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The Development of Theory of Mind and Inhibitory Processing Among 7-11 Year Old Mexican and Mexican American Children

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THE DEVELOPMENT OF THEORY OF MIND AND INHIBITORY PROCESSING AMONG 7-11 YEAR OLD MEXICAN AND MEXICAN AMERICAN CHILDREN

A Thesis

by

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ABSTRACT

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The present study examined the relationships among demographic factors and aspects of social and cognitive development in 130 predominantly bilingual Mexican and Mexican-American 7-to-11-year-old children residing in Mexico and the United States. Measures assessed children's WMLS-R Picture Vocabulary, inhibitory processing, visual-spatial problem solving, and theory of mind development. Demographic information was obtained from parents. Intercorrelations among age, WMLS-R Picture Vocabulary , inhibitory processing, visual-spatial problem solving, and theory of mind (ToM) revealed that ToM related to inhibitory processing, but not with visual-spatial problem solving skills, after controlling for age. Findings suggest that cultural and other individual factors might play an important role in social and cognitive development.

DEDICATION

I dedicate the completion of my master's thesis to my husband Roberto Perez and to my two beautiful daughters, Sarah and Sophia Perez Kuri. It is because of their unconditional love and support that I was able to achieve this goal. They spent countless hours away from me even though they knew it broke my heart and theirs. Nevertheless, they did not complain once because they know how passionate I am about this. I want to lead them with my example and to make them proud. I want to show them that with enough passion, dedication, and motivation everything is possible. I love them to infinity and beyond.

I must also give thanks to my mother. I am who I am today in great part thanks to her. She made sure I got the best upbringing and education as a child and made many sacrifices to ensure it. Through hardship and disappointment, she never stopped believing in me, and in my ability to accomplish great things. She is an exceptional mother. Thank you mom, I love you so much.

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I am also very thankful to my two thesis committee members Dr. Philip Gasquoine, and Dr. Francisco Guajardo. It was through their dedication, knowledge, and passion that they motivated me to move forward and to not give up.

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INTRODUCTION

Over half of the world's population is considered bilingual (Baker, 2007). In the U.S. alone, 8.7 percent of the population in 2002-2003 and 9.1 percent of the population in 2011-2012 were considered bilingual. In 2011-2012, this amounted to a total of 4.4 million public school students (U.S. Department of Education, National Center for Education Statistics, 2014). English/Spanish students are the majority of bilingual students in the U.S. (Rhodes, Ochoa, & Ortiz, 2005). Consequently, it is important to understand the developmental processes underlying cognitive advances in this understudied population of learners.

Researchers have found that in comparison to monolingual children, bilingual children exhibit advantages on some assessments of executive functioning (e.g., Barac & Bialystok, 2012; Costa, Hernández, & Sebastián-Gallés, 2008). Specifically, it has been found that bilingual children possess an advantage over monolinguals in inhibitory skills, a component of executive functioning (Bialystok, 2017) . However, not all research on cognitive development among bilinguals finds an advantage. Some researchers have failed to find a bilingual advantage in inhibitory skills using the Stroop task (Kousaie & Phillips, 2012). These discrepancies might depend on the degree of bilingualism, that is, whether participants are balanced across both languages (Roselli, Ardila, Jurado, & Salvatierra, 2014) or have more proficiency in one over the other, hereafter referred to as language-dominant individuals. Language switching is one reason thought to underlie the improved performance of bilinguals compared to their monolingual peers

on tasks that require inhibitory skills (Bialystok, 1999). As bilinguals use one language, they must inhibit the other, resulting in improved cognitive control, i.e., increased selective attention and conflict resolution (Sabourin, Vīnerte, & García Mayo, 2015) such as that measured by the Stroop task (Poulin-Dubois, 2011; Stroop, 1935). One version of this task requires participants to inhibit the word (red, blue, green) as the participant reports the color of ink in which it was written.

Another advantage that bilingual children exhibit over monolinguals is in their ability "… to understand others' desires and intentions that can be different from one's own" (Kobayashi, Glover, & Temple, 2008, p. 62). That is, bilingual children exhibit better Theory of Mind (ToM) compared to monolinguals. It is important to understand which executive skills are associated with ToM development. Inhibition is one of the components that underlie ToM development. It has been found that inhibition, which is a component of executive function, is strongly associated with ToM development (Carslon, Moses, & Claxton, 2004).

