NARRATIVE ABILITIES IN BILINGUAL CHILDREN WITH AUTISM

by

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Abstract

Storytelling requires the integration of cognitive, linguistic, and sociocultural knowledge, and because autism undercuts competence in each of these domains, narratives provide a valuable means to investigate the nature of such deficits in autism. This is the first study on narrative abilities in bilingual children with autism, which will contribute to our knowledge of language development and the effects of bilingualism in this population. The study compares the narrative abilities of 13 monolingual English children with autism, 10 bilingual Mandarin-English children with autism, and 9 typically-developing bilingual Mandarin-English children matched on nonverbal intelligence and language ability. All children were asked to tell a story based on the wordless picture book, *Frog, Where are You?* (Mayer, 1969), and the bilingual children were asked to generate a story in both languages. The narratives were analyzed according to their global structure, local linguistic structure, and the child’s ability to provide evaluative comments.

Comparisons between the monolingual children with autism and bilingual children with autism revealed no group differences, suggesting that bilingualism is not likely to have a negative effect on language development in children with autism. Comparisons between the two bilingual groups on the global structure revealed that bilingual children with autism included fewer story episodes and fewer types of orientation. However, both groups were able to grasp the theme of the story. With regard to the local structure, bilingual children with autism told stories of similar length, but employed less complex syntax and fewer types of conjunction, and also made more reference errors than their typically developing peers. Finally, the two groups did not differ significantly on the evaluative aspects of narratives. Results of this study demonstrated that bilingual children with autism did find certain aspects
of narrative challenging, but their performance was comparable to that of monolingual children with autism, suggesting that bilingualism does not further impede language development in this population and that verbal children with autism have the capacity to be bilingual.
Preface

This research was approved by the UBC Behavioural Research Ethics Board. The Certificate Number of the Certificate of Approval is H10-00128. No part of this thesis has been submitted for publication yet.
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Dedication

This study is dedicated to KW, the wonderful child who first inspired me to ask these questions.
1 Introduction

People around the world tell stories and the ability to tell a story emerges early in the development of children (Applebee, 1978; Ochs & Capps, 1996; Berman & Slobin, 1994; Peterson & McCabe, 1983). From an early age, children begin to tell personal narratives, which allow them to organize their experiences, and provide a window into the children’s perceptions of their own self and the world (Bruner, 1986; Losh & Capps, 2003). More importantly, narratives “are not simply accounts of something that has happened, but accounts of events from a very human point of view” (Peterson & McCabe, 1983, p. 1). In telling a story, the narrator not only orders events along a temporal axis, but also provides evaluative comments that give meaning to the individual events (Bamberg & Damrad-Frye, 1991). In other words, evaluative comments identify “the point of the narrative” (Labov & Waletzky, 1967). Furthermore, narrative practices are culturally grounded and presuppose considerable interpersonal awareness between speakers (Loveland & Tunali-Kotoski, 2005). The sequencing of otherwise disconnected events in time and their rendering from a particular perspective in a social-cultural context require the integration of cognitive, linguistic, and social cultural knowledge and abilities, making narratives a valuable tool for the assessment of children’s communicative competence (Losh & Capps, 2003; Botting, 2002). Thus, in recent years, researchers have begun to investigate narrative ability in children with Autism, whose hallmark characteristic is social communication impairments (e.g., Loveland, McEvoy, Tunali, & Kelley, 1990; Tager-Flusberg, 1995; Capps, Losh, & Thurber, 2000; Norbury & Bishop, 2003). However, there has been no research on narrative abilities of bilingual children with autism. In fact, little is known about bilingual language development in this population in general, and yet parents are often advised to restrict
language input to English, based on the notion that “simplifying” the linguistic input can facilitate the learning and use of the language of choice (Kremer-Sadlik, 2005). From both a theoretical and clinical perspective, it would be interesting to investigate the effects of bilingualism on the narratives of children with autism. The study of narrative competence in bilingual children with autism will fill the gap in current knowledge, and in turn equip clinicians to better serve these children and their parents.

1.1 Development of Narrative Discourse

Narrative discourse is found in all cultures and pervades our daily living, existing in forms such as self-generated stories, recounting of personal experiences, fairy tales, and retelling of movies. Furthermore, narrative production allows us to organize and make sense of our experiences in the world (Westby, Dongen, & Maggart, 1989). “Evidence strongly suggests that humans in all cultures come to cast their own identity in some sort of narrative form. We are inveterate story tellers” (Flanagan, 1993, p. 198).

Unlike other discourse genres, such as conversation, a narrative is distinguished in the way that it is a social monologue maintained by one speaker to capture and hold the listener’s attention (Owens Jr., 1996). It is an extended unit of text, organized in a coherent and cohesive manner, to relate events that are linked with one another temporally or causally. To make a narrative coherent, the speaker uses a story schema, or a template that represents the knowledge about how stories are organized, to “structure the story into a culturally defined sequence” (Shapiro & Hudson, 1997, p. 23). The Western story schema typically includes a formal beginning (e.g., once upon a time), setting to introduce characters, internal responses (e.g., thoughts and feelings), a problem and resolution, and an ending. Story cohesion is established by employing linguistic devices, such as pronominal referencing and temporal
and causal conjunctions, to tie a span of sentences together on a micro level (Shapiro & Hudson, 1997). Moreover, narratives are relatively decontextualized, in that they relate events that do not centre on some shared experience within the immediate context (Owens Jr., 1996). Hence, the narrator must be mindful of the information needed by the listener.

Narratives are not only sequentially ordered accounts of events, but are told with a point. According to Labov and Walezky (1967), the evaluative dimension of narratives allows the narrator to evaluate story events from a particular perspective and involves strategies for maintaining audience involvement. Narrators use evaluative devices, such as descriptions of mental states and explanations of motives of actions, to communicate their attitudes toward characters and events, and how the events are related to each other (Bamberg & Damrad-Frye, 1991; Labov & Walezky, 1967; Peterson & McCabe, 1983; Reilly, Bates & Marchman, 1998). Therefore, evaluation gives meaning to the individual events and contributes to narrative coherence. Furthermore, evaluative devices, such as onomatopoeia, character speech, intensifiers, and audience hookers, serve to capture and maintain the listener’s attention (Reilly, Losh, Bellugi, & Wulfeck, 2004). In summary, “the evaluative component of narrative represents the narrator’s perspective, illuminates the relational significance of narrated events” (Losh & Capps, 2003), and makes a story worthy of the listener’s interest. In other words, the evaluative function of narrative points to why we tell stories and why we listen to stories.

Therefore, telling a well-organized and meaningful narrative that serves the purpose of the narrator and engages the listener requires sophisticated cognitive, linguistic, and social skills. Even though narrative abilities emerge relatively early, they continue to develop into adulthood as individuals acquire these necessary skills (e.g., Applebee, 1978; Bamberg &
Children as young as two-and-a-half years can produce rudiments of a story to talk about things that have happened to them, but these stories tend to center on certain highlights in their experience and lack sequencing and identifiable plot structure (Applebee, 1978; Nelson, 1989; Owens Jr., 1996). Similarly, in telling third-person narratives, such as picture-based narrative elicitations, young preschoolers demonstrate a good awareness of the pragmatics of telling stories, and can relate dynamic events (Berman & Slobin, 1994). However, they tend to treat each scene as an isolated event, and consequently, their narratives lack an explicitly motivated plot. Later on, children start to chain events sequentially, demonstrating competence of temporal organization of series of events (Peterson & McCabe, 1983; Berman & Slobin, 1994).

