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Narrative Abilities and Resistance to Suggestion in Monolingual and Bilingual Children: Implications for Forensic Interviews

by

Christina O. Perez

Submitted to the Graduate Faculty as partial fulfillment of the requirements for the

Masters of Arts Degree in

Experimental Psychology

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Dr. Kamala London, Committee Chair

_____

Dr. Jason Rose, Committee Member

_____

Dr. Stephen Christman, Committee Member

_____

Dr. Cyndee Gruden, Dean

College of Graduate Studies

The University of Toledo

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An Abstract of

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Children's narrative accounts play a major role in cases of alleged child maltreatment. Case outcomes are highly dependent upon the statements children provide during forensic interviews. Bilingual children are vastly underrepresented in the forensic interviewing literature despite the overrepresentation of ethnic minorities in the criminal justice system. The present study compared monolingual (n = 31) and bilingual (n = 34) preschool-aged children's ability to provide meaningful reports about a staged event following a delay. Additionally, we examined group differences in resistance to suggestion, language abilities, and executive functioning. Bilingual and monolingual children's narrative quality scores and performance on suggestive questions did not differ significantly. Individual difference factors such as age, language abilities, and executive functioning were significantly correlated with narrative quality and resistance to suggestion. Explanations for the findings and forensic implications are discussed.

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List of Abbreviations

ABM .....Autobiographical memory
ALEQ.....Alberta Language Environment Questionnaire
ALI.....Adaptive Language Inventory

CPS .....Child Protective Services

DLL.....Dual Language Learners

ESH.....English and Spanish at Home
EVT-II .....Expressive Vocabulary Test, Second Edition

HTKS .....Head Toes Knees Shoulders

MT.....Mother Tongue

NAP .....Narrative Assessment Protocol
NICHD.....National Institute for Child Health and Development

OSH .....Only Spanish at Home

PPVT-III .....Peabody Picture Vocabulary Test, Third Edition
PPVT-IV .....Peabody Picture Vocabulary Test, Fourth Edition

SES.....Socioeconomic status

U.S. .....United States

Chapter One

Literature Review

Bilingualism is a pervasive experience in the United States, where over 60 million individuals ages 5 years and older speak a language other than English at home (Ryan, 2011). Despite comprising a significant portion of the U.S. population, ethnic minority children remain underrepresented in the eyewitness literature. This is problematic because ethnic and racial minority children are more likely to come into contact with Child Protective Service (CPS) agencies and to be forensically interviewed than Caucasian children (Coulton, Korbin, Su, & Chow, 1995; Hussey, Chang, & Kotch, 2006). A recent survey of 39 U.S. child forensic interviewers and child advocacy centers directors found that in practice, there are many significant challenges that arise when interacting with bilingual children and their families in cases of alleged child sexual abuse (Fontes & Tishelman, 2016). Participants reported encountering a number of problems when working with bilingual children, including a lack of completeness in children's reports when speaking in a single language. As we discuss below, these findings are highly problematic because cases of alleged child sexual abuse tend to rely heavily on the information children provide in interviews.

Bilingual children are of special interest to eyewitness researchers and investigators because of the unique linguistic and cognitive consequences of bilingualism (for a review see Akhtar & Menjivar, 2012). Ahktar and Menjivar (2012) found that although bilingual children often scored lower on standardized measures of vocabulary, they often displayed an advantage on certain measures of executive functioning skills, such as inhibitory control and attentional focusing. We explored these factors in the

context of an analogue forensic interview in order to further scientific knowledge about conducting interviews with this population and to promote the development of empirically supported interviewing methods. Although the obvious solution appears to be simply conducting interviews in a child's first language, evidence from the field of clinical psychology suggests discussing distressing events in a second language has a protective, emotionally-distancing effect that allows speakers to continue without becoming upset (for a review see Altarriba, 2014). However, to our knowledge, no empirical research exists that assesses whether bilingual children's reports are lower in quality compared to those provided by monolingual children in simulated forensic interviews.

Narratives are important components of human interaction and discourse. They are verbal accounts of either fictional or personally experienced events that typically follow a temporal sequence and represent an interaction between cognitive, linguistic, and cultural factors (McCabe, 1991; McCabe, 1997). In cases of child sexual abuse, the narrative accounts that children provide to investigators are often central to the cases themselves. Despite the efforts of investigators, allegations of child sexual abuse are often difficult to substantiate due to the absence of definitive medical or physical evidence in many cases, therefore investigations often rely heavily on the information gathered in forensic interviews with alleged child victims (London, Bruck, Ceci, & Shuman, 2005). Additionally, the present study may be of interest to law enforcement and border patrol officials who have seen a dramatic increase in unaccompanied minors entering the United States. In 2016, over 20,000 unaccompanied minors (ages 0-17 years old) were detained by officials along the southwest border; this represents a 102%

increase between the 2015 and 2016 fiscal years (U.S. Customs and Border Protection, 2017).

Children's narratives also significantly impact case outcomes. Prosecutors tend to examine children's narratives for clarity, consistency, and details indicative of abuse (Davis, Hoyano, Keenan, Maitland, & Mogan, 1999). In court settings, the judge and juries overseeing trials tend to base their legal judgments on their own perceptions of children's accounts (Bennett, 1978; Westcott & Kynan, 2004). Specifically, they use children's narratives to "identify [a] central action" (e.g., instance(s) of abuse), make inferences about the different elements of the narrative (e.g., any motives for false allegations), and ultimately "test the internal consistencies and descriptive completeness" (e.g., make judgments about plausibility/credibility) before making final decisions about the case (Westcott & Kynan, 2004). These findings suggest that witnesses unable to provide clear and skillfully constructed narratives may be at a major disadvantage, even if they are telling the truth (Bennett & Feldman, 1981).

Narrative quality is also related to children's resistance to suggestion, a major concern among both eyewitness researchers and investigators who strive to obtain the most accurate information possible from child witnesses (Kulkofsky & Klemfuss, 2008). Ceci and Bruck (1993) broadly define suggestibility as "the degree to which children's encoding, storage, retrieval, and reporting of events can be influenced by a range of social and psychological factors" (p. 404). A large body of research has focused on identifying factors that may put children at increased risk of assenting to interviewers' suggestions (for reviews see Bruck & Ceci, 1999; Bruck & Melnyk, 2004). Individual differences in domains such as language ability and executive functioning contribute to

children's ability to resist suggestion (Bruck & Melnyk, 2004). As we discuss below, bilingual children tend to differ from their monolingual peers in both of these domains.

In the present study, we examined the extent to which the quality of children's narratives and their resistance to suggestion are influenced by their language background (e.g., being bilingual vs. monolingual). Much of the existing research on bilingual children's narratives has focused on the development of language skills, literacy, and predicting school readiness. Given the linguistic and cognitive consequences associated with bilingualism and the surprising lack of forensic research studying this population, the goal of the present study was to examine bilingual children's abilities to provide quality information to investigators and to resist assenting to suggestions. This research is important for the development of empirically supported methods to interview bilingual children.

In the following sections, we review research on the role of narratives in autobiographical memory development. Additionally, we review research on bilingual children's narratives, vocabulary skills, and executive functioning skills. We also cover the eyewitness testimony research examining the role of children's vocabulary skills and executive functioning in the production of event-specific narratives and resistance to suggestibility.

Autobiographical Memory Development

The development of narrative skills through social interactions (e.g., shared reminiscing) is thought to play an important role in the development of autobiographical memory (ABM) (e.g., Fivush & Reese, 1992; Fivush, Haden, & Reese, 1995; Hudson,

1990; Nelson & Fivush, 2004). ABM is an individuals' memory of personally experienced events. ABM begins to develop gradually over the course of the preschool years and occurs in unison with the development of "understanding of temporal relations, narrative, self and others, and mental states" (Nelson & Fivush, 2004, p. 489). According to Nelson and Fivush's (2004) social-cultural developmental theory, ABM development is heavily influenced by both social and cultural factors in children's environments. A primary focus of their model is the development of language and its usage in social interactions. Children learn to construct narratives about personally experienced events through interactions with their parents. For example, children of mothers who use more elaborative reminiscing styles with their children tend to have better memories of personally experienced events than children with less elaborative mothers (Fivush, Haden, & Reese, 1995; Reese, 2002). This suggests that language usage with family, especially mothers, is influential in the development of children's ability to provide memories and the development of ABM.

Based on Nelson and Fivush's model, we recruited bilingual children who speak their native language at home with family but attend daycare or preschool in an English-only setting. Bilingual children's exposure to both languages differed by situational context (e.g., at school vs. at home). That is, we expected bilingual children were likely engaging in shared reminiscing with their mothers in a different language than in their school environments and, therefore, this may alter their abilities to provide narratives in only one language.

Bilingualism may be uniquely associated with ABM. Schrauf (2000) conducted a review of the experimental and clinical literatures on ABM among consecutive

bilinguals, which he defines as individuals "who learn first one language through socialization in the 'mother culture', and, subsequently, a second language through socialization in a 'second culture'" (p. 387). Through his review, he found evidence from clinical research that among consecutive bilinguals, early memories retrieved in the mother tongue tend to be more emotional and more detailed than those retrieved in their second language. Schrauf argues these findings can be accounted for by encoding-specificity (Tulving, 1983; Tulving & Thompson, 1973) and state-dependent learning (Weingartner, 1978) wherein the language used at the time of encoding can be used as a retrieval cue for the memory at a later time. Although the present study used English at both the time of encoding and retrieval, these findings hold significant implications for investigators who may be interviewing children in a different language than the one used at encoding. While this may cause concern about the quality of the information (e.g., the overall amount, descriptiveness, etc.) being provided, there is research that supports interviewing bilingual individuals in their second language may serve to emotionally protect individuals when recalling traumatic events (for a review, see Altarriba, 2014). The present study explored whether the narrative quality of bilingual children's account of a personally experienced event differs significantly from monolingual children's narratives and whether this difference should be a cause for concern for investigators.

Bilingual Children's Narratives

Although the present study considers narratives in the context of forensic interviews, researchers in other fields have examined bilingual children's narrative accounts as a method of assessing language development, literacy, and predicting school readiness. Assessments of narratives in bilingual children have been collected using a

variety of methods including narratives prompted with wordless picture books, story comprehension measures, and story retellings (e.g., Fiestas & Peña, 2004; Gutiérrez-Clellen, 2002; Kupersmitt, Yifat, & Kulka, 2014; Lofranco, Peña, & Bedore, 2006; Mead, 2015; Uccelli & Páez, 2007). Recently, narratives have been considered a more ecologically valid and culturally unbiased measure of expressive vocabulary skills in bilingual children as opposed to standardized measures of vocabulary (Bedore, Peña, Gillam, & Ho, 2010; Fiestas & Peña, 2004, as cited in Mead, 2015).

We found two contradicting studies that have compared bilingual and monolingual children's narratives. Pearson (2002) compared the narratives of monolingual children and two groups of bilingual children in Grades 2 and 5 in Miami, Florida. Bilingual children in one group were receiving English-only schooling (with optional daily half-hour Spanish lessons), and bilingual children in the other group were receiving bilingual schooling where both English and Spanish were used. The bilingual children were then further divided into two groups: OSH (Only Spanish at Home) and ESH (English and Spanish at Home). A wordless picture book was used to elicit narratives and both a story score (e.g., the use of story elements) and language score (e.g., complex syntax) were calculated. Pearson found that in Grade 2, the monolingual children outperformed the bilingual groups, particularly for the language scores. However, by Grade 5, all children were performing similarly.

Lofranco, Peña, and Bedore (2006) examined the narratives of eight 6- and 7-year-old Filipino-American children. Children in this sample were dominant English speakers according to parental reports, but were exposed to Filipino at home. Lofranco

and colleagues reported that the children's narrative productivity skills were comparable to those of monolingual children in previous research.

