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How Bilingualism Informs Theory of Mind Development

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Abstract

The possibility and nature of bilingual advantage for theory of mind, that is, young bilingual children outperforming their monolingual peers, have been discussed increasingly since the first research on the topic was published in 2003. Because accumulating evidence demonstrates a theory of mind advantage for bilingual individuals, in this article, we focus on how this advantage arises. We consider how current theoretical positions, including *executive function*, *metalinguistic awareness*, and *sociolinguistic awareness* accounts, explain such an advantage in young bilingual children. These theoretical accounts receive some, but only partial, support, so further research and theory are needed to understand comprehensively the relationship between bilingualism and theory of mind.

Keywords: theory of mind, bilingualism

Human beings are physically independent but psychologically connected. We deal with others through thinking about their mental states—their beliefs, intentions, and experiences—

evidencing theory of mind (ToM). ToM is fundamental to social life, influencing the quantity and quality of social interaction. Most studies on ToM focus on typically developing young children or those with delays (e.g., autism, deafness). What about children who may have accelerated ToM development, such as, possibly, bilingual children?

More than half the world's population is bilingual or multilingual, including many children (Bialystok et al., 2012). For example, in the United States, bilinguals make up more than a quarter of young children from birth to age 8. The population of bilingual children is increasing worldwide, and bilingualism will soon become the norm instead of the exception.

One difficulty in understanding and studying bilinguals is that bilingualism cannot be defined precisely (Lynch, 2017). For example, how proficient and via what measures must someone be in both languages to qualify as bilingual? How early in life must proficiency in a second language begin for someone to be considered a bilingual rather than a second language learner? Inevitably, but sensibly, the answers to these questions differ for different researchers or educators pursuing different questions of theory or practice. But many difficulties dissolve if we speak only of young bilingual children exposed to two languages early in life. Fortunately, almost all the studies that have examined bilingualism and ToM have been conducted with young children, who receive early and naturalistic exposure to two languages and who use two languages systematically and regularly.

The focus on young children in these bilingual-ToM studies also occurs because *standard* ToM tests were developed for preschoolers, an age at which rapid ToM achievements are clear cut for typically developing children. The classic example concerns false-belief tasks. In such tasks, a child sees Sally place her prize marble in a bowl, and in Sally's absence, the marble is moved to a basket. When Sally reenters the scene, the child is asked where Sally will look for her marble (or think it is). Correct answers—that Sally will look in the bowl (where she falsely thinks it is) rather than the basket (where it really is)—show that the child understands the situation in terms of Sally's mental state rather than merely the true state of the world. Meta-analyses (e.g., Wellman et al., 2001) confirm that typically developing children go from consistently answering incorrectly to consistently answering correctly between ages 3 and 6 years.

Thus, when Goetz (2003) first found that bilinguals have a ToM advantage, she focused on 4-year-olds and used standard ToM, false-belief tasks. Goetz (2003) also recruited young children with precise monolingual and bilingual status (e.g., bilinguals with early dual language exposure and high proficiency). Later bilingual-ToM studies have followed similar standards: Children have been considered bilingual if their parents confirmed that they communicate in both languages fluently and regularly, and (for most studies) reported that they learned both languages early in life (e.g., before age 3). For children considered monolingual, parents confirmed that they had minimal knowledge of any language other than their native tongue. These background characteristics (e.g., context of acquisition, age of acquisition, proficiency, the preschool appropriateness of most ToM tasks) shape our understanding of as well as our review of how ToM develops in bilingual children.

How Might Bilingualism Influence Theory of Mind?

Does bilingualism confer ToM advantage? A meta-analysis of 16 studies (Schroeder, 2018) found a small to medium effect for a bilingual ToM advantage. In our review, we looked at 24 empirical studies (see Table 1; for more details, see Table S1) that investigated ToM development in bilingual children. Most (17) used false-belief tasks or those tasks combined with other ToM tasks. Three studies provided no relevant data for examining the potential bilingual-monolingual difference because they included no monolingual comparison group (see Table 1); only five others found no ToM advantage. Thus, 16 of the 21 studies showed a bilingual ToM advantage, echoing the findings of the earlier meta-analysis (Schroeder, 2018).