As children continue to develop their narrative abilities, linguistic cohesion and thematic coherence improve. Their narratives progressively become “causally structured in terms of a hierarchically organized goal plan of actions” instead of individual local events (Berman & Slobin, 1994, p. 44). Thus, children gradually learn to link events with causal connectives, such as because (Owens Jr., 1996). In addition, with a better command of complex syntax, older school-age children are able to elaborate on both individual events and the relationship between them (Berman & Slobin, 1994). Furthermore, children begin to rely less on paralinguistic affective expressions (e.g., intonation), but increasingly use lexically encoded evaluative devices (Reilly et al, 1998). Particularly, older school-age children include more references to mental states and more initiations and motivations as causal links in their stories (Bamberg & Damrad-Frye, 1991; Berman & Slobin, 1994). Thus, narrative skills develop as children mature and such a developmental trend has been replicated in
studies of narrative development cross-linguistically (e.g., Berman & Slobin, 1994; Chang, 2004; Hickman, 2003; Huang & Shen, 2003; Sah, 2007)

However, even though older school-age children (i.e., 9-year-olds) construct well-organized accounts with references to causal connections between events and to internal states, their narratives are not fully mature (Berman & Slobin, 1994). Narrative abilities continue to develop into adulthood. Berman and Slobin (1994) found that unlike the stereotypical perception of narrative task demonstrated by the children in their study, adults show a “mature conception of the narrative genre” and have access to a full repertoire of linguistic forms and stylistic options, allowing them to adopt different narrative styles (p. 79). Moreover, a key difference between adult and children’s narratives is that adults’ constructions are motivated by the overall plotline, embedding each event within a network of background circumstances and evaluations (Berman & Slobin, 1994). Thus, adults display “full rhetorical flexibility in the range of expressive devices” which they employ to construct a truly thematically coherent, linguistically cohesive, and individually stylized narrative, in which character intentions and causal links are made fully explicit (Berman & Slobin, 1994, p. 84; Reilly et al., 1998).

1.2 Narrative Abilities of Bilingual Children

Even though the act of storytelling is universal and a common developmental pattern emerges across languages, storytelling is an interactive social act that occurs in culturally specific patterns (Berman & Slobin, 1994; Minami, 2002). Children learn what narratives are and how to tell them within their culture and language communities. Given that narrative practices are culturally grounded, researchers are also interested in probing the effect of linguistic input and cultural context on narrative development (e.g., Berman &
Slobin, 1994; Heath, 1983; Minami, 2002). Children’s narratives are influenced and constructed through social interactions (Minami, 2002). Stein (1982, as cited in Owens, Jr., 1996) identifies at least four basic narrative types that exist in every society—recount, event cast, accounts, and stories—but their distribution, frequency, and degree of elaboration vary greatly. For instance, while children from mainstream American families are expected to be familiar and use all four forms in various social contexts, Chinese-American children are encouraged to give accounts of personal experiences only within their families.

Cross-linguistic studies have revealed substantial differences in narrative production, especially with regard to narrative structure (e.g., story schema), cohesion (e.g., reference strategies), and evaluative function (Berman & Slobin, 1994; Hickmann, 2003; Kang, 2003; Minami, 2002). For instance, story schema, which is the underlying organization paradigm for stories, is culturally specific (Minami, 2002). Kaplan (1966, as cited in Minami, 2002) claimed that the English narrative schema, which follows a direct and linear organization, is straight, whereas the Oriental pattern is indirect, forming a spiral circling around a point. For example, it was found that Japanese school children’s narratives are exceptionally succinct, are usually composed of multiple experiences, and reflect the characteristic of a haiku (Minami, 2002). However, Erbaugh (1990, cited in Chang, 2009) found that in comparison with American children, Chinese children use similar strategies of chronological sequencing, but with more detail and elaboration, as well as social and moral interpretations. American children, on the other hand, included more personal comments and observations. Furthermore, in terms of evaluation, studies have found that Japanese and Korean narrators avoid making explicit evaluative comments (Kang, 2003; Kuntay & Nakamura, 1993) and that Asian (Japanese, Chinese and Korean) mothers elicit fewer evaluative and descriptive
information than European-American mothers (Han, Leichtman, & Wang, 1998; Minami, 2002).

Since children in different language and cultural communities exhibit differences in narrative production, bilingual children may employ different strategies in telling stories in each of their languages. Consequently, researchers have begun to investigate narrative development in a bilingual context (e.g., Alvarez, 2003; Fiestas & Peña, 2004; Kang, 2003; Lofranco, Peña, Bedore, 2006; Verhoeven & Strömqvist, 2001). Current findings have shown that variations in narratives are related to children’s level of bilingual language proficiency, linguistic structural differences, and cultural differences. Fiestas and Peña (2004) investigated the effect of language on Spanish-English bilingual children’s elicited narratives and found that children produced narratives of equal complexity regardless of language. However, differences in story grammar were found in that more attempts and initiating events were used in Spanish and more consequences were found in English. Also, children demonstrated the use of Spanish-influenced utterances, such as the use of “no” before the verb to indicate negation and the use of post noun modifiers, when narrating in English. In like manner, story complexity of English narratives of Filipino children was comparable with that of monolingual English children, but influences from children’s first language was manifested in the use of L1-influenced English forms, such as pronoun gender agreement errors (Lofranco et al, 2006).

Gutiérrez-Clellen (2002) assessed the narrative performance of Spanish-English bilingual children in both languages using a story comprehension task, story recall task, and spontaneous narrative elicitation. The results indicated that children could produce appropriate narrative structure and use their grammatical knowledge in each language
without apparent difficulty. They were capable of producing temporal and causal sequences in their spontaneous narratives in each language. However, depending on the demands of the narrative task, children may not show equivalent levels of narrative proficiency in L1 and L2, underscoring the view of bilingualism as a continuum of proficiencies.

Research on narratives in bilingual population has also found that their stories reflect cultural influences of their first language. A study on the narrative abilities of English-learning Korean adults found differences in story structure components and the use of evaluation (Kang, 2003). Compared to the English speakers, Korean told shorter stories with fewer events, less descriptive information, and fewer explicit evaluative comments, presumably due to the influences of the culturally-determined narrative strategies in their first language. Pearson (2001) studied the use of mental verb in Spanish-English bilingual children’s storybook narratives and found that they produced significantly fewer mental verbs in either language than the monolingual children. In a study on narrative development of Native American children who speak Keres as the home language, it was found that these bilingual children produced stories that reflected characteristics of Native American syntactic structures, story structure and content (Westby et al., 2002).

Furthermore, Chen and Pan (2009) studied development of referring expressions in narratives of Chinese-English bilinguals and found that although the pattern of development resembles that of monolingual children, two significant differences were identified. First, four-to-five-year-old bilingual children were more likely to introduce characters appropriately than the monolingual English and monolingual Chinese children, showing a temporal bilingual advantage due to “bilingual bootstrapping.” In other words, children’s LI (Chinese), the more developed language, was facilitating the use of referential expressions in
their L2 (English), the less developed language. Second, 10-year-old bilingual children used fewer pronouns in comparison with their monolingual peers, a phenomenon that was speculated to be due to the fact that bilinguals were more aware of the potential of ambiguity with pronominal use and were therefore avoiding it.

1.3 Mandarin Grammar and Narratives

Mandarin represents the major Northern dialect family of Chinese, a language family that is classified as a branch of Sino-Tibetan language family (Li & Thompson, 1981). Mandarin is the official language in both China and Taiwan, which is called Pǔtōnghuà (‘common language’) and Guóyǔ (‘national language’) respectively in each country. Typologically, Mandarin is a language that is significantly different from English. The following section will present a general profile of Mandarin with regard to morphology and syntax.

Chinese (including Mandarin and its many dialects) is often considered an isolating or analytic language due to the lack of morphological complexity relative to other languages in the world (Li & Thompson, 1981). For example, unlike English, Mandarin does not have verb conjugation or plural inflection. However, Mandarin does have three types of morphological processes—reduplication, compounding, and affixation (Li & Thompson, 1981). Therefore, Mandarin is not a monosyllabic language (a common misconception due to the nature of Chinese writing system, in which each syllable is represented by a single character) and “words can be monosyllabic free morphemes or disyllabic [or even multisyllabic] compounds words composed of free or bound roots, derivation-like morphemes, or inflection-like morphemes” (Sun, 2006).
Since Mandarin has very little morphology as compared with other languages, word order is particularly important in defining lexical categories (Sun, 2006). As in English, Mandarin has the basic Subject/Predicate, Verb/Object, and Adjective/Noun patterns. Yet, Mandarin word order is far from rigid because “the position of elements in a sentence interacts with other features of the language, such as notions of topic and the expression of definiteness and directionality” (Li & Thompson, 1981). For instance, one of the distinguishing features of Mandarin is that it is a topic-prominent language, in which the topic of a sentence (or what the sentence is about), always occurs first in the sentence, and the notion of subject is structurally not well defined in the language, and can be omitted altogether (Li & Thompson, 1981). For example, (1) shows that 蛋糕 (dàngāo ‘cake’), as the topic of the sentence, occurs first, and the subject is dropped:

(1) 蛋糕 吃了。
    dàngāo chī-le
    cake eat-perfective marker
    ‘(I) ate the cake’

Thus, noun phrases, whether a subject or an object, and pronouns understood from context can often be left unspecified (Li, 2004). Such an association between word order and meaning and the permission for unspecified arguments will be relevant for reference strategies used in Mandarin narratives.