Unlike executive functions, in comparison to monolinguals, bilinguals perform more poorly on language-format tasks (Gasquoine & Gonzalez, 2012). Some have proposed that this is due to retrieval problems (Gollan & Acenas, 2004) or semantic fluency problems (Rosselli, Ardila, Jurado, & Salvatierra, 2014), but the most popular explanation for lower language-format test scores by bilinguals vs. monolinguals is that parallel activation of both languages causes inter language interference thereby slowing processing time and increasing the possibility of errors (Green, 1998).

Thus, identifying the mechanisms and circumstances underlying when bilinguals will outperform monolinguals and on which cognitive tasks is a complex research endeavor. In the past, researchers of this topic have faced many challenges. In particular, some studies have been

criticized for failing to measure participants' language skills, selecting non-representational samples of the bilingual population, or failing to consider the sociocultural processes that affect language acquisition (Gasquoine, 2016). Further research is clearly needed to gain more insight about the processes underlying bilingual children's development.

To gain more insight into this area of research, cross-cultural studies on English/Spanish bilingualism could be valuable. The majority of scientific studies that focus on social cognitive development among bilinguals have not compared Mexican and Mexican-American samples. An extensive literature search through Psych Info, Google Scholar, and other sites that publish peer reviewed scientific articles, produced no results on cross-cultural bilingual studies with Mexican and Mexican American samples. Overall, it is widely known that English/Spanish bilinguals perform differently on these tasks than monolinguals, but there are no comparative studies using Mexican bilingual samples. It might be that students who are encouraged within their school system to value bilingualism perform differently on assessments as compared to bilinguals in a less-affirming cultural context. Most schools in the US that teach Hispanic children instruct only in English, but it has been found that "…their Spanish skills may provide essential scaffolding for building English knowledge" (Palermo, Mikulski, Fabes, Martin, & Hanish, 2015, p. 2). There also are many practical reasons to investigate bilingual Mexican-American children's development. For example, most standardized tests of children's academic performance, used within the school system, rely on the use of verbal skills. For example, the State of Texas Assessments of Academic Readiness (STAAR), the Graduate Record Examination (GRE), and the Scholastic Assessment Test (SAT) are all standardized tests used as important criteria to determine academic proficiency and eligibility to attend college and graduate school. These tests might be biased against bilingual students who perform more poorly

on them than monolinguals, yet as a group, they do "…not subsequently exhibit inferior achievement" (Mupinga & Mupinga, 2005, p. 404). Thus, the study of bilingualism and its effects are important as seen from language, developmental, and educational perspectives because even though bilinguals seem to exhibit these different cognitive advantages, English/Spanish bilingual students in the U.S. lag behind their monolingual peers academically (Gibson, 2011).

Purpose

Studies focused on investigating the underlying social and cognitive processes of bilingual children's development have not compared samples from the US and Mexico, which will allow for the sociocultural context of bilingual children's social cognitive development to be examined. The present study had three goals:

1) First, to examine the interrelations among age, WMLS-R picture vocabulary in English and Spanish, inhibitory processing (measured via the Stroop test), visual-perceptual skills (measured via a Matrix Reasoning subtest), and theory of mind development among Mexican and Mexican-American bilingual children. It was expected that ToM and Stroop scores will be significantly correlated. It also was expected that the two groups score comparably on Matrix Reasoning, a visual-perceptual task.
2) Second, to compare balanced and language-dominant bilinguals on assessments of WMLS-R Picture Vocabulary in English and Spanish, visual-perceptual skills, inhibitory processing, and theory of mind reasoning. It was hypothesized that balanced bilingual children would outperform language dominant children on

inhibitory processing and theory of mind reasoning as they involve inhibitory processes.

3) Third, to compare mean group performance between Mexican and Mexican-American children on WMLS-R Picture Vocabulary in English and Spanish, visual-perceptual problem-solving skills, inhibitory processing, and theory of mind. Given the importance of the cultural context, it was expected that Mexican children were going to have a significantly higher mean on WMLS-R Picture Vocabulary Spanish, as compared to Mexican-American children, who were expected to have significantly higher scores on WMLS-R Picture Vocabulary English. Also, Mexican balanced bilinguals were expected to perform better on measures of inhibitory processing and theory of mind compared to balanced bilinguals in the US.