[TABLE 1 HERE]

However, demonstrations of a bilingual ToM advantage raise a more crucial question: How does bilingualism promote enhanced ToM development? When Goetz (2003) first found a bilingual ToM advantage, she proposed (but did not test) three accounts for such an advantage: *executive function*, *metalinguistic awareness*, and *sociolinguistic awareness* accounts. Although these three accounts remain the prominent positions, no prior report, including Schroeder's (2018), evaluates how these accounts fare in light of existing research. Whether any of these

accounts or any combinations of them explain a ToM advantage conveyed by bilingualism remains unanswered. Next, we review these executive function, metalinguistic awareness, and sociolinguistic awareness accounts to address more fully how a bilingual ToM advantage arises, evaluating evidence for and against each.

Executive Function

Executive function refers to children's general control mechanisms that modulate conscious, goal-directed behaviors, such as paying attention to relevant information while inhibiting distractors (i.e., inhibitory control), temporarily holding and manipulating information in mind (i.e., working memory), and performing deliberate task shifting (Miyake et al., 2000). The executive function account was initially plausible because of research demonstrating executive function advantages (primarily improved inhibitory control) in bilinguals based on the idea that bilingual speakers often inhibit one language or another to speak to others (Bialystok et al., 2012), thereby enhancing executive function. In ToM as well, children have to inhibit their own mental states to consider others' (e.g., Sally's) mental states (Devine & Hughes, 2014); thus, enhanced executive function in bilingual children might advantage ToM development.

At the same time, claims that bilinguals have an executive function advantage are contentious (e.g., Dick et al., 2019; Nichols et al., 2020). A large-scale study of adults (Nichols et al., 2020) found no executive function advantage for bilinguals over monolinguals. Another large-scale study, of 9- to 10-year-olds (Dick et al., 2019), also failed to support such an executive function advantage in children. However, these data do not tell us about children younger than 9. Younger children are in the throes of mastering both executive function and language, so language may nonetheless affect executive function for them. Indeed, several recent studies (e.g., Choi et al., 2018; Tran et al., 2019), as well as a large-scale study of 5- to 7-year-olds (Hartanto et al., 2019), show an executive function advantage for young bilingual children.

To evaluate a possible executive function explanation for a bilingual ToM advantage requires assessing not only ToM but also executive function in young children, as several tasks do (see Table S3). An exemplary task, assessing inhibitory control, is Day-Night Stroop. Children see two cards, one bright with a shining sun and one dark with a shining moon. Children are told that when they see the moon, they should say "day" (inhibiting saying "night"), and when they see

the sun, they should say "night" (inhibiting saying "day"). In the preschool years, children's competence on this task and other executive function tasks varies considerably.

Executive Function as a Source of Bilingual ToM Advantage

Early evidence from two studies supported the executive function account by directly or indirectly measuring inhibitory control along with ToM (Bialystok & Senman, 2004; Kovács, 2009). One study (Bialystok & Senman, 2004) assessed 5-year-olds' ToM (via an appearance-reality task; see Table S2) and inhibitory control skills. In monolingual children, inhibitory control was initially correlated with ToM performance; later, bilingual children outperformed monolingual children on ToM. Although these findings, along with the reasoning of the studies' authors, were indirect and correlational (Bialystok & Senman, 2004; Kovács, 2009), they still offered some initial support for a bilingual ToM advantage via executive function.

Executive function goes beyond inhibitory control to include working memory (Miyake et al., 2000), so another study (Nguyen & Astington, 2014) tested bilingual children's working memory. Three- to 5-year-olds were measured on ToM (false-belief), inhibitory control (Day-Night Stroop), and working memory (via a Backward Word Span task; see Table S3). Working memory (rather than inhibitory control) fully mediated the significant relationship between bilingualism and ToM. The authors reasoned that bilingual children had more practice maintaining and simultaneously operating on items (e.g., keeping two mental lexicons in mind, one in each language), which led to better working memory and consequently, better ToM.

However, other studies have failed to support an executive function account of bilingual ToM advantage (Buac & Kaushanskaya, 2020; Dahlgren et al., 2017; Diaz & Farrar, 2018a, 2018b; Fan et al., 2015). In one (Diaz & Farrar, 2018a), preschoolers' executive function abilities, specifically inhibitory control, predicted ToM but, contrary to the executive function account, only in monolinguals, not bilinguals. Similarly, in another study (Diaz & Farrar, 2018b), when preschoolers were tested longitudinally, executive function at Time 1 was associated with ToM at Time 2, but only in monolinguals, not bilinguals.

