical position within the embedded CP (embedded: no resumptive pronouns). All judgements in this block were based on code-switched English to Egyptian Arabic interrogative sentences.

5.5.2 The yes-rp model

In the *yes-rp* model we compared the interaction of *clause type* and *adjunct island presence*, but this time restricted *clause type* to the *matrix* and *embedded: yes rp* conditions. The conditions under comparison for this model can be seen in Table 44.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Matrix	**Who** claimed | inn el-ra'ees katab el-risala? **Who** claimed | that the-president wrote the-speech? "Who claimed that the president wrote the speech?"
Absent	Embedded Yes RP	**Which speech$_i$** did the ambassador claim | inn el-ra'ees katab-**ha$_i$**? **Which speech$_i$** did the ambassador claim | that the-president wrote-**it$_i$**? "Which speech did the ambassador claim that the president wrote it?'
Present	Matrix	**Who** celebrated | lamma el-ra'ees katab el-risala? **Who** celebrated | when the-president wrote the-speech? "Who celebrated when the president wrote the speech?"
Present	Embedded Yes RP	**Which speech$_i$** did the ambassador celebrate | lamma el-ra'ees katab-**ha$_i$**? **Which speech$_i$** did the ambassador celebrate | when the-president wrote-**it$_i$**? "Which speech did the ambassador celebrate when the president wrote it?'

Table 44: Sample stimuli of the conditions under comparison of the no-rp model in the third block.

The *yes-rp model* revealed a main effect for *clause type* ($p<.001$), *adjunct island presence* ($p<.05$), and the interaction of *clause type* and *adjunct island presence* ($p<.05$). These results indicate participant rated sentences where the wh-constituent was the subject of the matrix CP (the *matrix* conditions) as being significantly more acceptable than sentences where the clause initial wh-constituent co-refer with a resumptive pronoun in the embedded CP (the *embedded: yes rp* conditions). Participants also rated sentences where an adjunct island was absent (the *absent* conditions) as being significantly more acceptable than sentences where an adjunct island is present (the *present* conditions). Taken together, this means that, in the absence of a resumptive pronoun, participants were sensitive to the adjunct island effect in the code-switched sentences which started in English and ended in Egyptian Arabic. These results can be seen in Table 45.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.43652	0.05418	8.056	< .001
Clause Type: Matrix vs. Embedded:Yes Resumptive Pronoun	0.32799	0.04653	7.048	<.001
Adjunct Island Presence: Present vs. Absent	0.17094	0.0465	3.676	<.001
Interaction: Clause Type X Adjunct Island Presence	-0.15409	0.04652	-3.313	< .001

Table 45: Estimated coefficients and t-values for the linear mixed effects model with clause type (matrix vs. embedded: no resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the code-switched English to Egyptian Arabic sentences. Significant effects are shown by p-values.

Participants sensitivity to the effect of an adjunct island in code-switched English to Egyptian Arabic contexts is corroborated by the interaction plot in Figure 15. As can be seen in Figure 15 the interaction between *clause type* and *adjunct island presence* results in non-parallel lines which has been taken to visually indicate a superadditive effect of island presence.

This finding is in line with our original prediction, although not fully. We had originally predicted that in contexts where the code-switched sentences begin in English and end in Egyptian Arabic participants would be sensitive to the presence of an island when a resumptive pronoun is not present, and that this sensitivity would be ameliorated (to an unspecified degree) in the presence of a resumptive pronoun. In the unilingual English conditions of the second block discussed in section 2 of this chapter, we reported a full amelioration effect of adjunct island sensitivity in the presence of a resumptive pronoun. In this code-switched context reported on in this section, we find no amelioration effect (DD score of no-rp model = 0.61 , DD score of yes-rp model = 0.62). This is, however, in line with the proposals which have claimed that although resumptive pronouns make a sentence that is subject to constraints on movement more *comprehensible* it does not make it more *grammatical* (see Beltrama & Xiang, 2016 for

discussion). This evident when we compare the average scores of each condition: Although participants rated the conditions with resumptive pronouns as being slightly more acceptable than the conditions without a resumptive pronoun, the DD score quantifying their sensitivity to adjunct islands were nearly identical whether or not a resumptive pronoun was present.

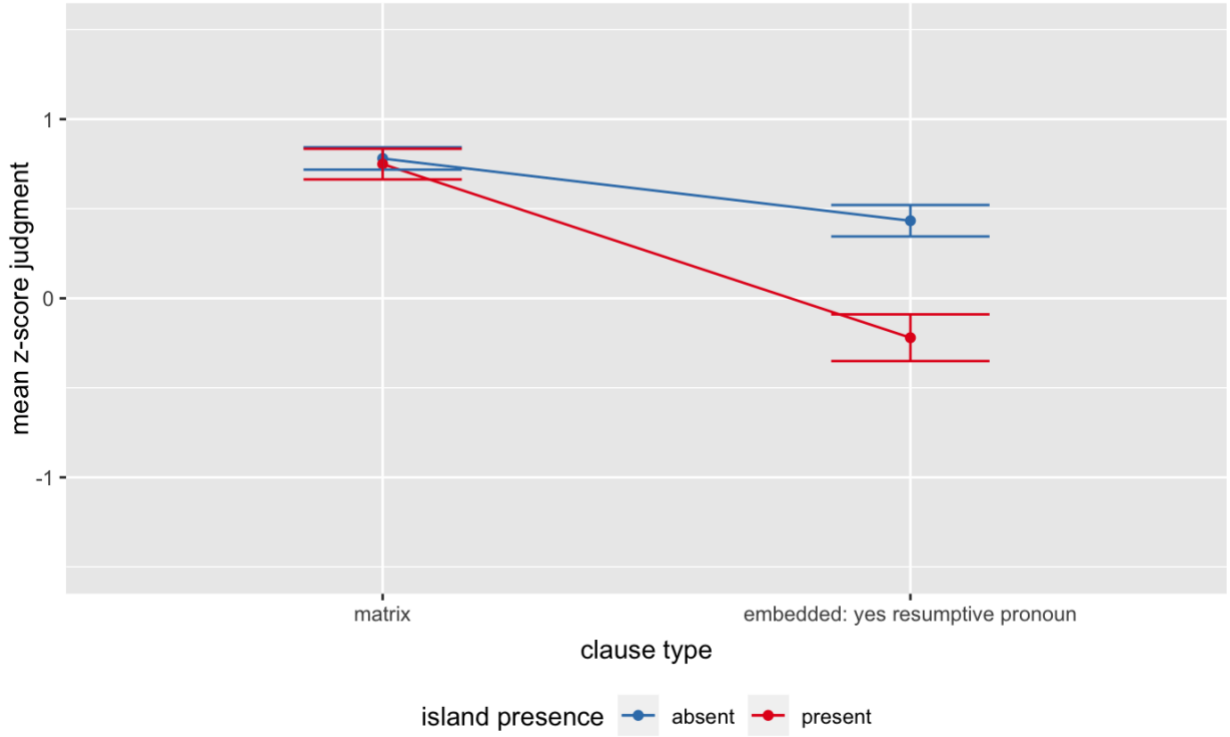

Figure 15: Interaction plot output for the factors tested in the yes-rp model of the third block. Here we plot the interaction of (i) adjunct island presence: present vs. absent where present is indicated by the red line and absent is indicated by the blue line, and (ii) clause type: where the wh-constituent is the subject of the matrix CP (matrix) or appeared clause initially and refers to a resumptive pronoun in its canonical position within the embedded CP (embedded: yes resumptive pronouns). All judgements in this block were based on code-switched English to Egyptian Arabic interrogative sentences.

5.5.3 The rp model

Finally, as we had in the first three blocks, we also compared the embedded conditions with each other using the *rp* model in this block. In the *rp* model we compared the interaction of *clause type* and *adjunct island presence*, but this time restricted *clause type* to the *embedded: no rp* and *embedded: yes rp* conditions. The conditions under comparison for this model can be seen in Table 46.

Adjunct Island Presence	**Clause Type**	**Example sentence**
Absent	Embedded No RP	**Which speech$_i$** did the ambassador claim | inn el-ra'ees katab **___$_i$**? **Which speech$_i$** did the ambassador claim | that the-president wrote **___$_i$**? "Which speech did the ambassador claim that the president wrote?"
Absent	Embedded Yes RP	**Which speech$_i$** did the ambassador claim | inn el-ra'ees katab-**ha$_i$**? **Which speech$_i$** did the ambassador claim | that the-president wrote-**it$_i$**? "Which speech did the ambassador claim that the president wrote it?"
Present	Embedded No RP	**Which speech$_i$** did the ambassador celebrate | lamma el-ra'ees katab **___$_i$**? **Which speech$_i$** did the ambassador celebrate | when the-president wrote **___$_i$**? "Which speech did the ambassador celebrate when the president wrote?"
Present	Embedded Yes RP	**Which speech$_i$** did the ambassador celebrate | lamma el-ra'ees katab-**ha$_i$**? **Which speech$_i$** did the ambassador celebrate | when the-president wrote-**it$_i$**? "Which speech did the ambassador celebrate when the president wrote it?"

Table 46: Sample stimuli of the conditions under comparison of the rp model in the fourth block.

The *rp model* revealed a main effect of *adjunct island presence* ($p < .001$), but no effect for *resumptive pronoun presence* ($p = .07$) or the interaction between *resumptive pronoun presence* and *adjunct island presence*. This means that participants were sensitive to the presence of an island, rating contexts without an adjunct island (the *absent* conditions) as being significantly more acceptable than the contexts with an adjunct island (the *present* conditions), but not resumptive pronouns, rating contexts with a resumptive pronoun (the *embedded: yes rp* conditions) as being equally acceptable to the contexts without a resumptive pronoun (the *embedded: no rp* conditions). Table 47 summarizes these results.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.12105	0.086826	1.394	.19
Resumptive Pronoun Presence: Embedded: No Resumptive Pronoun vs. Embedded: Yes Resumptive Pronoun	-0.104345	0.056399	-1.85	.07
Adjunct Island Presence: Present vs. Absent	0.324508	0.056209	5.773	<.001
Interaction: Resumptive Pronoun Presence X Adjunct Island Presence	0.002281	0.056319	0.041	.97

Table 47: Estimated coefficients and t-values for the linear mixed effects model with resumptive pronoun presence (embedded: yes resumptive pronoun vs. embedded: yes resumptive pronoun) and adjunct island presence (present vs. absent) as fixed effects in the code-switch English to Egyptian Arabic. Significant effects are shown by p-values.

These results are visually corroborated by the graph in Figure 16. In Figure 16, we see that across the board participants preferred the presence of a resumptive pronoun over its absence in both island and non-island conditions.

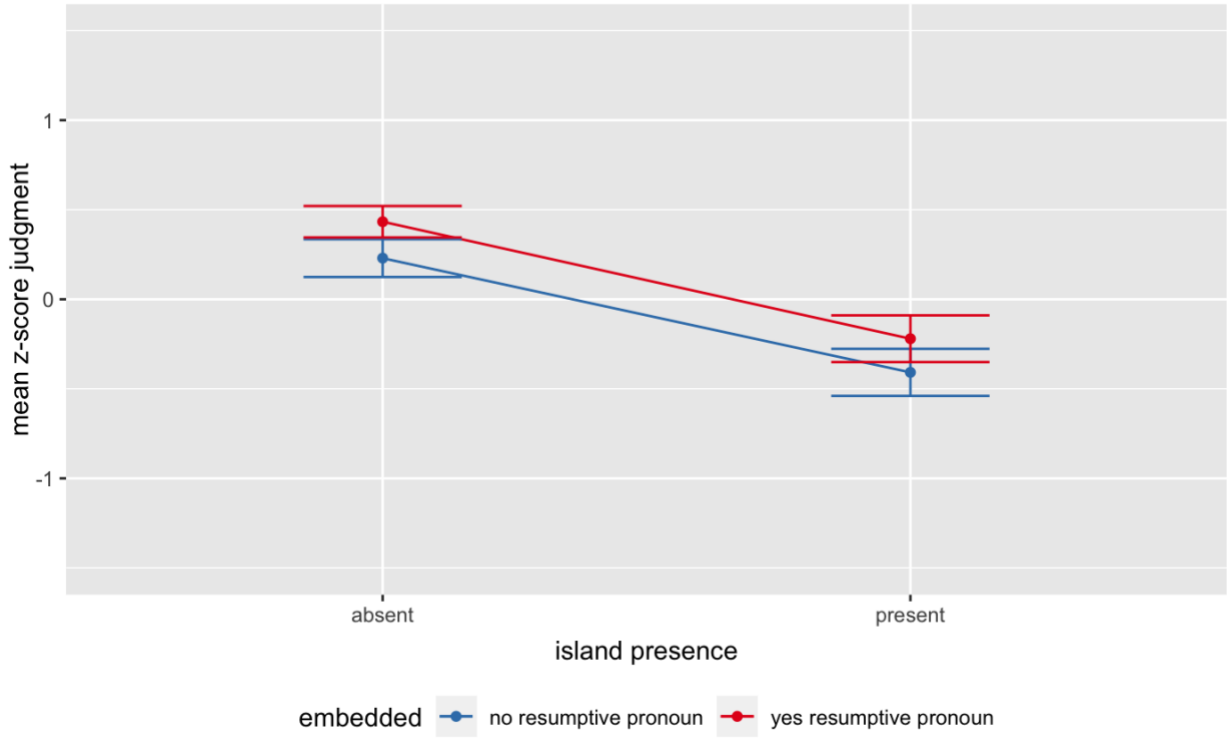

Figure 16: Interaction plot output for the factors tested in the rp model of the fourth block. Here we plot the interaction of (i) resumptive pronoun presence: embedded: no resumptive pronoun vs. embedded: yes resumptive pronoun where embedded: no resumptive pronoun is indicated by the red line and embedded: yes resumptive pronoun is indicated by the blue line, and (ii) adjunct island presence: where the long distance dependency either contained an adjunct island (present) or did not (absent). All judgements in this block were based on code-switched English to Egyptian Arabic interrogative sentences.