CHAPTER II

METHOD

Participants and Recruitment

Participants recruited to participate included 130 children (60 boys, 70 girls) ages 7-11 years. Participants were required to pass at least nine control questions on the 12 ToM stories. Participants who failed more than 9 control questions were excluded from the study. Therefore, four participants were excluded from the study. All participants were of Mexican or Mexican-American descent, and approximately half (42%) were residents of Mexico and half of the U.S (58%). Teachers at the different schools in the US and Mexico were asked to identify students who were bilingual at any level of proficiency. The research team consisted of graduate and undergraduate research assistants who visited one elementary private school in Puebla, Mexico and three elementary private schools in the United States. When asked to complete a "write-in" response about ethnicity, parents most often omitted these data (i.e., 52% of cases had missing data on mother's ethnicity and 53% for father's ethnicity). However, of those who responded, children's parents predominantly self-identified as Hispanic (94% of mothers and 89% of fathers). Of those who reported country of birth, in the Mexican sample, 91% were born in Mexico, while of the US sample, 61% were born in the US. Other demographic data were also obtained on parental educational level and total household income. Parents were asked to

indicate their highest educational level coded as 0= elementary/middle, 1= high school, 1.5= vocational/technical, 2= bachelor's, 3= master's, 4=doctorate's (Figures 2 and 3). Parents were also asked to select their income level in dollars coded as 1 = less than $10,000, 2 = $10,000-$20,000, 3 = $20,000-$30,000, 4 = $30,000-$40,000, 5 = $40,000-$50,000, 6 = $50,000-$60,000, 7 = $60,000-$70,000, 8 = over $70,000. The mean household income for the whole sample was 5.73, which falls on the 50,000 to 60,000 dollar range (Figure 3). Participants were selected from one large bilingual private school in Mexico and three smaller bilingual private schools in the US. All schools had similar educational curricula and were bilingual. Classes were instructed in both English and Spanish and a lot of effort and resources were utilized in helping the children become biliterate in both languages. However, the school in Mexico was non-religious, while the three schools in the US were religious and incorporated daily religious educational components in their curricula. The school in Mexico consisted of a student population of about 700 students, and each of the schools in the US consisted of a student population of about 400 students.

Figure 1. *Percentage of Father's Education*

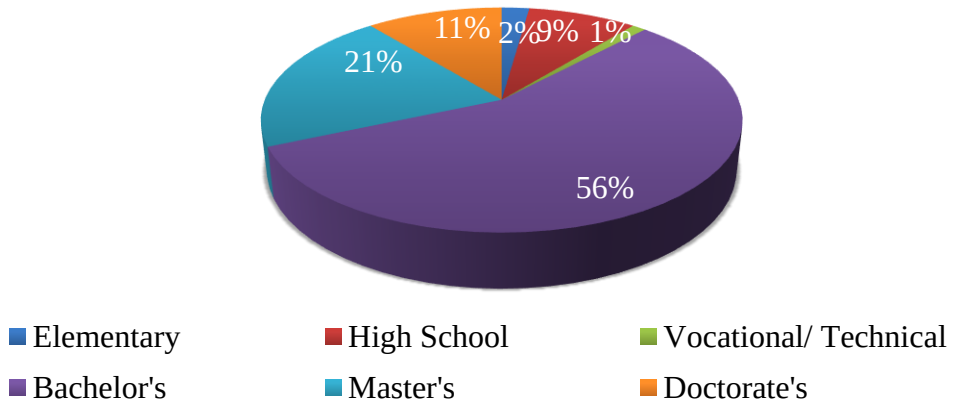


Figure 2. *Percentage of Mother's Education*

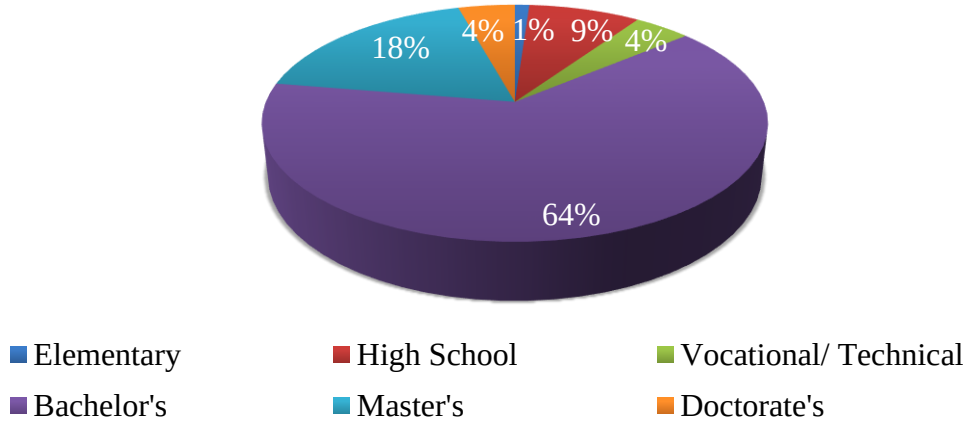
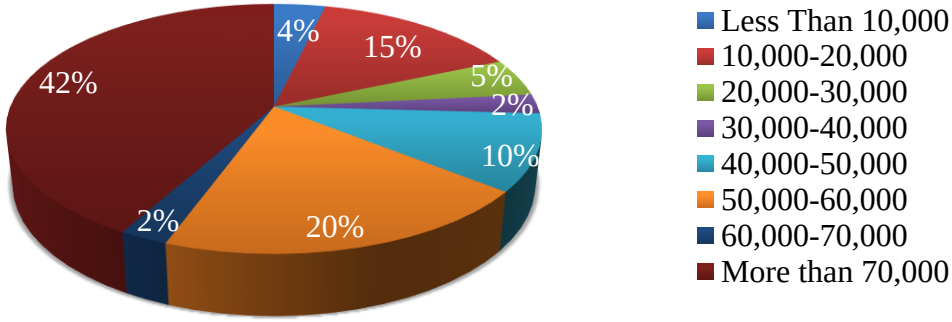


