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The Importance of Theory of Mind in Oral and Reading Comprehension in Emergent Bilingual Students

La importancia de la Teoría de la Mente en la comprensión oral y comprensión lectora en estudiantes bilingües emergentes

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Abstract

Theory of Mind (ToM), as a relevant aspect in children's socio-cognitive development, has been widely studied. Some results have suggested that bilingual children have an advantage over their monolingual peers in development of ToM. However, there is less research regarding the predictive role of ToM in performance of oral and reading comprehension in elementary school students. This study evaluated a sample of 84 emergent bilingual, Spanish-speaking, third to fifth graders to identify the predictive role of ToM in their oral comprehension and reading comprehension in English, their second language, controlling for grade, vocabulary, and word identification. ToM was assessed using a test of other people's intentions, beliefs, and perspectives, along with recognition of emotions through facial expressions. For comprehension, standardized measures of oral and reading comprehension were used. The bivariate correlations and hierarchical linear regression analyses between ToM and each of the types of comprehension indicated a prediction of ToM in both types of comprehension when controlling statistically for grade, word identification, and vocabulary. This highlights the role of ToM in oral language and reading variables in emergent bilingual students and emphasizes its importance for teaching of reading for this population.

Keywords: theory of mind (ToM); reading comprehension; oral comprehension; bilingual students

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Resumen

La Teoría de la Mente (ToM, por sus siglas en inglés) como aspecto relevante en el desarrollo socio-cognitivo, ha sido ampliamente estudiada. Algunos resultados han sugerido una ventaja de los niños bilingües en el desarrollo de ToM respecto a sus pares monolingües. No obstante, la investigación sobre su rol predictivo en el desempeño en comprensión oral y lectora en estudiantes de primaria es menor. Este estudio evaluó una muestra de 84 niños bilingües emergentes, hispanohablantes, de tercer a quinto grado para identificar el rol predictivo de ToM en su comprensión oral y lectora en inglés, su segunda lengua, controlando por grado, vocabulario e identificación de palabras. ToM fue medida con una prueba de evaluación de intenciones, creencias y perspectivas de otros y con reconocimiento de emociones mediante expresiones faciales. Se emplearon pruebas estandarizadas de comprensión oral y lectora de pasajes. Los análisis de correlaciones bivariadas y regresión lineal jerárquica entre ToM y cada uno de los tipos de comprensión indicaron una predicción de ToM en ambos, controlando por grado, identificación de palabras y vocabulario. Esto destaca el rol de ToM en la oralidad y lectura de estudiantes bilingües emergentes y enfatiza su importancia para la enseñanza de la lectura en esta población.

Palabras clave*: Teoría de la Mente (ToM); comprensión lectora; comprensión oral; estudiantes bilingües

The Importance of Theory of Mind in Oral and Reading Comprehension in Emergent Bilingual Students

Theory of Mind (ToM) refers to the ability to predict and explain other people's behavior in terms of their mental state, including beliefs and desires (Fletcher et al., 1995). This is a socio-cognitive skill that enables the interpretation of other people's behavior and the communication of one's own thoughts, emotions, and desires to others (Astington & Edward, 2010, in Kim, 2020b). In conceptual and operative terms, various components of ToM have been identified that emerge during different stages of evolutionary development. Understanding *first-order false belief* is an initial manifestation of ToM, occurring at around four years of age (Wellman, Cross, & Watson, 2001), which shows a child's ability to recognize that different people may hold different beliefs about the same reality and that these beliefs are subject to change (Astington, Pelletier, & Homer, 2002).

Understanding *second-order false belief*, which emerges in children between 5 and 7 years of age (Perner & Wimmer, 1985; Sullivan, Zaitchik, & Tager-Flusberg, 1994), refers to the development of awareness of the fact that people have beliefs about the beliefs that others have about the world and that these, in turn, can be different from their own (Astington et al., 2002). Finally, at a more sophisticated socio-cognitive level, *advanced ToM*, which develops between 8 and 10 years of age, is a set of skills that denote higher-order false belief understanding, social understanding, recognition of emotional and mental states, and skills linked to perspective-taking (Osterhaus, Koerber, & Sodian, 2016). ToM is a socio-cognitive component that develops from preschool ages through the late elementary grades.

The first research on ToM focused on studies of children within the autism spectrum (Baron-Cohen, 1989, 2000; Baron-Cohen, Leslie, & Frith, 1985; Leslie, 1987; Leslie & Frith, 1988; Wulff, 1985) and was followed by research with neurotypical children, mainly in the early stage of their development (Miller, 2012), particularly

at preschool ages between 3 and 5 years. The study of ToM at elementary school ages is more limited (Hughes & Devine, 2015) and empirical research on ToM in bilingual populations with respect to their reading is even less common (Weimer et al., 2021). Indeed, research that disaggregates subcomponents or types of reading (e.g., literal versus inferential, or narrative versus expository) in relation to ToM in monolingual children is even more scarce (Weimer et al., 2021) and, to our knowledge, nonexistent among bilingual children. Given that Spanish-speaking bilingual student populations in the United States have difficulties in reading comprehension, partly in relation to difficulties associated with oral comprehension, the exploration of ToM with these variables is of interest because of its possible empirical role, as well as regarding its implications for teaching reading in the classroom.