Mandarin sentences can be classified into three basic types: 1) minor sentences, 2) simple sentences, and 3) complex sentences (Li & Cao, 2009). Minor sentences generally consist of single words, verbal expressions, or nominal expressions. For example, a minor sentence can be a verbal expression used as directive (e.g., 坐下 zuòxià ‘sit down’). A simple sentence consists of a single independent clause, which in general is composed of a subject
and a predicate (as in English). Finally, a complex sentence can be a coordinate sentence (composed of two or more clauses with a coordinate/equal relation with or without a linking element), a subordinate sentence (composed of two or more clauses with a subordinate relation, typically connected with a linking element that expresses the directionality of the link), or an embedded sentence (Li & Cao, 2009; Li & Thompson, 1981). In addition, Mandarin has other distinct sentence types, such as sentences that are constructed using special verbs (e.g., 被 bēi, bei-construction, which is similar to the English passive construction) and serial verb constructions (which are sentences that contain two or more juxtaposed verb phrases).

Similar to English, Mandarin coordinate sentences consist of two or more clauses with coordinate relations and are often connected by conjunctions such as and (和 hàn), and or (或 huò). However, Mandarin coordinate sentences can be composed without a linking element (2):

(2) 一個 人 跳舞，一個 人 唱歌。
    yi-ge  ren  tiàowǔ  yi-ge  ren  chàngge
    one-classifier person  dance  one-classifier person  sing
    ‘Dance alone (and) sing alone.’

Moreover, like English, Mandarin subordinate sentences are typically composed of a dependent clause and an independent clause. With forward linking, one clause is dependent on the following one for its meaning to be complete, and the linking element typically occurs in the first clause (3). With backward linking, on the other hand, one clause is dependent on the previous clause and the linking element typically occurs in the second clause (4; Li & Cao, 2009; Li & Thompson, 1981). Subordinate sentences can be linked together by conjunctions (similar to English) or adverbs (but can also occur without a linking element).
For example, the adverb 就 (jiù) in (3), which typically means ‘immediately’, is used as a linking element meaning ‘then, thereupon’ and has a normal tone in this usage.

(3) 論文 完成 以後，我 就 去 度假。

lùnwén wánchéng yǐhòu wò jiù qù dùjià
‘After (I) finish the thesis, I go on a vacation.’

(4) 我 想 去 墾丁，因為 那裡 有 漂亮 的 白 沙灘。

wò xiǎng qù kěndīng yīnwèi nàlǐ yǒu piàoliàng de bái shātān
‘I want to go to Kenting because there are beautiful white beaches.’

The few studies of Mandarin-speaking children’s narrative development have revealed common growth patterns similar to those in English. Mandarin-speaking preschool children also produced longer narratives, were better able to relate events, and included more story components, evaluative comments, and temporal devices over time (Chang, 2004; Sah, 2007). Huang and Shen (2003), in their study of oral and written narratives produced by school-age children of different language abilities, found that Mandarin-speaking children improved their ability to organize narratives throughout elementary school years, a finding that corresponds to research with English-speaking children. By Grade 4, most children were able to tell a story with a complete story structure, connect events temporally and causally, and highlight the theme of the story.

However, studies have also shown some differences in narrative style. Huang and Shen (2003) found that references to characters’ mental states and emotions were rare except in the older group of children (Grade 4 and Grade 6) with better language skills. The authors concluded that compared with English-speaking children, Mandarin-speaking children
tended to give direct and straightforward accounts of stories, and were relatively lacking in creative or imaginative style, as seen in their limited use of evaluative and literary devices and rare references to mental states of characters.

In terms of the evaluative dimension of narratives, Wang and Leichtman (2000) investigated cultural influences on social, emotional, and cognitive characteristics of 6-year-old American and Chinese children’s narratives. The children were asked to tell stories prompted by pictures and to recount emotional memories. It was found that compared with American children, Chinese children showed greater orientation toward social engagement, such as including more characters and references to group actions in their stories. They also demonstrated greater concern with moral correctness and authority, a less autonomous orientation, and more expressions of emotions. Such findings can be explained by Chinese cultural norms that emphasize social harmony, attention to others, and moral correctness. Chinese children’s narratives were also more concrete and included more temporal elements, showing a greater sensitivity to environmental factors and situational details than American children.

With regard to story cohesion, Hickmann (2003) compared narratives of English, Mandarin, German, and French speaking children to investigate language-specific reference strategies. For instance, in English, referent introduction and maintenance are marked by obligatory nominal determiners (indefinite ‘a’ vs. definite ‘the’), while word order is an additional optional means of marking in this respect. In contrast, nominal determiners are optional in Mandarin, while word order constitutes the obligatory marking of information status (i.e., a new referent must be postverbal). Moreover, Mandarin differs from English in the use of null elements in maintaining character reference. Zero anaphora are particularly
frequent in Mandarin-speaking children, as Chinese is a pro-drop language in which pronouns can often be omitted in contexts that would be considered ungrammatical in English (a non-pro-drop language).

1.4 Narrative Abilities in Children with Autism

Autism is a neurodevelopmental disorder characterized by symptom onset prior to age 3 years as evidenced by delay or abnormal functioning in social interaction, language as used in social interaction, and symbolic or imaginative play (Volkmar & Klin, 2005). According to the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)* of the American Psychiatric Association (2000), to be diagnosed with autism, an individual must demonstrate impairment in three areas: (a) social interaction, (b) communication, (c) restricted repetitive and stereotyped patterns of behaviour, interests, and activities. The individual must have also demonstrated a delay or abnormal functioning in at least one of the following areas: (a) social interaction, (b) language as used in social communication (c) symbolic or imaginative play. The current prevalence of autism in the Canada is estimated to be approximately 20 in 10,000 (Autism Society Canada, 2005).

“There is enormous variation in the timing and patterns of acquisition of language among children with autism” (Tager-Flusberg, Paul, & Lord, 2005, p. 341). Some children with autism with very low non-verbal intelligence never acquire functional language, while a majority of children with autism begin to speak late and develop speech and language at a significantly slower rate than typically developing peers (Tager-Flusberg et al., 2005).

Regardless of language proficiency, all individuals with autism have challenges in the pragmatic aspects of language, or language use (Tager-Flusberg et al., 2005). Some specific unusual aspects of language use include delayed echolalia and neologisms and difficulties in
understanding and using mental state and social-emotional terms (e.g., Eskes, Bryson, & McCormick, 1990; Tager-Flusberg, 1992). Furthermore, individuals with autism demonstrate marked difficulties in social uses of language, especially in conversations (Tager-Flusberg et al., 2005). For example, individuals with autism are less likely to initiate spontaneous interactive communication and tend to use less sophisticated strategies to maintain conversation. Moreover, they are less able to infer the interlocutor’s implicit attentions or to accommodate for the needs of their conversation partner.

Studying narratives in children with autism can be a valuable tool to explore aspects of discourse and pragmatics that are not usually accessible with standardized language tests (Loveland & Tunali-Kotoski, 2005; Norbury & Bishop, 2003; Tager-Flusberg, 1995). Given that narrative production draws upon cognitive, linguistic, and social-pragmatic knowledge and abilities, and because autism undercuts competence within each of these domains, analysis of narratives allows us to investigate the nature of such deficits in autism (Losh & Capps, 2003; Norbury & Bishop, 2003). Specifically, storytelling provides a window into the functional use of language in children with autism. It has been found that children with autism who are verbal tend to have relatively intact (albeit delayed) phonological, morphological, and syntactic development, but have significant pragmatic deficits, such as rigid speech, difficulty organizing discourse, and limited conversation skills (Diehl, Bennetto, & Young, 2006; Tager-Flusberg et al., 2005). Therefore, there is a small but growing literature on narrative ability in children with autism (e.g., Capps et al., 2000; Diehl et al., 2006; Losh & Capps, 2003; Loveland et al., 1990; Norbury & Bishop, 2003; Tager-Flusberg 1995).
Storytelling takes place within a social context in which the narrator and the listener “share not only a common language code, but also knowledge of the topic discussed, of the world at large, of social and cultural conventions, and of each other as persons and as individuals” (Loveland & Tunali, 1993, p. 249). Consequently, the interpersonal nature of narratives and the culturally-defined narrative practices may pose a challenge for individuals with autism, who “might be expected to have an imperfect grasp of cultural expectations as well as impaired interpersonal awareness” (Loveland & Tunali-Kotosky, 2005, p. 259). Furthermore, the analysis of narratives can provide an insight into the theory of mind hypothesis of autism. Telling a story requires the narrator to understand and interpret characters’ mental states and to ensure the listener’s understanding and engagement.