Taken together we find that these results suggest that, when code-switching from English into Egyptian Arabic, the formation of non-subject clause wh-constituents show sensitivity to constraints on movement, and, although resumptive pronouns did not necessarily ameliorate this effect, participants preferred the presence of a resumptive pronoun within embedded Egyptian Arabic CPs rather than its absence.

5.6 Discussion

In this chapter we tested bilingual individuals' sensitivity to the wh-resumptive structure in unilingual Egyptian Arabic, unilingual English, code-switched Egyptian Arabic to English, and code-switched English to Egyptian Arabic interrogative sentences. As we previously stated, the wh-resumptive structure refers to contexts where the wh-constituent appears in a clause initial

position and co-refers with a resumptive pronoun in a structurally lower position. The wh-resumptive structure was originally chosen because previous literature has analyzed this structure as arising from a different derivation across Egyptian Arabic and English. In Egyptian Arabic, the obligatory presence of resumptive pronouns at the tail end of non-subject A'-dependencies and the insensitivity of wh-resumptive structure to movement constraints have led scholars to categorize Egyptian Arabic as a language with *grammatical resumptive pronouns*. That is, resumptive pronouns that are base generated in the positions in which they are pronounced and bound by the structurally higher A'-constituent, which is also base generated in the position in which it is pronounced, in a derivation that does not involve movement (see Soltan, 2012, Lassadi, 2005, Gad, 2011, and references therein). In English on the other hand, although resumptive pronouns have been shown to be systematically produced both spontaneously (see Prince, 1990) and in lab settings that induced their production (see Morgan & Wagers, 2018, and Ferreira & Swets, 2005), speakers have consistently rated their presence as being highly unacceptable both in non-island and island conditions (see Alexopoulou & Keller, 2007; Heestand et. al., 2011). For this reason, English has been typologically categorized as a language with intrusive resumptive pronouns (see Asudeh, 2011, Morgan & Wagers, 2018, Alexopoulou & Keller, 2007, and references therein).

Based on this previous literature we had predicted that when rating unilingual Egyptian Arabic sentences, bilinguals would be insensitive to the presence of an adjunct island, and that they would prefer the presence of a resumptive pronoun in both island and non-island contexts over its absence. In line with our predictions we did in fact find an insensitivity of island constraints and a preference for resumptive pronouns in both island and non-island contexts in unilingual Egyptian Arabic wh-questions. We had also predicted that when rating unilingual English sentences, bilinguals would be sensitive to the presence of an adjunct island, particularly in the

contexts where no resumptive pronoun was present, but that the presence of a resumptive pronoun would ameliorate this island effect. In line with our predictions we did find a sensitivity to island constraints that is ameliorated by the presence of a resumptive pronoun in the unilingual English contexts.

Based on the previous literature that has proposed that the wh-resumptive structure is formed through different derivations across Egyptian Arabic and English, we originally classified the wh-resumptive structures as *separate* structures across Egyptian Arabic and English. With this classification, we made specific predictions regarding bilingual individuals' sensitivity to code-switched wh-resumptive structures. Under the assumption that the grammatical constraints set on code-switching fall out of the grammatical constraints of the two languages being mixed, we predicted that participants' sensitivity to island structures in wh-resumptive contexts will be dependent on the direction of the code-switch. We made the general prediction that the magnitude of island sensitivity, subsequent ameliorative effects of resumptive pronouns, and preference for the presence or absence of a resumptive pronoun across both island and non-island contexts would follow the same pattern as the language of the matrix CP. Specifically, we predicted that in contexts where the code-switched sentences begin in Egyptian Arabic and end in English, participants would be insensitive to the presence of an island, as they were in the unilingual Egyptian Arabic contexts, and prefer the presence of a resumptive pronoun over its absence in both island and non-island wh-questions, since no movement is assumed. We also predicted that in contexts where the code-switched sentences begin in English and end in Egyptian Arabic, participants would be sensitive to the presence of an island, as they were in the unilingual English contexts, and prefer the absence of a resumptive pronoun over its presence even in non-island contexts since in English A'-constituents corefer with a gap in non-island contexts.

In the context of code-switching we instead found the following results. In the context of code-switched interrogatives that began in Egyptian Arabic and ended in English we found that, contrary to our previous predictions, in the absence of a resumptive pronoun participants were sensitive to the presence of the adjunct island, rating adjunct island contexts as being significantly less acceptable than contexts without an adjunct island. In the presence of a resumptive pronoun, participants seemed to show a preference for a resumptive pronoun in the context of an adjunct island, but this preference was not significant.

In the context of code-switched interrogatives that began in English and ended in Egyptian Arabic we found that, in line with our previous prediction, participants were sensitive to the presence of the adjunct island, but contrary to our previous prediction, they showed a significant preference for the presence of a resumptive pronoun in both island and non-island contexts. Generalizing across these results, we see that participants were sensitive to the presence of an adjunct island in both code-switched directions, which was especially apparent in the absence of resumptive pronouns. With respect to their sensitivity to the presence of a resumptive pronoun, we found that when the embedded CP was in Egyptian Arabic, participants preferred the presence of a resumptive pronoun vs. its absence across both island and non-island conditions, however when the embedded CP was in English participants preferred the presence of a resumptive pronoun vs. its absence only in island conditions.

These results indicate a couple of things: first, due to participants' sensitivity to adjunct islands in code-switched interrogative sentences, both code-switching directions are to a certain extent sensitive to constraints on movement. Similarly, the participants' preference for resumptive pronouns in island and non-island contexts when the embedded CP was in Egyptian Arabic, but

only in island contexts when the embedded CP was in English, suggests that their sensitivity to resumptive pronouns can also depend on the language of the embedded CP.

To account for these results under an analysis where the wh-resumptive structures have different derivations across Egyptian Arabic and English, we could consider the possibility that in the code-switched contexts participants were more sensitive to treating code-switched sentences with a gap as instances of wh-movement regardless of the language of the matrix CP. This would explain why the code-switched conditions that began in Egyptian Arabic but ended in English showed sensitivity to island structures in the absence of a resumptive pronoun, while the unilingual Egyptian Arabic conditions did not show this sensitivity. This would also retain our categorization of the wh-resumptive structure as a separate structure across Egyptian Arabic and English. However, such an analysis does not explain why participants showed no significant sensitivity to adjunct islands with a resumptive pronoun in these same conditions, but a significant sensitivity to the island conditions with a resumptive pronoun in the English to Egyptian Arabic code-switched conditions.

Another possibility that we could consider would extend the assumptions above to the syntactic representation of unilingual Egyptian Arabic structures in this specific participant population. Recall that in section 3.3 of chapter 3 we had stated that the participants' self-reported proficiency of Egyptian Arabic and English indicated that this pool of participants were more proficient in English than they were in Egyptian Arabic. If our prediction that the language of the matrix CP drives the island sensitivity of code-switched sentences is in fact true, then perhaps the island sensitivity found in the Egyptian Arabic to English sentences by this population of participants may actually indicate their knowledge of unilingual Egyptian Arabic wh-resumptive structures isalso sensitive to constraints on movement. For instance, if we adopt an analysis, such

as has been proposed by Rasin (2017) where the distribution of resumptive pronouns is subject to morphophonological and syntactic well-formedness conditions, then we could explain the results in this chapter in the following way: Rasin (2017) notes that resumptive pronouns in Hebrew seem to occur in free distribution with gaps in the direct object position outside of island contexts (see 18a), but they obligatorily appear when they are the complement of a preposition (see 18b), follow a noun in the construct state, or are in an island context (see 18c).

(18) a. Optional - direct object
ze ha-iš$_i$ še-raiti (oto$_i$)
this the-man$_i$ that-I.saw (him$_i$)
"This is the man that I saw."
b. Obligatory - complement of a preposition
ze ha-iš$_i$ še-xašavti *(alav$_i$)
this the-man$_i$ that-I.thought *(on.him$_i$)
"This is the man that I thought about."
c. Obligatory - island context
ze ha-iš$_i$ še-raiti et ha-iša še-pagša *(oto$_i$)
this the-man$_i$ that-I.saw ACC the-woman that-met *(him$_i$)
"This is the man x such that I saw the woman who met x."

First, Rasin attributes the apparent optionality of resumptive pronouns in (18a) to be due to free C choice (following McCloskey, 1990's analysis of Irish)[11], and that the obligatory resumptive pronoun in (18c) acts as an island saving mechanism, since movement is disallowed in this context. In order to account for the obligatory presence of a resumptive pronoun when the relativized nominal is the complement of a prepositional phrase, as in (18b), he proposes that these resumptive pronouns are inserted due to a general PF rule in Hebrew. This rule states that if a trace is morphologically merged to a linearly adjacent element, resulting in a complex head, then the trace

[11] He proposes that in Hebrew, the complementizer še is actually the surface realization of two homophonous C's: še$_{\text{BLOCKER}}$ which blocks movement, and a še$_{\text{NON-BLOCKER}}$ which allows movement. In the derivations with a C$_{\text{BLOCKER}}$, since movement is illicit a resumptive pronoun is obligatorily inserted to save the derivation, but in derivations with a C$_{\text{NON-BLOCKER}}$, since movement is licit, no resumptive pronoun is required.

must be pronounced as a resumptive pronoun[12]. This spell-out rule of resumptive pronouns then accounts for why it obligatorily occurs within well-defined phonological contexts.

Following Rasin (2017)'s analysis of resumptive pronoun distribution in Hebrew outside of *island* contexts, we could propose that the distribution of resumptive pronouns in Egyptian Arabic satisfies similar well-formedness requirements of both the syntax and the phonology. Outside of an island context, if this same PF rule used to account for (18b) is also present in Egyptian Arabic, then we would expect that a trace becomes a resumptive pronoun when it has merged morphologically with a linearly-adjacent syntactic element, such as prepositions, verbs, certain complementizers, and construct state nominals, but not when it does not. We find evidence for this argument when we consider the ditransitive alternation in Egyptian Arabic in (19). In Egyptian Arabic the ditransitive can be expressed either via double object construction, as seen in (19a), or through the prepositional object construction, as seen in (19b).

(19) a. Ditransitive - Double Object

Diana	idit	el-bint	el-kitaab el-aHmar	imbaarih
I	gave	the-girl	the-book the-red	yesterday

"I gave the girl the red book yesterday."

b. Ditransitive - Prepositional Object

Diana	idit	el-kitaab el-aHmar	li-el-bint	imbaarih
I	gave	the-book the-red	to-the-girl	yesterday

"I gave the red book to the girl yesterday."

When we relativize the linearly non-adjacent direct object from the double object structure in (19a) we find no resumptive pronoun in the position of the trace (see 20a), however when we relativize the linearly adjacent direct object from a preposition object structure in (20b) the resumptive

[12] This is the specific rule that Rasin proposes: [t → pro / X⊕ __], where (X ⊕ Y) stands for the relationship between two linearly-adjacent syntactic elements X and Y that have merged morphologically.

pronoun is obligatory, and when we relativize the linearly adjacent complement of the preposition, we also find an obligatory resumptive pronoun, see (20c).

(20)[13] a. el-kitaab el-aHmar$_i$ illi Diana idit el-bint ___$_i$ imbaarih …
the-book the-red that Diana gave the-girl ___$_i$ yesterday…
"the red book that Diana gave the girl yesterday…

b. el-kitaab el-aHmar$_i$ illi Diana idit-*(hu$_i$) li-el-bint imbaarih…
the-book the-red$_i$ that Daina gave-*(it$_i$) to-the-girl yesterday…
"the red book that Diana gave to the girl yesterday..."

c. el-bint$_i$ illi Diana idit el-kitaab el-ahmar li-*(ha$_i$) imbaarih…
the-girl$_i$ that Diana gave the-book the-red to-*(her$_i$) yesterday…
"the girl that Diana gave the red book to yesterday…"

This data seems to suggest that outside of an island context, there is a morphophonological requirement present in the distribution of resumptive pronouns in Egyptian Arabic in general. Continuing with this analysis, in order to explain the island insensitivity in the presence of a resumptive pronoun, we could argue that within an island context the resumptive pronoun saves the derivation from crashing. This phonological rule explains why participants in this experiment preferred the presence of a resumptive pronoun over its absence in both non-island and island contexts when the embedded CP was in Egyptian Arabic, since the trace is presumed to have morphophonologically merged to the embedded Egyptian Arabic verb, but only preferred its presence in island contexts when the embedded CP was in English, as English does not seem to have this specific PF rule requiring the spell-out of traces. Adopting such an approach would lead us to argue that that the island effect in the unilingual Egyptian Arabic conditions in the *no-rp model*, and ameliorative properties of resumptive pronouns in the *yes-rp model* were not apparent because the resumptive pronoun is always required as a spell-out of the trace in the Egyptian Arabic morphophonological conditions tested in this dissertation. However, since English does not have the same morphophonological requirement that Egyptian Arabic has, the island sensitivity of

[13] The judgements in (20) are based on my own intuitions of Egyptian Arabic that were corroborated with another speaker. Both of us, however, fit the same profile of so-called heritage speakers.

Egyptian Arabic is made apparent in the code-switched contexts with a matrix Egyptian Arabic CP with an embedded English CP.

Adopting such an approach would give us evidence to say that, for this participant population, the wh-resumptive structure in Egyptian Arabic is formed via movement in a manner that is similar to how clause-initial wh-constituents are formed in English, but that the presence of a resumptive pronoun is derived differently across the two languages. In Egyptian Arabic, resumptive pronouns are spelled out copies of the trace formed by movement, while in English they serve more as an artifact of parsing and production instead of being grammatical elements of the language. All together, if we adopt this later view, then we would argue that for this population of participants the wh-resumptive structure is a partially overlapping structures across Egyptian Arabic and English, since the clause wh-initial element is formed via movement in both languages, but the insertion of resumptive pronouns is generated post-syntactically in Egyptian Arabic as part of the derivation but in the production of sentences in English.