The discrepant findings between Lofranco et al. (2006) and Pearson (2002) may be in part a result of children's exposure to English. The children in Lofranco and colleagues' study were bilingual, but considered dominant in English. The project's inclusion criteria permitted bilingual children with indirect exposure to the Filipino language via their parents' conversations with others to participate in the study. Consequently, the children in that study spoke Filipino on average for 5.19 hours per week. Thus, the children in the sample on average had minimal exposure to Filipino. In Pearson's study, the older bilingual children (e.g., 5th graders) were performing similarly to their monolingual peers, potentially as a result of increased exposure to English as they progressed through school. This is consistent with research suggesting that as children get older and receive increased exposure to English (e.g., when they enter school), their community language usage increases, and they become more dominant in the community language (Gathercole & Thomas, 2009; Hammer, Lawrence, & Miccio, 2008; Oller, Pearson, & Cobo-Lewis. 2007).

There is further contradicting research on differences in the quality of children's narratives in their first versus second language. Some researchers have found that children's narratives were comparable in both languages (Fiestas & Peña, 2004; Gutiérrez-Clellen, 2002), while others have found an advantage in the production of English narratives (Pearson, 2002; Uccelli & Páez, 2007). Sample differences may account for some of these conflicting findings. Some studies examined children with a more balanced grasp of their first and second languages (Fiestas & Peña, 2004) and some

studies examined older children (Gutiérrez-Clellen, 2002). These findings suggest that bilingual children may not necessarily be at a disadvantage regarding narrative skill development, but rather their narratives vary in quality as a function of age and exposure to each language.

Vocabulary Skills in Bilingual Children

The body of research on bilingual children's language abilities has forensically relevant implications for eyewitness researchers and investigators. These research findings highlight the diversity in bilingual children's linguistic abilities and suggest bilingual children might provide lower quality accounts when interviewed in a single language and may be more prone to assenting to an interviewer's suggestions. Eyewitness researchers have found some evidence that children with better verbal abilities tend to provide higher quality narratives and are better able to resist interviewers' suggestions (Bruck & Melnyk, 2004; Chae & Ceci, 2005; Chae, Kulkofsky, Debaran, Wang, & Hart, 2016; Clarke-Stewart, Malloy, & Allhusen, 2004; Kulkofsky & Klemfuss, 2008; Roebers & Schneider, 2005). In a forensic interview, children must be capable of verbalizing their previous memories and, in some cases, maintaining accuracy when exposed to suggestive questioning techniques. Since bilingualism is not a categorical variable, forensic interviewers and investigators must determine the needs of a specific child on a case by case basis.

Akhtar and Menjivar (2012) conducted a review of the extensive literature on the linguistic correlates of bilingualism and found that bilingual children, particularly younger children, tend to have a smaller vocabulary sizes in both languages when

compared to their monolingual peers. This disadvantage has been consistent in measures of both receptive and expressive vocabulary, which suggests bilingual children may be limited in both the understanding and production of language in their first and second languages (Bialystok, Luk, Peets, & Yang, 2010; Calvo & Bialystok, 2004; Hoff, Rumiche, Burridge, Ribot, & Welsh, 2014; Keller, Troesch, & Grob, 2015; Oller et al., 2007; Pearson, Fernández, & Oller, 1993; Ribot, 2012; Uccelli & Páez, 2007). Researchers propose this may reflect bilingual children's divided language usage in various environments (e.g., Spanish at home, English at school) and not an overall vocabulary size deficit (Thordardottir, 2011).

One possibility is that bilingual children's vocabulary skills vary according to the context in which they speak their first versus second language. To test whether bilingual and monolingual children's receptive vocabulary knowledge for home-related words (e.g., food, household items, etc.) and school-related words (e.g., professions, shapes, etc.) differed, Bialystok and colleagues (2010) analyzed 161 3- to 10-year old children's scores on the English language Peabody Picture Vocabulary Test, Third Edition (PPVT-III) by word context. The authors coded vocabulary words on the PPVT-III such that home-related words consisted of terms such as food and household items, while school-related words consisted of terms related to professions and shapes. The results showed that although both groups performed comparably on school-related vocabulary words, the bilingual sample was less familiar with home-related vocabulary words. When examining the overall PPVT-III, the monolingual sample significantly outperformed bilingual children at all ages. These findings are particularly interesting because the majority of perpetrators in cases of child sexual abuse tend to be family members or acquaintances

(Finkelhor, 2012), therefore children being forensically interviewed may be more likely to discuss items, actions, and emotions more relevant to the home than to school.

This suggests that perhaps the peaks and valleys in bilingual children's performance may be accounted for by certain domains of language abilities. Bilingual children show a larger deficit in expressive versus receptive vocabulary skills than that seen in monolingual children (e.g., Gibson, Peña, & Bedore, 2014; Keller, Troesch, & Grob, 2015). In a sample of 406 bilingual children aged 34- to 53-months, children's scores on expressive and receptive vocabulary measures were compared. There was a significant gap between receptive and expressive vocabulary scores which favored children's receptive vocabulary by 1 standard deviation (Keller, Troesch, & Grob, 2015). In the same study, bilingual children's expressive and receptive vocabulary scores remained below monolingual norms. Similarly, when expressive vocabulary was measured separately in each language, Pearson, Fernandez, and Oller (1993) observed significantly lower English scores in bilingual infants and toddlers compared to those of their monolingual peers. However, when both expressive vocabulary knowledge was summed across both languages, bilingual children's total vocabulary size was similar to that of the children in the monolingual group.

Hoff and colleagues (2014) observed lower expressive vocabulary scores as well, but only in Spanish-English bilingual children who had two native Spanish-speaking parent at home. This finding suggests that these effects may differ as a result of language use at home. Other studies have also found a linear relationship between English input and English productive vocabulary skills (Ribot, 2012; Ribot, Hoff, & Burridge, 2017). These findings suggest that the amount of English used at home significantly impacts

children's language production skills in English. This is consistent with previous research indicating child-directed speech with toddlers predicts children's vocabulary skill development (e.g., Rowe, 2008). In the present study, we administered a language environment parental questionnaire to bilingual children's parents to obtain information on how frequently the child uses their native language and English in the home.

Vocabulary skills and language input is one possible factor that may influence children's performance in an analogue forensic interview. Bilingualism is also associated with changes in executive functioning skills, which we review in the following section.

Executive Functioning Skills in Bilingual Children

Executive functioning is a broad term that describes the cognitive processes used in problem solving, including working memory, inhibitory control, cognitive flexibility, and attentional focusing. There is some evidence that suggests executive functioning skills predict children's resistance to suggestion. Executive functioning skills have been tested using various measures and its relationship with resistance to suggestion is not yet clearly defined (Alexander et al., 2002; Bruck & Melnyk, 2004; Karpinski & Scullin, 2009; Melinder, Endestad, & Magnussen, 2006; Poole, Brubacher, Dickinson, Liberty, & Kaake, 2014). Theoretically, researchers believe that suggestibility and executive functioning should be correlated because both processes "involve keeping track of original events while ignoring (inhibiting) or disposing of subsequent misleading information which is discrepant with the original memory of the event" (Bruck & Melnyk, 2004). In forensic interviews, children presented with misleading yes/no or

forced-choice questions must inhibit their automatic responses (e.g., assenting to the incorrect information) and provide accurate information.

Additionally, some research suggests that executive functioning also plays a role in the production of narratives (Brookshire, Chapman, Song, & Levin, 2000; Chapman et al., 1992; Mead, 2015; Ygual Fernández, Roselló Miranda, & Miranda Casas, 2010). Narrative production is a cognitively demanding task that requires the speaker to create a cohesive storyline and monitor the details and temporal sequence of events. Despite showing a disadvantage in language abilities (as reviewed above), bilingual children often display an advantage in executive functioning skills. For example, in comparison to monolingual children, balanced bilinguals (i.e., children who have been exposed to both languages from infancy) display advantages in selective attention and inhibition (Bialystock, 1999; Bialystok; 2001). In theory, this is believed to stem from bilingual children's practice switching between two competing language systems that remain active during language processing (Guttentag, Haith, Goodman, & Hauch, 1984).

Mead (2015) examined the relationship between narrative competence and executive functioning skills among two groups of Spanish-English bilingual children: balanced bilinguals and dual language learners (DLL; children who had at least 6 months of significant exposure to a second language). The majority of DLL children were considered English-dominant but still met bilingual inclusion criteria. Children were administered a battery of executive functioning measures to assess "cognitive flexibility, interference control, inhibition of a prepotent response, planning, [and] inhibitory control" (p. 29). Overall narrative complexity was assessed using four narrative measures: language sample indices (e.g., total number of words, total number of different

words, mean length of utterance), the Narrative Assessment Protocol short form, story grammar elements, and high-point analysis (e.g., a score of 0-7, with 7 indicating a narrative of the highest quality).There was a strong positive correlation ($r = .49$, $p < .01$) between narrative complexity and executive functioning across both groups of bilingual children. This positive correlation held when controlling for age, but it became marginally significant ($r = .36$, $p = .06$) given the small sample size (n = 21). Mead also found a significant positive correlation ($r = .28$, $p < .05$) between all children's scores on the Head Toes Knees Shoulders task (which we discuss below) and scores on the Narrative Assessment Protocol short form (NAP; Justice, Bowles, Pence, Gosse, 2010) , which examines 5 components of microstructure in narratives elicited using a wordless picture book: sentence structure, phrase structure, modifiers (e.g., adverbs), nouns, and verbs. Given these findings, we are interested in examining whether executive functioning differs between our bilingual and monolingual groups and whether executive functioning is correlated with narrative quality scores using our coding scheme.

Although researchers have found little to no advantages for bilingual children on simple Stroop day-night inhibition tasks commonly used by eyewitness researchers to measure inhibitory control in monolingual children (e.g., Alexander et al., 2002; Carlson & Meltzoff, 2008; Martin-Rhee & Bialystok, 2008; Melinder, Endestad, & Magnussen, 2006; Poole, Brubacher, Dickinson, Liberty, & Kaake, 2014), other executive functioning and inhibitory control tasks have produced significant bilingual advantages (for a review see Akhtar & Menjivar, 2012). This suggests that there may be an underlying advantage among bilingual children in overall executive functioning (including inhibitory control), but perhaps the day-night task is not sensitive enough to detect it. We are interested in

whether using a more challenging executive functioning task, the Head Toes Knees Shoulders task (HTKS; Ponitz, McClelland, Jewkes, Connor, Farris, & Morrison, 2008; Ponitz, McClelland, Matthews, & Morrison, 2009), produces differences between our groups and predicts resistance to suggestion. The HTKS measure was designed to cover three domains of executive functioning (e.g., attentional focusing, working memory, and inhibitory control) and, to our knowledge, has not been used to compare executive functioning in bilingual and monolingual children.

The Present Study

To review, forensic interviewers have no guidelines upon which to rely when interviewing bilingual children and, to our knowledge, no research examining bilingual children's eyewitness testimony has been published. The experience of growing up bilingual may cause peaks and valleys in children's eyewitness performance. Despite frequently showing a disadvantage in language abilities, bilingual children often display an advantage in various domains of executive functioning skills such as selective attention and inhibitory control. This has forensically relevant implications for eyewitness researchers and investigators because individual difference factors such as language skills and executive functioning are associated with the production of higher quality narratives and increased resistance to suggestion, respectively.

The purpose of the present study was to empirically examine whether bilingual preschool-aged children's event-specific narratives differ in quality when compared to those of their monolingual peers. Additionally, we wanted to examine bilingual children's performance on suggestive questions. Monolingual and bilingual pre-school

aged children participated in a 15-minute staged event and shared their memory for the event with an unfamiliar interviewer approximately 1-week later. Children also completed a battery of language and executive functioning measures.