Figure 3. *Percentage of Yearly Total Income Dollar/Pesos*



Measures and Procedures

Teachers at the school distributed packets to the children containing the informed consent for parents and the participant assent, as well as a demographic survey. All packets contained English and Spanish forms. The English survey was translated into Spanish by native Spanish

speaking translators. The translation process was adapted from Bullinger et al. (1998). It was conducted by performing forward and backward translations of the original U.S. questionnaires into Spanish by speakers who were fluent in both English and Spanish. Teachers at the school collected the completed packets and returned them to the research team.

Demographic Information Survey

The children's parents completed a demographic form indicating their income and educational level. The survey also included questions about the participant's age and gender as well as the participant's preferred receptive and expressive languages, country of birth, country of residence, number of siblings between the ages of 3 an 13, and age of second language acquisition (Appendix A).

WMLS-R Picture Vocabulary

Spanish and English language proficiency were measured using the WMLS-R Picture Vocabulary subtest scores from the Woodcock-Munoz Language Survey–Revised (Woodcock, Munoz-Sandoval, Ruef, & Alvarado, 2005). To determine the participant's language dominance (i.e., if he or she were more proficient in English, Spanish, or had a balanced level of proficiency in each), difference scores were created for each participant. This was done by subtracting the English from the Spanish language WMLS-R Picture Vocabulary score. The sample was then divided into three groups based on the overall difference scores established a priori: Spanish-dominant (>10); balanced bilinguals (–10 to+10); and English-dominant (>–10). These cutoffs have been used successfully to form groups that differed significantly on language-based tests (e.g., Weimer & Gasquoine, 2016), though there is no consensus among researchers about which values should be used for separating balanced bilingual vs. language dominant groupings

(Takakuwa, 2005). Subsequent tests were administered in the participant's dominant language. Or if the English and Spanish scores differed by one or two points, the participant was allowed to choose the language of assessment.

Means and standard deviations for the demographic variables of participant's age, mother's level of education, father's level of education, yearly household income for each language group are shown in Table 1. A 3 Language Group X 4 Demographic Variable repeated measures analysis of variance (ANOVA) found the main effect of language group was significant, F_{group} (2, 70) = 15.40, $p < .05$, $\eta^2_p = .31$. Post hoc pairwise comparisons, using the Bonferoni correction, revealed that the groups did not differ on participant's age, mother's level of education, nor father's level of education; however, the groups significantly differed on WMLS-R Picture Vocabulary in English and Spanish, and yearly household income. Interestingly, the Spanish-dominant language group's score differed greatly between English and Spanish. The Spanish-dominant group's income was significantly lower.

Table 1. *Means and Standard Deviations for Children's Age, Parental Education, and Yearly Household Income by Language Group*