Chapter 6 Conclusion

In this dissertation we investigated the extent to which bilingual speakers' cognitive representations of the syntactic structures of their two languages are interconnected. To do this, we zoomed in on two structures which can have the same surface word order across Egyptian Arabic and English but have been argued to have been formed through either similar or different derivations: the wh-in situ structure and the wh-resumptive structure. We decided to focus on wh-questions in these two languages since the typology of wh-questions available in Egyptian Arabic and English provide comparisons of structures that have been argued to have either a similar (*shared*) or different (*separate*) derivation across these two languages, despite having the same word order (surface order) regarding the realization of wh-questions. While wh-in situ structures were chosen because they have been argued to have similar derivational properties across both languages, the wh-resumptive structures have been argued to be formed through different derivations across both languages. With respect to the wh-in situ structures we argued that, although the wh-in situ structures is more productive in Egyptian Arabic than in English, Egyptian Arabic and English both form this structure in a derivationally similar way, in that the wh-constituent remains in situ and does not move to a structurally higher position either overtly or covertly. With respect to the wh-resumptive structure we initially argued that while both Egyptian Arabic and English show evidence of resumptive pronouns in A'-structures, resumptive pronouns were assumed to be base generated in their canonical position in Egyptian Arabic but inserted due to movement in English.

In order to draw solid conclusions about bilingual individuals' linguistic representations of syntactic structures, we tested Egyptian Arabic-English bilingual individuals' sensitivity to island and non-island wh-in situ and wh-resumptive structures in both unilingual and code-switched contexts. We opted to test island structures as island sensitivity serves as a relevant domain in arguing whether or not a structure has been formed via movement. Similarly, code-switching also served as a particularly relevant domain of investigation for determining how structures with similar surface word orders, but either similar or different derivations across the two languages, are processed and stored as part of the bilingual individual's linguistic representation system. This is especially relevant because of the hypothesis that the acceptability of code-switched sentences, i.e the constraints determining licit vs. illicit code-switched sentences rely on the same structure building operations as the constraints determining licit vs. illicit unilingual sentences. We hypothesized that if two structures with similar surface orders also have the same derivation, which we classified as a *shared* structure, then these structures will be sensitive to the same well-formedness conditions in both unilingual and code-switched contexts. On the other hand, if two structures with similar surface orders have different derivations, which we classified as *separate* structures, then we should see divergent sensitivities to well-formedness conditions across the two unilingual contexts, as well as the code-switched contexts.

Since we argued that the wh-in situ structure in both Egyptian Arabic and English was not derived via movement, we predicted that, if this structure was shared, participants would show insensitivities to island structures in both the Egyptian Arabic unilingual contexts, English unilingual contexts, and Egyptian Arabic/English code-switched contexts. With respect to the wh-resumptive structures we made different predictions. In Egyptian Arabic we find that resumptive pronouns are required at the tail of non-subject nominal A'-dependencies, and that these structures

are typically insensitive to movement constraints such as islands. The obligatoriness of resumptive pronouns in addition to island insensitivity led us to assume that the wh-resumptive structure in Egyptian Arabic is formed by base generating the wh-constituent in a clause initial position and coreferring it with a base generated resumptive pronoun in the argument position. In English, on the other hand, we find that resumptive pronouns are generally only preferred where a gap is not permitted, i.e in contexts which disallow movement. Because of this we assumed that the clause initial wh-constituents in English move from their base generated position to a higher position, and that a resumptive pronoun is inserted when this movement is prohibited (perhaps as a saving mechanism). Since we assumed that the wh-resumptive structure was formed without movement in Egyptian Arabic but with movement in English, we predicted that participants would be insensitive to the presence of an island structure in unilingual Egyptian Arabic sentences but sensitive to similar contexts in unilingual English sentences. For the code-switched contexts, we predicted that the magnitude of island sensitivity, and subsequent ameliorative effects of resumptive pronouns, will follow the same pattern as the language of the matrix CP: For code-switched sentences that began in Egyptian Arabic and ended in English, we predicted that participants would pattern similarly to their judgements of the unilingual Egyptian Arabic sentences. For code-switched sentences that began in English and ended in Egyptian, we predicted that participants would pattern similarly to their judgements of the unilingual English sentences.

To test bilingual participants' sensitivity to wh-in situ and wh-resumptive structures, we built on previous methodologies adopted in experimental syntax and conducted a four block experiment administered within one experimental session. The first block tested the acceptability of the wh-in situ and wh-resumptive structures in unilingual Egyptian Arabic sentences. The second block tested the acceptability of the wh-in situ and wh-resumptive structures in unilingual

English sentences. The third block tested the acceptability of the wh-in situ and wh-resumptive structures in code-switched sentences that began in Egyptian Arabic and ended in English, while the fourth block did so in code-switched sentences that began in English and ended in Egyptian Arabic. In order to test both island and non-island wh-in situ and wh-resumptive questions, we used a factorial design. We opted for a factorial design as factorial designs have consistently demonstrated an ability to isolate the grammatical island effects from processing effects that may contribute to the unacceptability of island extractions In this specific design, each block used a similar 2X4 design, where *island presence* served as the first factor, while *clause type* served as the second factor. All critical stimuli consisted of a bi-clausal wh-question where the embedded CP was non-interrogative. In the first factor we manipulated whether an adjunct island was present in the stimuli. In the second factor we manipulated whether the wh-constituent was the subject of the matrix CP (labeled as *matrix*), or the object of the embedded verb in the embedded CP. The wh-question object of the embedded CP either remained in situ within its canonical position (labeled as *embedded: in situ*) to capture the wh-in situ structure, was generated as a gap (labeled as *embedded: no RP*) to capture instances where a resumptive pronoun was absent, or had a resumptive pronoun cliticized onto the embedded verb (labeled as *embedded: yes RP*), to capture the wh-resumptive structure with a present resumptive pronoun. Since the constraints determining licit vs. illicit code-switched sentences are predicted to fall out from the same syntactic conditions of the presumably individual grammars being mixed, the unilingual contexts provided us with a baseline against which we could test the code-switched contexts.

For the wh-in situ structure we found that participants were insensitive to the presence of an adjunct island in the unilingual Egyptian Arabic condition and the unilingual English conditions, and took these results to indicate that the Egyptian Arabic and English wh-in situ

structures do in fact share the same derivation (no movement). Since the constraints determining licit vs. illicit code-switched sentences are predicted to fall out from the same syntactic conditions of the presumably individual grammars being mixed, we predicted that participants' sensitivity to wh-in situ adjunct islands in code-switched sentences would resemble their sensitivity to adjunct islands in the unilingual conditions. Indeed, we found that bilinguals were insensitive to adjunct islands in both code-switched contexts as predicted, which further supports the idea that the wh-in situ structure is not only similar in surface word order across Egyptian Arabic and English, but has the same derivation across these two languages as well.

For the wh-resumptive structure we found that participants were insensitive to the presence of an adjunct island in the unilingual Egyptian Arabic condition, but sensitive to these similar contexts in the unilingual English, code-switched Egyptian Arabic to English, and code-switched English to Egyptian Arabic conditions. We also found that participants preferred the presence of a resumptive pronoun over its absence when the embedded CP was in Egyptian Arabic, in both island and non-island conditions, but when the embedded CP was in English participants preferred the presence of a resumptive pronoun vs. its absence only in island conditions. Since we had posited that participants' sensitivity to adjunct islands in code-switched sentences would resemble their sensitivity to adjunct islands in the unilingual conditions, due to the island sensitivity of the wh-resumptive structure in the Egyptian Arabic to English code-switched contexts we reassessed whether or not this structure was also derived via movement in Egyptian Arabic. We ultimately concluded that the participants' island sensitivities are best accounted for when we analyze the wh-resumptive structure in Egyptian Arabic as a derivation that is formed via movement in a manner that is similar to how clause-initial wh-constituents are formed in English, and that participants' preference for resumptive pronouns in embedded Egyptian Arabic CPs can be

accounted for by adopting an approach where the distribution of resumptive pronouns is subject to phonological and syntactic well-formedness conditions. Essentially, we concluded that for this participant population the wh-resumptive structure is a *partially overlapping* structure across Egyptian Arabic and English, instead of a separate structure, since the clause wh-initial element is formed via movement in both languages, but the insertion of resumptive pronouns is generated post-syntactically in Egyptian Arabic unlike English. Although it is plausible that this analysis could extend to the representation of Egyptian Arabic in general, more data would be required from participant populations who are more dominant in Egyptian Arabic than in English in order to reach that conclusion.

Although it is tempting to say that these results would be due to processing effects, especially since they correspond to code-switched data, which have been shown to incur a higher processing cost than unilingual utterances, we interpret these results as being instead more indicative of the grammatical competence underlying the representation of these structures instead. This interpretation is warranted since the methodology used in this dissertation was careful to isolate the processing cost associated with these kinds of sentences from the grammatical effects, and also to isolate the code-switched judgements from the unilingual judgements. First, as mentioned in section 3.1, to isolate the grammatical island effects from processing effects that may contribute to the unacceptability of island extractions we used a fully cross factorial design throughout this dissertation. Second, as several experimental papers on code-switching have shown (see Vernooij & Boland, 2020, Ebert and Koronkiewicz, 2018, a.o.), there is some evidence that when unilingual sentences are mixed with code-switched sentences, participants tend to give higher acceptability of the unilingual sentences when compared to code-switched sentences. Because of this, we separated the code-switched sentences from the unilingual sentences in

different testing blocks. The blocks were also analyzed independently of each other. For instance, z-scores were calculated based on the judgements of each block, not based on judgements of all four blocks together. This was done in order to mitigate the effect that the ratings of the unilingual sentences may have had on the code-switched sentences.

This dissertation has multiple methodological, empirical, and theoretical contributions:

Methodologically this work contributes to the inclusion of understudied varieties of languages that have not yet been represented within the experimental syntax literature. In this dissertation we focused on bilinguals' acceptability of unilingual Egyptian Arabic, unilingual English, and code-switched Egyptian Arabic/English sentences. Although the experimental syntax literature has provided very valuable conclusions insights about unilingual English, not many experimental studies have formally studied the magnitude of island effects across dialects of Arabic, and to my knowledge, none have used this methodology to investigate code-switched sentences. In this dissertation we found that the same methodologies that have been used to investigate island constraints experimentally can be easily transferred to these varieties as well. The use of audio stimuli rather than written stimuli was also especially relevant for two reasons. First, as reported in section 3.3 of chapter 3, the specific population recruited here reported varying comfort levels with reading and writing in Egyptian Arabic, but higher levels of proficiency and comfort with speaking and listening. The use of audio stimuli, rather than written stimuli, allowed us to study a population of speakers who have knowledge of these structures, but just not necessarily in the written form. Second, in this population of speakers code-switching is primarily spoken practice rather than a written one.

Empirically, although in this dissertation we were primarily concerned with the linguistic representation of bilingual grammars, the results from the unilingual data were substantially

consistent with the reported data from the literature. With respect to the unilingual Egyptian Arabic data, participants showed no island effect both in the wh-in situ and wh-resumptive structures, and a general dislike of gaps when the wh-constituent appeared clause initially. With respect to the unilingual English data, participants were less likely to accept wh-in situ structures in an out-of-the-blue context, but they recognized a wh-in situ structure as a possible structure in English, and showed no island effect in these contexts, as wh-in situ structures in English have been argued to be derived without movement. They also showed a general preference for gaps in the non-island contexts where the wh-constituent appeared clause initially, island sensitivity in the presence of a gap, and an amelioration of this island sensitivity in the presence of a resumptive pronoun. In addition to these empirical findings, participants also provided novel empirical judgements about their sensitivities to the syntactic structures of code-switched sentences, which had not yet been reported in the literature. This work then expands on our understanding of the mental representation of competing grammatical structures. While the role of bilingual convergence has been argued to be relevant to second language acquisition, it is only recently that there have been attempts to tease apart the varying degrees to which similarity of a few grammatical features, such as negation and plurality, may be expressed in languages in contact (see Baptista, 2020, Baptista, Gelman, & Beck, 2016). This work then extends this domain of study to other aspects of syntactic structure.

Theoretically, because this work centers on linguistic knowledge of bilingual speakers, this dissertation has shown that the use of code-switched data not only contributes to our understanding of bilingual grammars and language practices, but syntactic structure building in general. Assuming that the acceptability of code-switched sentences rely on the same structure building operations as the constraints determining licit vs. illicit unilingual sentences, we predicted that if

two structures with similar surface orders also have the same derivation then participants will be sensitive to the same well-formedness conditions in both unilingual and code-switched contexts, but if two structures with similar surface orders have different derivations then we should see divergent sensitivities to well-formedness conditions across the two unilingual contexts as well as the code-switched contexts. With respect to wh-structures, we assumed that the main driving factor of wh-movement is localized in the properties of the matrix C: matrix C heads with a strong EPP feature drive movement to the specifier position of the matrix CP, while C hears without this strong EPP feature do not. I In the context of code-switching within a biclausal Egyptian Arabic/English wh-question, specifically a structure in which a non-interrogative CP is embedded within a matrix interrogative CP, we had predicted that if the interrogative C head of the matrix CP has a strong EPP feature, then the wh-constituent is overtly required in Spec, CP. However, if the interrogative C head of the matrix CP does not have a strong EPP feature, then the wh-constituent remains in its canonical position within the embedded CP. These predictions did in fact hold up throughout the code-switched contexts, and led us to a novel conclusion about the derivation of fronted wh-constituent in the unilingual Egyptian Arabic contexts, at least for the population of speakers tested in this dissertation.