We examined pre-school aged children because younger bilingual children's language abilities tend to be furthest behind monolingual children's during the preschool years, thus placing them at higher risk for providing lower quality narratives and assenting to suggestive questions. Presumably, any gaps should narrow as bilingual children grow older and become more assimilated in the community language. This is reflected in findings that bilingual children tend to become increasingly exposed to the community language (e.g., English in the United States) once they enter school (Oller et al., 2007) and simultaneously decrease in usage of their native language at home (Hammer, Lawrence, & Miccio, 2008). Over time, bilingual children tend to become more dominant in the community language (Gathercole & Thomas, 2009) and therefore we may expect older bilingual kids with prolonged exposure to perform more similarly to monolingual children.

Research Questions and Hypotheses

Research Question 1. Do preschool aged bilingual children's event-specific narratives differ in quality from those of their monolingual peers?

Hypothesis 1. Previous research indicates that bilingual children's vocabulary skills, especially expressive vocabulary, tend to be lower than their monolingual peers. Eyewitness researchers have found some evidence that better language abilities are associated with higher quality narratives, therefore we expected that bilingual children in

our sample would score lower on the measures of language ability and that their narratives would be of lower quality than monolingual children's. We expect that bilingualism does not hinder children's narrative development, rather it affects their language abilities which in turn affects the quality of their narratives.

Research Question 2. Do bilingual and monolingual children differ in resistance to suggestive questions?

Hypothesis 1. Bilingual children have displayed advantages in multiple domains of executive functioning, including inhibitory control. Evidence suggests that inhibitory control may play a role in children's resistance to suggestion, therefore, we expected bilingual children might be less likely than monolingual children to assent to suggestive questions. However, as discussed above, bilingualism is also associated with deficits in language abilities in young children. Eyewitness testimony researchers have also found evidence that higher language abilities are associated with increased resistance to suggestion, therefore, we also expected that bilingual children could be at increased risk for suggestion due to their lower language abilities.

Research Question 3. Is bilingualism a predictive factor for narrative quality?

Hypothesis 1. Previous research suggests age, language abilities, and executive functioning skills are related to the quality of the narratives children produce. Using a hierarchical regression analysis to control for these variables, we expected that being bilingual would remain a significant predictor of narrative quality.

Research Question 4. Is bilingualism a predictive factor for resistance to suggestion?

Hypothesis 1. Previous research suggests age, language abilities, and executive functioning skills predict children's resistance to suggestion. Using a hierarchical regression analysis to control for these variables, we expected that being bilingual would remain a significant predictor of resistance to suggestion.

Chapter 2

Methods

Participants

Preschool-aged children were recruited from daycares and preschools located within the Toledo metropolitan area. Please see Appendix A for a copy of the parental informed consent form. The initial sample consisted of 134 children. Twenty-nine (n = 29) children were dropped from the sample for failure to complete the interview protocol. Reasons for failure included prolonged absences following Session 1 (n = 23), refusal to participate in session 2 (n = 1), and failure to meet inclusion criteria (n = 5). Our final sample consisted of 105 children ages 35 to 71 months (M = 53.18, SD = 9.410; 55.2% male). Our sample was predominantly Caucasian (n = 68), with some children of African American (n = 19), Hispanic/Latino (n = 4), Asian (n = 7), and Other (n = 7) backgrounds.

Seventy-one (n = 71) children were identified as being monolingual. These children ranged in age between 36 and 71 months (M = 51.85, SD = 9.72; 55.2% female). Monolingual children were native English-speakers and did not have frequent prolonged exposure to another non-English language.

Our bilingual sample was made up of 34 children ages 35 to 68 months (M = 55.97, SD = 8.19; 55.2% female). All bilingual children were enrolled in English-only child care centers or preschools with monolingual peers, did not have any language impairments, and were able to both understand and communicate in both languages, as indicated by their parent/guardian. Bilingual children in our sample primarily spoke Arabic (n = 19) at home with their families. Other languages spoken included Spanish (n

= 4), Hindi (n = 1), Serbian (n = 1), Marathi (n = 1), Farsi (n = 1), and Greek (n = 1). Parents did not report the other language spoken at home for six (n = 6) children. For a copy of the screening form we used, please see Appendix B.

An independent samples t-test was conducted to compare age (in months) between the monolingual and bilingual groups. There was a significant difference in age for monolingual (M = 51.85, SD = 9.72) and bilingual children (M = 55.97, SD = 8.19), $t(103) = -2.138$, $p = .035$, $d = .46$. In order to address the marked difference in the sample sizes and the significant difference in age between our groups, we matched our groups as closely as possible on age, gender, and delay between sessions. Our final experimental sample consisted of 31 monolingual children and 34 bilingual children. Table 1 below contains information on demographic characteristics between our groups.

Table 1

Demographic characteristics of bilingual and monolingual children.

	Group	
	Bilingual (n = 34)	Monolingual (n = 31)
Age (months)	55.97 (8.70)	56.23 (9.05)
Gender (% Males)	56	55
Delay (days)	7.29 (2.10)	7.84 (2.30)
Range	3-14	4-14

Note: Standard deviations are in parentheses. Delay = the number of days separating Sessions 1 and 2 of the study.

Materials and Procedure

All study procedures were approved by the University of Toledo's Institutional Review Board. Written parental consent was obtained for all children. Children whose

parents did not provide permission for video and/or audio recording were not tested. Children provided verbal assent on each day of testing. Trained undergraduate research assistants assisted with data collection and were kept blind to children's group membership and all study hypotheses. All study procedures were conducted in English and audio and/or video recorded unless otherwise noted. Both sessions occurred at children's child care centers or preschools on a day and time approved by administrators. Due to school closings, two children participated in the study in an office located on the first floor of University Hall.

Session One

Staged Event. Groups of up to 6 children participated in a 10-minute interactive pizza-making event with a female researcher (adapted from Kulkofsky, Wang, & Ceci, 2008). The staged pretend pizza-making event included a series of aschematic events along with schematic events (please see Table 2 below for a list). For a copy of the event script, please see Appendix C.

Table 2

List of schematic and aschematic events.

Schematic events	Aschematic events
Wearing a chef hat	Washing hands with a chalkboard eraser
Adding toppings to the pizza	Baking the pizza in a refrigerator
Setting the table prior to eating	Brushing teeth with a hairbrush
Decorating their paper plates	Making a phone call using a shoe
Pretending to eat the pizza	Cutting the pizza with chopsticks

The researcher introduced herself and told the children she was there to play a pretend pizza making game. Children put on a chef hat. The researcher put on an apron and a chef hat before beginning to "cook". A second researcher, who administered the expressive vocabulary measure after the staged event, watched on and made note of any deviations from the protocol (e.g., a child refused to wear the chef's hat) in children's folders.

Next, the researcher told the children that the first step in making a pizza is to clean their hands. However, because she did not have any soap or water with her, they used a chalkboard eraser instead. The researcher pulled a chalkboard eraser out of her bag, rubbed her hands on it, and then passed it around for the children to do the same.

The researcher presented the children with the toy pizza crust (made of felt), sauce, and various (also felt) toppings (cheese, tomatoes, onions, peppers, sardines, mushrooms, and olives) that they would be using. She clearly labeled each item for the children (e.g. "First we have the cheese. Can everyone see the cheese? Next we have the tomatoes. Does everyone see the tomatoes?"). Each child chose 2 toppings and added them to the pizza.

Once the children added their toppings, the researcher announced that she would bake the pizza in her "magic refrigerator" (a large decorated box). She placed the pizza in the "magic refrigerator" and asked the children to set the table while waiting for the pizza to bake. Children were given colored placemats and paper plates. The researcher interrupted them and said, "Gee, you know what I forgot to do today? I forgot to brush my teeth! I better do that now!" She then pulled a hairbrush out of her bag and pretended to brush her teeth.

The researcher complemented the children on what a nice job they did setting the table and gave them sheets of stickers to decorate their plates. She told them that once they finished playing the game, they would be able to take their decorated plates home. She then exclaimed, "Oh my goodness! I forgot how long I needed to bake the pizza! I'd better call my friend Max. He knows all about pizza." She pretended to call her friend using a shoe and said, "Hello, Max, this is _____. Yes, I want to know how long I should bake my pizza. OH! Okay!" She put down the shoe and told the children, "Max says we should take the pizza out right now or it might burn!"

The researcher removed the pizza with the contents out of view from the children and announced that she was cutting the pizza using chopsticks. Finally, she placed a piece of the "cooked" pizza on each child's plate, and the children pretended to eat the pizza.

The researcher monitoring the event recorded the following information on a separate piece of paper: the names of the children who played the game, the color of each child's hat, the toppings each child put on the pizza, and any deviations from the script (e.g. a child chose 3 toppings instead of 2 toppings).

After completing the event, the researcher playing the role of the chef thanked the children for making a pizza with her and left the room.

Executive Functioning Measure. After the pizza-making event, children individually completed the Head Toes Knees Shoulders task, a measure of executive functioning, with a different researcher (HTKS; Ponitz, McClelland, Jewkes, Connor, Farris, & Morrison, 2008; Ponitz, McClelland, Matthews, & Morrison, 2009). In this task, children were initially instructed to touch their toes when told to touch their head (or vice versa). Consistent with coding instructions for the HTKS, children received a score

of 0 points for incorrect responses, 1 point for self-corrected responses, and 2 points for correct responses. If children were successful with the head/toes instructions (≥ 5 points), the researcher moved on to a more advanced round where knee/shoulder instructions were added. The final part of testing incorporated both sets of instructions. HTKS form versions were counterbalanced so that about half of the children received form A (head/toes instructions first) and half of the children received form B (knees/shoulders instructions first). Upon completing the task, a cumulative response score was calculated by taking the sum of correct responses in both parts of the test. The HTKS task took about 5 minutes to complete. A copy of this measure is included in Appendix D.

Session Two

Event Interview. Following an approximately 1-week delay (M = 7.55 days, SD = 2.19), an unfamiliar researcher returned to individually administer a structured interview to each child about the event. Interviews were based off a modified version of the National Institute for Child Health and Development (NICHD) protocol, an empirically supported method of interviewing child witnesses (Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007). For a copy of the study interview script, see Appendix E.

The interviewer began with an introductory phase that included instructions for the interview (e.g., correcting the interviewer if they make a mistake, not guessing when they do not know the answer, etc.) and a brief rapport building session. The rapport building session is designed to facilitate children's communication and provide them with an opportunity to practice telling a narrative before delving into the substantive phase of the interview.

Next, the interviewer explained to the child that they were not at the pizza-making event but would like to know everything that happened from beginning to end. The interviewer used open-ended follow-up prompts (e.g., "Then what happened?") and facilitators (e.g., "uh-huh", "ok") to prompt the child for more information. Once the child indicated they could recall no more, the interviewer moved on to the direct questions about the staged event.

For the final portion of the interview, children were asked 13 direct questions about the event. Seven questions were suggestive and misleading in nature (e.g., giving children two false options to choose from or implying a false desired response; "Did she put the sticker on your knee or on your face?"). The remaining six questions were non-suggestive and open-ended (e.g., "What color hat did you wear?"). Table 3 lists the open-ended and suggestive questions children were asked in the final portion of the interview.

Table 3

List of open-ended questions and suggestive questions.

Open-ended Questions	Suggestive Questions
Who did you play the game with?	Were her gloves blue or yellow?
What color hat did you wear?	You used soap and water to clean your hands, right?
What kinds of toppings did she bring?	What kind of pop did she bring to drink?
How did she bake the pizza?	The lady used a tooth brush to brush her teeth, right?
How did she know when the pizza was done baking?	Did she put the sticker on your face or your knee?
What did you do with the baked pizza?	The lady gave you plastic trays to eat the pizza on, right?
	When the pizza was done baking, did she cut it up with scissors or a knife?

Expressive Vocabulary Measure. Following the interview, a new researcher administered the Expressive Vocabulary Test, Second Edition (EVT-II ; Williams, 1997), an individually-administered, standardized measure of Standard American English expressive vocabulary. This portion of the study was not video recorded because scoring was done at the time of testing and did not need to be reviewed on tape. In this test, children were presented with a picture and asked a stimulus question about the object in the picture (e.g., providing a synonym or label). Children received a 0 for incorrect responses and a 1 for correct responses. This measure has been normed using a national sample of individuals ranging in age from 2:6 (years; months) to 90+ years old.