Research has shown that individuals with autism demonstrate difficulties in employing theory of mind, namely a failure to develop normal understanding that people have minds and mental states which relate to behaviour (Baren-Cohen, 1993). Thus, if theory of mind deficit is associated with autism, children with autism should have difficulties in referencing mental states and in caring for the listener’s needs in their narratives (Loveland & Tunali, 1993).

There have been only a dozen investigations of narrative abilities in individuals with autism. Different researchers have examined narratives in different contexts. Early studies elicited narratives using techniques such as viewing a puppet show (Loveland et al., 1990) and asking individuals with autism to tell stories about a set of pictures (Baron-Cohen, Lesley, & Frith, 1986; Tager-Flusberg & Quill, 1987, as cited in Loveland & Tunali, 1993). Subsequent studies have focused on narratives elicited using a wordless picture book (Capps et al., 2000; Colle, Baron-Cohen, Wheelwright, & van der Lely, 2008; Diehl et al., 2006;
Losh & Capps, 2003; Norbury & Bishop, 2003; Tager-Flusberg, 1995; Tager-Flusberg & Sullivan, 1995). In addition to elicited narratives, personal narratives were collected in the study by Losh and Capps (2003). Also, children’s performance on tasks assessing theory of mind and emotional understanding was examined in two of the studies (Capps et al., 2000; Losh & Capps, 2003).

Research on narrative abilities of individuals with autism has focused on basic narrative measures of story length, narrative structure, cohesion, evaluation, and narrative performance in relation to theory of mind. Findings from various studies have been inconclusive, and sometimes contradictory. On the measure of story length, some researchers have found that children with autism told stories similar in length to those of typically-developing children, (Tager-Flusberg & Sullivan, 1995; Losh & Capps, 2003; Norbury & Bishop 2003; Diehl et al. 2006) while others have found that their stories were significantly shorter and included fewer propositions (Tager-Flusberg & Quill, 1987, as cited in Loveland & Tunali, 1993; Tager-Flusberg, 1995; Capps et al. 2000).

With regard to narrative structure, investigations have shown that narratives told by children with autism were less coherent, included fewer story components, and were less likely to include a resolution (Diehl et al., 2006; Losh & Capps, 2003; Tager-Flusberg, 1995). In particular, children with autism were less likely to tell stories as a meaningful chain of events (Baron-Cohen et al., 1986; Loveland et al., 1990; Diehl et al., 2006). A study with adolescents with autism found, for example, that participants with autism were more likely to have incomplete story episodes and that the plot structures of their stories were not well organized (Landa, Matin, Minshew, & Goldstien, 1995, cited in Landa, 2000). However,
Norbury and Bishop (2003) did not find any group differences in story structure and noted that most children “got the gist” of the story.

Furthermore, in terms of narrative cohesion, research has largely found that individuals with autism have difficulty with referencing. They relied less on the use of pronominal expressions to maintain reference to characters and were more likely to make reference errors, such as ambiguous pronouns (Loveland et al., 1990; Norbury & Bishop, 2003; Colle et al., 2008). Colle et al. (2008) also found that adults with autism used fewer temporal markers, as seen in their preferential use of simple and unlinked sentences, without taking into account the relation between events. On the other hand, Tager-Flusberg and Sullivan (1995) found that narratives of children with autism were not limited in the use of lexical cohesive devices (adverbial phrases, causal connectives, subordination). However, some studies have found that children with autism were less likely to employ causal language, which is a basic mechanism for organizing a thematically coherent stories and to explain the motivations for character’s behaviours and internal states (Capps et al., 2000; Losh & Capps, 2003; Tager-Flusberg, 1995).

Investigations on the evaluation of narratives also produced divergent findings. It has been found that children with autism relied on a more restricted range of evaluative devices, especially in terms of attention getting devices that are used to direct listener’s attention to particular story events, and such a difficulty was more pronounced when telling personal stories (Capps et al., 2000; Losh & Capps, 2003). On the other hand, Norbury and Bishop (2003) and Tager-Flusbeg (1995) did not find significant group differences in narrative evaluation. In particular, somewhat contrary to the theory of mind hypothesis, the children
with autism did not relate fewer references of mental or affective states (Norbury & Bishop, 2003; Tager-Flusberg, 1995; Tager-Flusberg & Sullivan, 1995).

However, it is worth noting that children with autism demonstrated significant difficulties in attributing character’s thoughts and emotions within a causal framework and were more inclined to simply label affective and mental states (Capps et al., 2000; Losh & Capps, 2003; Tager-Flusberg, 1995). For example, in Capps et al.’s study, in an episode that depicts a crying baby, typically-developing children tended to use the conjunction “because” to explain why the baby is crying (e.g., “The boy started to cry ‘cause the cat scratched him!”) whereas children with autism most often described the same episode without including any causal explanation (e.g., “…an the baby is crying”). Furthermore, some children with autism made explicit reference to behavioural manifestation of emotions (e.g., “The frog ate the bug and made his mouth sad.”), a characteristic that seems unique to this population, as none of the typically-developing children and children with developmental delay in the study made such comments (Capps et al., 2000).

Finally, there was evidence suggesting that narrative abilities of children with autism are correlated with their performance on theory of mind tasks (Tager-Flusberg & Sullivan, Capps et al., 2000). It has also been found that children with autism were more likely to exhibit pragmatic violations, to include “bizarre” or inappropriate information in their stories, and were less likely to take into account the listener’s needs (Loveland et al., 1990; Loveland & Tunali, 1993; Norbury & Bishop, 2003). Findings from a few studies suggested that individuals with autism might be deficient not only in awareness of listener’s needs, but also in a cultural perspective underlying the telling of stories (Loveland et al., 1990; Bruner & Feldman, 1993; Loveland & Tunali, 1993).
The divergent findings on the narrative ability in children with autism is likely due to the diverse abilities and symptom profiles exhibited by children on the autistic spectrum. As mentioned earlier, there is extreme variability in the language development among verbal children with autism and their languages skills are significantly correlated with intelligence (Tager-Flusberg et al., 2005). Consequently, it is difficult to draw a conclusion based on current literature because studies have examined narratives in both children with limited cognitive abilities (e.g., Capps et al., 2000; Tager-Flusberg, 1995) and children with high-functioning autism or Asperger Syndrome (e.g., Losh & Capps, 2003; Norbuty & Bishop, 2003).

Furthermore, studies of children with Specific Language Impairment (SLI) have revealed difficulties with certain aspects of narratives that are similar to that of children with autism. For instance, like children with autism, children with SLI produced less cohesive stories, fewer mental state verbs, and fewer socio-cognitive and affective devices (Botting, 2002; Liles, Duffy, Merritt, & Purcel, 1995; Johnston, Miller, & Tallai, 2001) Thus, it is difficult to determine which deficits may be specific to autism because a complex relationship exists between language, social-pragmatic ability, and narrative ability. For example, it is challenging to decide whether limited use of causal language to explain character’s emotions in children with autism is due to challenges in understanding and making inferences about others’ emotions (i.e., deficit in theory of mind) or due to limited syntactic ability that is needed to construct causal relationships. In reality, theory of mind and language development are interdependent and interwoven in complex ways (Miller, 2006). From the very beginning, children learn language in a social context and early pragmatic skills (e.g., joint attention) are precursors to language development (Rollins & Snow, 1998).
As children develop, “language skills grow and support a developing theory of mind, while at the same time, the increasingly sophisticated theory of mind makes it possible to engage in meaningful communication” (Miller, p. 147).

1.5 Bilingualism and Autism

To date, there are very few studies on bilingualism and autism, and only two of them have been published. The first published one was a longitudinal case study, which examined data from a Korean-English bilingual child with autism (Seung, Siddiqi, & Elder, 2006). The case study followed the child for two years and evaluated the efficacy of a Korean-English bilingual speech-language intervention that focused on vocabulary building and pragmatic goals. Intervention was first provided in Korean, and as the child made progress in his primary language, English intervention was introduced. At the end of the intervention, the child’s English vocabulary skill and behaviours both improved significantly. The results support the practice of providing intervention in the primary language in order to establish a linguistic foundation, when English, the language of the majority culture, is not used at home (Seung et al., 2006).