There are several ways in which this work can be expanded. First, throughout this dissertation we made conclusions based on participants' acceptability judgments of various sentences, which is an offline measure. Because some of the long-distance dependencies tested throughout this dissertation, such as the clause initial wh-questions co-referring either to a gap or a resumptive pronoun, are structures that involve displacing an argument from its canonical position to a structurally higher position, this empirical domain becomes particularly amenable to being tested through more online measures. For instance, by using more online measures that get

at the incremental processing of these structures, such as pupillometry or EEG, we would be able to capture the online time-sensitive, processing effects of code-switching, resumption, islands, and displacement. Second, with respect to the speaker population, throughout this dissertation we focused on the judgments of speakers who were more dominant in English than they were in Egyptian Arabic. However, echoing Grosjean's complementarity principle, that "bilinguals usually acquire and use their languages for different purposes, in different domains of life, [and] with different people" (Grosjean, 2010, p. 29), we expect that different populations of bilinguals differ to what extent they either share or separate the syntactic structures of their two languages. In future research, we hope to include judgements from speakers who have varying degrees of dominance across Egyptian Arabic and English. For instance, we hope to recruit a subset of speakers who are more dominant in Egyptian Arabic than in English and compare their behavior with that of the participants recruited in this dissertation.

Appendices

Appendix A: Critical Stimuli for the Unilingual Egyptian Arabic Conditions

	Adjunct Island	Extraction Type	Example
1	Absent	Matrix	miin laaHiz inn el-muHamii nisee el-shanta? lit. who realized that the lawyer forgot the bag?"
	Absent	Embedded: In situ	el-qaadi laaHiz inn el-muHamii nisee anhii shanta? lit. the lawyer realized that the lawyer forgot which bag?
	Absent	Embedded: No RP	anhii shanta el-qaadi laaHiz inn el-muHamii nisee ___? lit. which bag the judge realized that the lawyer forgot ___?
	Absent	Embedded: Yes RP	anhii shanta el-qaadi laaHiz inn el-muHamii nisee-ha? lit. which bag the judged realized that the lawyer forgot it?
	Present	Matrix	miin zi'il lamma el-muHamii nisee el-shanta? lit. who upset when the lawyer forgot the bag?
	Present	Embedded: In situ	el-qaadi zi'il lamma el-muHamii nisee anhii shanta? lit. the lawyer upset when the lawyer forgot which bag?
	Present	Embedded: No RP	anhii shanta el-qaadi zi'il lamma el-muHamii nisee ___? lit. which bag the judge upset when the lawyer forgot ___?
	Present	Embedded: Yes RP	anhii shanta el-qaadi zi'il lamma el-muHamii nisee-ha? lit. which bag the judged upset when the lawyer forgot it?
2	Absent	Matrix	miin iktashaf inn el-Harami sara' el-maHfazah? lit. who realized that the burglar stole the wallet?
	Absent	Embedded: In situ	el-bint iktashafit inn el-Harami sara' anhii maHfazah? lit. the girl realized that the burglar stole which wallet?
	Absent	Embedded: No RP	anhii maHfaza el-bint iktashafit inn el-Harami sara' ___? lit. which wallet the girl realized that the burglar stole ___?
	Absent	Embedded: Yes RP	anhii maHfaza el-bint iktashafit inn el-Harami sara'-ha? lit. which wallet the girl realized that the burglar stole it?
	Present	Matrix	miin 'ayat lamma el-Harami sara' el-maHfazah? lit. who cried when the burglar stole the wallet?
	Present	Embedded: In situ	el-bint 'ayatit lamma el-Harami sara' anhii maHfazah? lit. the girl cried when the burglar stole which wallet?
	Present	Embedded: No RP	anhii maHfaza el-bint 'ayatit lamma el-Harami sara' ___? lit. which wallet the girl cried when the burglar stole ___?

	Present	Embedded: Yes RP	anhii maHfaza el-bint ‘ayatit lamma el-Harami sara'-ha? lit. which wallet the girl cried when the burglar stole it?
3	Absent	Matrix	miin mutakid inn el-docotr katab el-roshitaa? lit. who certain that the doctor wrote the prescription?
	Absent	Embedded: In situ	el-mariiD mutakid inn el-doctor katab anhii roshitaa? lit. the patient certain that the doctor wrote which prescription?
	Absent	Embedded: No RP	anhii roshita el-mariiD mutakid inn el doctor katab __? lit. which prescription the patient certain that the doctor wrote ___?
	Absent	Embedded: Yes RP	anhii roshita el-mariid mutakid inn el doctor kataab-ha? lit. which prescription the patient certain that the doctor wrote it?
	Present	Matrix	miin irtaaH lamma el-docotr katab el-roshitaa? lit. who relaxed when the doctor wrote the prescription?
	Present	Embedded: In situ	el-mariiD irtaaH lamma el-doctor katab anhii roshitaa? lit. the patient relaxed when the doctor wrote which prescription?
	Present	Embedded: No RP	anhii roshita el-mariiD irtaaH lamma el doctor katab __? lit. which prescription the patient relaxed when the doctor wrote ___?
	Present	Embedded: Yes RP	anhii roshita el-mariid irtaaH lamma el doctor kataab-ha? lit. which prescription the patient relaxed when the doctor wrote it?
4	Absent	Matrix	miin 'aal inn el-walad akal el-caka? lit. who said that the boy ate the cake?
	Absent	Embedded: In situ	el-sit 'aalit inn el-walad akla anhii caka? lit. the woman said that the boy ate which cake?
	Absent	Embedded: No RP	anhii caka el-sit 'aalit inn el walad akal ___? lit. which cake the woman said that the boy ate ___?
	Absent	Embedded: Yes RP	anhii caka el-sit 'aalit inn el walad akal-ha? lit. which cake the woman said that the boy ate it?
	Present	Matrix	miin mishee lamma el-walad akal el-caka? lit. who left when the boy ate the cake?
	Present	Embedded: In situ	el-sit mishyit lamma el-walad akla anhii caka? lit. the woman left when the boy ate which cake?
	Present	Embedded: No RP	anhii caka el-sit mishyit lamma el walad akal ___? lit. which cake the woman left when the boy ate ___?
	Present	Embedded: Yes RP	anhii caka el-sit mishyit lamma el walad akal-ha? lit. which cake the woman left when the boy ate it?
5	Absent	Matrix	miin mutakid inn el-sawaa' rakan el-‘arabiyya? lit. who certain that the driver parked the car?
	Absent	Embedded: In situ	el-shaghala mutakida inn el-sawaa rakan anhii ‘arabiyya? lit. the maid certain that the driver parked which car?
	Absent	Embedded: No RP	anhii ‘arabiyaa el-shaghala mutakida inn el-sawa' rakan ___?

			lit. which car the maid certain that the driver parked ___?
	Absent	Embedded: Yes RP	anhii ‘arabiyaa el-shaghala mutakida inn el-sawa' rakan-ha? lit. which car the maid certain that the driver parked it?
	Present	Matrix	miin istaghrab lamma el-sawaa' rakan el-‘arabiyya? lit. who confused when the driver parked the car?
	Present	Embedded: In situ	el-shaghala istaghrabit lamma el-sawaa rakan anhii ‘arabiyya? lit. the maid confused when the driver parked which car?
	Present	Embedded: No RP	anhii ‘arabiyaa el-shaghala istaghrabit lamma el-sawa' rakan ___? lit. which car the maid confused when the driver parked ___?
	Present	Embedded: Yes RP	anhii ‘arabiyaa el-shaghala istaghrabit lamma el-sawa' rakan-ha? lit. which car the maid confused when the driver parked it?
6	Absent	Matrix	miin iktashaf inn el-tilmiiz rasam el-Soora? lit. who discovered that the man drew the portrait?
	Absent	Embedded: In situ	el-ustaadha iktashafit inn el-tilmiiz rasam anhii Soora? lit. the professor discovered that the student drew which portrait?
	Absent	Embedded: No RP	anhii Soora el-ustaadha iktashafit inn el-tilmiiz rasam ___? lit. which portrait the professors realized that the student drew ___?
	Absent	Embedded: Yes RP	anhii Soora el-ustaadha iktashafit inn el-tilmiiz rasam-ha? lit. which portrait the professors realized that the student drew it?
	Present	Matrix	miin imbasat lamma el-tilmiiz rasam el-Soora? lit. who happy when the man drew the portrait?
	Present	Embedded: In situ	el-ustaadha imbasatit lamma el-tilmiiz rasam anhii Soora? lit. the professor happy when the student drew which portrait?
	Present	Embedded: No RP	anhii Soora el-ustaadha imbasatit lamma el-tilmiiz rasam ___? lit. which portrait the professors happy when the student drew ___?
	Present	Embedded: Yes RP	anhii Soora el-ustaadha imbasatit lamma el-tilmiiz rasam-ha? lit. which portrait the professors happy when the student drew it?
7	Absent	Matrix	miin laaHiz inn el-mumasil kasar el-camera? lit. who realized that the actor broke the camera?
	Absent	Embedded: In situ	el-mukhrig laaHiz inn el-mumasil kasar anhii camera? lit. the director realized that the actor broke which camera?
	Absent	Embedded: No RP	anhii camera el-mukhrig laaHiz inn el-mumasil kasar? lit. which camera the director realized that the actor broke ___?
	Absent	Embedded: Yes RP	anhii camera el-mukhrig laaHiz inn el-mumasil kasar-ha? lit. which camera the director realized that the actor broke it?
	Present	Matrix	miin itnarfiz lamma el-mumasil kasar el-camera? lit. who nervous when the actor broke the camera?
	Present	Embedded: In situ	el-mukhrig itnarfiz lamma el-mumasil kasar anhii camera? lit. the director nervous when the actor broke which camera?

	Present	Embedded: No RP	anhii camera el-mukhrig itnarfiz lamma el-mumasil kasar? lit. which camera the director nervous when the actor broke ___?
	Present	Embedded: Yes RP	anhii camera el-mukhrig itnarfiz lamma el-mumasil kasar-ha? lit. which camera the director nervous when the actor broke it?
8	Absent	Matrix	miin 'aal inn el-ra'ees dakhal el-ginayna? lit. who said that the president entered the garden?
	Absent	Embedded: In situ	el-bawaab 'aal inn el-ra'ees dakhal anhii ginayna? lit. the doorman said that the president entered which garden?
	Absent	Embedded: No RP	anhii ginayna el-bawaab 'aal inn el-ra'ees dakhal ___? lit. which garden the doorman said that the president entered ___?
	Absent	Embedded: Yes RP	anhii ginayna el-bawaab 'aal inn el-ra'ees dakhal-ha? lit. which garden the doorman said that the president entered it?
	Present	Matrix	miin firih lamma el-ra'ees dakhal el-ginayna? lit. who happy when the president entered the garden?
	Present	Embedded: In situ	el-bawaab firih lamma el-ra'ees dakhal anhii ginayna? lit. the doorman happy when the president entered which garden?
	Present	Embedded: No RP	anhii ginayna el-bawaab firih lamma el-ra'ees dakhal ___? lit. which garden the doorman firih lamma the president entered ___?
	Present	Embedded: Yes RP	anhii ginayna el-bawaab firih lamma el-ra'ees dakhal-ha? lit. which garden the doorman happy when the president entered it?

Appendix B: Critical Stimuli for the Unilingual English Conditions

	Adjunct Island	Extraction Type	Example
1	Absent	Matrix	Who claimed that the school raised the budget?
	Absent	Embedded: In situ	The superintendent claimed that the school raised which budget?
	Absent	Embedded: No RP	Which budget did the superintendent claim that the school raised __?
	Absent	Embedded: Yes RP	Which budget did the superintendent claim that the school raised-it?
	Present	Matrix	Who celebrated when the school raised the budget?
	Present	Embedded: In situ	The superintendent celebrated when the school raised which budget?
	Present	Embedded: No RP	Which budget did the superintendent celebrate when the school raised ___?
	Present	Embedded: Yes RP	Which budget did the superintendent celebrate when the school raised-it?
2	Absent	Matrix	Who assumed that the band wrote the song?
	Absent	Embedded: In situ	The drummer assumed that the band wrote which song?
	Absent	Embedded: No RP	Which song did the drummer assume that the band wrote ___?
	Absent	Embedded: Yes RP	Which song did the drummer assume that the band wrote-it?
	Present	Matrix	Who scoffed when the band wrote the song?
	Present	Embedded: In situ	The drummer scoffed when the band wrote which song?
	Present	Embedded: No RP	Which song did the drummer scoff when the band wrote ___?
	Present	Embedded: Yes RP	Which song did the drummer scoff when the band wrote-it?
3	Absent	Matrix	Who suggested that the director leaked the script?
	Absent	Embedded: In situ	The actress suggested that the director leaked which script?
	Absent	Embedded: No RP	Which script did the actress suggest that the director leaked ___?
	Absent	Embedded: Yes RP	Which script did the actress suggest that the director leaked-it?
	Present	Matrix	Who complained when the director leaked the script?
	Present	Embedded: In situ	The actress complained when the director leaked which script?
	Present	Embedded: No RP	Which script did the actress complain when the director leaked ___?