Other studies mostly demonstrate that there are positive relationships between ToM and executive functions, such as working memory, attentional flexibility, and inhibitory control in children of preschool ages (Carlson, Moses, & Breton, 2002; Hughes, 1998; Pérez-Zapata, Cuadra-Martínez, Valenzuela-Barrios, & Salgado-García, 2019) and school ages (Lecce, Bianco, Devine, & Hughes, 2017).

The connection between ToM and academic indicators in elementary school student populations has been varied, including its link to various socio-cognitive variables, such as the social circumstances of children in the classroom, performance (grades), academic strategies, and motivation in the face of learning (Wellman, 2016). Despite the relationships between ToM and academic indicators, the socio-cognitive development of skills such as ToM is rarely included in school (Smogorzewska, Szumski, & Grygiel, 2020) and in relation to reading (e.g., Kelly & Taboada Barber, 2020). Specifically, there is a relatively limited number of studies on the relationship between ToM and indicators of oral language and reading comprehension simultaneously, both of which are academic indicators in elementary, middle, and high schools. For example, of 11 studies on ToM and comprehension processes in the last two decades, only five considered the relationship of ToM to reading comprehension and oral comprehension within the same empirical study (Atkison, Slade, Powell, & Levy, 2017; Ebert, 2020; Guajardo & Cartwright, 2016; Kim, 2020a; Pelletier, 2006). The remaining studies considered only one type of comprehension: either oral or reading.

Consideration of the empirical relationship between ToM and both oral and reading comprehension is important for two reasons: first, in addition to word identification, *oral* comprehension at early stages of language development is a significant predictor of *reading* comprehension at later ages in elementary school (Cain, 2007; Kieffer, Biancarosa, & Mancilla Martínez, 2013; LARRC, 2015; LARRC & Chiu, 2018). Likewise, there is compelling evidence that the influence of oral comprehension on reading comprehension increases once readers' word identification is more developed (Garcia & Cain, 2014; Vellutino, Tunmer, Jaccard, & Chen, 2007). Second, oral comprehension—or linguistic comprehension—one of the two components, along with decoding, in the established Simple View of Reading (SVR) model refers to the ability to extract and construct literal and inferential meanings from oral discourse (Hoover & Tunmer, 2020). In this paper, we adopt this definition of oral comprehension or linguistic comprehension, as stated in the SVR, and opt for the former term. Listening comprehension is not only a predecessor of reading comprehension, but, according to the SVR model, it is one of the factors that, in conjunction with decoding, contributes directly to reading comprehension. Considering the crucial role of oral comprehension in reading comprehension and, in turn, the importance of the latter for a large proportion of academic learning, in this paper we propose to consider the relationship of ToM as a socio-cognitive variable with respect to oral comprehension and reading comprehension, respectively.

This study focuses on emergent bilingual students, which means that they are students who are becoming bilingual during the process of learning the social language of their environment while continuing to develop and communicate in their native language (García, Kleifgen, & Falchi, 2008). In other words, they use English in learning at school, but speak another language at home; in this case, Spanish. We focus on this population of Spanish-speaking bilingual elementary school students for two reasons: first, operating in two or more languages

and cultures has led to the empirical finding that bilingual children tend to have more developed ToM than their monolingual peers (Schroeder, 2018). This ToM advantage among emergent bilingual children has been found even when controlling statistically for their level of proficiency in English, their second language, thus highlighting the significant role of ToM. Second, we have a particular interest in comprehension processes in this population, and the lack of studies on the role of ToM in this area merits empirical exploration. In the following sections we first consider the previous literature on the relationships of ToM to listening comprehension, and then reading and listening comprehension, before concluding with studies considering ToM in bilingual populations.

ToM and oral comprehension

Although the empirical literature is relatively recent, there is evidence of the relationship between ToM and comprehension of fictional oral narratives in both Spanish- and English-speaking children. Specifically, of 11 studies in the last two decades that have focused on ToM and the two types of comprehension, five included both types of comprehension and only three exclusively addressed oral comprehension. In these three empirical studies, Pelletier and Beatty (2015) explored the relationship between the level of development of ToM, as measured by first- and second-order false belief tasks, and the level of oral comprehension of narratives, specifically fables, in a sample of Canadian children aged between 4 and 5 years. In order to assess comprehension, they created a task in which the children had to listen to a fable and observe related images, and then orally answer comprehension questions and assess the moral of the narrative. The results showed that, when controlling for general vocabulary, there was an association between the development of second-order ToM and oral comprehension of fables, suggesting that ToM plays a relevant role in the ability to assess the intentions of the characters in this type of narratives. However, the study does not provide information on the effects of ToM development on autonomous reading comprehension.