In the second published study on bilingualism and autism, Kremer-Sadlik (2005) explored the experiences of families who had been advised by professionals to restrict language input to English, the language of the mainstream society in the United States, for their children with high functioning autism (HFA), regardless of the parents’ English proficiency. Such recommendation is based on the notion that “simplifying” the linguistic input can facilitate the learning and use of the language of choice. It was found that when families followed the advice to use only English with their child with autism, the children’s participation in family conversations and their interactions with the parents decreased.
Kremer-Sadlik states that due to the socio-pragmatic deficit inherent in autism, it is important for the children to speak the home language, so that they can be exposed to a variety of social situations to learn the rules of speech acts and social functioning. Moreover, speaking the home language will allow maximum interactions between the children with HFA and their parents, and hence facilitates language and social development. Thus, these findings demonstrated that limiting the home language input could have negative effects on the social and language development of children with autism.

Finally, Peterson (2010) investigated lexical production skills of bilingual English-Chinese and monolingual English preschool-age children with autism. The children’s use of nouns, verbs, and mental state terms was explored, as well as vocabulary comprehension, overall language skills, and nonverbal skills. Results revealed that bilingual and monolingual children with autism had equivalent English expressive vocabularies and produced comparable number of English mental state words. Furthermore, bilingual participants had larger receptive vocabularies and more verbs in their conceptual production vocabularies. They also received have higher vocabulary comprehension scores and higher language scores. Finally, the bilingual children’s lexical skills were comparable across their two languages. Thus, the findings suggest that bilingualism does not negatively affect language development in children with autism and that they have the capacity to function successfully as bilinguals.

1.6 Current Study

It is important to document possible differences in the narrative production in bilingual children for two primary reasons. First, research with monolingual children has established the importance of narrative ability as a predictor of academic achievement (Fey,
Catts, Proctor-Williams, Tomblin & Zhang, 2004; Westby, 1991). Westby (1991) has stated that narrative skills can form a bridge from oral to literate language, which is important for success in school. Second, narrative assessment has been prevalent and can serve as a less biased, ecologically valid alternative to standardized testing for ESL-learning children (Fiestas & Peña, 2004). Thus, it is important to document non-Western story telling styles and differences in bilingual narrative production for clinical purposes. However, to date there has been no research on narrative abilities in bilingual children with autism. From a theoretical perspective, it would be interesting to investigate the effects of bilingualism on the narrative production of children with autism, in particular, how would they perform relative to monolingual children with autism? From a clinical perspective, it would be important to know whether it would be beneficial or detrimental for a child with autism to become bilingual and what the effects of bilingualism will be on the child’s global language skills (Cummins, 2000).

The main objectives of this study were therefore: (1) to fill in the gap in current knowledge on narrative competence in bilingual children with autism, and (2) to study potential benefits or problems bilingualism can exert on the communicative competence of children with autism. In order to meet these objectives, the following research question was addressed: Do the narratives produced by monolingual children with autism, bilingual children with autism, and typically developing bilingual children differ in terms of the global structure, local structure, and evaluation of narrative? Comparing narrative abilities across the groups it was expected that:

- Bilingual children with autism and monolingual children with autism would perform comparably on all narrative measures, except on evaluation and some
aspects of local structure, which are likely more susceptible to cultural and linguistic influences of the children’s L1.

• Based on previous research with high-functioning monolingual children with autism using similar methodology as the present study, bilingual children with autism were expected to have more difficulties with certain aspects of the global structure, local structure, and evaluation of narrative as compared with typically-developing bilingual children.
  
  o In terms of global structure, bilingual children with autism would include fewer story components and fewer number and types of orientation devices but will grasp the theme of the story.

  o In terms of local structure, bilingual children with autism would tell stories that are similar in length to that of typically developing children, but their stories would be less cohesive and less complex syntactically and would make more reference errors.

  o In terms of evaluation, bilingual children would use evaluative devices as frequently but with decreased diversity.
2 Method

2.1 Participants

Three groups of children participated in the study: 13 monolingual English children with autism, 10 bilingual Mandarin-English children with autism, and 10 typically-developing Mandarin-English bilingual children. Both clinical groups of were diagnosed by qualified clinicians, using DSM-IV criteria.

2.1.1 Monolingual Children with Autism

The 13 monolingual children with autism were recruited from the Vancouver and Richmond school districts, private autism centres, parent groups, and through clinician referrals. All children had an autism diagnosis without any other developmental disability or hearing or vision difficulties. Nine children had received their autism diagnosis from the Sunny Hill Health Centre for children, an agency of the British Columbia Provincial Health Services Authority. Sunny Hill Health Centre has a specialized multidisciplinary team for children with Autism Spectrum Disorders (ASD) and is the provincial resource for diagnosis and assessment. The four other children received their diagnosis from two reputable private centres that are on the Registry of Autism Service Providers, and their diagnostic assessment adhered to the same Standards and Guidelines for the Assessment and Diagnosis of Young Children with ASD in BC (Dua, 2003).

Of the 13 participants, 10 were boys and 3 were girls. They ranged in chronological age from 6;6 years to 12;0 years, with an average of 8;9 years. English was the only language spoken at the home for all of the children. The number of years of therapy that the children had received ranged from 1 to 8 years, with an average of 3.2 years. The majority of children had received behavioural therapy intervention, speech-language therapy, and occupational
therapy. Other types of therapy included TEACCH (Treatment and Education of Autistic and Communication related handicapped Children), play therapy, social skills group, peer relationship support, therapeutic tutoring, multisensory learning, DIR/Floortime (Developmental, Individual-Difference, Relationship-based model), Relationship Development Intervention (RDI), and physical therapy. At the time of the study, 11 of the 13 children were receiving intervention services, which included behavioural intervention, speech-language therapy, occupational therapy, and social skills groups.

2.1.2 Bilingual Children with Autism

Ten Mandarin-English bilingual children with autism were recruited from the Vancouver and Richmond school districts, private autism centres, parent groups, and through clinician referrals. These children all had an autism diagnosis without any other developmental disability or hearing or vision difficulties. Nine out of the ten children had received their autism diagnosis from the Sunny Hill Health Centre for children. Only one child received the diagnosis from a private paediatrician. All 10 participants were boys, ranging in chronological age from 6;1 years, to 12;10 years, with an average of 8;8 years. The number of years of therapy that the children have received ranged from 1.5 to 6 years, with an average of 3.1 years. The majority of children had received behavioural therapy intervention and speech-language therapy. Other types of therapy included Reference & Regulate therapy, play groups, academic and social skills tutoring, play therapy, and occupational therapy. At the time of the study, 9 of the 10 children were receiving intervention services, which included behavioural intervention, speech-language therapy, occupational therapy, Reference & Regulate therapy, and specialized tutoring. All 10
children received intervention services in English and 4 of the children had therapy in Mandarin as well.

For the purpose of this study, bilingual individuals were operationally defined as bilingual learners who were exposed to both Mandarin and English on a daily basis, and both English and Mandarin were spoken in the home. The inclusion criteria required that all participants were verbal and could speak in short sentences in both languages. The parents of all the participants spoke Mandarin as their mother tongue and used Mandarin as the primary language at home. Mandarin was the first language for all 10 children. Their length of residency in an English-speaking country ranged from 3 to 12 years, with an average of 7.1 years.

2.1.3 Typically-Developing Bilingual Children

Ten typically-developing Mandarin-English bilingual children were recruited from Metro Vancouver. These children had no hearing or vision problems, no speech or language difficulties, nor any other developmental disability. The children ranged in chronological age from 6;9 years, to 9;9 years, with an average of 7;9 years. Their length of residency in an English-speaking country ranged from 2 to 7 years, with an average of 5.1 years. Like the group of bilingual children with autism, these children were exposed to both Mandarin and English on a daily basis and could speak in sentences in both languages. The parents of nine of the participants spoke Mandarin as their mother tongue and used Mandarin as the primary language at home. One child came from a family where one parent spoke Mandarin as the primary language while the other parent only spoke English.
2.2 Procedure

Two meetings, which were usually separated by one week, were scheduled with each participant. Each child was assessed individually in a quiet setting, typically in the family home. During the first meeting, two standardized assessments that measure nonverbal intelligence and receptive vocabulary were administered. For the bilingual children, the Chinese version of the standardized measure of vocabulary comprehension was also administered. In addition, storybook narratives were elicited using the 24-page wordless picture book, *Frog, Where Are You?* (Mayer, 1969). In the second meeting, the last standardized assessment of receptive and expressive language abilities was administered. Each meeting was approximately an hour in duration.