	Present	Embedded: Yes RP	Which script did the actress complain when the director leaked-it?
4	Absent	Matrix	Who discovered that the government confiscated the document?
	Absent	Embedded: In situ	The senator discovered that the government confiscated which document?
	Absent	Embedded: No RP	Which document did the senator discover that the government confiscated ___?
	Absent	Embedded: Yes RP	Which document did the senator discover that the government confiscated-it?
	Present	Matrix	Who panicked when the government confiscated the document?
	Present	Embedded: In situ	The senator panicked when the government confiscated which document?
	Present	Embedded: No RP	Which document did the senator panic when the government confiscated ___?
	Present	Embedded: Yes RP	Which document did the senator panic when the government confiscated-it?
5	Absent	Matrix	Who confirmed that the camera crew filmed the restaurant?
	Absent	Embedded: In situ	The chef confirmed that the camera crew filmed which restaurant?
	Absent	Embedded: No RP	Which restaurant did the chef confirm that the camera crew filmed ___?
	Absent	Embedded: Yes RP	Which restaurant did the chef confirm that the camera crew filmed-it?
	Present	Matrix	Who resigned when the camera crew filmed the restaurant?
	Present	Embedded: In situ	The chef resigned when the camera crew filmed which restaurant?
	Present	Embedded: No RP	Which restaurant did the chef resign when the camera crew filmed ___ ?
	Present	Embedded: Yes RP	Which restaurant did the chef resign when the camera crew filmed-it?
6	Absent	Matrix	Who suspected that the intern read the report?
	Absent	Embedded: In situ	The assistant suspected that the intern read which report?
	Absent	Embedded: No RP	Which report did the assistant suspect that the intern read ___?
	Absent	Embedded: Yes RP	Which report did the assistant suspect that the intern read-it?
	Present	Matrix	Who quit when the intern read the report?
	Present	Embedded: In situ	The assistant quit when the intern read which report?
	Present	Embedded: No RP	Which report did the assistant quit when the intern read ___?
	Present	Embedded: Yes RP	Which report did the assistant quit when the intern read-it?
7	Absent	Matrix	Who believed that the associate dean wrote the email?
	Absent	Embedded: In situ	The department head believed that the associate dean wrote which email?

	Absent	Embedded: No RP	Which email did the department head believe that the associate dean wrote ___?
	Absent	Embedded: Yes RP	Which email did the department head believe that the associate dean wrote-it?
	Present	Matrix	Who laughed when the associate dean wrote the email?
	Present	Embedded: In situ	The department head laughed when the associate dean wrote which email?
	Present	Embedded: No RP	Which email did the department head laugh when the associate dean wrote ___?
	Present	Embedded: Yes RP	Which email did the department head laugh when the associate dean wrote-it?
8	Absent	Matrix	Who realized that the valedictorian plagiarized the speech?
	Absent	Embedded: In situ	The dean realized that the valedictorian plagiarized which speech?
	Absent	Embedded: No RP	Which speech did the dean realize that the valedictorian plagiarized ___?
	Absent	Embedded: Yes RP	Which speech did the dean realize that the valedictorian plagiarized-it?
	Present	Matrix	Who apologized when the valedictorian plagiarized the speech?
	Present	Embedded: In situ	The dean apologized when the valedictorian plagiarized which speech?
	Present	Embedded: No RP	Which speech did the dean apologize when the valedictorian plagiarized ___?
	Present	Embedded: Yes RP	Which speech did the dean apologize when the valedictorian plagiarized-it?

Appendix C: Critical Stimuli for the Code-switched Egyptian Arabic to English Conditions

	Adjunct Island	Extraction Type	Example
1	Absent	Matrix	Who claimed | inn el-ra'ees katab el-risala? lit. who claimed | that the president wrote the letter?
	Absent	Embedded: In situ	The ambassador claimed | inn el ra'ees katab anhii risala? lit. the ambassador claimed | that the president wrote which letter?
	Absent	Embedded: No RP	Which letter did the ambassador claim | inn el-ra'ees katab ___? lit. which letter did the ambassador claim | that the president wrote ___?
	Absent	Embedded: Yes RP	Which letter did the ambassador claim | inn el-ra'ees katab-ha? lit. which letter did the ambassador claim | that the president wrote it?
	Present	Matrix	Who celebrated | lamma el-ra'ees katab el-risala? lit. who claimed | that the president wrote the speech?
	Present	Embedded: In situ	The ambassador celebrated | lamma el ra'ees katab anhii risala? lit. the ambassador celebrated | when the president wrote which letter?
	Present	Embedded: No RP	Which letter did the ambassador celebrated | lamma el-ra'ees katab ___? lit. which letter did the ambassador celebrated | when the president wrote ___?
	Present	Embedded: Yes RP	Which letter did the ambassador celebrated | lamma el-ra'ees katab-ha? lit. which letter did the ambassador celebrated | when the president wrote it?
2	Absent	Matrix	Who assumed | inn el-mumasila ishatarit el-ghwaysha? lit. who assumed | that the actress bought the bracelet?
	Absent	Embedded: In situ	The understudy assumed | inn el-mumasila ishtarit anhii ghwaysha? lit. the understudy assumed | that the actress bought which bracelet?
	Absent	Embedded: No RP	Which bracelet did the understudy assume | inn el-mumasila ishtarit ___? lit. which bracelet did the understudy assume | that the actress bought ___?
	Absent	Embedded: Yes RP	Which bracelet did the understudy assume | inn el-mumasila ishtarit-ha? lit. which bracelet did the understudy assume | that the actress bought it?
	Present	Matrix	Who scoffed | lamma el-mumasila ishatarit el-ghwaysha? lit. who scoffed | when the actress bought the bracelet?
	Present	Embedded: In situ	The understudy scoffed | lamma el-mumasila ishtarit anhii ghwaysha? lit. the understudy scoffed | when the actress bought which bracelet?
	Present	Embedded: No RP	Which bracelet did the understudy scoff | lamma el-mumasila ishtarit ___? lit. which bracelet did the understudy scoff | when the actress bought ___?

	Present	Embedded: Yes RP	Which bracelet did the understudy scoff | when el-mumasila ishtarit-ha? lit. which bracelet did the understudy scoff | when the actress bought it?
3	Absent	Matrix	Who suggested | inn el-‘aroosa ghayarit el-ughniyya? lit. who suggested | that the bride changed the song?
	Absent	Embedded: In situ	The best man suggested | inn el-‘aroosa ghayarit anhii ughniyya? lit. the best man suggested | that the bridge changed which song?
	Absent	Embedded: No RP	Which song did the best man suggest | inn el-‘aroosa ghayarit ___? lit. which song did that best man suggest | that the bride changed ___?
	Absent	Embedded: Yes RP	Which song did the best man suggest | inn el-‘aroosa ghayarit-ha? lit. which song did that best man suggest | that the bride changed it?
	Present	Matrix	Who complained | lamma el-‘aroosa ghayarit el-ughniyya? lit. who complained | when the bride changed the song?
	Present	Embedded: In situ	The best man complained | lamma el-‘aroosa ghayarit anhii ughniyya? lit. the best man complained | when the bridge changed which song?
	Present	Embedded: No RP	Which song did the best man complained | lamma el-‘aroosa ghayarit ___? lit. which song did that best man complained | when the bride changed ___?
	Present	Embedded: Yes RP	Which song did the best man complained | lamma el-‘aroosa ghayarit-ha? lit. which song did that best man complained | when the bride changed it?
4	Absent	Matrix	Who discovered | inn el-mukhrig sawar el-vizaa? lit. who discovered | that the director copied the visa?
	Absent	Embedded: In situ	The actress discovered | inn el-mukhrig sawar anhii vizaa? lit. the actress discovered | that the director copied which visa?
	Absent	Embedded: No RP	Which visa did the actress discover | inn el-mukhrig sawar ___? lit. which visa did the actress discover | that the director copied ___?
	Absent	Embedded: Yes RP	Which visa did the actress discover | inn el-mukhrig sawar-ha? lit. which visa did the actress discover | that the director copied it?
	Present	Matrix	Who panicked | lamma el-mukhrig sawar el-vizaa? lit. who panicked | when the director copied the visa?
	Present	Embedded: In situ	The actress panicked | lamma el-mukhrig sawar anhii vizaa? lit. the actress panicked | when the director copied which visa?
	Present	Embedded: No RP	Which visa did the actress panic | lamma el-mukhrig sawar ___? lit. which visa did the actress panic | when the director copied ___?
	Present	Embedded: Yes RP	Which visa did the actress panic | lamma el-mukhrig sawar-ha? lit. which visa did the actress panic | when the director copied it?
5	Absent	Matrix	Who confirmed | inn el-rnudiir baa’ el-shirka? lit. who confirmed | that the manager sold the company?
	Absent	Embedded: In situ	The employee confirmed | inn el-mudiir bas’ anhii shirka? lit. the employee comfirmed | that the manager sold which company?
	Absent	Embedded: No RP	Which company did the employee confirm | inn el-mudiir baa’ ___?

			lit. which company did the employee confirm | that the manager sold ___?
	Absent	Embedded: Yes RP	Which company did the employee confirm | inn el-mudiir baa'-ha? lit. which company did the employee confirm | that the manager sold it?
	Present	Matrix	Who resigned | lamma el-rnudiir baa' el-shirka? lit. who resigned | when the manager sold the company?
	Present	Embedded: In situ	The employee resigned | lamma el-mudiir bas' anhii shirka? lit. the employee resigned | when the manager sold which company?
	Present	Embedded: No RP	Which company did the employee resign | when el-mudiir baa' ___? lit. which company did the employee resign | when the manager sold ___?
	Present	Embedded: Yes RP	Which company did the employee resign | lamma el-mudiir baa'-ha? lit. which company did the employee resign | when the manager sold it?
6	Absent	Matrix	Who suspected | inn el-muhamii shaaf el-gareema? lit. who suspected | that the lawyer witnessed the crime?
	Absent	Embedded: In situ	The judge suspected | inn el-muhamii shaaf anhii gareema? lit. the judge suspected | that the lawyer witnessed which crime?
	Absent	Embedded: No RP	Which crime did the judge suspect | inn el-muhamii shaaf ___? lit. which crime did the judge suspect | that the lawyer witnessed ___?
	Absent	Embedded: Yes RP	Which crime did the judge suspect | inn el-muhamii shaaf-ha? lit. which crime did the judge suspect | that the lawyer witnessed it?
	Present	Matrix	Who quit | lamma el-muhamii shaaf el-gareema? lit. who quit | when the lawyer witnessed the crime?
	Present	Embedded: In situ	The judge quit | lamma el-muhamii shaaf anhii gareema? lit. the judge quit | when the lawyer witnessed which crime?
	Present	Embedded: No RP	Which crime did the judge quit | lamma el-muhamii shaaf ___? lit. which crime did the judge quit | when the lawyer witnessed ___?
	Present	Embedded: Yes RP	Which crime did the judge quit | lamma el-muhamii shaaf-ha? lit. which crime did the judge quit | when the lawyer witnessed it?
7	Absent	Matrix	Who believed | inn el walad khaba el-kubayya? lit.who believed | that the boy hid the cup?
	Absent	Embedded: In situ	The babysitter believed | inn el-walad khabba anhii kubayya? lit. the babysitter believed | that the boy hid which cup?
	Absent	Embedded: No RP	Which cup did the babysitter believe | inn el-walad khaba? lit. which cup did the babysitter believe | that the boy hid ___?
	Absent	Embedded: Yes RP	Which cup did the babysitter believe | inn el-walad khaba-ha? lit. which cup did the babysitter believe | that the boy hid it?
	Present	Matrix	Who laughed | lamma el walad khaba el-kubayya? lit.who laughed | when the boy hid the cup?
	Present	Embedded: In situ	The babysitter laughed | lamma el-walad khabba anhii kubayya? lit. the babysitter laughed | when the boy hid which cup?

	Present	Embedded: No RP	Which cup did the babysitter laugh | when el-walad khaba? lit. which cup did the babysitter believe | that the boy hid ___?
	Present	Embedded: Yes RP	Which cup did the babysitter laugh | lamma el-walad khaba-ha? lit. which cup did the babysitter laugh | when the boy hid it?
8	Absent	Matrix	Who realized | inn el-mudiir sara' el-migala? lit. who realized | that the manager stole the magazine?
	Absent	Embedded: In situ	The receptionist realized inn el-mudiir sara' anhii migala lit. the receptionist realized | that the manager stole which magazine?
	Absent	Embedded: No RP	Which magazine did the receptionist realize inn el-mudiir sara' ___? lit. which magazine did the receptionist realize | that the manager stole___?
	Absent	Embedded: Yes RP	Which magazine did the receptionist realize | inn el-mudiir sara'-ha? lit. which magazine did the receptionist realize | that the manager stole it?
	Present	Matrix	Who apologized | lamma el-mudiir sara' el-migala? lit. who apologized | when the manager stole the magazine?
	Present	Embedded: In situ	The receptionist apologized | lamma el-mudiir sara' anhii migala lit. the receptionist apologized | when the manager stole which magazine?
	Present	Embedded: No RP	Which magazine did the receptionist apologize | lamma el-mudiir sara' ___? lit. which magazine did the receptionist apologize | when the manager stole___?
	Present	Embedded: Yes RP	Which magazine did the receptionist apologize | lamma el-mudiir sara'-ha? lit. which magazine did the receptionist apologize | when the manager stole it?