Variable	Language group									Total	
	English-dominant			Balanced Bilingual			Spanish-dominant				
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*M*	*SD*
Participant's Age (years)	35	9.26	1.17	23	9.04	1.22	67	8.96	1.34	9.06	1.27
Mother's Education	28	2.30	0.79	11	1.82	0.75	55	2.12	0.61	2.13	0.68
Father's Education	27	2.44	1.12	11	2.00	0.77	54	2.27	0.72	2.28	0.86
Yearly Income dollar/pesos	27	7.48	1.65	8	7.13	1.36	46	4.57	2.16	5.79	2.38
English Vocabulary	36	101.94	8.56	23	91.91	8.71	67	53.76	22.00	74.49	20.15
Spanish Vocabulary	36	70.92	19.92	23	93.30	8.58	67	117.87	10.88	99.97	24.68
Stroop	36	30.54	8.51	23	27.88	7.52	66	29.53	5.98	29.52	7.07
Matrix Reasoning	35	10.43	2.62	23	9.74	2.20	65	10.88	3.05	10.54	2.80
Theory of Mind	33	1.78	0.18	23	1.65	0.24	62	1.80	0.18	1.7	0.19

Note: There were significant differences among groups on income and WMLS-R Picture Vocabulary English and Spanish.

Inhibitory Skills

The Stroop Interference Test, originally developed by Stroop (1935), measures selective attention and cognitive flexibility. It provides a measure of an individual's cognitive inhibition skills. It has been widely used to screen for brain damage in suspected cases. It has been translated into several languages (Homack & Riccio, 2004). The Spanish version used here is from La Batería Neuropsicológica (Artiola i Fortuny, Hermosillo, Heaton, & Pardee, 1999) and the English version on which it was based.

Executive Functioning

The Matrix Reasoning is a subtest of the Wechsler Intelligence Scale for Children IV (WISC-IV; Wechsler, 2003) and the Spanish version on which it was based (WISC-IV; Wechsler, 2005).It consists of items that require visual-perceptual sameness, symmetry, and analogy problems.

Theory of Mind

The ToM task consists of the "Strange Stories" originally created by Happé (1994). The task is comprised by 12 stories that are used to measure children's ToM abilities (Appendix B). They have been widely used and exemplify diverse mental states (e.g., lie, joke, sarcasm). This task consisted of a control question and a justification question (Appendix B). Responses to control question were coded as pass or fail, 0 = fail and 1 = pass. Responses to the justification questions were coded as 2- when they consisted of a mental state response involving thoughts, feelings, and desires such as "he did not want to hurt his aunt's feelings". Responses coded as 1- consisted of partial mental state responses such as "he did not like the hat". Responses that were incorrect were coded as 0 – and consisted of responses that were inappropriate or mistaken about

the facts of the story such as “because he likes her hat”. The final scores ranged from 0-24 for the justification questions. The rater agreement was good with a kappa of .71.

CHAPTER III

RESULTS

Independent sample *t*-tests were conducted to explore for gender differences in all variables. No gender differences were found. Thus, the data were collapsed across gender for all subsequent analyses.

To address the first goal of the study, intercorrelations among age, WMLS-R Picture Vocabulary in English and Spanish, inhibitory processing (measured via the Stroop test), visual-perceptual skills (measured via a Matrix Reasoning subtest), and theory of mind development among Mexican and Mexican-American bilingual children were computed and are reported in Table 2. Of interest, ToM was positively and significantly correlated with age, r (117) = .32, p < .01, and Stroop performance, r (117) = .21, p < .05. Age was also correlated negatively with Matrix Reasoning r (117) = -.27, p < .05 and positively with Stroop r (117) = .34, p < .05. Also, WMLS-R Picture Vocabulary in English correlated positively with income r (117) = .54, p < .05, and WMLS-R Picture Vocabulary in Spanish correlated negatively with income r (117) = .38, p < .05. Finally, income correlated positively with mother's education r (117) = .31, p < .05 and with father's education r (117) = .33, p < .05.

Table 2. *Intercorrelations among Age, WMLS-R Picture Vocabulary in English and Spanish, Stroop, Matrix Reasoning, and Theory of Mind Scores*

	1	2	3	4	5	6	7	8	9
1. Age	-	.15	-.13	.08	-.16	-.02	.34**	-.27**	.32**
2. Vocabulary English		-	-.70**	.54**	.19	.06	.13	-.06	-.06
3. Vocabulary Spanish			-	-.38**	-.05	-.14	-.09	.08	.09
4. Income				-	.31**	.33**	.02	.08	-.01
5. Mother's Education					-	.32**	.05	.10	.04
6. Father's Education						-	-.02	-.04	.02
7. Stroop							-	-.06	.21*
8. Matrix Reasoning								-	.10
9. ToM									-

**. Correlation is significant at $p \geq 0.01$ level (2-tailed).

*. Correlation is significant at $p \leq 0.05$ level (2-tailed).