Similarly, Strasser and del Río (2014) studied the role of ToM in predicting narrative comprehension in 5-year-old kindergarten children. Unlike the aforementioned study, this research measured oral comprehension using two assessments: a standardized story recall assessment and one adapted by the researchers. In the latter, the children observed a picture book in which the story is told without words and they responded orally to comprehension questions about characters, details, and inferential processes. ToM was measured by contents false belief, explicit false belief, belief-emotion, real-apparent emotion, and second-order false belief tasks. They also examined the role of executive functions, comprehension monitoring, and vocabulary depth and breadth. The results showed that although ToM did not significantly predict comprehension of narratives, statistically significant correlations were found between ToM and vocabulary, comprehension monitoring, oral comprehension, working memory, and inhibition. Due to the high correlations with vocabulary and the lack of prediction of ToM in oral comprehension (memory for stories), Strasser and del Rio (2014) suggest that ToM may be a variable that is commonly confused with linguistic ability and argue that linguistic, general inference, and mental inference skills are difficult to isolate in children of young ages, which is an obstacle for the identification of the specific effect of understanding mental states on oral comprehension.

Finally, Tompkins, Blosser, and Downing (2020) carried out a longitudinal study of the role of ToM with respect to story comprehension skills and found a moderate positive significant correlation between ToM and the oral comprehension of concurrent stories and comprehension at a later point. However, when they statistically controlled for participants' age and language development, they found no significant association between ToM and oral comprehension of stories.

ToM, oral comprehension, and reading comprehension

ToM has been linked to reading comprehension in monolingual children, both Spanish- (Ramos & Crespo, 2008) and English-speakers (Atkinson et al., 2017; Boerma, Mol, & Jolles, 2017; Ebert, 2020; Guajardo & Cartwright, 2016; Kim, 2020a) and bilingual children (Pelletier, 2006) in several empirical studies that vary in the complexity of their statistical analyses and, consequently, in the role that ToM plays. At a purely correlational level, Ramos and Crespo (2008) studied the relationship between ToM and reading comprehension in Chilean children of 8 and 9 years of age using a measure constructed on the basis of classical stories of second-order false belief. They found a low correlation, although statistically significant, between the two variables. The authors concluded that the ability to internally represent the mental states and intentions of others would be a basic condition for children to develop comprehension of narratives. However, the study does not consider other control variables that would strengthen these findings.

In studies where control variables or relationships between latent variables are considered in structural equation modeling (SEM) models, the associations between ToM and reading comprehension vary with respect to the age of the participants and the type of variables used in the models. For example, in their longitudinal research, Guajardo and Cartwright (2016) assessed the level of development of first-order ToM among English-speaking children from 3-5 years of age and then reading comprehension and second-order ToM at 6 and 9 years of ages. The ToM measures consisted of first- and second-order false belief tasks, while standardized instruments were used for reading comprehension. The results indicated that first-order ToM did not directly contribute to paragraph reading comprehension, but did contribute to single-sentence comprehension when statistically controlling for working memory, cognitive flexibility, vocabulary, and decoding. Notably, ToM in children of preschool age contributed to reading comprehension at later ages, pointing to the role of both ToM and executive functions in the longitudinal prediction of reading comprehension.

ToM also plays an important role in its relationship to reading comprehension in research that has identified an association between them through intermediary variables. In this framework, Ebert (2020) conducted a longitudinal study with a group of children between 3 and 13 years of age in Germany. He conducted measurements at four points in time: at 3 years of age he assessed working memory, nonverbal skills, and language skills; at 5 years of age, he evaluated language skills and first- and second-order ToM; at 12 years of age, vocabulary and advanced ToM; and at 13 years of age, reading and oral comprehension. The results indicated that, although ToM measured at early stages had no effect on reading comprehension at 13 years of age, advanced ToM, assessed at 12 years of age, had a small indirect effect through oral comprehension. These findings are consistent with those of Atkinson et al. (2017), whose longitudinal study assessed English-speaking children at 4 and 6 years of age. They found that ToM measured at 4 years of age indirectly predicted reading comprehension through language proficiency measured at 6 years of age.