Appendix D: Critical Stimuli for the Code-switched English to Egyptian Arabic Conditions

	Adjunct Island	Extraction Type	Example
1	Absent	Matrix	miin laaHiz | that the gambler unlocked the safe? lit. who realized | that the gambled unlocked the safe?
	Absent	Embedded: In situ	el-Haaris laaHiz | that the gambler unlocked which safe? lit. the guard realized | that the gambler unlocked which safe?
	Absent	Embedded: No RP	anhii khazna el-Haaris laaHiz | that the gambler unlocked ___? lit. which safe did the guard realize | that the gambler unlocked ___?
	Absent	Embedded: Yes RP	anhii khazna el-Haaris laaHiz | that the gambler unlocked-it? lit. which safe did the guard realized | that the gambler unlocked it?
	Present	Matrix	miin zi'il | when the gambler unlocked the safe? lit. who upset | when the gambled unlocked the safe?
	Present	Embedded: In situ	el-Haaris zi'il | when the gambler unlocked which safe? lit. the guard realized | when the gambler unlocked which safe?
	Present	Embedded: No RP	anhii khazna el-Haaris zi'il | when the gambler unlocked ___? lit. which safe did the guard upset | when the gambler unlocked ___?
	Present	Embedded: Yes RP	anhii khazna el-Haaris zi'il | when the gambler unlocked-it? lit. which safe did the guard upset | when the gambler unlocked it?
2	Absent	Matrix	miin iktashaf | that the bridesmaid forgot the necklace? lit. who discovered | that the bridesmaid forgot the necklace?
	Absent	Embedded: In situ	el-‘aroosa iktashafit | that the bridesmaid forgot which necklace? lit. the bride discovered | that the bridesmaid forgot which necklace?
	Absent	Embedded: No RP	anhii silsila el-‘aroosa iktashafit | that the bridesmaid forgot ___? lit. which necklace the bride discovered | that the bridesmaid forgot ___?
	Absent	Embedded: Yes RP	anhii silsila el-‘aroosa iktashafit | that the bridesmaid forgot-it? lit. which necklace the bride discovered | that the bridesmaid forgot it?
	Present	Matrix	miin ‘aayat | when the bridesmaid forgot the necklace? lit. who cried | when the bridesmaid forgot the necklace?
	Present	Embedded: In situ	el-‘aroosa ‘aayatit | when the bridesmaid forgot which necklace? lit. the bride cried | when the bridesmaid forgot which necklace?
	Present	Embedded: No RP	anhii silsila el-‘aroosa ‘aayatit | when the bridesmaid forgot ___? lit. which necklace the bride cried | when the bridesmaid forgot ___?
	Present	Embedded: Yes RP	anhii silsila el-‘aroosa ‘aayatit | when the bridesmaid forgot-it?

			lit. which necklace the bride cried | when the bridesmaid forgot it?
3	Absent	Matrix	miin mutakid | that the pet-store owner sold the bird? lit. who certain | that the pet-store owner sold the bird?
	Absent	Embedded: In situ	el-bint mutakida | that the pet-store owner sold which bird? lit. the girl certain | that the pet-store owner sold which bird?
	Absent	Embedded: No RP	anhii ‘asfoora el-bint mutakida | that the pet-store owner sold ___? lit. which bird the girl certain | that the pet-store owner sold ___?
	Absent	Embedded: Yes RP	anhii ‘asfoora el-bint mutakida | that the pet-store owner sold-it? lit. which bird the girl certain | that the pet-store owner sold it?
	Present	Matrix	miin irtaaH | when the pet-store owner sold the bird? lit. who relaxed | when the pet-store owner sold the bird?
	Present	Embedded: In situ	el-bint irtaaHit | when the pet-store owner sold which bird? lit. the girl relaxed | when the pet-store owner sold which bird?
	Present	Embedded: No RP	anhii ‘asfoora el-bint irtaaHit | when the pet-store owner sold ___? lit. which bird the girl relaxed | when the pet-store owner sold ___?
	Present	Embedded: Yes RP	anhii ‘asfoora el-bint irtaaHit | when the pet-store owner sold-it? lit. which bird the girl relaxed | when the pet-store owner sold it?
4	Absent	Matrix	miin ‘aal | that the CEO signed the check? lit. who said | that the CEO signed the check?
	Absent	Embedded: In situ	el-wakeel ‘aal | that the CEO signed which check? lit. the ambassador said | that the CEO signed which check?
	Absent	Embedded: No RP	anhii chique el-wakeel ‘aal | that the CEO signed ___? lit. which check the ambassador said | that the CEO signed ___?
	Absent	Embedded: Yes RP	anhii chique el-wakeel ‘aal | that the CEO signed-it? lit. which check the ambassador said | that the CEO signed it?
	Present	Matrix	miin mishee | lamma the CEO signed the check? lit. who left | when the CEO signed the check?
	Present	Embedded: In situ	el-wakeel mishee | lamma the CEO signed which check? lit. the ambassador left | when the CEO signed which check?
	Present	Embedded: No RP	anhii chique el-wakeel mishee | lamma the CEO signed ___? lit. which check the ambassador left | when the CEO signed ___?
	Present	Embedded: Yes RP	anhii chique el-wakeel mishee | lamma the CEO signed-it? lit. which check the ambassador left | when the CEO signed it?
5	Absent	Matrix	miin mutakid | that the soccer player deflated the ball? lit. who certain | that the soccer player deflated the ball?
	Absent	Embedded: In situ	el-mudarrib mutakid | that the soccer player deflated which ball? lit. the coach certain | that the soccer player deflated which ball?
	Absent	Embedded: No RP	anhii koora el-mudarrib miutakid | that the soccer player deflated ___? lit. which ball the coach certain | that the soccer player deflated ___?

	Absent	Embedded: Yes RP	anhii koora el-mudarrib mutakid that the soccer player deflated-it? lit. which ball the coach certain | that the soccer player deflated it?
	Present	Matrix	miin istaghrab | when the soccer player deflated the ball? lit. who perplexed | when the soccer player deflated the ball?
	Present	Embedded: In situ	el-mudarrib istaghrab | when the soccer player deflated which ball? lit. the coach perplexed | when the soccer player deflated which ball?
	Present	Embedded: No RP	anhii koora el-mudarrib istaghrab | when the soccer player deflated ___? lit. which ball the coach perplexed | when the soccer player deflated ___?
	Present	Embedded: Yes RP	anhii koora el-mudarrib istaghrab | when the soccer player deflated-it? lit. which ball the coach perplexed | when the soccer player deflated it?
6	Absent	Matrix	miin iktashaf | that the woodworker built the table? lit. who discovered | that the woodworker built the table?
	Absent	Embedded: In situ	el-nagaar iktashaf | that the woodworker built which table? lit. the carpenter discovered | that the woodworker built which table?
	Absent	Embedded: No RP	anhii tarabeza el-nagaar iktashaf | that the woodworker built ___? lit. which table the carpenter discovered | that the woodworker built ___?
	Absent	Embedded: Yes RP	anhii tarabeza el-nagaar iktashaf | that the woodworker built-it? lit. which table the carpenter discovered | that the woodworker built it?
	Present	Matrix	miin imbasat | when the woodworker built the table? lit. who happy | when the woodworker built the table?
	Present	Embedded: In situ	el-nagaar imbasat | when the woodworker built which table? lit. the carpenter happy | whem the woodworker built which table?
	Present	Embedded: No RP	anhii tarabeza el-nagaar imbasat | when the woodworker built ___? lit. which table the carpenter happy | when the woodworker built ___?
	Present	Embedded: Yes RP	anhii tarabeza el-nagaar imbasat | when the woodworker built-it? lit. which table the carpenter happy | when the woodworker built it?
7	Absent	Matrix	miin laaHiz | that the investigator fabricated the report? lit. who realized | that the investigator fabricated the report?
	Absent	Embedded: In situ	el-zabit laaHiz | that the investigator fabricated which report? lit. the officer realized | that the investigator fabricated which report?
	Absent	Embedded: No RP	anhii kissaa el-zabit laaHiz | that the investigator fabricated ___? lit. which report the office realized | that the investigator fabricated ___?
	Absent	Embedded: Yes RP	anhii kissaa el-zabit laaHiz | that the investigator fabricated-it? lit. which report the office realized | that the investigator fabricated it?
	Present	Matrix	miin itnarfiz | lamma the investigator fabricated the report? lit. who nervous | when the investigator fabricated the report?
	Present	Embedded: In situ	el-zabit itnarfiz | lamma the investigator fabricated which report? lit. the officer nervous | when the investigator fabricated which report?
	Present	Embedded: No RP	anhii kissaa el-zabit itnarfiz | lamma the investigator fabricated ___?

			lit. which report the office nervous | when the investigator fabricated ___?
	Present	Embedded: Yes RP	anhii kissaa el-zabit itnarfiz | lamma the investigator fabricated-it? lit. which report the office nervous | when the investigator fabricated it?
8	Absent	Matrix	miin ‘aal | that the intern returned the stapler? lit. who said | that the intern returned the stapler?
	Absent	Embedded: In situ	el-secretara ‘aalit | that the intern returned which stapler? lit. the secretary said | that the intern returned which stapler?
	Absent	Embedded: No RP	anhii dabasa el-secretara ‘aalit | that the intern returned ___? lit. which stapler the secretary said | that the intern returned ___?
	Absent	Embedded: Yes RP	anhii dabasa el-secretara ‘aalit | that the intern returned-it? lit. which stapler the secretary said | that the intern returned it?
	Present	Matrix	miin firih | lamma the intern returned the stapler? lit. who happy | when the intern returned the stapler?
	Present	Embedded: In situ	el-secretara firhit | when the intern returned which stapler? lit. the secretary happy | when the intern returned which stapler?
	Present	Embedded: No RP	anhii dabasa el-secretara firhit | when the intern returned ___? lit. which stapler the secretary happy | when the intern returned ___?
	Present	Embedded: Yes RP	anhii dabasa el-secretara firhit | when the intern returned-it? lit. which stapler the secretary happy | when the intern returned it?

Appendix E: Analysis of language as a variable

For interested readers, we present here a post-hoc analysis comparing the unilingual conditions in the wh-in situ structure, the wh-resumptive structure, and the structures with a fronted wh-constituent, but a gap in in its canonical argument position (wh-gap). In order to conduct this analysis, the results from all four blocks in the experiment were combined, and participants ratings were z-scored across all four blocks. We first discuss the results of the wh-in situ structure, followed by the wh-resumptive structure, and end with the wh-gap structures.

We first begin with the wh-in situ structures comparing the unilingual Egyptian Arabic and unilingual English conditions, with *language* as a factor. In this analysis the *embedded: in-situ* conditions were considered. The conditions under comparison can be seen in Table A.

Language	**Adjunct Island Presence**	**Example sentence**
English	Absent	The superintendent claimed that the school raised **which budget?**
English	Present	The superintendent complained when the school raised **which budget?**
Egyptian Arabic	Absent	El-qaadi laaHiz inn el-muHamii nisee **anhii shanta**? The judge realized that the-lawyer forgot **which bag**? "The judge realized that the lawyer forgot which bag?"
Egyptian Arabic	Present	El-qaadi zi'il lamma el-muHamii nisee **anhii shanta**? The judge was.upset when the-lawyer forgot **which bag**? "The judge was upset when the lawyer forgot which bag?"

Table 48: Stimuli of the conditions under comparison looking at the embedded: in-situ structures with language as a factor.

As seen in Table B, and the interaction plot in Figure A, we find that with the wh-in situ structures, participants were more sensitive to island contexts in English than they were in

Egyptian Arabic, rating the non-island contexts as being higher than the island contexts in the former but not in the latter.

Language	Adjunct Island Presence	Average raw score	Average z-score
English	Absent	5.07	0.33
English	Present	4.38	0.02
Egyptian Arabic	Absent	4.93	0.27
Egyptian Arabic	Present	5.2	0.37

Table B: Average ratings (raw judgements and z-scores) for each condition comparing the unilingual Egyptian Arabic and unilingual English conditions. These results measure participants' sensitivity of embedded: in situ structures both within and outside of adjunct islands in unilingual English and unilingual Egyptian Arabic sentences.

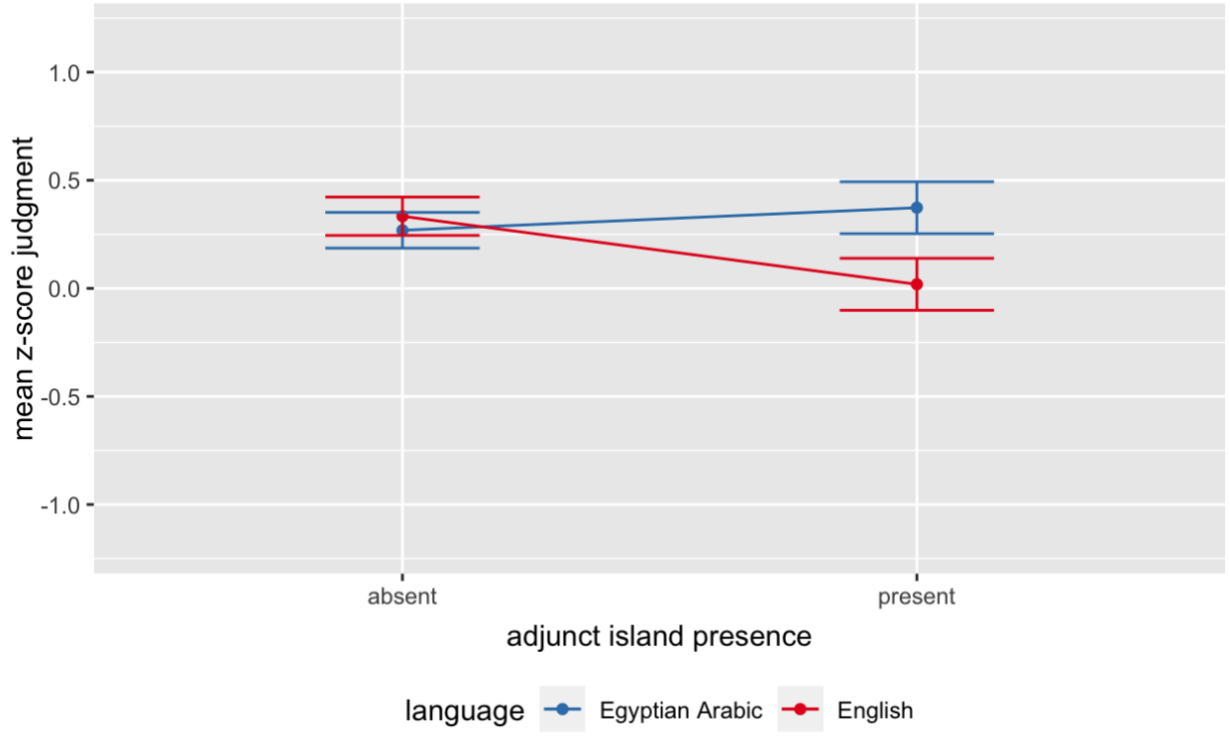

Figure A: Interaction plot output for the factors testing participants' sensitivity of embedded: in situ structures both within and outside of adjunct islands in unilingual English and unilingual Egyptian Arabic sentences. Here we plot the interaction of (i) language: Egyptian Arabic vs. English, where Egyptian Arabic is indicated by the blue line and English is indicated by the red line, and (ii) adjunct island presence: where and adjunct island was either absent or present in the structure.