Debriefing. Children were thanked for their participation at the end of each session. They also received a colorful certificate thanking them.

Parent and Teacher Measures. Children's teachers/child care providers were asked to rate children's language usage with adults using the Adaptive Language Inventory (ALI; Feagans & Farrans, 1997). The ALI is an 18-item questionnaire that examines six components of language usage in the classroom: language comprehension, language expression, rephrasing ability, spontaneity, listening ability, and fluency. We used the ALI in addition to the EVT-II because the ALI allows us to examine multiple domains of language usage as opposed to focusing on one (e.g., expressive vocabulary). For a copy of the ALI, see Appendix F.

Bilingual children's English-speaking parent (or, if both parents are fluent in English, the parent with the best knowledge about language usage in the home) were sent a modified version of the Alberta Language Environment Questionnaire (ALEQ; Paradis, 2011). Please see Appendix G for a copy of the ALEQ. The ALEQ asks about key

information such as family demographics, when the child learned English, and the child's usage of English and their Mother Tongue (MT) with various people in the home. We were interested in using the ALEQ to summarize bilingual children's language usage in the home as either shifted towards English (proportion scores greater than .5) or as maintaining the child's MT (proportion scores lower than .5). Parents who initially failed to return the ALEQ questionnaire after 4 weeks were contacted again. Return rates were very low (<30% returned) and were therefore excluded from analyses.

Coding

Coding for narrative quality. Each interview was transcribed verbatim and verified for accuracy by two undergraduate research assistants. Filler words (e.g., "um", "like", etc.), redundant utterances (e.g., false starts, repetitions, etc.), and off-topic utterances were removed from transcripts. Children's on-topic free recall responses were coded for volume, complexity, descriptive texture, and cohesion using guidelines from previous research (Kulkofsky et al., 2008; Kulkofsky & Klemfuss, 2008). *Volume* measures narrative length, or the total number of subject-predicate pairs (propositions) made (Han, Leichtman, & Wang, 1998). *Complexity* is the number of words per proposition and measures the amount of detail made per statement (Han et al.,1998; Sperry & Sperry, 1996). *Descriptive texture* assesses the overall amount of detail provided by counting the total number of adjectives, adverbs, and intensifiers (Han et al., 1998). *Cohesion* measures the temporal cohesion of children's narratives by counting the total number of words and phrases that provide temporal information (e.g., first, then, last week, etc.). To obtain an overall narrative quality score, we computed the standardized z

score for each component of narrative quality and summed the z scores together (Kulkofsky & Klemfuss, 2008).

Two coders independently coded 20 randomly selected transcripts for the four components of narrative quality (volume, complexity, descriptive texture, and cohesion markers) to assess interrater reliability. Based on Hallgren's (2012) guidelines for assessing interrater reliability in ratio data, intra-class correlations (ICCs) were used to determine agreement between the two coders. According to Cicchetti's (1994) benchmarks, interrater reliability indicated agreement between raters was very high on all four measures of narrative quality (all ICC scores >.90). The two coders met to discuss any discrepancies, and the remaining transcripts were coded by a single coder.

Coding for suggestibility. In order to compare differences in suggestibility among the two samples, children's responses to the seven suggestive questions in the direct question portion of the interview were examined. Suggestibility was measured as the number of false items children assented to in the direct question portion of the interview (maximum score of 7). Examples of assenting included failing to correct the interviewer about a detail that did not occur, elaborating on events that did not occur, or choosing one of two incorrect options. Two coders independently coded 20 randomly selected transcripts for children's suggestibility (i.e., tallying the number of suggestions accepted). Again, interrater reliability was excellent (ICC >.90). Disagreements were generally a result of human error (e.g., miscounting) and were resolved through discussion. The remaining transcripts were coded by a single coder.

Chapter 3

Results

Preliminary Analyses. Preliminary analyses were conducted to assess for any deviations from the parametric assumption of normality among the data. Multiple methods were employed, including the assessment of skewness values, kurtosis values, P-P plots, histograms, Kolmogorov-Smirnov tests, and Shapiro-Wilks tests. Two of our variables, HTKS scores and narrative quality scores, violated the assumption of normality as their distributions were positively skewed. Following guidelines from Field (2018) and Osborne (2002), we applied various transformations to correct the departures from normality. First, a constant was added to each variable since values less than or equal to 0 were present in the raw data. Then, square root and logarithmic transformations were applied. For the narrative quality data, the square root transformation corrected the departure from normality while the logarithmic transformation did not. Analyses examining group differences in narrative quality below were conducted using square root transformed data.

Unfortunately, neither the square root or logarithmic transformations corrected the departure from normality in children's HTKS scores. The square root transformation improved skewness, but did not fix the departure from normality. Per Osborne's (2002) recommendation, a more powerful transformation, an inverse transformation, was applied to the data. The variable was reversed by multiplying scores by -1. Then, a constant was applied and the inverse was taken by dividing 1 by the reversed scores. Again, this transformation did not correct the departure from normality. Of the three transformations, the square root transformation improved the deviation from normality best. Additionally,

no outliers were found to be present and influencing the skewness of the variable and therefore deletion of outliers was not an option. Both parametric and nonparametric tests, discussed below, were used to examine group differences in HTKS scores. An independent samples t-test using the square root transformed data revealed no significant difference in HTKS scores between bilingual and monolingual children, t (62) = - 1.116, p = .27, d = .28. Using the raw scores, a Mann-Whitney U test, a nonparametric alternative to the independent samples t-test, also revealed no significant differences between bilingual and monolingual children's HTKS scores, U = 583.50, p = .331. As both analyses are telling the same statistical story, we can conclude there was no difference in bilingual and monolingual children's performance on the HTKS task. See Table 4.

We also examined whether group differences existed on two separate measures of language abilities, the EVT-II and ALI. As discussed above, the EVT-II is an individually-administered measure of children's expressive vocabulary. Since age was included in the regression analyses below, raw EVT-II scores were calculated for each child by subtracting the number of incorrect responses from the ceiling item (i.e., the last item in a sequence of 5 consecutively incorrect items the child answered). An independent samples t-test revealed no significant difference in EVT-II scores between bilingual and monolingual children, t (62) = 1.14, p = .26, d = .28. See Table 4. Children's ALI scores reflect average teacher ratings across six components of language usage in the classroom (i.e., comprehension, production, rephrasing abilities, spontaneity of speech, listening skills, and fluency) on a scale of 1 (*well below average*) to 5 (*well above average*). ALI scores were missing for 4 children (n = 3 monolingual, n = 1

bilingual), therefore analyses reflect only the mean ALI scores for 60 children in the sample. An independent samples t-test revealed no significant difference in ALI scores between bilingual and monolingual children, t (59) = -1.79, p = .08, d = .46.

Table 4 below lists the means and standard deviations for our groups across our various outcome variables.

Table 4

Means and standard deviations for Expressive Vocabulary Test, Head Toes Knees Shoulders Task, Adaptive Language Inventory, Components of Narrative Quality, and Assents to Suggestive Questions.

	Group					
	Bilingual			Monolingual		
	M (*SD*)	*Mdn*	Range	*M* (*SD*)	*Mdn*	Range
EVT-II Score*	56.67 (17.36)	55	19-90	62.06 (20.54)	59	19-101
HTKS Score**	16.85 (12.54)	18	0-37	13.68 (13.41)	8	0-37
Transformed HTKS Score	3.84 (1.78)	4.36	1-6.16	3.32 (1.94)	3	1-6.16
ALI Score***	3.63 (0.73)	3.61	2.17-5	3.30 (0.70)	3.22	1.39-4.78
Narrative Component						
Volume	8.64 (7.25)	9	0-24	8.52 (10.81)	4	0-38
Complexity	4.18 (2.02)	4.90	0-7.10	4.58 (2.29)	5.30	0-7.80
Descriptive Texture	1.94 (2.55)	1	0-11	3.06 (5.09)	1	0-21
Cohesion Markers	2.42 (3.00)	1	0-10	3.39 (4.56)	1	0-14
Narrative Quality	- 0.10 (2.99)	-0.39	- 4.36-6.67	0.11 (3.54)	-0.74	-4.36-9.84
Transformed Narrative Quality	2.19 (0.69)	2.23	1-3.47	2.21 (0.76)	2.15	1-3.90
Assents	4.24 (1.74)	4	1-7	3.61 (1.80)	3	0-7

Note: All values reflect raw, untransformed scores unless otherwise noted. EVT-II = Expressive Vocabulary Test, Second Edition. HTKS = Head Toes Knees Shoulders. ALI = Adaptive Language Inventory. Assents = the number of suggestive questions children assented to.

*Mean and standard deviation for bilingual children on the EVT-II reflect average group scores excluding 1 outlier.

**HTKS data is missing for 1 bilingual child.

***ALI data is missing for 3 monolingual children and 1 bilingual child.

Relationships between individual difference factors. Table 5 below presents the Pearson correlations between our various outcome measures. Additional analyses were conducted using the square root transformed data for the HTKS and narrative quality variables, but they told the same statistical story. Therefore, the Pearson correlations reported in the table were conducted using the raw data.

Table 5

Pearson Correlation Coefficients for All Measures including Age.

Variable	1	2	3	4	5	6
1. Age (in months)	—	.36**	.55***	.01	.43***	-.26*
2. HTKS Score		—	.67***	.51***	.50***	-.31*
3. EVT-II Score			—	.36**	.61***	-.48***
4. ALI Score				—	.41**	-.09
5. Narrative Quality					—	-.32**
6. Assents						—

Note: Narrative quality computed from the standardized *z* scores of volume, complexity, descriptive texture, and cohesion markers. HTKS = Head Toes Knees Shoulders. EVT-II = Expressive Vocabulary Test, Second Edition. ALI = Adaptive Language Inventory.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Research Questions

Research Question 1. Do preschool aged bilingual children's event-specific narratives differ in quality from those of their monolingual peers?

As discussed above, the final narrative quality variable was positively skewed and thus violated the parametric assumption of normality. Adding a constant and applying a

square root transformation to the data, as recommended by Field (2018) and Osborne (2002), fixed the positive skew. To assess whether children's narrative quality differed between the two groups, an independent samples t-test was conducted using the square root transformed narrative quality scores. Results indicated there was no significant difference in the quality of narratives between bilingual and monolingual children, t (62) = .13, p = .90, d = .03. These results suggest the quality of narratives about the staged pizza-making event was the same for bilingual and monolingual children.

Research Question 2. Do bilingual and monolingual children differ in resistance to suggestive questions?

To assess whether resistance to suggestion differed between the two groups, an independent samples t-test was conducted. Results indicated there was no significant difference in the number of suggested items assented to between bilingual and monolingual children, t (63) = -1.42, p = .16, d = .36. These findings suggest there is no difference in suggestibility between bilingual and monolingual children.

Research Question 3. Is being bilingual a predictive factor for narrative quality?

To test whether bilingualism is a significant predictive factor of children's narrative quality, a hierarchical regression analysis was conducted. Previous research suggests age, language abilities, and executive functioning skills are related to the quality of the narratives children produce. Prior to conducting the hierarchical regression, the relevant assumptions were tested according to Field's (2018) and Osborne & Waters' (2002) guidelines. An examination of Pearson correlations (see Table 5 above) revealed none of our predictor variables were highly correlated. To prevent possible issues of multicollinearity associated with including multiple measures of language abilities (i.e.,

EVT-II scores and ALI scores), separate regression analyses were conducted with only a single language-related predictor included. A scatterplot of the predicted and residual values indicated the assumption of homoscedasticity was violated. Entering the square root transformed data for overall narrative quality scores and the inverse transformations for HTKS scores alleviated issues with heteroscedasticity.