More generally, the association between executive function and ToM in monolinguals was confirmed in a meta-analysis (Devine & Hughes, 2014), but in our review, it mostly failed to appear for bilinguals. Given that executive functioning affects ToM in monolinguals, why does it

not have an impact for bilinguals as well? We hypothesize that other factors lead to their enhanced ToM, displacing executive functions. In the following sections, we add support for that hypothesis.

In summary, the executive function account is a plausible, often-cited hypothesis for a bilingual ToM advantage. But empirical data provide inconsistent evidence for, and often clear evidence against, this account.

Metalinguistic Awareness

Metalinguistic awareness taps children's understanding that language provides a cognitive representation of the speaker's communicative intent instead of a direct portrayal of the world—that is, language ("the car is blue") may misrepresent the world (if the car is red). Similarly, ToM rests on understanding that mental states ("I think the car is blue") can misrepresent the world (e.g., in the case of a false belief). Thus, both metalinguistic awareness and ToM can be considered as reflecting meta-representations (Doherty & Perner, 1998). According to this parallel, the metalinguistic awareness account suggests that bilingual children's enhanced meta-representation skills, developed through using two languages, advantage their ToM development.

Metalinguistic awareness has been measured by several tasks (see Table S3), such as Synonym Judgment tasks. A canonical Synonym Judgment task uses pictures of common objects and a puppet. In an initial (synonym-check) phase, children show that they know that a single pictured item has two names (e.g., cup and mug). In the test phase, when a child uses one name (e.g., cup) for the item, the puppet uses or fails to use the synonym. When the puppet is incorrect, the child needs to correct it, showing awareness of how one object can have many names.

Several studies underwrite the background plausibility of a metalinguistic awareness account for a bilingual ToM advantage by demonstrating that bilingual children show enhanced metalinguistic awareness over monolinguals (e.g., Ben-Zeev, 1977). Nevertheless, evidence that directly links metalinguistic awareness and ToM in bilinguals is sparse.

Metalinguistic Awareness as a Source of Bilingual ToM Advantage

Only three studies have examined the relationship between metalinguistic awareness and ToM in bilingual children. In a study of 4-year-olds (Chan, 2004), bilingual status (i.e., bilingual

or not) was associated with several factors, particularly metalinguistic awareness and ToM. This allowed the author to conclude that bilingual children scored higher on ToM tasks because they had a better general understanding of human representations, including their potential for misrepresentation (i.e., higher metalinguistic awareness).

A longitudinal study mentioned in the previous section (Diaz & Farrar, 2018b) tested 4-year-old bilinguals and monolinguals, and then retested them one year later, investigating not only executive function but also metalinguistic awareness. Bilinguals outperformed monolinguals on both metalinguistic awareness and ToM. More importantly, Time 1 metalinguistic awareness was the only significant predictor of Time 2 ToM for bilinguals, whereas executive function was the primary predictor of ToM for monolinguals.

The third study (Pearson, 2013), of 4-year-old bilinguals and monolinguals, provided partial evidence to support the metalinguistic awareness account. Although the study did not find a ToM advantage in bilinguals, it did find a strong relation between metalinguistic awareness and ToM, regardless of children's language status (i.e., monolingual or bilingual), suggesting that metalinguistic awareness might generally explain the ToM advantage among bilinguals seen in other studies.

Thus, it is empirically plausible that, because bilinguals experience diverse ways of mapping concepts and thoughts onto language from early in life, their strengthened awareness of language as a representational system enhances an ability to represent different mental states. But this account has rarely been explored.

Sociolinguistic Awareness

Sociolinguistic awareness refers to bilingual children's ability to match the language they use to others' needs. Evidence for the sociolinguistic awareness account comes from studies examining bilingual children's regulation of the use of their two languages (Genesee et al., 1996), suggesting that bilingual children's realization that different people have different language knowledge may advance their understanding that people have different mental states.

Typically, to assess sociolinguistic awareness, a child is asked to interact with an experimenter (a bilingual posing as monolingual). If the child uses one language, the

experimenter says, "What?" in the other language. Sociolinguistic awareness is assessed by whether and how quickly the child appropriately switches language (see Table S3).