The book *Frog, Where Are You?* (Mayer, 1969) was chosen because it has been used extensively in research on narrative development in typically developing children cross-linguistically and also in research with children with autism and other clinical groups (e.g., Bamberg, 1987; Berman & Slobin, 1994; Tager-Flusberg, 1995; Reilly et al., 1998; Capps et al., 2000; Losh & Capps, 2003). The use of a wordless picture book is suitable for the purpose of comparing the narrative produced by monolingual and bilingual children because it provides a common external basis for cross-linguistic comparison (Berman & Slobin, 1994). Finally, a narrative elicitation task prevents the child from relying on rote memory or overly rehearsed scripts in telling the story, which are problems that can occur in a spontaneous narration and retelling.

*Frog, Where are You?* (Meyer, 1969) is a story about a boy’s quest to find his missing pet frog. It has a simple storyline that can be easily interpreted even by children in primary grades. Furthermore, the story has a well-defined plotline, consisting of an initiating
goal or problem (i.e. the boy set out to find the missing frog), the attempts to achieve the
goal (i.e., the boy’s adventure in the woods), and the overall outcome (i.e., the boy brings a
baby frog home). The plot structure has been extensively analyzed (Bamberg, 1987; Reilly et
al., 1998), rendering it a valuable tool for the investigation of children’s global organization
of the main story elements. In addition, the story involves two primary characters (i.e., the
boy and his dog), whose actions often occur in parallel, requiring the use of cohesive devices
to maintain character referencing. Finally, the protagonists encounter many obstacles, which
will provide opportunities for the participants to infer the characters’ mental states and to use
evaluative devices, rendering it possible to investigate the influences of social-pragmatic
impairments on the narrative produced by the participants with autism.

During the narrative elicitation task, the child was first asked to look through the
book silently to familiarize himself/herself with the story. Then, the child was asked to turn
back to the beginning and tell the story to the examiner. Verbal comments from the examiner
were kept to a minimum, except for acknowledgment (e.g., “umhm”, “I see”),
encouragement (e.g., “you’re doing great”), and prompting for elaboration or clarification
(e.g., “And then what happened?”) if the child paused for an excessive length of time, was
unintelligible, or became distracted from the task. The narratives were audio recorded using a
digital recorder (Olympus Voice Recorder VN-3100PC) for later transcription. The bilingual
children were asked to tell the story in both English and Mandarin and the order was
counterbalanced.
2.3 Tasks Administered

In addition to the narrative elicitation, four standardized tests were used in this study.

2.3.1 The Test of Nonverbal Intelligence

The Test of Nonverbal Intelligence Third Edition (TONI-3) is a norm-referenced measure of intelligence, aptitude, abstract reasoning, and problem solving that is apparently free of the overt use of language (Brown, Sherbenou & Johnsen, 1997). It is intended to be used with subjects ranging in age from 6 through 89 years. The test requires no reading, writing, speaking, or listening on the part of the test subject. Instead, the subject looks at the stimulus items, which are abstract/figural diagrams, and are required only to point, nod, or use other gesture to indicate response choices. Thus, this language-free and culture-reduced format makes the TONI-3 ideal for evaluating individuals who have communication disorders, such as children with autism. It also accommodates the needs of subjects who have limited knowledge or exposure to the English language and North American culture. The test-retest reliability coefficients are in the .90s for both forms at all ages tested.

2.3.2 The Peabody Picture Vocabulary Tests

The Peabody Picture Vocabulary Test - Fourth Edition (PPVT-4) is a popular norm-referenced standardized assessment tool that measures receptive vocabulary (Dunn & Dunn, 2007). To administer the test, the examiner orally presents a stimulus word and the subject selects the picture that best represents the meaning of the target word from a choice of four. Split-half reliability coefficient by age for both forms is .94.

The Chinese version of the PPVT (Lu & Liu, 1994) is also a norm-referenced standardized measure of a child’s receptive in Mandarin. Like its English counterpart, the test
is administered in the same format. The test-retest coefficients is .90 for Form A used in the present study.

2.3.3 The Clinical Evaluation of Language Fundamentals

The Clinical Evaluation of Language Fundamentals - Fourth Edition (CELF-4) is a widely used standardized diagnostic tool that measures receptive and expressive language skills in children ages 5 though 21 years (Semel, Wiig & Secord, 2003). On different subtests, the subject is asked to follow directions, apply word structure (morphology) rules, recall sentences, formulate sentences, and answer questions about word meanings. For the purpose of this study, the four core subtests were administered to produce a composite score, which quantifies a subject’s overall language performance and represents his/her general language ability. The test-retest reliability coefficients range from .71 to .86 for subtests and from .88 to .92 for composite scores.

2.4 Matching of Participants

Standard scores were calculated for the TONI-3 (nonverbal intelligence), the English and Chinese PPVTs (receptive vocabulary), and the CELF-4 (general language abilities). Table 2.1 summarizes the mean scores on these standardized assessments. The scores were used to match the children on their nonverbal intelligence, receptive vocabulary, and general abilities. The monolingual children with autism and the bilingual children with autism were group-matched on chronological age, nonverbal intelligence, receptive vocabulary in English, and general language abilities, using the core language composite score of the CELF-4. T tests confirmed that there were no significant differences between the groups. The bilingual children with autism and the typically developing bilingual children were also matched on
the same measures. In addition, the two bilingual groups were matched on their length of residence in Canada.

Table 2.1 Subject profile

<table>
<thead>
<tr>
<th></th>
<th>Monolinguals with autism (N=13)</th>
<th>Bilinguals with autism (N=10)</th>
<th>Typically developing bilinguals (N=9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronological age (years)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td></td>
<td>8.80 (1.98)</td>
<td>8.70 (2.79)</td>
<td>7.90 (1.23)</td>
</tr>
<tr>
<td>Nonverbal intelligence</td>
<td>99.31 (16.38)</td>
<td>105.30 (12.75)</td>
<td>113.89 (11.42)</td>
</tr>
<tr>
<td>English receptive vocabulary</td>
<td>95.23 (18.01)</td>
<td>88.50 (20.87)</td>
<td>99.67 (13.08)</td>
</tr>
<tr>
<td>General language abilities</td>
<td>76.69 (27.78)</td>
<td>83.40 (25.73)</td>
<td>98.89 (9.43)</td>
</tr>
<tr>
<td>Length of residence in Canada</td>
<td>N/A</td>
<td>7.08 (2.33)</td>
<td>5.07 (1.94)</td>
</tr>
</tbody>
</table>

One participant in the typically developing bilingual group was not able to complete the narrative task as successfully as the other children. It was suspected that the child, who was the youngest in the group and had only recently begun formal schooling in English, did not fully understand the expectations of the narrative task and did not perform optimally (e.g., flipping through the book rapidly and was distracted at times). His performance was distinct from other typically developing children in the group and as a consequence, his data were excluded from the matching procedure and subsequent analyses.

2.5 Transcription and Coding

The audio-recorded narratives were transcribed on the computer using the Codes for the Human Analysis of Transcripts (CHAT) format, enabling the coding to be performed using the Computerized Language Analysis (CLAN) program (MacWhinney, 2010). Each narrative was divided into clauses, following Berman and Slobin (1994), because the clause is “more linguistically structured than the behavioural unit of an ‘utterance’ but less
determined by syntactic criteria than a ‘sentence’” (p. 26). A clause is defined as any unit that contains a unified predicate that expresses a single situation (activity, event, state) (for more information see Appendix B.3). After each narrative was transcribed, it was analyzed according to the global structure of narratives, local structure, and the use of evaluation, which will be described in the following sections. Ten randomly selected narratives, which constituted approximately 30% of the data, were coded by two independent coders to test the reliability of the designed coding system. Inter-coder agreement was 92% for the English narratives and 80% for the Mandarin narratives.

2.5.1 Global Structure

Global structure refers to the narrator’s ability to construct a hierarchical representation of the main story elements (Norbury & Bishop, 2003). Through this global organization causal links between events in the story are made explicit and thematic coherence is established (Norbury & Bishop, 2003; Berman & Slobin, 1994).