Lastly, Kim's (2020a) study measured ToM, and oral and reading comprehension assessed through standardized tests, comprehension monitoring, vocabulary, grammatical knowledge, and executive functions in second- and fourth-grade English-speaking students. The results of SEM indicated that the indirect effect of ToM on reading comprehension increased from second to fourth grade. Specifically, fundamental language variables (vocabulary, grammar) and cognitive variables (working memory, attention) were shown to differ in their relationship with ToM according to grade/age. Kim (2020a) concluded that the vocabulary demand for ToM decreases in fourth grade and, as a consequence, individual differences in working memory explain variance in ToM, transcending vocabulary and other variables.

ToM in bilingual children

There is little empirical research that links ToM to oral comprehension and reading comprehension in bilingual children. However, in the last decade a body of empirical research has proliferated that has focused on the advantages that bilingual children have in ToM over their monolingual peers. Specifically, a meta-analysis of 16 empirical studies involving 1283 children revealed a small advantage in ToM for bilingual children over their monolingual peers (Cohen's d = 0.22, p = 0.05) (Schroeder, 2018). This study noted that bilingual children perform better in ToM than monolingual children at early ages, indicating that ToM is malleable and can be facilitated by a bilingual environment. There are three explanations for this advantage. One is based on the idea that bilingualism enhances development and strengthens executive functions (Bialystok, 2016; Carlson & Meltzoff, 2008) and that, in turn, executive functions predict ToM (Devine & Hughes, 2014), so that the presumed greater attentional control can be used to regulate one's mental states, that is, beliefs and knowledge. The second explanation follows the idea that bilingualism enhances metalinguistic awareness (Ben-Zeev, 1977; Bialystok, 1988) and that this is linked to the development of ToM (Doherty, 2000; Doherty & Perner, 1998). The fact that bilingual children understand that there are two ways, one in each language, to refer to the same concept may facilitate the understanding that two people may have a different mental state regarding the same event and, therefore, one that may differ from one's own mental state with respect to the same event. The third explanation is sociopragmatic, which holds that just as bilingual children come to understand at an early age that two people can speak either one or both languages, they transfer this notion to the idea that two people can have different or similar mental states. All three explanations predict an advantage of bilingual children in ToM, which has sometimes been supported by empirical studies. In the meta-analysis mentioned above, it is notable that when controlling statistically for the level of proficiency, the ToM advantage of bilingual children was found to be increased with respect to the initial analysis (Cohen's d = 0.58, p = 0.001), suggesting that ToM may be enhanced by bilingual experience.

The Study

In this study we focus on the relationship between ToM and oral and reading comprehension in a sample of bilingual children from third to fifth grade of elementary school. This study is carried out considering the previous literature precisely because ToM could be a skill to develop in bilingual elementary school students, given its possible relationship with reading and oral comprehension. With this study we seek to gain a more complete understanding of the relationship between ToM and the two types of comprehension in this population. However, our interest is not to demonstrate the advantage of ToM in bilingual children *in comparison* with monolingual children, but to provide empirical data to indicate whether ToM predicts oral comprehension and reading comprehension in emergent bilingual children. We aim to do this because of the importance of these academic skills for all students, but particularly for those who have specific difficulties with them, as is the case with most Spanish-speaking bilingual students in the United States. Two research questions therefore guided our study:

1. Can ToM explain variance in the English (second language) listening comprehension of emergent bilingual elementary school students when statistically controlling for grade, vocabulary, and word identification?

2. Can ToM explain variance in the English (second language) reading comprehension of emergent bilingual elementary school students when statistically controlling for grade, vocabulary, and word identification?

Given the exploratory nature of the study, which is pioneering in this area, we used vocabulary and word identification as control variables because of the prominent role they play in both types of comprehension. We controlled for grade, as ToM can vary between the ages corresponding to third grade (7-8 years of age) and fifth grade (10 years of age). We also chose to explore only the predictive level of ToM with respect to the two types of comprehension, leaving its potential mediating role for later studies. We believe that the early state of research on the topic in this population justifies our simple regression approach with each construct separately.

Method

Participants

Eighty-four emergent bilingual, Spanish- and English-speaking, Hispanic students in third through fifth grade from a suburban public elementary school with a high level of vulnerability, located in a state on the Atlantic coast of the United States, took part in the study. According to school records, more than 90% of the school's students were Hispanic and more than 90% received free meals, which is an indicator of low socioeconomic status. The sample was randomly selected from the 113 Spanish-speaking students in third to fifth grade at the school who were participating in a broader project on the development of reading among bilingual students. All of them reported that they spoke Spanish at home and their parents were native Spanish speakers. According to the school records, four of the participants had disabilities, but were able to participate in the assessments in the same way as the other students in the sample. Table 1 shows the demographic information.

Teaching of reading in the lower elementary grades included daily phonetic work and reading comprehension three days each week. While there was a greater emphasis on reading comprehension in the higher grades, comprehension strategies were a focus of the teaching in all grades. Fountas and Pinnell's (2007) A-Z reading level system was used, along with guided reading lessons. Students in the English for Speakers of Other Languages (ESOL) program received oral English instruction outside the classroom a minimum of three times per week.