Given that there were no zero-order correlations among vocabulary scores and any cognitive test, a correlational analysis examined the relationship among Stroop, Matrix Reasoning, and ToM scores, after controlling for age, but not vocabulary. After controlling for age, the pattern of relations among the variables changed, such that ToM was no longer significantly associated with Stroop performance, but was significantly related to Matrix Reasoning, r (112) = .18, $p \geq .05$. These are shown in Table 3.

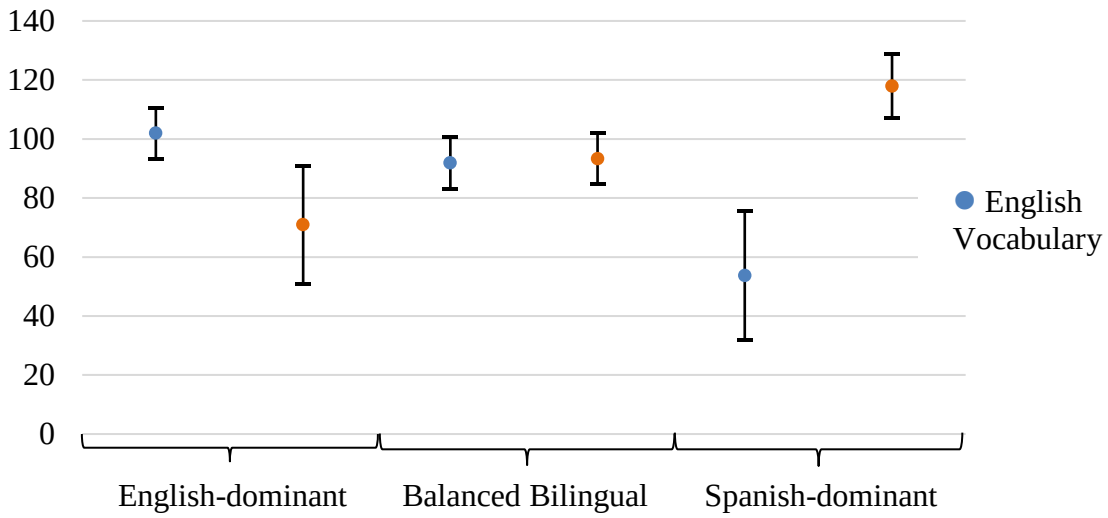
Table 3. *Intercorrelations Among Stroop, Matrix Reasoning, and Theory of Mind Scores, After Controlling for Age*

	1	2	3
1. Stroop	-	.06	.11
2. Matrix Reasoning		-	.18*
3. Theory of Mind			-

*. Correlation is significant at $p \geq .05$ level (2-tailed).

To address study goal 2, the balanced and language-dominant bilinguals were first compared on assessments of vocabulary. A repeated measures MANOVA comparing the three language groups on WMLS-R Picture Vocabulary in English and Spanish was significant, $F(2,126) = 4.25$, $p < .05$,. $\eta^2_p = .06$. Post hoc univariate analyses to compare the groups on WMLS-R Picture Vocabulary scores, using the Bonferoni correction, revealed that the mean of the English-dominant group ($M_{adj} = 101.94$, $SE = 2.86$) was significantly higher from the Spanish-dominant group ($M_{adj} = 53.76$, $SE = 2.10$), but not significantly different from the balanced bilinguals ($M_{adj} = 93.30$, $SE = 2.87$). Post hoc univariate analyses to compare the groups on, WMLS-R Picture Vocabulary scores using the Bonferoni correction, revealed that the Spanish-dominant group ($M_{adj} = 117.87$, $SE = 1.68$) was significantly higher than both the balanced bilingual group ($M_{adj} = 93.30$, $SE = 2.87$) and the English-dominant group ($M_{adj} = 70.92$, $SE = 2.29$), which were also significantly different from each other (Figure 4).

Figure 4. *WMLS-R Picture Vocabulary in English and Spanish by Language Groups*



Next, a repeated measures MANOVA was conducted to compare the groups on visual-perceptual skills, inhibitory processing, and theory of mind reasoning. The omnibus *F* test was significant, $F = 1243.62$, $p < .001$, $\eta^2_p = .96$; however tests of between subjects effects revealed that there were no significant differences between the groups, $F\ (2, 112) = 1.43$, $p = .24$, $\eta^2_p = .03$.

Study goal 3 was to compare mean group performance between Mexican and Mexican-American children on WMLS-R Picture Vocabulary in English and Spanish, visual-perceptual skills, inhibitory processing, and theory of mind. A crosstabulation was conducted to examine the number of children in each language group by country. These values are reported in Table 4. Given that there were no English-dominant or balanced bilinguals in the Mexican group, the groups could not be compared in this manner.