First, the narrative structure of the children’s stories was investigated using an episodic analysis adapted from the procedure used by Reilly et al. (1998), supplemented with Berman and Slobin’s (1994) criteria for the core components of the story. The 10-point scale tallied the extent to which children included the following basic components of the story: setting, problem, seven search episodes, and resolution (see Appendix B.1). For the setting, the child received one point for setting the scene, such as introducing the protagonists and/or describing where and when the story takes place. For the problem, or the initiating event, the child received one point for explicit mention of the boy’s discovery that the frog was missing. Furthermore, the child received one point for each search episode (search for the frog in the house; interaction with bees; gopher biting, interaction with owl; interaction with
deer; falling in pond; finding frog). Finally, for resolution, the child received one point for describing the boy taking home the frog he has lost (or one to take its place).

Second, orientation, which is statements that provide the setting or context of a narrative, is evaluated (Labov & Waletzky, 1967; Peterson & McCabe, 1983). Three main types of orientation were examined in the study—orientation of time, place, and characters—which are used by the narrator to orient the listener to the context in which the story unfolds (Labov & Waletzky, 1967; Peterson & McCabe, 1983). Third, to explore the extent to which children understood the motivation of the boy’s behaviour and the general search theme of the story, a 4-point scoring procedure adopted by Reilly et al. (1998) was used. The child received one point for mentioning that the frog was missing and another point for describing the boy was searching for him. To measure whether the search theme was reiterated later in the story, one point was credited for one or two additional mentions of the search theme and another point for multiple additional mentions of the search theme. Thus, the child could receive a maxim of four points (see Appendix B.2).

2.5.2 Local Structure

At a more local linguistic level, analysis focused on story length, syntactic complexity, and cohesion. Clauses were used to quantify story length. To control for varying story length, the number of clauses in a story was used as a denominator for other measures. The type and frequency of complex syntax were tallied to assess children’s syntactic knowledge and ability. Complex syntax was defined as sentences in which the syntactic structures underlying two simple sentences were combined within a single utterance contour (Capps et al., 2000). They were categorized into five types in English: coordinate sentences, sentences with adverbial clauses, sentences with verb complements, relative clauses, and
passives (see Appendix B.3). Complex sentences in Mandarin were categorized into four
types: coordinate sentences, subordinate sentences, the ba-construction, and the bei-
construction (See Appendix B.4). The total number of individual complex sentences occurred
in a story was divided by the number of clauses in that story to yield a proportion, the
frequency of complex syntax. Syntactic diversity was evaluated by counting the number of
different types of complex syntax used by the child and dividing that number by the number
of all the types of syntax coded. The types of complex syntax are represented as a proportion
because the number of the types of complex syntax coded differed between the two
languages (i.e., five sentence types were coded in English and four sentence types were
coded in Mandarin).

Story cohesion is established by linking sentences together on a local level, and it is
primarily achieved by the use of anaphoric reference, such a pronomonalization, and
different types of conjunction, such as temporal connective “then” and causal connective
“because.” To investigate how successful the children were in using reference strategies to
keep track of the two protagonists (i.e., the boy and the dog), reference errors were counted.
Four types of reference errors investigated were: inappropriate use of the indefinite
determiner “a”, inappropriate use of the definite determiner “the”, ambiguous pronouns, and
erroneous use of zero anaphora. The number of reference errors occurred in the story was
divided by the number of clauses to yield a proportion, the frequency of reference errors.
Furthermore, five types of conjunction in both languages were evaluated: additive
conjunction (e.g., “and”), adversative conjunction (e.g., “but”), causal conjunction (e.g.,
“because”), sequential conjunction (e.g., “before”, “after”), connectors of simultaneity (e.g.,
“while”), and connectors of continuation (e.g., “again”). The number of conjunctions
employed by children in a story was divided by the number of clauses to yield a proportion, the frequency of conjunction. Conjunction diversity was assessed by counting the number of different types of conjunction in a story.

2.5.3 Evaluation

Stories were coded for the type and frequency of evaluation. The number of evaluative devices employed in a story was divided by the number of clause to yield the frequency of evaluation. The coding scheme followed Bamberg and Damrad-Fyre (1991) and Reilly, Klima, & Bellugi (1990), which were often adopted by researchers studying narrative abilities of children with autism (e.g., Losh & Capps, 2003; Norbury & Bishop, 2003) and included the following major types of evaluative devices in both English and Mandarin.

*Frames of mind*, which are references to characters’ cognitive states (e.g., *think*), emotions (e.g., “sad”), and intentions (e.g., “want to”), were tallied. These evaluative devices require an inference of the characters’ internal states and are indicative of theory of mind understanding (Norbury & Bishop, 2003). *Character speech* and *onomatopoeia* are devices that represent strategies for capturing and maintaining the listener’s attention. *Intensifiers* (e.g., “very”), *expressives* and *attention getters* (e.g., “wow”, “look!”), and *repetitions*, are social engagement devices that signal the importance of an event, drawing the listener’s attention to a specific episode, character, or behaviour (Losh & Capps, 2003; Reilly et al., 2004). *Hedges* (e.g., “maybe”, “probably”), which function as distancing devices, indicate narrator uncertainty and, thus, multiple possible interpretations or perceptions (Bamberg & Damrad-Frye, 1991; Losh & Capps, 2000). *Negatives* (e.g., “didn’t”, “not”) indicate events or behaviours contrary to underlying expectations and serve to define narrator perspectives
(Losh & Capps, 2002). Finally, *narrator comments* represent explicit subjective evaluations of the story. For a complete list of evaluative devices coded see Appendix B.3.

### 2.5.4 Additional Analyses

One aspect that differentiated children with autism from other clinical groups was that children with autism tend to include “bizarre” or irrelevant information in their stories (Loveland et al. 1990; Norbury & Bishop, 2003). Therefore, the number of off-topic or unexpected statements in the narratives was tallied and divided by the number of clauses to yield a proportion of off-topic remarks. Finally, incidences of code-switching (alternation between the two languages) in bilingual children’s narratives was measured as a ratio with respect of story length. A clause that was produced entirely in the alternate language was counted as one incidence of code switching, and each word substitution in the alternate language that occurred in a single sentence was counted as an incidence of code switching.
3 Results

3.1 Comparisons between Monolingual and Bilingual Children with Autism

To investigate the effects of bilingualism on the narrative competence in children with autism, English narratives of the monolingual children with autism and the bilingual children with autism were compared. Children’s narratives were analyzed according to the global structure of narrative, the local structure of narrative, and the use of evaluation. If bilingualism negatively affects language abilities of children with autism, the bilingual group may demonstrate significantly lower performance on each measure. On the other hand, if bilingualism does not have an adverse effect on communicative competence of children with autism, narrative performance may be comparable between the two groups, or there may be a possibility that the bilingual children may do better on some measures. The narrative performance of the monolingual English children with autism and bilingual Mandarin-English children with autism was compared through a series of t-tests. Table 3.1 displays the group means and standard deviations for the general measures of narrative abilities.

Table 3.1 Means and standard deviations for major narrative measures, comparing the English narratives of monolingual and bilingual children with autism

<table>
<thead>
<tr>
<th></th>
<th>Monolinguals with autism (N=13)</th>
<th>Bilinguals with autism (N=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Global structure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narrative structure</td>
<td>5.92 (2.40)</td>
<td>5.50 (2.55)</td>
</tr>
<tr>
<td>Frequency of orientation (%)</td>
<td>.10 (.05)</td>
<td>.10 (.08)</td>
</tr>
<tr>
<td>Types of orientation</td>
<td>1.62 (0.65)</td>
<td>1.70 (0.95)</td>
</tr>
<tr>
<td>Search theme</td>
<td>3.15 (1.52)</td>
<td>3.10 (1.29)</td>
</tr>
<tr>
<td><strong>Evaluation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of evaluation (%)</td>
<td>.53 (.32)</td>
<td>.40 (.24)</td>
</tr>
<tr>
<td>Types of evaluation</td>
<td>7.62 (3.60)</td>
<td>6.40 (4.03)</td>
</tr>
<tr>
<td><strong>Local structure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narrative length</td>
<td>35.77 (8.85)</td>
<td>36.10 (9.52)</td>
</tr>
<tr>
<td>Frequency of reference errors (%)</td>
<td>.16 (.10)</td>
<td>.20 (.11)</td>
</tr>
<tr>
<td>Frequency of conjunction (%)</td>
<td>.41 (.24)</td>
<td>.42 (.33)</td>
</tr>
</tbody>
</table>
There were no significant differences between the monolingual children with autism and the bilingual children with autism on all major dimensions of narrative performance coded (see Table 3.2). Therefore, no further investigation was conducted.