The first hierarchical regression analysis predicted children's narrative quality scores from EVT-II scores, HTKS scores, age, and language background. Model 1, excluding language background, was significant, $F(3,59) = 13.91$, $p < .001$, $R^2 = .41$, although only EVT-II score was a significant independent predictor of narrative quality. The second model, including language background, was also significant, $F(4,58) = 10.57$, $p < .001$ $R^2 = .42$. Language background (coded as 0 = monolingual, 1 = bilingual) was not a significant independent predictor and did not result in a significant change in R^2, $\Delta R^2 = .01$, $F(1,58) = .74$, $p = .39$.

The second hierarchical regression analysis predicted children's narrative quality scores from ALI scores, HTKS scores, age, and language background. The first model, excluding language background, was significant, $F(3,55) = 12.54$, $p < .001$, $R^2 = .41$. ALI score and age, measured in months, were significant independent predictors of narrative quality. The second model was also significant after including language background as a predictor, $F(4,54) = 9.92$, $p < .001$, $R^2 = .42$. Language background was not a significant independent predictor and its addition to the model did not result in a significant change in R^2, $\Delta R^2 = .02$, $F(1,54) = 1.62$, $p = .21$.

The findings from both sets of analyses suggest bilingualism is not a significant independent predictor of narrative quality. Across both analyses, both measures of

children's language abilities (i.e., EVT-II scores and ALI scores) were significant predictors of narrative quality. In the second hierarchical regression analysis, age was also a significant predictor. The results of both hierarchical regression analyses predicting assents to suggestive questions are displayed in Table 6.

Table 6

Hierarchical Linear Regression Analyses Predicting Narrative Quality.

Variable	ß	*t*	R^2	Variable	ß	*t*	R^2
Model 1:			$.41^{***}$	Model 1:			$.41^{***}$
EVT-II	.51	4.18^{***}		ALI	.41	3.85^{***}	
HTKS	.18	1.66		HTKS	.21	1.88	
Age	.07	.58		Age	.33	3.06^{*}	
Model 2:			$.42^{***}$	Model 2:			$.42^{***}$
EVT-II	.54	4.26^{***}		ALI	.44	4.06^{***}	
HTKS	.17	1.57		HTKS	.21	1.93	
Age	.06	.49		Age	.33	3.11^{**}	
Language				Language			
Background	.09	.86		Background	- .14	- 1.27	

Note: EVT-II = Expressive Vocabulary Test, Second Edition. HTKS = Head Toes Knees Shoulders. ALI = Adaptive Language Inventory. Language background is defined as either monolingual or bilingual.
* p <.05. ** p < .01. *** p <.001.

Research Question 4. Is being bilingual a predictive factor for suggestibility?

To test whether bilingualism is a significant predictive factor of children's suggestibility (measured as the number of assents to suggestive questions), a hierarchical

regression analysis predicting narrative quality was conducted. Previous research suggests age, language abilities, and executive functioning skills are related to children's suggestibility. As discussed above, the relevant assumptions were tested according to Field's (2018) and Osborne and Waters' (2002) guidelines prior to conducting the hierarchical regression analyses. No violations of assumptions were found. Separate regression analyses were conducted again with only a single language-related predictor included to prevent possible issues of multicollinearity associated with including multiple measures of language abilities (i.e., EVT-II scores and ALI scores).

The first hierarchical regression analysis predicted the number of assents to suggestive questions from EVT-II scores, HTKS scores, age, and language background. The first model, excluding language background, was significant, $F(3,60) = 5.70$, $p < .01$, $R^2 = .22$, although only EVT-II score was a significant independent predictor of assenting. The second model, including language background, was also significant, $F(4,59) = 4.40$, $p < .01$, $R^2 = .23$. Again, only EVT-II score was a significant predictor of number of assents to suggestive questions. Language background was not a significant independent predictor and did not significantly change R^2, $\Delta R^2 = .01$, $F(1,59) = .60$, $p = .44$.

The second hierarchical regression analysis predicted the number of assents to suggestive questions from ALI scores, HTKS scores, age, and language background. Model 1, excluding language background, was marginally significant, $F(3,56) = 2.54$, $p = .07$, $R^2 = .12$. The only significant predictor of assenting was HTKS score. Model 2 was significant after including language background as a predictor, $F(4,55) = 3.21$, $p = .01$, $R^2 = .19$. Language background and HTKS score were both significant independent

predictors of assents. The addition of language background as a predictor resulted in a significant change in R^2, $\Delta R^2 = .07$, $F(1,55) = 4.71$, $p = .03$.

The findings from both sets of analyses offer mixed findings regarding bilingualism as a significant independent predictor of assents to suggestive questions. Across both analyses, children's inhibitory control abilities, measured with the HTKS task, was a significant predictor of assents to suggestive questions. In the second hierarchical regression analysis, language background was a significant predictor and its addition to the model resulted in a significant R^2 change, ultimately making the model significant. The results of both hierarchical regression analyses predicting assents to suggestive questions are displayed below in Table 7.

Table 7

Hierarchical Linear Regression Analyses Predicting Assents to Suggestive Questions.

Variable	ß	*t*	R^2	Variable	ß	*t*	R^2
Model 1:			.22**	Model 1:			.12
EVT-II	- .49	- 2.88**		ALI	.08	.52	
HTKS	.00	- .00		HTKS	- .33	- 2.12*	
Age	.03	.22		Age	- .10	- .73	
Model 2:			.23***	Model 2:			.19*
EVT-II	- .44	- 2.42*		ALI	.03	.23	
HTKS	- .04	- .24		HTKS	- .36	- 2.40*	
Age	.02	.12		Age	- .10	-. 75	
Language				Language			
Background	.10	.78		Background	.27	2.17*	

Note: EVT-II = Expressive Vocabulary Test, Second Edition. HTKS = Head Toes Knees Shoulders. ALI = Adaptive Language Inventory. Language background is defined as either monolingual or bilingual.
* p <.05. ** p < .01. *** p <.001.

Chapter 4

Discussion

In cases of child sexual abuse, there is rarely definitive medical or physical evidence available to investigators, therefore, criminal cases rely heavily on children's eyewitness accounts (London et al., 2005). Child witnesses who are unable to provide clear and skillfully constructed narratives may be at a major disadvantage, even if they are telling the truth. Bilingual children should be of special interest to researchers and investigators due to the unique linguistic and cognitive correlates of bilingualism (for a review see Akhtar & Menjivar, 2012). The present study aims to begin to bridge the gap between basic cognitive developmental research on bilingualism and applied eyewitness testimony research.

The primary goals of the present study were to examine whether a) the quality of event-specific narratives and b) resistance to suggestion differed among bilingual and monolingual preschool-aged children. Additionally, we were interested in determining whether language background (i.e., monolingual or bilingual) was an independent predictor of narrative quality and suggestibility. Children participated in a staged-pizza making event and were interviewed about their memory for the event approximately 1-week later. Individual difference factors (i.e., language skills and inhibitory control) were assessed using a battery of measures.

Narrative Quality. According Nelson and Fivush's (2004) social-cultural developmental theory, social and cultural factors in children's environments influence the development of autobiographical memory. Specifically, Nelson and Fivush stressed the significance of language development and its usage in social interactions such as

conversations. Previous research suggests that the quality of children's narratives is related to their language abilities (Kulkofsky & Klemfuss, 2008). Due to the linguistic disadvantages associated with bilingualism among young children, we predicted that bilingual pre-school aged children would score lower on various measures of language abilities and that their lower language abilities would in turn produce lower quality narratives. As discussed above, there were no significant group differences on the two language measures. Additionally, results failed to lend any support to the hypotheses that bilingual and monolingual children differed on the measure of narrative quality.

Suggestibility. Within the eyewitness testimony literature, there is evidence suggesting children with higher language abilities and higher executive functioning skills are better able to resist interviewers' suggestions (Bruck & Melnyk, 2004; Chae & Ceci, 2005; Clarke-Stewart, Malloy, & Allhusen, 2004; Roebers & Schneider, 2005). Given that bilingualism has been associated with increased executive functioning skills and decreased language abilities, we predicted higher executive functioning in bilingual children might help them filter out false suggestions. Alternatively, bilingual children's presumed delays in narrative abilities might make them more susceptible to suggestion. There were no significant group differences in inhibitory control or suggestibility and therefore results failed to support either hypothesis.

Individual Differences. Individual difference factors such as language ability and executive functioning are associated with children's ability to resist suggestion and their production of narratives (Bruck & Melnyk, 2004; Clarke-Stewart et al, 2004; Klemfuss, 2015; Kulkofsky and Klemfuss, 2008). Based on previous cognitive and linguistic research, we expected bilingual children would score higher on a measure of inhibitory

control (i.e., the HTKS task) and lower on measures of language abilities (i.e., the EVT-II and the ALI). No significant differences were found between groups on measures of inhibitory control, expressive vocabulary, general language abilities, narrative quality, and suggestibility.

Bilingualism as an Independent Predictor. Our final research questions of interest concerned whether bilingualism would significantly predict our two primary outcome measures, narrative quality and assents to suggestive questions. Our hierarchical regression analyses predicting narrative quality from language abilities, inhibitory control, age, and language background (coded as 0 = monolingual, 1 = bilingual) indicated measures of children's language abilities (i.e., EVT-II scores and ALI scores) were significant predictors of narrative quality. Additionally, when ALI scores were included in the model, age also significantly predicted narrative quality. Findings from these analyses did not support our hypothesis that bilingualism independently predicted the quality of children's event-specific narratives. Results indicate that children's language abilities and age are important mechanisms driving the quality of children's reports. These results are consistent with other research that has identified a link between language abilities and narrative quality (Kulkofsky & Klemfuss, 2008).

Our hierarchical regression analyses predicting assents to suggestive questions from language abilities, inhibitory control, age, and language background provide mixed results. Across both sets of analyses, children's inhibitory control abilities (measured with the HTKS task) significantly predicted assents to suggestive questions. In the second hierarchical regression analysis, language background was also a significant predictor. The results of both analyses suggest inhibitory control is an underlying mechanism

explaining children's ability to resist an interviewer's suggestions; this finding is consistent with previous research findings linking suggestibility and children's executive functioning skills (Alexander et al., 2002; Bruck & Melnyk, 2004; Karpinski & Scullin, 2009; Melinder, Endestad, & Magnussen, 2006; Poole, Brubacher, Dickinson, Liberty, & Kaake, 2014). Although the relationship between executive functioning and resistance to suggestion has not been clearly defined, researchers theorized they are related because both processes involve identifying a target event and ignoring details not encountered during the target event (Bruck & Melnyk, 2004). Since bilingualism significantly predicted the number of assents to suggestive questions children made independent of the other predictors in the second analysis, future work should focus on identifying other mechanisms associated with bilingualism that may be driving this effect.

Limitations and Future Directions. Although the present study represents an innovative line of research examining an understudied population within the eyewitness testimony literature, there are a number of limitations that need to be discussed.

The first limitation to address is the size and generalizability of our bilingual sample. Our bilingual sample was small (n = 34), thus increasing the probability of being underpowered in the present study. Additionally, children in our bilingual sample may not reflect all bilingual children who come before authorities with allegations of maltreatment. First, the majority of our bilingual sample consisted of Arabic-English bilingual children. Within the United States, Spanish is the second most commonly spoken language in the U.S. after English and therefore our predominantly Arabic-speaking sample is likely not representative of the bilingual children investigators come into contact with (Colby & Ortman, 2015). Inclusion criteria for our bilingual sample

modeled criteria used in previous research examining bilingual children's executive functioning skills, narratives, and language abilities (Barak, Moreno, & Bialystok, 2016; Bialystok et al., 2010; Calvo &Bialystok, 2014; Kupersmitt et al., 2014). Namely, bilingual children were only included in our sample if they: (a) did not have any language impairments, (b) spoke another non-English language at home with their family, (c) were enrolled in preschool or child care in an English-only setting, and (d) were able to understand and communicate in both languages. The purpose of using such selective inclusion criteria for our bilingual sample was to closely reflect real-world cases in which a bilingual child who is deemed able to communicate in English would be interviewed only in English by investigators. However, we know bilingualism occurs on a spectrum and is not always easily defined. For example, refer back to the marked differences in how Pearson (2002) and Lofranco et al. (2006) operationalized bilingualism within their samples. Although the strictness of our inclusion criteria means our sample is not entirely representative of bilingual children throughout the United States, including bilingual children who were unable to speak English fully would not have been ecologically valid since those children would likely be interviewed in their other language or with an interpreter present. Additionally, including bilingual children who only received exposure to a non-English language but did not speak it (e.g., the children in Lofranco et al., 2006) would not have fully reflected how the cognitive and linguistic changes associated with bilingualism affect performance in an analogue forensic interview. Future research investigating how varying degrees of bilingualism influences children's eyewitness testimony is needed.