Table 4. *Number of Children in Each Language Group by Country*

Country	Language group			Total
	English-Dominant	Balanced Bilingual	Spanish-Dominant	
Mexico	0	0	52	52
USA	36	23	15	74
Total	36	23	67	126

CHAPTER IV

DISCUSSION

The present study makes several contributions to the literature on theory of mind development and inhibitory processing among bilinguals. The first goal was to examine the interrelations among age, WMLS-R Picture Vocabulary in English and Spanish, inhibitory processing (measured via the Stroop test), visual-perceptual skills (measured via a Matrix Reasoning subtest), and theory of mind development among Mexican and Mexican-American bilingual children. Though it was expected that Stroop, Matrix Reasoning, and ToM would be interrelated, independently of age and vocabulary, this hypothesis was only partially supported such that ToM related to Stroop, but not Matrix when age was not partialed out; but ToM related to Matrix Reasoning and not Stroop, after controlling for age. Thus, after controlling for age, ToM related with the visual perceptual problem solving, but not with the inhibitory processing. Past research has found that ToM relates to inhibitory processing even after controlling for age and language (Carslon et al., 2004). While the differences across studies could be due to differences in task and therefore need to be replicated, there is the possibility that relations among these variables differ among bilinguals to consider.

This finding could have important implications about the development of ToM. While some accounts describe ToM development as biologically-based (e.g., Scholl & Leslie, 1999), others suggest that family, social, and environmental influences influence ToM development (Shahaeian, Peterson, Slaughter, & Wellman, 2011; Wellman, 2014). Given that inhibitory

processing did not independently relate to ToM beyond age, there is support for these theories that claim that inhibitory processing is not enough to explain ToM development, and suggest that the roles of social, cultural, and environmental factors are influential. Further research should explore cultural factors in ToM development.

Another possible reason for cross-study discrepancies is that the present study tested older children using an advanced ToM measure (Happé, 1994). This measure assesses higher order thinking that requires more sophisticated cognitive processing such as the ability to analyze, evaluate, understand and remember when compared with false belief tasks (Wimmer & Perner, 1983) that are less cognitively demanding. It has also been argued that "…advanced ToM requires a more complex understanding of emotions" (Qualter, Barlow, & Stylianou, 2010, p. 438). Thus, emotional knowledge seems to be an important aspect of ToM development that could explain, along with the other social, cognitive, and biological aspects, some of the unaccounted variance in the results.

The second goal of this study was to compare balanced and language-dominant bilinguals on assessments of WMLS-R Picture Vocabulary in English and Spanish, visual-perceptual skills, inhibitory processing, and theory of mind reasoning (Perani et al., 1998). Though it was hypothesized that balanced bilingual children would outperform language dominant children on ToM and inhibition tasks, this hypothesis was not supported. The language groups performed similarly. There are several reasons that might explain this finding. First, most of our participants were Spanish-dominant. Thus, perhaps there was not enough power to identify true group differences. Future research should include larger sample sizes of bilinguals. It is also possible that the groups were too homogeneous. Past studies have found significant differences in executive functioning when comparing bilingual to monolingual children (Barac & Bialystok,

2012), but studies examining bilinguals compared to language dominants have reported similarities across groups in ToM (Weimer & Gasquoine, 2016). A third possibility is that the effects of bilingualism might be confounded with many other factors including immigration (Fuller-Thomson, 2015; Fuller-Thomson, Milaszewski, & Abdelmessih, 2013). It has been suggested that the cognitive effects found in bilinguals might be an effect of immigration. That is, bilingual immigrants might possess certain characteristics that distinguish them from their non-immigrant counterparts. For example, bilingual immigrants report better mental and physical health and certain cultural flexibility that might allow them to adjust better to the new social context. Bilingual immigrants might also possess and expanded repertoire of social support (e.g., friendship) in their country of origin and new country (Schachter, Kimbro, & Gorman, 2012). Given the low percentage of immigrants (6.2%) in this study, it was not possible to compare immigrant to nonimmigrants on cognitive outcomes, but future studies should seek to identify the distinct cultural, linguistic, and cognitive skills in bilingual immigrant versus non-immigrants.