Table 1
Demographic information of the sample.

Demographic information	Complete sample (n = 84) %
Grade	
3	38.1%
4	36.9%
5	25.0%
Gender	
Female	47.6%
Male	48.8%
Not reported	3.6%

Status in ESOL	
Active	73.8%
Graduated < 2 y	6%
Graduated > 2 y	10.7%
Assessed	6%
Not reported	3.6%
Language spoken	
Spanish and English	19.0%
Mostly Spanish	56.0%
Mostly English	10.7%
Only Spanish	11.9%
Not reported	2.4%
Reading language	
Spanish and English	7.1%
Mostly Spanish	2.4%
Mostly English	16.7%
Only Spanish	2.4%
Only English	69%
Not reported	2.4%

Note: The percentages do not add up to 100 due to rounding. Status in ESOL: Active = currently on the ESOL program; Graduated < 2 y = graduated within the last 2 academic years. Graduated > 2 y = graduated more than 2 academic years ago. Assessed = Assessed for the ESOL program and not considered eligible. Language spoken = language/s that the family of the student speaks at home. Reading language = language/s in which the student reads at home.

Procedures and measurements

Word identification

We used the letter-word identification subtest of the Woodcock-Johnson IV (WJ-IV) Tests of Achievement (Schrank, Mather, & McGrew, 2014). This requires students to individually read a list of English letters and words presented in writing. One point is assigned for each correct answer, with a total possible score of 78. The reliability of the original test, measured according to the split-half procedure, was within a range of 0.94 to 0.98 for students from 6 to 10 years of age (McGrew, LaForte, & Schrank, 2014).

Vocabulary

We used the Picture Vocabulary subtest of the WJ-IV battery (Schrank et al., 2014). Students have to name the pictures corresponding to objects in 54 items. The difficulty of the task increases during the test as the pictures become less familiar. One point is assigned for each correct answer, with a total possible score of 54. The reliability of the original test, measured according to the split-half method, was within a range of 0.77 to 0.78 for students from 6 to 10 years of age (McGrew et al., 2014). The internal consistency for this sample was 0.79.

Oral comprehension

In order to measure listening comprehension in English, we used the eponymous WJ-IV subtest (Schrank et al., 2014), and to measure listening comprehension in Spanish we used the eponymous *Pruebas de Aprovechamiento* subtest of the Woodcock-Muñoz battery (WMLS-R) (Schrank et al., 2005). In these tests, students listen to short passages and provide a missing word based on syntactic and semantic cues. The score is the total number of correct responses to 33 items. The reliability coefficients according to the split-half method for children of 6 to 10 years of age were in the range of 0.78 to 0.83 for the English test (McGrew et al., 2014) and 0.92 to 0.97 for the Spanish test (Schrank et al., 2005). In this sample, the internal consistency (Cronbach's alpha) was 0.77 for the test in English and 0.88 for the test in Spanish.

Reading comprehension

We used the passage comprehension subtest of the WJ-IV battery (Schrank et al., 2014) in English. The items increase in complexity as the test progresses and there are three types of them: associating an icon with a real image, identifying the image that represents an utterance composed of one to three words, and providing the missing word after silently reading short incomplete passages. One point is assigned for each correct answer, with the maximum score being 52 points. The reliability of the original test measured according to the split-half method was within a range of 0.89 to 0.98 for children from 6 to 10 years of age (McGrew et al., 2014). In this sample, the internal consistency was 0.93.

Theory of Mind (ToM)

We used the NEPSY-II subtest (Korkman, Kirk, & Kemp, 2007a), which measures performance associated with the ability to understand the intentions, beliefs, and perspectives of others, and the recognition of emotions via facial expressions. The verbal subscale contains 15 items that include listening to situations, 11 of them with pictorial support, and answering questions that involve knowledge of the point of view of another person. The contextual subscale includes six items that consist of observing images showing a social context and selecting the photograph that represents the emotion of the person in the image whose face is not visible. This test has a test-retest reliability of 0.77 for elementary school children (Korkman, Kirk, & Kemp, 2007b). Each item is worth 1 to 2 points and the score is the total number of points obtained. In this study, two of the items were excluded due to poor psychometric performance, resulting in a maximum score of 24 points. The reliability (Cronbach's alpha) for the final scale is 0.66.

Procedure

The students were assessed by a specialized team during the second half of the school year. All of the assessments were carried out in a low-noise room in the schools during a period of 75 to 90 minutes. The language and reading instruments were completed on the first day and the ToM assessment was carried out on the second day. The instructions were given in English, since this is the language of the school and the setting, with the exception of the listening comprehension test in Spanish. All of the participants had sufficient language proficiency to take part in the tasks given. The team of evaluators was trained in the administration procedures during four sessions. Prior to collecting the data, we obtained approval from the *Institutional Review Board*, as well as consent from the schools, parents, and teachers.