In order to find out whether or not this sensitivity was significant, we ran a linear mixed effects model where *language* (English vs. Egyptian Arabic), *adjunct island presence* (present vs.

absent), and their interactions served as fixed effects, while *item* and *participant* served as random effects. As seen in Table C, this model did not reveal a main effect for *language* (p = .120), which indicates that participants rated sentences with wh-in situ structures in Egyptian Arabic as being equally acceptable to sentences with wh-in situ structures in English. It also revealed no effect for *adjunct island presence* (p = .304) , which indicates that participants rated wh-in situ structures within an island context as being equally acceptable to wh-in situ structures outside of an island context. This model did however reveal a significant interaction of the two effects (p < .05). Based on the significance of the interaction, I posit that the insignificance of both *adjunct island presence* and *language* might be due to the slight cross-over interaction seen in Figure A. As seen in Figure A, the wh-in situ structure outside of an adjunct island context in English (average z score = 0.46) was rated slightly higher than the wh-in situ structure outside of an adjunct island context in Egyptian Arabic (average z score = 0.42). However, the wh-in situ structure within an adjunct island context in English (average z score = 0.15) was rated lower than the wh-in situ structure inside an adjunct island context in Egyptian Arabic (average z score = 0.51). A post-hoc pairwise comparison was then performed to determine the significance between the individual conditions (see Table A). This pairwise comparison showed that participants rated the *English* and *adjunct island: present* condition as being significantly less acceptable than the *Egyptian Arabic* and *adjunct island: present* condition (β =-0.37, SE = 0.137, p < .05), but showed no significant difference in their rating of the *adjunct island : absent* conditions (β =0.07, SE = 0.14, p = .62). This indicates that while participants were insensitive to the language of the sentence outside of an island context, language played a role in their sensitivity of adjunct island structures.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.25038	0.0747	3.352	< .05
Language: Egyptian Arabic vs. English	0.07571	0.04835	1.566	.120
Adjunct Island Presence: Present vs. Absent	0.04975	0.0482	1.032	.304
Interaction: Language X Adjunct Island Presence	-0.11011	0.04828	-2.281	< .05

Table C: Estimated coefficients and t-values for the linear mixed effects model with language (Egyptian Arabic vs. English) and adjunct island presence (present vs. absent) as fixed effects. Significant effects are shown by p-values.

We now present the results of the wh-resumptive structures comparing the unilingual Egyptian Arabic and unilingual English conditions, with *language* as a factor. In this analysis the *embedded: yes rp* conditions were considered. The conditions under comparison can be seen in Table D.

Language	**Adjunct Island Presence**	**Example sentence**
English	Absent	**Which budget$_i$** did the superintendent claim that the school raised-**it$_i$**?
English	Present	**Which budget$_i$** did the superintendent complain when the school raised-**it$_i$**?
Egyptian Arabic	Absent	**Anhii shanta** el-qaadi laaHiz inn el-muHamii nisee-**ha**? **Which bag** the-judge realized that the-lawyer forgot-**ha**? "Which bag did the judge realize that the lawyer forgot it?"
Egyptian Arabic	Present	**Anhii shanta** el-qaadi zi'il lamma el-muHamii nisee-**ha**? **Which bag** the-judge was.upset when the-lawyer forgot-**ha**? "Which bag was the judge upset when the lawyer forgot it?"

Table D: Sample stimuli of the conditions under comparison looking at the embedded: yes rp structures with language as a factor.

As seen in Table E, and the interaction plot in Figure B, we find that participants preferred resumptive pronouns within an island context rather than outside of an island, when rating unilingual English sentences. We also found that for the unilingual Egyptian Arabic conditions,

participants preferred the resumptive pronouns outside of an island context rather than within an island context. When comparing the two syntactic environments, we find that in the conditions where a resumptive pronoun was used outside of an island context, participants rated the unilingual Egyptian Arabic sentences higher than the unilingual English sentences. But in the conditions where a resumptive pronoun was used within an island context, participants rated the unilingual English sentences higher than the unilingual Egyptian Arabic sentences.

Language	Adjunct Island Presence	Average raw score	Average z-score
English	Absent	4.53	0.10
English	Present	4.88	0.25
Egyptian Arabic	Absent	5.03	0.31
Egyptian Arabic	Present	4.58	0.09

Table E: Average ratings (raw judgements and z-scores) for each condition comparing the unilingual Egyptian Arabic and unilingual English conditions. These results measure participants' sensitivity of embedded: yes rp structures both within and outside of adjunct islands in unilingual English and unilingual Egyptian Arabic sentences.

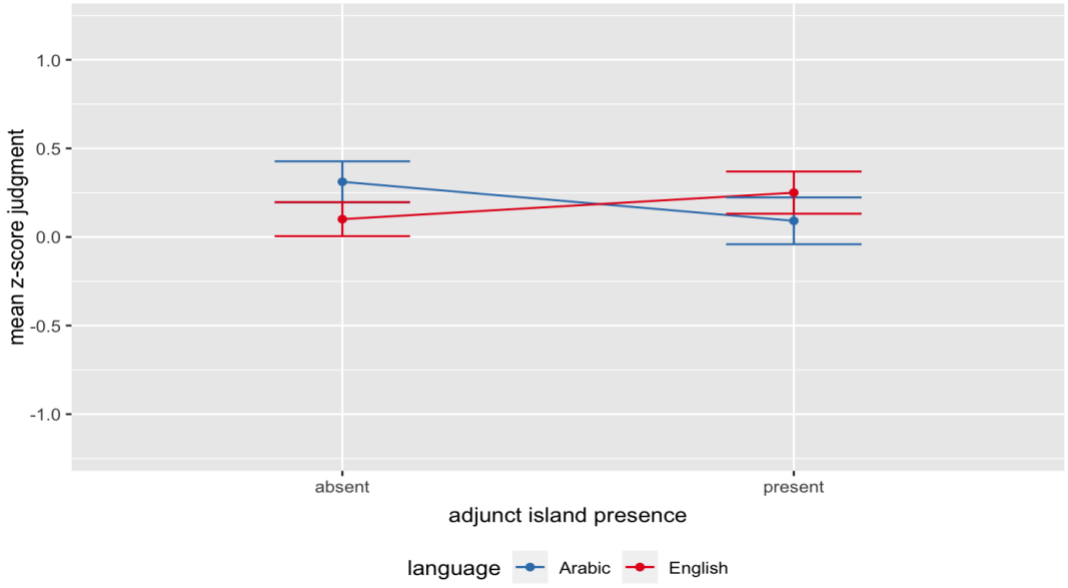

Figure B: Interaction plot output for the factors testing participants' sensitivity of embedded: yes rp structures both within and outside of adjunct islands in unilingual English and unilingual Egyptian Arabic sentences. Here we plot the interaction of (i) language: Egyptian Arabic vs. English, where Egyptian Arabic is indicated by the blue line and English is indicated by the red line, and (ii) adjunct island presence: where and adjunct island was either absent or present in the structure.

In order to find out whether or not this pattern was significant, we ran a linear mixed effects model where *language* (English vs. Egyptian Arabic), *adjunct island presence* (present vs. absent), and their interactions served as fixed effects, while *item* and *participant* served as random effects. As seen in Table F, this model did not reveal a main effect for *language* (p = .799), *adjunct island presence* (p = .734), or their interaction (p = .08), which indicates that the patterns reported above in Table E and Figure B were not statistically significant. Once again, a post-hoc pairwise comparison was performed to determine the significance between the individual conditions (see Table D). This pairwise comparison revealed that participants showed no significant difference in their rating of the *adjunct island: present* conditions (β =-0.156, *SE* = 0.147, p = .29) or the *adjunct island: absent* conditions (β =-0.209, *SE* = 0.147, p = .16). These results indicate that participants did not rate the unilingual Egyptian Arabic and unilingual English sentences as being statistically significantly different from each other, both within and outside of an island context.

	Estimate	SE	*t*-value	*p*-value
Intercept	0.18853	0.07616	2.476	<.05
Language: Egyptian Arabic vs. English	0.0132	0.05169	0.255	.799
Adjunct Island Presence: Present vs. Absent	0.01761	0.05165	0.341	.734
Interaction: Language X Adjunct Island Presence	0.09133	0.05167	1.768	.08

Table F: Estimated coefficients and t-values for the linear mixed effects model with language (Egyptian Arabic vs. English) and adjunct island presence (present vs. absent) as fixed effects. Significant effects are shown by p-values.

Finally, we now present the results of the wh-gap structures, structure where the fronted wh-constituent co-refers with a gap in the embedded clause, comparing the unilingual Egyptian

Arabic and unilingual English conditions, with *language* as a factor. In this analysis the *embedded: no rp* conditions were considered. The conditions under comparison can be seen in Table F.

Language	**Adjunct Island Presence**	**Example sentence**
English	Absent	**Which budget$_i$** did the superintendent claim that the school raised ___$_i$?
English	Present	**Which budget$_i$** did the superintendent complain when the school raised___$_i$?
Egyptian Arabic	Absent	**Anhii shanta** el-qaadi laaHiz inn el-muHamii nisee ___$_i$? **Which bag** the-judge realized that the-lawyer forgot ___$_i$? "Which bag did the judge realize that the lawyer forgot?"
Egyptian Arabic	Present	**Anhii shanta** el-qaadi zi'il lamma el-muHamii nisee ___$_i$? **Which bag** the-judge was.upset when the-lawyer forgot ___$_i$? "Which bag was the judge upset when the lawyer forgot?"

Table G: Sample stimuli of the conditions under comparison looking at the embedded: no rp structures with language as a factor.

As seen in Table H, and the interaction plot in Figure C, we find that outside of an adjunct island contexts, participants preferred wh-gap structures in English more than in Egyptian Arabic, however within an adjunct island context, participants disliked wh-gap structures in both languages.

Language	Adjunct Island Presence	Average raw score	Average z-score
English	Absent	5.8	0.65
English	Present	3.4	-0.39
Egyptian Arabic	Absent	4.07	-0.12
Egyptian Arabic	Present	3.8	-0.22

Table H: Average ratings (raw judgements and z-scores) for each condition comparing the unilingual Egyptian Arabic and unilingual English conditions. These results measure participants' sensitivity embedded: no rp structures both within and outside of adjunct islands in unilingual English and unilingual Egyptian Arabic sentences.

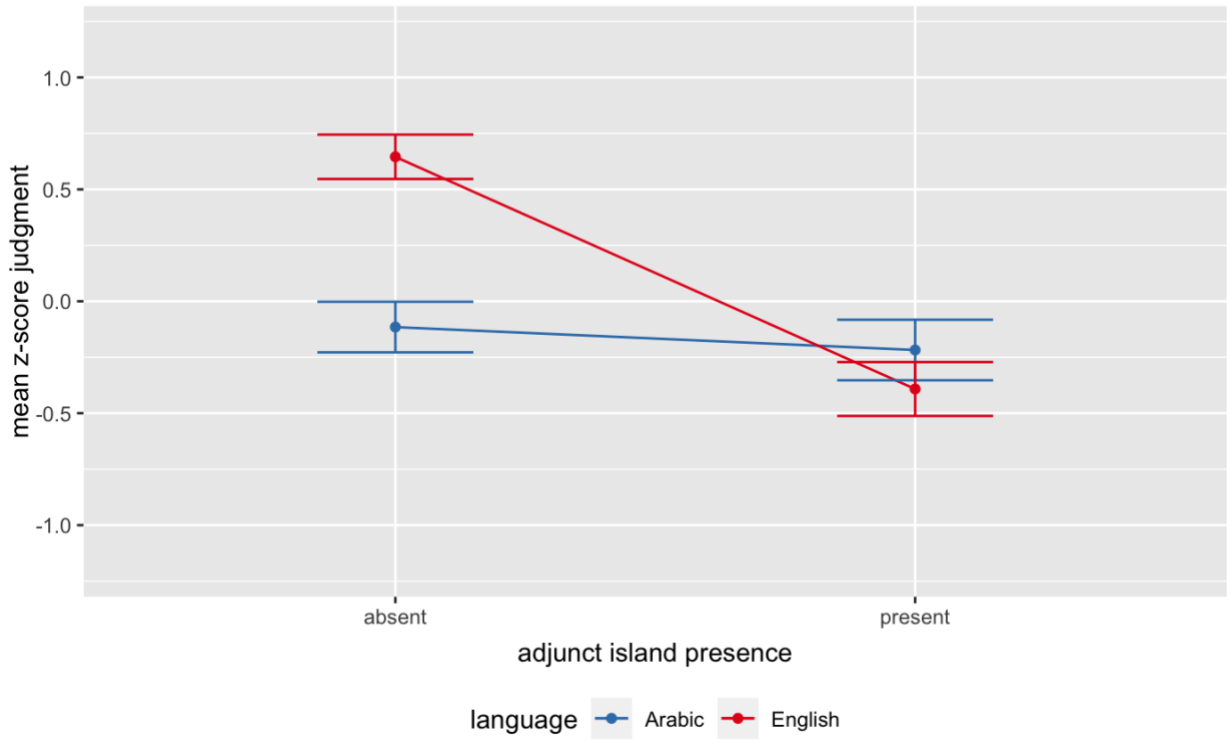

Figure C: Interaction plot output for the factors testing participants' sensitivity of embedded: no rp structures both within and outside of adjunct islands in unilingual English and unilingual Egyptian Arabic sentences. Here we plot the interaction of (i) language: Egyptian Arabic vs. English, where Egyptian Arabic is indicated by the blue line and English is indicated by the red line, and (ii) adjunct island presence: where and adjunct island was either absent or present in the structure.