A second limitation in the current study relates to the nature of the staged event and how it differs from the stressful experiences (e.g., maltreatment) children who come before investigators are typically discussing. This event was chosen for similar reasons outlined by Kulkofsky and colleagues (2008). First, the aschematic details were included so that children's memories were unique to the staged event versus drawing upon prior knowledge. Second, previous research suggests that bilingual children's receptive vocabulary knowledge for home-related words (e.g., food, household items, emotions) is significantly lower than monolingual children's, but both groups share a similar understanding of school-related words (e.g., professions, shapes, words reflecting school experiences; Bialystok et al., 2010). Additionally, since child maltreatment perpetrators tend to be family members or acquaintances (Finkelhor, 2012), children being forensically interviewed may be more likely to be asked about home-related concepts than school-related concepts and to discuss emotional reactions. Finally, children who undergo a forensic interview are typically asked to recall atypical events (e.g., sexual abuse) and the aschematic details in the event allowed us to ethically study children's memory in a similar, albeit less stressful, context.

Another limitation of the current study is both the staged event and interview were conducted in English. As mentioned previously, perpetrators of child maltreatment tend to be family members or acquaintances (Finkelhor, 2012), therefore forensic interviewers need to take into account the language being used during any instance(s) of maltreatment before interviewing a bilingual child. Based on the encoding specificity principle (Tulving, 1983; Tulving & Thompson, 1978), the retrieval of memories is optimal when the conditions present at recall match the conditions present at encoding. In

the context of this theory, language can be considered a retrieval cue for memory recall. Support for this argument comes from studies suggesting bilinguals' narratives undergo a variety of changes based on the language they are speaking during recall (e.g., Marian and Kaushanskaya, 2004; Schrauf, 2000; Wierzbicka, 2004). In the context of the present study, our inability to detect group differences may reflect stronger memory traces due to both the event and interview being conducted in English.

Children are often asked to recall emotional experiences, such as maltreatment, during forensic interviews and in court. Therefore, future research is needed on the extent to which bilingual children's eyewitness testimony differs as a function of the emotional valence of the event and the language used during the forensic interview. Language is the primary means through which we learn to identify and express our emotions; for bilingual individuals, this is often learned in two languages (Altarriba, Bauer, & Benvenuto, 1999). Among bilinguals, emotion is typically learned for the first time using their native language during childhood experiences, while second language acquisition typically takes place in more formal, educational settings (Bond & Lai, 1986; Dewaele, 2004; Silva, 2000). However, since bilinguals are able to encode and retrieve experiences in two languages, speaking in only one language limits their expressive abilities (Pérez-Foster, 1992). Schrauf (2000) conducted a review of the experimental and clinical literatures on autobiographical among consecutively bilingual adults, which he defines as individuals "who learn first one language through socialization in the 'mother culture', and, subsequently, a second language through socialization in a 'second culture'" (p. 387). Language-specific characteristics may also drive emotional expression in bilinguals. For example, Guttfreund (1990) found that participants reported feeling

greater affect in Spanish, regardless of whether participants were native Spanish speakers. Clinical psychologists have suggested conducting therapy with bilingual clients in their second language is potentially beneficial for discussing distressing events because it has a protective, emotionally-distancing effect that allows speakers to continue without becoming upset (for a review see Altarriba, 2014). Given the clinical and forensic implications, research is needed examining the degree to which the amount of information bilingual children provide about emotional events (e.g., trauma and maltreatment) differs based on language.

Conclusions and Forensic Implications. One of the major concerns expressed by child advocacy center (CAC) directors and forensic interviewers who have worked with bilingual children is the lack of completeness in their reports (Fontes & Tishelman, 2016). The primary goal of the present study was to examine differences in event-specific narrative quality and resistance to suggestion among bilingual and monolingual preschoolers. Findings did not indicate that bilingual children provided significantly lower quality reports or assented to interviewer suggestions more often than their monolingual peers. Future research should address the limitations discussed above in order to identify what factors may be driving the problems CAC directors and forensic interviewers report experiencing when working with bilingual children.

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Appendix A

Parental Informed Consent Form

Children's Storytelling and Event Memory

Principal Investigator: Dr. Kamala London, Ph.D., Professor

Kamala.London@utoledo.edu; 419-530-2352

Student Investigator: Christina O. Perez, Graduate Student

Christina.Perez@rockets.utoledo.edu; 419-530-2338

Purpose: Your child is invited to participate in a research project entitled, "Children's Storytelling and Event Memory" which is being conducted at the University of Toledo under the direction of Dr. Kamala London, Ph.D. In this study, we want to learn about how being bilingual affects the quality and amount of information children provide when asked to talk about a past event.

Description of Procedures: At a day/time your child's teacher/staff member approves, highly trained research assistants will visit your child's school or daycare site. Your child will be brought to a quiet public room or area (such as the main office, a conference room, a quiet corner of the classroom, etc.) that was approved for use by the administration. Groups of 4-8 children will participate in a pizza making event with a research assistant. The research assistant will teach the children the various steps involved in making a pretend pizza (made of felt), such as washing their hands and

picking out pizza toppings. Then, the child will complete two developmentally appropriate tasks individually with a second research assistant, such as a vocabulary task and a cognitive task. This session should last about 1 hour.

After a one-week delay, another trained research assistant will return to question the child about their memory for the pizza making event. Again, the session will take place in a quiet adjoining room approved by administrators. Then, the child will play two additional developmentally appropriate tasks with the research assistant. This session should last about 1 hour.

The developmentally appropriate tasks involved in this study include two picture vocabulary games, and two standard cognitive tasks (e.g., asking children to focus on two conflicting pieces of information at once and saying "happy" when they see a sad face or touching their toes when asked to touch their head). Administration of these tasks will be split up between session one and session two.

Some procedures in this study will be video recorded to ensure that the researcher can devote their full attention to the child. These procedures include the pizza making event, the two language measures, the two inhibitory control tasks, and the memory interview. All video recordings will be stored in a locked research laboratory at the University of Toledo and only trained researchers will have access to these files. All identifying information (such as names) will be removed from the videos to ensure confidentiality.

The video recordings may be used for professional or educational purposes, such as training new research assistants, but will not be used for commercial purposes.

Permission to record: Do you agree to allow us to video record the study procedures outlined above?

- ❑ YES Initial here: _____
- ❑ NO Initial here: _____

After the child has completed their participation, the research team will debrief you about the data, theory and research area under study and answer any questions you may have about the research.

As part of this study, we will also administer two instruments to parents/guardians and school teacher/daycare staff members. If the child is ***bilingual***, a short demographic interview asking about the child's language background will be conducted over the phone with the child's parent/guardian. This interview should last about 15-30 minutes. Teachers/daycare staff members will be given a short 18-item measure to complete regarding every child's use of language in the classroom.

Potential Risks: There are minimal risks to participation in this study, including loss of confidentiality. Your child may become tired or bored of certain tasks. If so, the child may stop participation at any time.

Potential Benefits: Children generally enjoy interacting with the research assistants and taking part in research studies. Additionally, it is expected that children will enjoy pretending to make a pizza. Others may benefit by learning about the results of this research.

Confidentiality: The researchers will make every effort to prevent anyone who is not on the research team from knowing that you provided this information, or what that information is. The consent forms with signatures will be kept separate from responses, which will not include names and which will be presented to others only when combined with other responses. Although we will make every effort to protect your confidentiality, there is a low risk that this might be breached.

Voluntary Participation: Your refusal to participate in this study will involve no penalty or loss of benefits to which you are otherwise entitled and will not affect your relationship with The University of Toledo or your child's school. In addition, you may discontinue participation at any time without any penalty or loss of benefits. If you opt not to participate, your child will participate in their regular classroom activities instead of this activity.

Contact Information: Before you decide to accept this invitation to take part in this study, you may ask any questions that you might have. If you have any questions at any time before, during or after your participation you should contact a member of the

research team, Christina Perez, 419-530-2338 (Christina.Perez@rockets.utoledo.edu), or her faculty advisor, Dr. Kamala London, 419-530-2352.

For bilingual parents, we also have trained research assistants available to speak with you and answer any questions you may have in Arabic, Hindi, and Spanish.

If you have questions beyond those answered by the research team or your rights as a research subject or research-related injuries, the Chairperson of the SBE Institutional Review Board may be contacted through the Office of Research on the main campus at (419) 530-2844.

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over.

SIGNATURE SECTION – Please read carefully

You are making a decision whether or not you or your child will participate in this research study. Your signature indicates that you have read the information provided above, you have had all your questions answered, and you have decided to take part in this research.

The date you sign this document to enroll in this study, that is, today's date must fall between the dates indicated at the bottom of the page.

Name of Child (please print)	Signature	Date of Birth
Name of Person Obtaining Consent	Signature	Date

This Adult Research Informed Consent document has been reviewed and approved by the University of Toledo Social, Behavioral and Educational IRB for the period of time specified in the box below.

Approved Number of Subjects: 150

Appendix B

Children's Storytelling and Event Memory: Bilingual Children Screening form

In order to qualify for the study, children cannot have a language impairment and parents must say YES to questions 2-4.

1. Does your child have any language impairments? **YES NO**

(e.g., a stutter, problems with pronunciation, etc.)

2. Does your child mainly speak another language (not English) at home? **YES NO**

(e.g., Arabic, Spanish, French, etc.)

If yes, what languages does your child speak?

_____

3. Is your child receiving education/child care in an English setting? **YES NO**

4. Is your child proficient in both languages (English and other language)? **YES NO**

(e.g., they can speak and understand both languages)

Appendix C

Children's Storytelling and Event Memory: Pizza Making Script

Record the following information on a whiteboard and film the whiteboard at the beginning of the video tape.

Participant IDs:

Date:

Event RA Initials:

(Make sure to fill this information above as well.)

Section I. SETTING UP

Before bringing the children into the room, make sure that you have all the supplies set up and ready to go. The list of supplies includes:

- ❑ Event chef outfit (hat and apron)
- ❑ Chef hats for kids (8)
- ❑ Pizza and toppings (cheese, tomatoes, onions, peppers, sardines, mushrooms, and olives)
- ❑ "Cooked" pizza
- ❑ Stickers
- ❑ Plastic plates

- ❑ Colored placemats (8)
- ❑ Magic refrigerator
- ❑ Shoe
- ❑ Chopsticks
- ❑ Hairbrush
- ❑ Chalkboard eraser
- ❑ Box for hats

Section II. PIZZA MAKING EVENT

Hi everyone, my name is _____. I'm here today to play a game with you. We're going to be pretending to be chefs and make a pizza today. Before we get started, you all need to put on your chef hats!

[Let children choose a hat from the box of hats and put it on themselves. Put on your own chef hat and apron.]

The first step in making a pizza is washing our hands. I don't have any soap or water with me, so we'll just have to use this eraser instead.

[Pull chalkboard eraser out of bag and rub it on your hands to wash it. Then pass it around to the children to do the same.]

Great! This is the pizza crust we will be using today to make our pretend pizza. [Show it so that all the children can see it.] **We will also be putting these different toppings on the pizza. First, we have cheese. Everyone see the cheese?** [Hold up the cheese so that all the children can see it.] **Here we have the tomatoes, everyone see the tomatoes?** [Continue labelling the remaining toppings and showing them to the children.]