Results

Descriptive statistics

Table 2 shows the descriptive statistics and bivariate correlations for all of the variables used in the main analyses and for oral comprehension in Spanish. ToM showed slight to moderately significant correlations with all the other variables. It is clear that ToM showed a significant correlation with Spanish listening comprehension, $r(82) = 0.24$, $p = 0.03$, although not as strongly as with English listening comprehension, $r(82) = 0.46$, $p \leq 0.001$. Therefore, the main analysis focused on oral comprehension in English.

Table 2
Correlation matrix and descriptive statistics

	ToM	RC	OC-E	WI	V	OC-S	Gr
ToM	—						
RC	.49***	—					
OC-E	.46***	.51***	—				
WI	.36***	.82***	.36***	—			
V	.36***	.52***	.74***	.41***	—		
OC-S	.24*	.25*	.25*	.24*	.22*	—	
Gr	.34**	.29**	.34**	.32**	.33**	.32**	—
P	17.66	24.93	14.96	46.70	24.29	13.01	3.87
SD	3.39	4.51	3.51	8.81	3.90	5.51	.79

Note: ToM = Theory of Mind; RC = English reading comprehension; OC-E = English oral comprehension; WI = word identification; V = vocabulary; OC-S = Spanish oral comprehension; Gr = Grade.

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Relationship between ToM and listening comprehension

In order to address our two research questions, we used a hierarchical linear regression. For the first research question, with listening comprehension as the dependent variable, we entered the independent variables in three stages. Stage 1 consisted of grade, stage 2 incorporated word identification and vocabulary, and stage 3, all of these variables plus ToM (Table 3). This analysis showed that ToM significantly predicted oral comprehension, after controlling for grade, word identification and vocabulary, = 0.21, $p = 0.01$ (see Table 3, Model 3). Vocabulary was also a significant predictor in Model 2 and Model 3, while grade was only significant when entered alone in Model 1. Word identification was not a significant predictor in these analyses. ToM added 3% to the predicted variance in listening comprehension over the three control variables, with the four predictors together explaining 59% of the variance in listening comprehension.

Table 3
Prediction of oral comprehension in English

Model	Independent variable	β				R^2	ΔR^2	dfs	ΔF
		Gr	WI	V	ToM				
1	Gr	.34**				.11	.11	1, 82	10.60**
2	Gr + WI + V	.10	.05	.69***		.56	.44	2, 80	39.81***
3	Gr + WI + V + ToM	.05	.01	.64***	.21*	.59	.03	1, 79	6.52*

Note: Gr = grade; WI = word identification; V = vocabulary; ToM = Theory of Mind.

* $p \le .05$; ** $p \le .01$; *** $p \le .001$.

Relationship between ToM and reading comprehension

The regression analysis for the second research question was constructed in a similar fashion, but with reading comprehension as the dependent variable (Table 4). ToM significantly predicted reading comprehension, controlling for grade, word identification, and vocabulary, = 0.19, p = 0.004 (see Table 4, Model 3). Word identification and vocabulary were also significant predictors in Model 2 and Model 3, while grade was significant only when entered alone in Model 1. ToM added 3% to the predicted variance in reading comprehension over the three control variables, with the four predictors together explaining 75% of the variance in reading comprehension.

Table 4
Prediction of reading comprehension in English

Model	Independent variable	β				R^2	ΔR^2	dfs	ΔF
		Gr	WI	V	ToM				
1	Gr	.29**				.08	.08	1, 82	7.47**
2	Gr + WI + V	-.02	.74***	.23***		.72	.64	2, 80	90.36***
3	Gr + WI + V + ToM	-.06	.70***	.19**	.19**	.75	.03	1, 79	8.77**

Note: Gr = grade; WI = word identification; V = vocabulary; ToM = Theory of Mind.

* $p \le .05$; ** $p \le .01$; *** $p \le .001$.

Discussion

This study examined the contribution of ToM to oral comprehension and reading comprehension with two standardized instruments in emergent bilingual Spanish-speaking students in elementary school grades in the United States. The analysis of this population makes this study one of the first to establish a relationship between ToM and comprehension variables in emergent bilingual children. The results of the study also showed that, like vocabulary, ToM was a significant predictor of English listening comprehension, explaining 3% of its variance after controlling for grade, vocabulary, and word identification. The model as a whole explained 59% of the variance in listening comprehension. Similarly, we found that, like vocabulary and word identification, ToM was a significant predictor of reading comprehension in English, explaining 3% of its variance after controlling

for the same variables. The model as a whole explained 75% of the variance in reading comprehension. On one hand, these findings are relevant in a broad framework due to the role that socio-cognitive skills such as ToM play in education and reading development. Studying these skills in bilingual populations, where they have been identified as an advantage over monolingual populations (Schroeder, 2018), enables us to consider the role of ToM in strengthening the academic and psychosocial performance of readers in training. Specifically, bilingual Spanish-speaking students tend to have difficulties that are related to reading comprehension, so the possibility of using their advantage in skills such as ToM to improve their reading performance requires further exploration. On the other hand, these results should be considered within a limited horizon, given that the proportion of variance explained exclusively by ToM was only 3% in both constructs, meaning there is room for numerous interpretations regarding these relationships.