In order to determine whether or not this pattern was significant, we ran a linear mixed effects model where *language* (English vs. Egyptian Arabic), *adjunct island presence* (present vs. absent), and their interactions served as fixed effects, while *item* and *participant* served as random effects. As seen in Table I, this model revealed a main effect for *language* ($p < .05$), *adjunct island presence* ($p < .001$), and their interaction ($p < .001$). This indicates that the patterns reported in Figure C were statistically significant. As we have done for the previous two analyses, we once again performed a post-hoc pairwise comparison to determine the significance of the individual conditions. The post-hoc pairwise comparison revealed a significant difference for the *adjunct island: present* conditions ($\beta = 0.781$, $SE = 0.136$, $p < .001$), but not the *adjunct island: absent* conditions ($\beta = -0.172$, $SE = 0.136$, $p = .21$). These results indicate that in the instances where the wh-element occurred clause initially and co-referred with a gap in its canonical argument position,

language significantly affected participants' ratings of the non-island conditions but not their ratings of the island conditions.

	Estimate	SE	*t*-value	*p*-value
Intercept	-0.02296	0.1007	-0.228	.823
Language: Egyptian Arabic vs. English	-0.15219	0.048	-3.171	< .05
Adjunct Island Presence: Present vs. Absent	0.28081	0.04777	5.878	< .001
Interaction: Language X Adjunct Island Presence	-0.2383	0.04789	-4.976	< .001

Table I: Estimated coefficients and t-values for the linear mixed effects model with language (Egyptian Arabic vs. English) and adjunct island presence (present vs. absent) as fixed effects. Significant effects are shown by p-values.

Bibliography

Alexopoulou, T., & Keller, F. (2007). Locality, cyclicity, and resumption: At the interface between the grammar and the human sentence processor. *Language*, 110-160.

Almeida, D. (2014). Subliminal wh-islands in Brazilian Portuguese and the consequences for syntactic theory. *Revista da ABRALIN*, *13*(2), 55-93.

Al-Aqarbeh, R., & Sprouse, J. (2021). Island effects and resumption in spoken Jordanian Arabic: an auditory acceptability judgment study. *Manuscript]*.

Asudeh, A. (2011). Towards a unified theory of resumption. *Resumptive pronouns at the interfaces*, 121-187.

Aoun, J., Benmamoun, E., & Choueiri, L. (2009). *The syntax of Arabic*. Cambridge University Press.

Aoun, J., & Li, Y. (1993). Wh-elements in Situ: Syntax or LF?. *Linguistic Inquiry*, *24*(2), 199-238.

Baptista, M. (2020). Competition, selection, and the role of congruence in Creole genesis and development. *Language*, *96*(1), 160-199.

Baptista, M., Gelman, S. A., & Beck, E. (2016). Testing the role of convergence in language acquisition, with implications for creole genesis. *international Journal of Bilingualism*, *20*(3), 269-296.

Bates, D., Maechler, M., Bolker, B., and Walker, S. (2015). *lme4: Linear MixedEffects Models using Eigen and S4*. R Package Version 1.1-9. Available at: https://CRAN.R-project.org /package=lme4

Beltrama, A., & Xiang, M. (2016). Unacceptable but comprehensible: the facilitation effect of resumptive pronouns. *Glossa: a journal of general linguistics*, *1*(1).

Bock, J. K. (1986). Meaning, sound, and syntax: Lexical priming in sentence production. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *12*(4), 575.

Boersma, P. (2001). Praat, a system for doing phonetics by computer. *Glot. Int.*, *5*(9), 341-345.

Borer, H. (1984). Restrictive Relatives in Modern Hebrew. *Natural Language and Linguistic Theory 2*, 219-260

Cann, R., Kaplan, T., & Kempson, R. (2005). Data at the grammar-pragmatics interface: the case of resumptive pronouns in English. *Lingua*, *115*(11), 1551-1577.

Chomsky, N. (1995). *The minimalist program*. MIT press.

Chomsky, N. (2000). Minimalist inquiries: The framework. In Martin, R., Michaels, D., & Uriagereka, J. (Eds.), *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*. (pp. 89–156). MIT Press

Choueiri, L. G. (2002). *Issues in the syntax of resumption: restrictive relatives in Lebanese Arabic*. (Doctoral Dissertation, University of Southern California).

Clyne, M. (2003). *Dynamics of language contact*. Cambridge: Cambridge University Press.

Costa, A., La Heij, W., & Navarrete, E. (2006). The dynamics of bilingual lexical access. *Bilingualism: Language and Cognition*, *9*(2), 137–151.

De Bot, K. (1992). A bilingual production model: Levelt's 'Speaking' model adapted. In *The bilingualism reader* (pp. 384-404). Routledge.

Dijkstra, T., & Kroll, J. F. (2005). Bilingual visual word recognition and lexical access. *Handbook of bilingualism: Psycholinguistic approaches*, *178*, 201.
Ebert, S., & Koronkiewicz, B. (2018). Monolingual stimuli as a foundation for analyzing code-switching data. *Linguistic Approaches to Bilingualism*, *8*(1), 25-66.
Ferreira, F., & Swets, B. (2005). The production and comprehension of resumptive pronouns in relative clause "island" contexts. In Cutler, A. (ed.) *Twenty-first century psycholinguistics: Four cornerstones*, 263-278. Mahway, NJ: Lawrence Erlbaum Associates.
Gad, R. (2011). *A syntactic study of wh-movement in Egyptian Arabic within the minimalist program* (Doctoral dissertation, University of Leeds).
Gibson, E. (1998). Linguistic complexity: Locality of syntactic dependencies. *Cognition*, *68*(1), 1-76.
Gibson, E. (2000). The dependency locality theory: A distance-based theory of linguistic complexity. *Image, language, brain*, *2000*, 95-126.
González-Vilbazo, K., & López, L. (2012). Little v and parametric variation. *Natural Language & Linguistic Theory*, *30*(1), 33-77.
Heestand, D., Xiang, M., & Polinsky, M. (2011). Resumption still does not rescue islands. *Linguistic Inquiry*, *42*(1), 138-152.
Hofmeister, P., Casasanto, L. S., & Sag, I. A. (2012). Misapplying working-memory tests: A reductio ad absurdum. *Language*, *88*(2), 408-409.
Huang, C. (1998). *Logical relations in Chinese and the theory of grammar*. Taylor & Francis.
Koopman, H. & Sportiche, D. Variables and the Bijection Principle. *The Linguistic Review* 2, 139-160.
Kroch, A. S. (1981). On the role of resumptive pronouns in amnestying island constraint violations. In *Papers from the 17th Regional Meeting. Chicago Linguistics Society Chicago, Ill* (No. 17, pp. 125-135).
Kush, D., Lohndal, T., & Sprouse, J. (2019). On the island sensitivity of topicalization in Norwegian: An experimental investigation. *Language*, *95*(3), 393-420.
Lasnik, H., & Saito, M. (1994). *Move alpha: Conditions on its application and output* (No. 22). MIT press.
Lassadi, B. (2005). *The syntax and semantics of optional wh-movement: The case of Egyptian Arabic*. (Doctoral Dissertation, University of Ottawa
Lewis, R.L. & Vasishth, S. (2005). An activation-based model of sentence processing as skilled memory retrieval. *Cognitive Science*, *29*, 375–419.https://doi.org/10.1207/s15516709cog0000_25
Loebell, H., & Bock, K. (2003). Structural priming across languages. *Linguistics*, *41*, 791–824.
López, L. (2018). Introduction: theory and methodology in code-switching research. In *Code-switching–Experimental Answers to Theoretical Questions* (pp. 1-14). John Benjamins.
López, L., Alexiadou, A., & Veenstra, T. (2017). Code-switching by phase. *Languages*, *2*(3), 9.
MacSwan, J. (2000). The architecture of the bilingual language faculty: Evidence from intrasentential code switching. *Bilingualism: Language and Cognition*, *3*(1), 37–54.
MacSwan, J. (2000). The architecture of the bilingual language faculty: Evidence from intrasentential code switching. *Bilingualism: Language and Cognition*, *3*(1), 37–54.
MacSwan, J. (2006). Code-switching and grammatical theory. In Bhatia, T., & Ritchie, W. (Eds.). *The handbook of bilingualism* (pp. 283–311). John Wiley & Sons.
MacSwan, J. (2009). Generative approaches to codeswitching. In B. Bullock & A. Toribio (Eds.), *Cambridge Handbook of Linguistic Codeswitching* (pp. 309–335). Cambridge University

Press.
MacSwan, J. (2012). Code switching and linguistic theory, In T. Bhatia & W. Ritchie (Eds.), *Handbook of Bilingualism and Multilingualism* (pp. 323–350). Blackwell.
McCloskey, J. (1990). Resumptive pronouns, Ā-binding, and levels of representation in Irish. In *The syntax of the modern Celtic languages* (pp. 199-248). Brill.
McCloskey, J. (2006) Resumption. In Everaert., M, and van Riemsdijk, H., (eds.). *The Blackwell Companion to Syntax*, 94–117. Oxford: Blackwell.
McInnerney, Andrew (2021) Islandhood of English PPs is not conditioned by the argument/adjunct distinction. Presentation at NELS 52.
Morgan, A. M., & Wagers, M. W. (2018). English resumptive pronouns are more common where gaps are less acceptable. *Linguistic Inquiry*, *49*(4), 861-876.
Pesetsky, D. (1987). Wh-in-situ: Movement and unselective binding. *The representation of (in) definiteness*, *98*, 98-129.
Pesetsky, D. 2000. *Phrasal Movement and its kin.* Cambridge, MA: MIT Press.
Pires, A., & Taylor, H. (2007). The syntax of wh-in-situ and common ground. In *Proceedings from the Annual Meeting of the Chicago Linguistic Society* (Vol. 43, No. 2, pp. 201-215). Chicago Linguistic Society.
Polinsky, M., Clemens, L. E., Milton, A., Morgan, M. X., & Heestand, D. (2013). 15 Resumption in English. *Experimental syntax and island effects*, 341.
Prince, E. (1990). Syntax and discourse: A look at resumptive pronouns. *Berkeley Linguistics Society: Proceedings of the 16th Annual Meeting*, 482-497.
Radford, A. (2019). *Relative clauses: Structure and variation in everyday English* (Vol. 161). Cambridge University Press.
Rasin, E. (2017). Two Types of Resumptive Pronouns: A Minimal Account of Hebrew Interpretive Asymmetries. In A. Lamont , & K. Tetzloff (Eds.), *NELS 47 : proceedings of the forty-seventh annual meeting of the North East Linguistic Society, October 14- October 16, 2016, University of Massachusetts, Amherst* (Vol. 3, pp. 25-34). (NELS ; No. 47). GLSA, University of Massachusetts.
Reinhart, T. (1998). Wh-in-situ in the framework of the Minimalist Program. *Natural language semantics*, *6*(1), 29-56.
Ross, J. R. (1967). Constraints on variables in syntax. Unpublished dissertation, MIT.
Rouveret, A. (2011). Some issues in the theory of resumption: A perspective on early and recent research. *Resumptive pronouns at the interfaces*, *5*, 1-62.
Sabo, E. (2021). *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.* (Doctoral dissertation, University of Michigan).
Schütze, C. T., & Sprouse, J. (2013). Judgment data. *Research methods in linguistics*, 27-50.
Sedarous, Y. (2022). Codeswitching and the Egyptian Arabic construct state: Evidence for the wordhood of a complex syntactic unit. *Linguistic Approaches to Bilingualism*.
Sedarous, Y., & Namboodiripad, S. (2020). Using audio stimuli in acceptability judgment experiments. *Language and Linguistics Compass*, *14*(8), e12377.
Sharvit, Y. (1999). Resumptive pronouns in relative clauses. *Natural Language & Linguistic Theory*, *17*(3), 587-612.
Shlonsky, U. (1992). Resumptive pronouns as a last resort. *Linguistic inquiry*, *23*(3), 443-468.
Sichel, I. (2014). Resumptive pronouns and competition. *Linguistic Inquiry*, *45*(4), 655-693.

Soltan, U. (2011). On strategies of question-formation and the grammatical status of the Q-particle huwwa in Egyptian Arabic wh-questions. *University of Pennsylvania Working Papers in Linguistics*, *17*(1), 24.

Spivey, M. J., & Marian, V. (1999). Cross talk between native and second languages: Partial activation of an irrelevant lexicon. *Psychological science*, *10*(3), 281-284.

Sprouse, J., Caponigro, I., Greco, C., & Cecchetto, C. (2016). Experimental syntax and the variation of island effects in English and Italian. *Natural Language & Linguistic Theory*, *34*(1), 307-344.

Sprouse, J., Wagers, M., & Phillips, C. (2012). A test of the relation between working-memory capacity and syntactic island effects. *Language*, 82-123.

Soltan, U. (2012). On licensing wh-scope: wh-questions in Egyptian Arabic revisited. *Arabic language and Linguistics*, *99*, 99-114.

Stepanov, A., Mušič, M., & Stateva, P. (2018). Two (non-) islands in Slovenian: A study in experimental syntax. *Linguistics*, *56*(3), 435-476.

Thierry, G., & Wu, Y. (2007). Brain potentials reveal unconscious translation during foreign-language comprehension. *Proceedings of the National Academy of Sciences*, *104*(30), 12530-12535.

Tucker, M. A., Idrissi, A., Sprouse, J., & Almeida, D. (2019). Resumption ameliorates different islands differentially: Acceptability data from Modern Standard Arabic. *Perspectives on Arabic linguistics*, *30*, 1-52.

Vernooij, N., & Boland, J. E. (2020, June). Grey manchas: codeswitching when grammars do not align. In *Presented at the IMPRS Conference: Interdisciplinary Approaches to the Language Sciences*.