Bilingual children, even those younger than 2 years, often appropriately choose the language they use in accord with their interactors in this controlled task and also in everyday conversation (Petitto & Kovelman, 2003). Does sociolinguistic awareness enhance bilinguals' ToM understanding?

Sociolinguistic Awareness as a Source of Bilingual ToM Advantage

Only two studies have assessed the link between sociolinguistic awareness and ToM. One (Cheung et al., 2010) recruited two groups of 4-year-old Hong Kong children: bilinguals and second language learners. The bilingual group spoke Cantonese at home but also attended child care, where native English speakers interacted with the children exclusively in English. The second language learners spoke Cantonese at home and attended child care where Cantonese was the primary language of communication and English was introduced only during short English language lessons. With this substantial difference in English experience, bilinguals had better ToM than second language learners, and (in line with Genesee et al., 1996) bilinguals outperformed second language learners on sociolinguistic awareness. Sociolinguistic awareness predicted ToM cross sectionally, explaining differences in ToM above and beyond other factors that might have been relevant.

Similarly, another study (Tare & Gelman, 2010) examined 4-year-olds' skills at choosing languages appropriately in response to actual conversational interaction in a free play situation with several experimenters whose native languages differed. Development of sociolinguistic awareness was not an all-or-none process, but emerged gradually through the preschool years and related closely to ToM development.

Again, little research has directly explored the sociolinguistic awareness account. But evidence from those studies that have suggests the considerable potential of this account.

Conclusions and Directions

The relation between bilingualism and ToM has been studied increasingly since the first research on the topic was published in 2003. Although only 24 studies have examined this link,

doing so is important because of ToM's demonstrable importance to children's social lives and the growing prevalence of bilingual competence in our world.

For now, although evidence is sparse and nondefinitive, four conclusions are clear. First, the bilingual advantage for ToM development is modest. This was evident in the abovementioned meta-analysis (Schroeder, 2018) as well as in our database of 24 studies (Table 1). Second, although three divergent theoretical positions seem plausible, studies have not fully uncovered the underlying mechanism of the bilingual ToM advantage. Third, the executive function account, although studied the most, has received the least empirical support. Metalinguistic and sociolinguistic awareness accounts remain more plausible, but these have been studied far less. Fourth, research that has measured the efficacy of one account rarely measures factors relevant to the other accounts. Further research is needed to create a comprehensive picture that integrates all relevant factors.

None of the three accounts claim that bilingualism induces extraordinary processes of ToM development; rather, bilingualism simply provides more opportunities to develop relevant skills (i.e., metalinguistic awareness, sociolinguistic awareness, and executive functions) that advantage ToM learning. To exemplify the dynamics, consider bilingual children in the United States who often attend schools in neighborhoods where school quality is lower because of low socioeconomic status. Socioeconomic status and school quality disadvantage school learning in general. In these schools, where students are taught in English, bilingual children from first-generation immigrant families learn English more slowly or less well. Yet despite the limits of low-quality schooling, bilingual children are often on par with their monolingual peers not only in academic subjects but also in ToM. Moreover, if researchers statistically control for such confounding variables (e.g., smaller English vocabularies), bilingual children outperform monolinguals significantly on ToM tasks. Arguably, even in less favorable learning environments, bilinguals' enhanced metalinguistic and sociolinguistic awareness (possibly complemented by enhanced executive function) can affect their academic and language learning, as well as their ToM learning.

Given the current state of the research, several questions remain for future investigations. To begin, because almost all current bilingual-ToM research is cross sectional (with Diaz and Farrar's work a singular exception [2018b]), we do not know, for example, whether enhanced

metalinguistic, sociolinguistic awareness, or executive functions precede enhanced ToM or vice versa. Longitudinal research examining the sequences of acquisition is needed to narrow developmental trajectories, providing a classic step toward causal accounts.

Relatedly, all current evidence for these accounts is correlational rather than experimental, limiting the theoretical inferences that can be made. Experimental studies could help answer which account is more plausible in supporting and driving the bilingual-ToM advantage. Take metalinguistic awareness as an example: Researchers could train monolingual children's metalinguistic awareness to see whether metalinguistic awareness is linked causally to ToM. Such experimental and training studies would allow researchers to examine those accounts in a firmer way, and could inform useful practical applications as well.