Now I want you to each pick two toppings to put on the pizza. [Take turns allowing each child to pick two toppings and giving it to them.]

It's time to put the toppings on the pizza now. [Take turns having each child put their toppings onto the pizza crust.]

I'm going to bake the pizza in this magic refrigerator. While we wait for the pizza to cook, we should set the table. [Place the pizza in the "refrigerator" and then give each child a colored placemat and a paper plate to set their place at the table.]

Gee, you know what I forgot to do today? I forgot to brush my teeth! I better do that now! [Pull the hairbrush out of your bag and pretend to brush your teeth.]

Now that I've taken care of that, we can move on! You all did a nice job setting the table. I have some stickers here for you guys to decorate your plates. When we're done making the pizza today, you can take your plates home with you. [Give each child a couple of stickers to decorate their plate.]

Oh my goodness! I forgot how long I needed to bake the pizza. I'd better call my friend Max, he knows all about pizza. [Take the shoe out from your bag and pretend to make a phone call.] **Hello, Max, this is _____. Yes, I want to know how long I should bake my pizza. OHH!! Okay!!** [Put down shoe and direct your attention back to the children.] **Max says we should take the pizza out right now or it might burn!**

[Go to the "magic refrigerator" and take out the "cooked" pizza out of view of the children.] **I need to cut this into pieces now. Let me get my chopsticks to cut it.** [Grab the chopsticks from your bag and pretend to cut the pizza while remaining out of view of the children. When you're done, place a slice of pizza on each child's plate. Pretend to eat the pizza briefly with the children before ending the event.]

Thank you all so much for learning how to make that pizza with me! I will escort you all back to your class and then you will come play some games with my friends _____ and _____ one by one.

[Have children take their hats off and head back to their classrooms. Make sure they all take their decorated plates with them.]

Appendix D

Head Toes Knees Shoulders (HTKS) Task Script – FORM A

INSTRUCTIONS: Administer the task while you are seated and the child is standing about 3 feet from you throughout the entire task. The person symbol indicates to demonstrate the correct body motions. If the child produces the correct response immediately, score the item "2". If they self-correct right away, without prompting, score the item "1". If they do not touch the correct part of their body at all, score the item "0".

PART I TRAINING:

Now we're going to play a game. The game has two parts. First, I want you to copy what I do. Touch your head.

Wait for the child to put BOTH his/her hands on head.

Good! Now touch your toes.

Wait for the child to put his/her hands on toes.

Good!

Repeat the two commands with motions again, or until the child imitates you correctly.

Now we're going to be a little silly and do the opposite of what I say. When I say to touch your head, instead of touching your head, you touch your toes. When I say to

touch your toes, you touch your head. So you're doing something different from what I say.

A1. What do you do if I say "touch your head"?		
0 (other than toes)	1 (self-corrects)	2 (toes)

- If s/he hesitates or responds incorrectly, say: **Remember, when I say to touch your head, you touch your toes, so you are doing something different from what I say. Let's try again.** [Repeat A1 again.]
- If s/he responds correctly, say and proceed to A2: **That's exactly right.**

A2. What do you do if I say "touch your toes"?		
0 (other than head)	1 (self-corrects)	2 (head)

- If s/he hesitates or responds incorrectly, say: **Remember, when I say to touch your toes, you touch your head, so you are doing something different from what I say. Let's try again.** [Repeat A2 again.]
- If s/he responds correctly, say and proceed to B2: **That's exactly right.**

You may re-explain (use EXPLANATION above) up to three times in the TRAINING (A1-A2) and PRACTICE (B1-B4) sections. If you have already given two explanations during the TRAINING questions, then you may correct them only once more in the PRACTICE items. If the child cannot do the task after the third explanation, administer the 10 test items anyway.

PART I PRACTICE:

	Incorrect	Self-Correct	Correct
B1. **Touch your head**	0 (other than toes)	1	2 (toes)
B2. **Touch your toes**	0 (other than head)	1	2 (head)
B3. **Touch your head**	0 (other than toes)	1	2 (toes)
B4. **Touch your toes**	0 (other than head)	1	2 (head)

PART I TESTING:

We're going to keep playing this game, and you keep doing the opposite of what I say.

If the child does not understand the task, you will have gone through the directions at most four times (once at the beginning, and up to three times in the TRAINING and PRACTICE sections). **DO NOT explain again after testing begins.**

	Incorrect	Self-Correct	Correct
1. **Touch your head**	0 (other than toes)	1	2 (toes)
2. **Touch your toes**	0 (other than head)	1	2 (head)
3. **Touch your toes**	0 (other than toes)	1	2 (head)
4. **Touch your head**	0 (other than toes)	1	2 (toes)
5. **Touch your toes**	0 (other than head)	1	2 (head)
6. **Touch your head**	0 (other than toes)	1	2 (toes)
7. **Touch your head**	0 (other than toes)	1	2 (toes)

	Incorrect	Self-Correct	Correct
8. **Touch your toes**	0 (other than head)	1	2 (head)
9. **Touch your head**	0 (other than toes)	1	2 (toes)
10. **Touch your toes**	0 (other than head)	1	2 (head)

SELF-CORRECTION DEFINITION: Mark "self-correct" on both the training and testing portion if the child makes *any discernible* motion toward the *incorrect* answer, but then changes his/her mind and makes the correct response. Pausing to think, not moving, and then responding correctly does *not* count as a self-correction.

PART II TRAINING:

Administer Part II if the child responds correctly (include self-corrects) to 5 or more items on Part I of the

task, or if child is in kindergarten or beyond.

Ok, now that you've got that part, we're going to add a part. Now, you're going to touch

your shoulders and your knees. First, touch your shoulders.

Touch your shoulders; wait for the child to touch his/her shoulders

with both hands.

Now touch your knees.

Repeat with four alternating commands (no demo) until the child has followed the commands correctly

or it is clear the child does not comprehend the task.

Ok, now we're going to be silly again. You're going to keep doing the opposite of what I say like

before. But this time, you're going to touch your knees and shoulders. When I say to touch your

knees, you touch your shoulders, and when I say to touch your shoulders, you touch

C1. What do you do if I say "touch your knees"?		
0 (other than shoulders)	1 (self-corrects)	2 (shoulders)

your knees.

- If s/he hesitates or responds incorrectly, say and proceed to D1: **Remember, when I say to touch your knees, *instead* of touching your knees, you touch your shoulders. I want you to do the opposite of what I say.**
- If s/he responds correctly, say and proceed to D1: **Good job! Let's practice.**

PART II PRACTICE:

	Incorrect	Self-Correct	Correct
D1. **Touch your knees**	0 (other than shoulders)	1	2 (shoulders)
D2. **Touch your shoulders**	0 (other than knees)	1	2 (knees)
D3. **Touch your knees**	0 (other than shoulders)	1	2 (shoulders)
D4. **Touch your shoulders**	0 (other than knees)	1	2 (knees)

If the child responds incorrectly, say NOT MORE THAN ONCE: **Remember, if I say to touch your knees, you touch your shoulders, and if I say to touch your shoulders, touch your knees. Do the opposite of what I say.**

Proceed to Part II test section. Do not explain any parts of the task again.

PART II TESTING:

Now that you know all the parts, we're going to put them together. You're going to keep doing the

opposite of what I say to do, but you won't know what I'm going to say.

There are four things I could say.

If I say to touch your head, you touch your toes.

If I say to touch your toes, you touch your head.

If I say to touch your knees, you touch your shoulders.

If I say to touch your shoulders, you touch your knees.

Are you ready? Let's try it.

	Incorrect	Self-Correct	Correct
11. **Touch your head**	0 (other than toes)	1	2 (toes)
12. **Touch your toes**	0 (other than head)	1	2 (head)
13. **Touch your knees**	0 (other than shoulders)	1	2 (shoulders)
14. **Touch your toes**	0 (other than head)	1	2 (head)
15. **Touch your shoulders**	0 (other than knees)	1	2 (knees)
16. **Touch your head**	0 (other than toes)	1	2 (toes)
17. **Touch your knees**	0 (other than shoulders)	1	2 (shoulders)
18. **Touch your knees**	0 (other than shoulders)	1	2 (shoulders)
19. **Touch your shoulders**	0 (other than knees)	1	2 (knees)
20. **Touch your toes**	0 (other than head)	1	2 (head)

After the child completes the task, say: **You did a great job!**

HTKS Scoring

Entering scores by item into your data analysis software is recommended. Below are directions for

obtaining training and practice performance, self-correct data, and final scores to be used in analyses

(Range: 0 – 40).

A) Sum of items A1-A2: _____ **C) Score on C1: _____**

B) Sum of items B1-B4: _____ **D) Sum of items D1-D4: ____**

TRAINING AND PRACTICE (Sum A-D): _____

SELF-CORRECTS (Number of items scored as "1" in items 1-20): _____

Final scores for analyses:

1) PART I (Sum items 1-10): _____

2) PART II (Sum items 11-20): _____

FINAL HTKS SCORE (Sum of Part I and Part II): _____

Appendix E

Interview Script

Record the following information on a whiteboard and film the whiteboard at the beginning of the video tape.

Participant ID:

Date:

Interviewer Initials:

(Make sure to fill this information above as well.)

Section I. RULES OF INTERVIEW

Hi, [child's name], my name is _____. My job is to talk to children about things that have happened to them. As you can see [point to video camera]**, we have a video camera here. Sometimes I forget things and the camera allows me to listen to you with having to write everything down.**

So, before we begin, I want to make sure that you know the difference between things that are TRUE and NOT TRUE. If I say that my shoes are red (or another color if your shoes are red) is that true or not true?

If the answer was correct, say: **Great! I see that you know what telling the truth means!**

If the answer was incorrect, say: **That would not be true, because my shoes are really** [black/blue/etc.]**.**

And if I say that I am sitting down now, would that be true or not true?

If the answer was correct, say: **It would be true, because you can see I am sitting down.**

If the answer was incorrect, say: **That would not be true, because you can see I am really sitting down.** [black/blue/etc.]**.**

When we talk today, you should only tell me about things that are REALLY true and that REALLY happened to you.

If I ask you a question that you don't understand, just say, "I don't understand." Okay?

If I ask a question, and you don't know the answer, just tell me "I don't know". So, if I ask you, "What is my dog's name?", what would you say?

If the child says "I don't know", say: **Right! You don't know my dog's name, do you?**

If the child offers a guess, say: **That would not be true, because I haven't told you my dog's name.**

And if I say things that are wrong, you should tell me. Okay?

So if I said you are a 2-year-old girl [when interviewing a 5-year-old boy, etc]**, what would you say?**

If the child says that's wrong, say: **That's right.**

If the child doesn't correct you, say: **How old are you?** [Wait for an answer.]

And are you a boy or a girl? [Wait for an answer.]

Now you know you should tell me if I make a mistake or say something that is wrong.

Section II. RAPPORT BUILDING (NARRATIVE PRACTICE)

Now I want to get to know you better.

Tell me about things you like to do.

[You said you like ___. Tell me more about ___.] [Follow up on 1 response]

Tell me about things you don't like to do.

[You said that you don't like ___. Tell me more about ___.] [Follow up on 1 response.]

Tell me about all the things that you've done TODAY, from the time you woke up until you came here and met me. [Follow up with **3** of the prompts below.]

1. **You told me you** [activity mentioned by child]. **Tell me more about** [activity mentioned by child].

2. **Then what happened?**

3. **Tell me everything that happened after** [some activity/event mentioned by the child] **until you came here.**

4. **What was the *very next thing* that happened after** [some activity/event mentioned by the child]**?**

[You should use **THREE** of these follow-up prompts (above).]

You did a great job telling me everything about the things you did today. I want you to know that it is VERY IMPORTANT to tell me EVERYTHING you remember about things that have REALLY happened to you.

Section III. FREE RECALL ABOUT STAGED EVENT

Now that I know you a little better, let me tell you why I've come to talk to you today.