Prediction of oral comprehension

The results of this study support and are consistent with those of Pelletier and Beatty (2015) in the sense that ToM contributed to oral comprehension going beyond vocabulary and one indicator of reading ability (word identification), with vocabulary contributing significantly, but word identification not doing so. This study also extends these findings, which were focused on children of 4 and 5 years of age, to older students in elementary school. Pelletier and Beatty (2015) also used a sample in which 60% of the children spoke a variety of first languages in addition to English, but few of them were Spanish speakers, so this study provides evidence regarding the role that ToM plays in the oral comprehension of Spanish speakers who are learning English as the language of their environment, which is different from the language used in the home.

In particular, our study differs from that of Pelletier and Beatty (2015) in terms of the types of measures used, which can be considered bearing in mind the limited amount of variance explained by ToM in our findings. Specifically, we used word identification as a control variable, whereas Pelletier and Beatty (2015) used an instrument that assesses pre-literacy concepts, knowledge of the alphabet, and comprehension of basic meaning. Furthermore, in this study we used a broader measure for oral comprehension than Pelletier and Beatty (2015), who focused on comprehension of narratives, specifically fables. We also considered more general measures of ToM that are not categorized into first- or second-order belief tasks, but instead involve skills associated with the ability to understand the intentions, beliefs, and perspectives of others and with interpreting emotions through facial expressions. Pelletier and Beatty (2015) instead used separate first- and second-order measures of ToM and found that only second-order ToM was a significant unique predictor. Nevertheless, it is possible that our measure of ToM explains the limited (3%), albeit statistically significant, variance in the two constructs of interest: listening comprehension and reading comprehension. It is possible that if our comprehension instruments had been more in line with the ToM measure used by these authors, or if it had included a strong inferential component regarding behaviors in social situations that require reading intentions or interpreting facial expressions, the predicted variance explained by ToM in these constructs may have been higher. For example, in the story *Dear Juno* by Soyung Pak (2001), a boy called Juno communicates with his grandmother in Korea through a series of drawings, while she uses letters, pictures, and toys to respond to him so that he can understand what she means. In these types of stories, themes of communication, linguistic and cultural diversity, and relational skills are reinforced, all of which are important components in ToM as a socio-cognitive construct. A measure of comprehension that takes these dimensions into account may have increased the correlation and thus the prediction of ToM, as the specific skills shared by the predictor and the predicted construct would have been more closely aligned.

In addition to the above, our results contrast with those of Strasser and del Río (2014), who found that ToM did not contribute to story comprehension in Chilean preschool children. However, these researchers used various predictors in addition to those studied here, including three measures of executive functions, as well as comprehension monitoring, inference, and breadth and depth of vocabulary, and did not include measures of reading. Nevertheless, they found positive but weak correlations in significance between ToM and their measures of story comprehension (0.18 and 0.21, respectively). The differences with our results could be due to the inclusion in Strasser and del Río's (2014) study of three executive functions and comprehension skills (such as comprehension monitoring and inferential ability), all cognitive skills that are either key components of oral and written language (e.g., Cain & Oakhill, 2007) or strong predictors of oral comprehension and reading comprehension in both monolingual and bilingual students from first to fourth grade (see, Taboada Barber, Klauda, & Stapleton, 2020a; Taboada Barber et al. , 2020b). This configuration of predictors leaves minimal room for the predictive role of socio-cognitive variables and those that are more detached from comprehension like ToM, as is feasible to have been the case in Strasser and del Río's (2014) study.

Prediction of reading comprehension

This study builds on previous work that found a positive correlation between ToM and reading comprehension in Spanish-speaking elementary school students in Chile (Ramos & Crespo, 2008) by controlling for factors not previously considered, such as word identification and vocabulary, which are key variables contributing to reading comprehension, as well as the grade. In addition, the results of this study extend those from previous studies conducted with monolingual English-speaking elementary school students (Atkison et al., 2017; Guajardo & Cartwright, 2016), since they indicate that, in the case of Spanish speakers who are emergent bilinguals, the predictive relationships between ToM and reading comprehension exist in their second language (English), even when controlling for strong predictors of reading, such as decoding and vocabulary in the second language. Taking into account the advantage that preliminary studies show with respect to ToM in bilingual students, a possibility emerges to explore its possible role as an enhancer of other skills related to the academic development of this population. This possibility is that ToM could be used as an asset, enabling us to move away from the learning deficit model that is often associated with this population.