Furthermore, because ToM is now widely acknowledged to encompass many insights that unfold in documentable progressions, understanding such progressions could help address how ToM learning differs for bilingual versus monolingual children. Several instruments capture those progressions (Osterhaus et al., 2016; Wellman & Liu, 2004). For example, in one study (Gordon, 2016) that used Wellman and Liu's ToM Scale, bilingual children differed from monolingual children only in an easy and early ToM step but not in more challenging later steps. This finding provides a provocative initial snapshot that highlights a way to characterize more effectively the differential learning trajectories of ToM in monolingual versus bilingual children.

In conclusion, our review confirms a bilingual ToM advantage in young children. But our understanding of how this advantage arises remains incomplete. Nonetheless, current research can set the stage, indicating that metalinguistic and sociolinguistic awareness could be especially important pieces in an integrative account that has not yet been articulated. Regardless, current research clarifies that bilingual experiences offer young children key opportunities to accumulate social and linguistic knowledge and skill, leading to enhanced ToM development.

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Table 1

Twenty-Four Empirical Studies of Theory of Mind Competence in Bilingual Children

Study	ToM Advantage	Study	ToM Advantage

Banasik & Podsiadło (2016)	-	Gordon (2016)	+
Berguno & Bowler (2004)	+	Greenberg et al. (2013)	+∗
Bialystok & Senman (2004)	+∗	Han & Lee (2013)	+
Buac & Kaushanskaya (2020)	X	Kovács (2009)	+
Chan (2004)	+∗	Kyuchukov & De Villiers (2009)	X
Cheung et al. (2010)	+∗	Meir & Novogrodsky (2019)	+
Dahlgren et al. (2017)	X	Nguyen & Astington (2014)	+∗
Diaz & Farrar (2018a)	+∗	Pearson (2013)	X
Diaz & Farrar (2018b)	+∗	Peristeri et al. (2019)	+∗
Fan et al. (2015)	+∗	Raisa et al. (2019)	-
Farhadian et al. (2010)	+∗	Tare & Gelman (2010)	-
Goetz (2003)	+∗	Yow (personal communication, April 27, 2020)	X

Note. ToM: Theory of Mind; in the ToM Advantage column, the - sign indicates that there is no comparison group (i.e., a monolingual group or groups) in the article, + indicates that a bilingual ToM advantage was found in raw scores of the ToM task in the article, +* indicates that a bilingual ToM advantage was found after statistically controlling for background variables (e.g., vocabulary skills). X indicates no significant bilingual ToM advantage was found. Note that Gordon (2016) provided partial evidence for a bilingual ToM advantage, where only one item's result (of seven items) showed that bilinguals outperformed monolinguals.

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Table 1

Twenty-Four Empirical Studies of Theory of Mind Competence in Bilingual Children

Study	ToM Advantage	Study	ToM Advantage
Banasik & Podsiadło (2016)	-	Gordon (2016)	+
Berguno & Bowler (2004)	+	Greenberg et al. (2013)	+*
Bialystok & Senman (2004)	+*	Han & Lee (2013)	+
Buac & Kaushanskaya (2020)	X	Kovács (2009)	+
Chan (2004)	+*	Kyuchukov & De Villiers (2009)	X
Cheung et al. (2010)	+*	Meir & Novogrodsky (2019)	+
Dahlgren et al. (2017)	X	Nguyen & Astington (2014)	+*
Diaz & Farrar (2018a)	+*	Pearson (2013)	X
Diaz & Farrar (2018b)	+*	Peristeri et al. (2019)	+*
Fan et al. (2015)	+*	Raisa et al. (2019)	-
Farhadian et al. (2010)	+*	Tare & Gelman (2010)	-
Goetz (2003)	+*	Yow (personal communication, 2020)	X

Note. ToM: Theory of Mind; in the ToM Advantage column, the - sign indicates that there is no comparison group (i.e., a monolingual group or groups) in the article, + indicates that a bilingual ToM advantage was found in raw scores of the ToM task in the article, +* indicates that a bilingual ToM advantage was found after statistically controlling for background variables (e.g., vocabulary skills). X indicates no significant bilingual ToM advantage was found. Note

that Gordon (2016) provided partial evidence for a bilingual ToM advantage, where only one item's result (of seven items) showed that bilinguals outperformed monolinguals.