I know that a lady/man came and taught you how to make a pizza. I wasn't there, but I'd like to know ALL about what happened. Tell me everything that happened from the beginning to the end as best as you can. [Take brief notes in this space here and on the next page if needed so you can keep track of details.]

Section IV. FOLLOW-UP QUESTIONS

Follow up with **ALL** the information reported by the child (e.g., activities, people, location, items present) and encourage elaborative reporting. Try to be systematic about this by focusing on one event and its associated details *until the child indicates s/he can recall no more.*

Use the following prompts:

Remember to REPEAT WHAT THE CHILD HAS SAID, USING HIS/HER WORDS and remember not to provide details (including names) that the child hasn't mentioned.

1. **You said that you** [something the child said, e.g., wearing a chef's hat]. **Tell me everything about that.**

2. **You said something about** [something the child said, e.g., the lady using a shoe to make a phone call]. **Tell me everything about that.**

3. **And then what happened?** [You can use this prompt several times until you get an overview of the incident]

4. **Tell me some more things about** [something or event mentioned by child] [You can use this prompt several times.]

If the child doesn't provide much information or if they get distracted, here are some good prompts:

"I don't understand what the lady taught you about making a pizza. Tell me everything about that so I can understand."

"Think back to when you learned how to make a pizza and tell me everything that you can remember."

BEFORE MOVING ON TO DIRECT/SPECIFIC QUESTIONS:

Is there anything else you can remember? [If child discloses anything else, follow up with appropriate prompts.]

Section V. DIRECT/SPECIFIC QUESTIONS

I know I've asked you a lot about what happened when the lady/man taught you how to make a pizza, but I need to ask you just a few more questions just to make sure I really understand what happened. [Make sure to use the correct pronouns below if the RA was a male.]

[Ask these questions one at a time. Wait for the child to respond before moving on to the next question. Only repeat the question if the child asks you to (e.g., they didn't hear you the first time) or if the child isn't paying attention.]

1. Who did you play the game with? [If the child says "My friends" or "The other kids" or a similar response then ask, "What are the names of the friends you played with?"]

2. I heard you all wore funny hats. What color hat did you wear?

3*. My friend said the lady also wore an apron and gloves. Were her gloves blue or yellow?

4*. Before cooking, you have to wash your hands. You used soap and water to clean your hands, right?

5. I heard the lady brought lots of toppings for the pizza. What kinds of toppings did she bring?

6*. What kind of pop did she bring to drink?

7. How did she bake the pizza?

8*. I heard the lady brushed her teeth. The lady used a tooth brush to brush her teeth, right?

9*. I also heard she gave you a sticker. Did she put the sticker on your face or your knee?

10. How did she know when the pizza was done baking?

11*. The lady gave you plastic trays to eat the pizza on, right?

12*. When the pizza was done baking, did she cut it up with scissors or a knife?

13. What did you do with the baked pizza?

Section VI. END OF INTERVIEW

Thank you for talking to me today, ____! You've told me lots about what happened when the lady taught you how to make a pizza and I want to thank you for helping me.

Is there anything else you want to tell me?

Appendix F

Language in the Classroom

We are interested in the child's verbal ability as evidenced in this childcare setting. Please answer the following questions carefully based on your experience with the child. Please **do not** leave any questions unanswered; make a **best guess** based on your experience with the child.

The child...	Well Below Average	Somewhat Below Average	Average for His/Her Age	Somewhat Above Average	Well Above Average
1. is able to carry out your directions well.	1	2	3	4	5
2. recalls and communicates personal experiences he/she has had to peers in a logical way.	1	2	3	4	5
3. will try repeatedly to communicate information which has not been understood by caregivers.	1	2	3	4	5
4. talks spontaneously and easily to peers.	1	2	3	4	5
5. is a good listener in conversations with peers.	1	2	3	4	5
6. attends to and reacts appropriately to stories which are read to him/her.	1	2	3	4	5

The child...	Well Below Average	Somewhat Below Average	Average for His/Her Age	Somewhat Above Average	Well Above Average
7. recalls and communicates the meaning of a story or other experiences/events which he/she has heard.	1	2	3	4	5
8. asks questions about information which is unclear to him/her.	1	2	3	4	5
9. is easily understood when he/she is talking to peers.	1	2	3	4	5
10. talks spontaneously and easily to adults.	1	2	3	4	5
11. listens carefully when you are giving instructions to him/her.	1	2	3	4	5
12. instructs peers in tasks which need to be done in a certain order.	1	2	3	4	5
13. responds to questions asked of him/her in a thoughtful logical way.	1	2	3	4	5
14. is easily understood when he/she is talking to you.	1	2	3	4	5
15. is a good listener in conversations with adults.	1	2	3	4	5

The child...	**Well Below Average**	**Somewhat Below Average**	**Average for His/Her Age**	**Somewhat Above Average**	**Well Above Average**
16. works well with instructional materials when placed on his/her own with little or no help from you.	1	2	3	4	5
17. relates and communicates personal experiences in a logical way or "in a way that makes sense."	1	2	3	4	5
18. rephrases questions or asks follow-up questions if he/she does not get the information he/she wanted.	1	2	3	4	5

Appendix G

Alberta Language Environment Questionnaire (ALEQ)

Thank you for agreeing to participate in our study! We are very interested in learning more about bilingual children's language usage at home. Please circle your answers or write your answers to questions in the spaces provided.

For this survey, the Mother Tongue (MT) refers to the non-English language your child speaks. For example, Spanish or Arabic would be considered a Mother Tongue.

What language, besides English, does your child speak? _____

A. QUESTIONS FOR CHILD'S *MOTHER*:

2. How much English do you speak? (

0 **Not fluent in English** No understanding or speaking ability	**1** **Limited fluency in English** Some understanding and can say short, simple sentences	**2** **Somewhat fluent in English** Good understanding and can express myself on many topics	**3** **Quite fluent in English** Can understand and use English adequately for work and most other situations	**4** **Very fluent in English** Understand almost everything. Very comfortable expressing myself in English in all situations
	Example: can answer the phone in English	Example: can go to the doctor and explain what is wrong	Example: can communicate effectively with teachers at parent-	

			teacher interviews; can follow movies or TV shows	

Comments/descriptions of abilities in English:

	ENG never MT always	ENG seldom MT usually	ENG 50% MT 50%	ENG usually MT seldom	ENG almost always MT almost never
3. What language(s) does the mother speak with the child?	**0**	**1**	**2**	**3**	**4**
4. What language(s) does the child speak with the mother?	**0**	**1**	**2**	**3**	**4**

	Mostly Mother Tongue	Mostly English
5. What language does the mother speak <u>most often</u> with the other people in your home?	**0**	**4**

B. <u>QUESTIONS FOR CHILD'S *FATHER*:</u>

9. How much English does the child's father speak?

0 **Not fluent in English** No understanding or speaking ability	1 **Limited fluency in English** Some understanding and can say short, simple sentences	2 **Somewhat fluent in English** Good understanding and can express myself on many topics	3 **Quite fluent in English** Can understand and use English adequately for work and most other situations	4 **Very fluent in English** Understand almost everything. Very comfortable expressing myself in English in all situations
	Example: can answer the phone in English	Example: can go to the doctor and explain what is wrong	Example: can communicate effectively with teachers at parent-teacher interviews; can follow movies or TV shows	

Comments/descriptions of abilities in English:

	ENG never MT always	**ENG seldom MT usually**	**ENG 50% MT 50%**	**ENG usually MT seldom**	**ENG almost always MT almost never**
10. What language(s) does the father speak with the child?	**0**	**1**	**2**	**3**	**4**
11. What language(s) does the child speak with the father?	**0**	**1**	**2**	**3**	**4**

	Mostly Mother Tongue	**Mostly English**
12. What language does the father speak <u>most often</u> with the other people in your home?	**0**	**4**

C. <u>QUESTIONS TO PARENT(S) ABOUT *OTHER ADULT FAMILY MEMBERS* IN THE HOME:</u>

15a. Are there other adult relatives in the home? (e.g., grandparents) Yes No

15b. If yes, how many? _____

16. If yes, if one of these adults the child's primary caregiver? Yes No

17. If yes, what language(s) does the primary caregiver speak with the child?

0 ENG never MT always	**1 ENG seldom MT usually**	**2 ENG 50% MT 50%**	**3 ENG usually MT seldom**	**4 ENG almost always MT almost never**	**Score: _____/__4__ – Include in Language Use Score (on page 7)**

18. If applicable, what language(s) does the child speak with the primary caregiver?

0 ENG never MT always	**1 ENG seldom MT usually**	**2 ENG 50% MT 50%**	**3 ENG usually MT seldom**	**4 ENG almost always MT almost never**	**Score: _____/__4__ Include in Language Use Score (on page 7)**

19a. If there are other adults in the home (who are not the primary caregiver), do they regularly interact with the child? Yes No

19b. If yes, what language(s) does the adult relative(s) speak with the child?

0 ENG never MT always	**1 ENG seldom MT usually**	**2 ENG 50% MT 50%**	**3 ENG usually MT seldom**	**4 ENG almost always MT almost never**

20. If applicable, what language(s) does the child speak with the adult relative(s) (who are not the primary care giver)?

0 ENG never MT always	**1 ENG seldom MT usually**	**2 ENG 50% MT 50%**	**3 ENG usually MT seldom**	**4 ENG almost always MT almost never**

C. QUESTIONS TO PARENT(S) ABOUT *OTHER CHILDREN* IN THE HOME:

21. Does the child have brothers or sisters? Yes No

If yes, answer questions 22-27.

22. Sibling 1: Older Younger

Gender: Male Female

Age: _____

23. What language(s) does Sibling 1 speak with the child?

0 ENG never MT always	**1 ENG seldom MT usually**	**2 ENG 50% MT 50%**	**3 ENG usually MT seldom**	**4 ENG almost always MT almost never**

24. What language(s) does the child speak with Sibling 1?

0 ENG never MT always	**1 ENG seldom MT usually**	**2 ENG 50% MT 50%**	**3 ENG usually MT seldom**	**4 ENG almost always MT almost never**

25. Sibling 2: Older Younger

Gender: Male Female

Date of birth: ____/____/_____

26. What language(s) does Sibling 2 speak with the child?

0 **ENG never** **MT always**	**1** **ENG seldom** **MT usually**	**2** **ENG 50%** **MT 50%**	**3** **ENG usually** **MT seldom**	**4** **ENG almost always** **MT almost never**

27. What language(s) does the child speak with Sibling 2?

0 **ENG never** **MT always**	**1** **ENG seldom** **MT usually**	**2** **ENG 50%** **MT 50%**	**3** **ENG usually** **MT seldom**	**4** **ENG almost always** **MT almost never**

***** If child has more siblings, continue with questions 35-40**

until all siblings are included – see Appendix***

Appendix: For ADDITIONAL SIBLINGS:

35. Sibling 3: Older Younger

Gender: Male Female

Age: _____

36. What language(s) does Sibling 3 speak with the child?

0 ENG never MT always	**1 ENG seldom MT usually**	**2 ENG 50% MT 50%**	**3 ENG usually MT seldom**	**4 ENG almost always MT almost never**

37. What language(s) does the child speak with Sibling 3?

0 ENG never MT always	**1 ENG seldom MT usually**	**2 ENG 50% MT 50%**	**3 ENG usually MT seldom**	**4 ENG almost always MT almost never**

38. Sibling 4: Older Younger

Gender: Male Female

Age: _____

39. What language(s) does Sibling 4 speak with the child?

0 ENG never MT always	**1 ENG seldom MT usually**	**2 ENG 50% MT 50%**	**3 ENG usually MT seldom**	**4 ENG almost always MT almost never**

40. What language(s) does the child speak with Sibling 4?

0 **ENG never** **MT always**	**1** **ENG seldom** **MT usually**	**2** **ENG 50%** **MT 50%**	**3** **ENG usually** **MT seldom**	**4** **ENG almost always** **MT almost never**