It is informative to take these findings into consideration in light of other studies focused on the role of ToM in conjunction with a range of socio-cognitive and general variables, such as executive functions, in European or European-American children (Atkinson et al., 2017; Boerma et al., 2017; Ebert, 2020; Guajardo & Cartwright, 2016; Kim, 2020a). For example, the aforementioned study by Guajardo and Cartwright (2016) involved a longitudinal examination of the role of ToM in reading comprehension among primarily monolingual preschool and elementary school children in the United States. They found that ToM as a second-order false belief and reading comprehension, measured concurrently, had a positive correlation ($r = 0.55$) in middle childhood. However, none of the ToM variables contributed uniquely to reading comprehension when the executive function of cognitive flexibility was included in their analysis, again suggesting a predominant role of these cognitive functions, and reducing the possibility of contribution or explanation of variance for ToM when these functions are included in regression models. This was confirmed by the authors through an analysis that produced evidence that cognitive flexibility may be masking the contribution of ToM to reading comprehension in middle childhood. In their analysis, ToM uniquely accounted for 14% of the variance in reading comprehension when including several controls (age, maternal education, vocabulary, decoding) and excluding cognitive flexibility.

Ebert (2020) also examined the role of ToM at multiple points in time among German children of 3 to 13 years of age and found that, in complex, multivariate models, ToM only contributed to reading comprehension indirectly through oral comprehension when her participants were young adolescents. It is likely that if we had

included oral comprehension as a control variable in this study, the prediction of ToM in reading comprehension would have been highly reduced or would have disappeared. However, our objective was not to consider the role of ToM with oral comprehension as a mediating variable, but simply to observe the relationship of ToM with each of these constructs separately. Again, we believe that, given the preliminary state of ToM research in emergent bilingual learners, starting with a regression analysis that distinguishes the relationships between ToM and each construct of interest is a positive first step. In addition to this reasoning, we can add the fact that mediation methodologists argue that analyses of mediating variables should not be merely an empirical exploration, but instead, just as SEM models are based on a prior conceptual or theoretical model, it is necessary to at least have an adequate hypothesis or theoretical framework as a basis for the mechanism of mediation between three variables (Curran & Hancock, 2020). Thus, since this is a new set of relationships between variables in a population that had not been studied previously, we opted for a regression analysis that considers the constructs of interest independently rather than a mediation model.

Future studies

Given that this research addresses a new domain in the study of reading and education among bilingual students, future investigation could involve various alternatives. One of these is the measurement of ToM between the languages of the children's home environment or first language and their academic outcomes. In this study we did not have these variables, which precluded such an analysis. A second option would be to compare the role of ToM in emergent bilingual children and those who are fully bilingual (balanced bilinguals), since its role could be more conspicuous in balanced bilinguals, considering that they tend to have more developed literacy in both languages. This idea would be commensurate with that of Kim (2020a), who found that ToM was a greater contributor to reading comprehension in fourth grade than in second grade, suggesting that, with greater language development (in Kim's case due to age rather than language proficiency), ToM may become more important for comprehension when both the first and second languages are more equally developed. A third option to consider is the role of executive functions and ToM in bilinguals. Although we did not explore this aspect in our study, the evidence of the advantage in executive functions observed in bilinguals suggests that this may be a dimension of interest in linguistic research. The results of previous studies indicate that a constellation of executive functions must be considered in order to avoid minimizing the possible contribution of ToM. Given the increase in empirical studies focused on executive functions and their role in the reading comprehension of emergent bilinguals (Taboada Barber et al., 2020a; Taboada Barber et al., 2020b; Kieffer, Mancilla-Martínez, & Logan, 2021), considering their role with regard to ToM would present a number of interesting predictions in order to attain a more complete understanding of reading comprehension in emergent bilinguals.

Conclusion

The growing linguistic diversity of educational contexts presents new challenges for both researchers and pedagogical actors in schools to respond to the specific demands of students in their learning. In the field of literacy, a variety of factors and constructs have an effect on the development of oral comprehension and reading comprehension. As our results show, ToM is one of them, so it is important to identify and design didactic strategies that promote this socio-cognitive skill, as well as to explore the mechanisms through which one can take advantage of the ToM advantage of emergent bilingual students, who are in particular need of a pedagogical approach that is disassociated from a deficit model. Along with these practical implications, our findings also

emphasize the importance of developing pedagogical frameworks for the integration of the various dimensions of development and invite us to review the extent to which the curricular instruments available to teachers incorporate social-cognitive skills as part of students' linguistic development.

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