A third goal of this study was to compare mean group performance between Mexican and Mexican-American children on WMLS-R Picture Vocabulary in English and Spanish, visual-perceptual skills, inhibitory processing, and theory of mind; however, this could not be examined. Most of the Mexican sample was Spanish-dominant. Research on English language learners shows that it takes about 5-7 years for a student to become fully proficient in a second language. (Lopez & Tashakkori, 2006). This study assessed 7- to 11-year-old children who might not have received English instruction for at least five consecutive years. It is not known whether the participants attended the bilingual school when they began schooling, which is usually at three years of age in Mexico, or whether they transferred from a non-bilingual campus.. In

addition, according to personal communication with the participants' parents, children in the Mexican sample were only exposed to the second language while in school, while the Mexican-American sample were exposed to a more bicultural environment outside of school. Furthermore, even though the Mexican and Mexican-American participants received instruction in both English and Spanish at a bilingual school, it is not known the degree of quality of the second language instruction. Thus, that might explain the reasons behind the Mexican sample lack of proficiency in the second language. Thus, future research should seek to examine older populations of children who have been exposed to the second language for a longer period of time and in a more biculturate context assessing the quality of the bilingual instruction method utilized.

A limitation of this study was the way in which the total household income was measured. It was difficult to integrate the income of Mexicans in pesos with the income of Mexican-Americans in dollars. The national minimum wage salary per day in Mexico was an average of $6.89 pesos in 2016 ("Evolución del Salario Mínimo Real," 2016). That is equivalent to 426.l23 pesos ($22.64 dollars) per week compared to an hourly rate of 7.25 dollars in Texas, which is equivalent to $348 dollars per week ("State Minimum Wages/2017 Minimum Wage by State," 2017). Also, this comparison becomes more complicated when the cost of living differs greatly between the two countries. Most importantly, about half of our Mexican sample failed to report an income.

A measure of acculturation was not included in the study. The Mexican sample, which included most of the Spanish proficient participants, is exposed to a very different culture from the Mexican-American one, and even though all of the schools in our sample valued bilingualism and the participants were bilingual, the samples differed in degree of biculturalism. As

previously mentioned, only a few small cognitive factors were assessed in this study. Future research should aim to study bilingualism in a more holistic manner giving consideration to the individual participant.

The study provides a useful launching point for future investigations on Mexican and Mexican-American bilinguals. Future studies should build on this foundation.

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APPENDIX A

APPENDIX A

DEMOGRAPHIC INFORMATION SURVEY

1. What is your child's date of birth? _____
2. What is your child's gender? Female or Male
3. What is your child's grade level in school?_____
4. How many siblings between the ages of 3 and 13 does your child have? _____
5. In which country was your child born? _____
6. What language(s) does your child speak? English Spanish
7. What language does your child currently understand better? English Spanish
8. What language(s) did your child first learn to speak? English Spanish Other _____
9. When did your child start to learn second language? _____
10. What language can your child currently speak better? English Spanish

(Step)Mother:	**(Step)Father:**
Age _____	Age_____
Ethnicity _____	Ethnicity _____
Highest level of education _____	Highest level of education _____

***Approximate* Yearly Total Household Income**

_____ Less than$10,000
_____ 10,000-20,000
_____ 20,000-30,000
_____ 30,000-40,000
_____ 40,000-50,000
_____ 50,000-60,000
_____More than 70,000

APPENDIX B

APPENDIX B

HAPPÉ STORIES (PERSUASION)

Jill wanted to buy a kitten, so she went to see Mrs. Smith who had lots of kittens she didn't want. Now Mrs. Smith loved the kittens and she wouldn't do anything to harm them, though she couldn't keep them all herself. When Jill visited she wasn't sure she wanted one of Mrs. Smith's kittens, since they were all males and she had wanted a female. But Mrs. Smith said, "If no one buys the kittens, I'll just have to drown them!"

1. Was it true what Mrs. Smith said?

2. Why did Mrs. Smith say this to Jill?

BIOGRAPHICAL SKETCH

Daniela Kuri was born in Puebla, Mexico on December 11, 1977. Her extended family resides in Puebla, Mexico. She immigrated to the United States on November, 2006.

She attended the “Instituto México” and the “Fundación Colegio Americano de Puebla” private schools before completing her General Education Diploma (GED) in 1999. On May 2011, she obtained an associates degree in Psychology from South Texas College (STC), and in 2013 she obtained a bachelor’s degree in Psychology from the University of Texas-Pan American. In the fall of 2013 she began pursuing her master’s degree in Clinical Psychology, and she graduated in May 2017. She plans to become a Licensed Professional Counselor (LPC) to be able to provide psychological services to the community. She also plans to pursue a PhD in Clinical Psychology in the future.

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