**Table 3.2 T tests for major narrative measures, comparing the English narratives of monolingual and bilingual children with autism**

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrative structure</td>
<td>21</td>
<td>.41</td>
<td>.69</td>
</tr>
<tr>
<td>Frequency of orientation (%)</td>
<td>21</td>
<td>.06</td>
<td>.95</td>
</tr>
<tr>
<td>Types of orientation</td>
<td>21</td>
<td>.25</td>
<td>.80</td>
</tr>
<tr>
<td>Search theme</td>
<td>21</td>
<td>.09</td>
<td>.93</td>
</tr>
<tr>
<td>Frequency of evaluation (%)</td>
<td>21</td>
<td>1.05</td>
<td>.31</td>
</tr>
<tr>
<td>Types of evaluation</td>
<td>21</td>
<td>.76</td>
<td>.45</td>
</tr>
<tr>
<td>Narrative length</td>
<td>21</td>
<td>.09</td>
<td>.93</td>
</tr>
<tr>
<td>Frequency of reference errors (%)</td>
<td>21</td>
<td>.87</td>
<td>.85</td>
</tr>
<tr>
<td>Frequency of conjunction (%)</td>
<td>21</td>
<td>.12</td>
<td>.91</td>
</tr>
<tr>
<td>Types of conjunction</td>
<td>21</td>
<td>.19</td>
<td>.85</td>
</tr>
<tr>
<td>Frequency of complex syntax (%)</td>
<td>21</td>
<td>.20</td>
<td>.84</td>
</tr>
<tr>
<td>Types of complex syntax</td>
<td>21</td>
<td>.60</td>
<td>.56</td>
</tr>
<tr>
<td>Frequency of bizarre comments (%)</td>
<td>21</td>
<td>.21</td>
<td>.84</td>
</tr>
</tbody>
</table>
3.2 Comparison between Bilingual Children with Autism and Typically-Developing Bilingual Children

The narrative performance in Mandarin and English of bilingual children with autism was compared with that of typically developing bilingual children in a series of 2 x 2 (group by language) repeated measures ANOVAs.

3.2.1 Global Structure of Narrative

Children’s performances on measures that assess the global structure of narrative, which included narrative structure, orientation, and search theme, in the two languages, were analyzed and compared in a series of 2 x 2 (group by language) repeated measures ANOVAs.

Table 3.3 shows the mean overall narrative structure scores the children received. A significant main effect for group was found, $F(1, 17) = 8.92, p = .008, \eta = .34$, indicating that typically developing children conveyed significantly more episodes in their narratives in both languages. No language effect was found, $F(1, 17) = 8.73, p = .36, \eta = .05$, and there was no interaction between language and group, $F(1, 17) = 8.73, p = .36, \eta = .05$. To further investigate the group differences on narrative structure, three basic components of narrative structure were examined—setting, problem, and resolution.
Table 3.4 Means and standard deviations for global structure variables, comparing bilinguals with autism and typically developing bilinguals in the two languages

<table>
<thead>
<tr>
<th></th>
<th>Bilinguals with autism (N = 10)</th>
<th>Typically developing bilinguals (N = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td><strong>English narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting</td>
<td>0.60 (0.52)</td>
<td>0.78 (0.44)</td>
</tr>
<tr>
<td>Problem</td>
<td>0.40 (0.52)</td>
<td>0.78 (0.44)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.40 (0.52)</td>
<td>0.89 (0.33)</td>
</tr>
<tr>
<td>Frequency of orientation (%)</td>
<td>.10 (.08)</td>
<td>.13 (.06)</td>
</tr>
<tr>
<td>Types of orientation</td>
<td>.70 (.95)</td>
<td>2.33 (.71)</td>
</tr>
<tr>
<td>Orientation of place</td>
<td>.02 (.03)</td>
<td>.02 (.02)</td>
</tr>
<tr>
<td>Orientation of time</td>
<td>.02 (.03)</td>
<td>.03 (.02)</td>
</tr>
<tr>
<td>Orientation of character</td>
<td>.06 (.06)</td>
<td>.07 (.05)</td>
</tr>
<tr>
<td>Search theme score</td>
<td>3.10 (1.29)</td>
<td>3.44 (0.53)</td>
</tr>
<tr>
<td><strong>Mandarin narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting</td>
<td>0.60 (0.52)</td>
<td>1.00 (0.00)</td>
</tr>
<tr>
<td>Problem</td>
<td>0.50 (0.53)</td>
<td>0.78 (0.44)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.20 (0.42)</td>
<td>1.00 (0.00)</td>
</tr>
<tr>
<td>Frequency of orientation (%)</td>
<td>.11 (.11)</td>
<td>.16 (.06)</td>
</tr>
<tr>
<td>Types of orientation</td>
<td>.70 (.06)</td>
<td>2.67 (.71)</td>
</tr>
<tr>
<td>Orientation of place</td>
<td>.01 (.02)</td>
<td>.03 (.02)</td>
</tr>
<tr>
<td>Orientation of time</td>
<td>.04 (.04)</td>
<td>.04 (.03)</td>
</tr>
<tr>
<td>Orientation of character</td>
<td>.07 (.07)</td>
<td>.08 (.03)</td>
</tr>
<tr>
<td>Search theme score</td>
<td>3.20 (1.32)</td>
<td>3.11 (0.60)</td>
</tr>
</tbody>
</table>

On the score for setting, there was no main effect for group, $F(1, 17) = 2.94, p = .11$, $\eta = .15$, or for language $F(1, 17) = 1.12, p = .31, \eta = .06$, nor was there significant interaction between group and language, $F(1, 17) = 1.12, p = .31, \eta = .06$. Furthermore, on the score for problem, there was no main effect for group, $F(1, 17) = 2.64, p = .12, \eta = .13$, or for language, $F(1, 17) = 0.28, p = .61, \eta = .16$, nor was there an interaction between group and language, $F(1, 17) = 0.28, p = .61, \eta = .16$. Therefore, bilingual children with autism and typically developing bilingual children did not differ in the ability to relate the setting and problem of the story.
On the score for resolution, there was a significant main effect for group, $F(1, 17) = 18.35, p = .001, \eta = .52$, indicating that typically developing children were better able to provide a resolution to the story. In fact, Table 3.4 shows that twice as many children from the typical group provided a resolution than the children with autism. In addition, all the typically-developing children accounted for the resolution of the story in Mandarin, while only 20% of the children with autism did. No language effect was found, $F(1, 17) = 0.26, p = .62, \eta = .02$, and there was no significant interaction between language and group, $F(1, 17) = 3.13, p = .10, \eta = .16$.

Furthermore, children’s use of statements that provided orientation for the context of a narrative was examined. For the frequency of orientation, there was no main effect for group, $F(1, 17) = 0.96, p = .34, \eta = .05$. However, there was a significant main effect for language, $F(1, 17) = 5.83, p = .03, \eta = .26$, as both groups provided more orientation in their Mandarin narratives. There was no significant interaction between group and language, $F(1, 17) = 1.31, p = .27, \eta = .07$. A significant main effect for group was detected for the types of orientation, $F(1, 17) = 4.64, p = .046, \eta = .22$, indicating that typically developing children had more types of orientation in their narratives. There was no main effect for language, $F(1, 17) = 1.12, p = .31, \eta = .06$, nor was there significant interaction, $F(1, 17) = 1.12, p = .31, \eta = .06$.

To further investigate the types of orientation employed by the two groups, subsequent analyses were performed on the specific types of orientation, which included orientation of place, time, and characters. For the frequency of orientation of place, there was a significant interaction between group and language, $F(1, 17) = 10.85, p = 0.004, \eta = .39$. As illustrated in Figure 3.1, the typical developing bilingual group (TDB) had more
orientation of place in the Mandarin narratives than bilingual children with autism (BA), who actually had fewer orientation of place in their Mandarin narratives. However, there was no main effect for group, $F(1, 17) = 1.35, p = .26, \eta = .07$, or for language $F(1, 17) = 0.01, p = .93, \eta = .001$.

![Figure 3.1](image.png)

Figure 3.1 Frequency of orientation of place across languages

Analysis of the frequency of orientation of time revealed no main effect for group, $F(1, 17) = 0.79, p = .39, \eta = .04$. However, a significant main effect for language was detected, $F(1, 17) = 10.76, p = .004, \eta = .39$. Table 3.4 reveals that both groups demonstrated a higher percentage of orientation of time in the Mandarin narrative. There was no significant interaction between group and language, $F(1, 17) = 1.03, p = .32, \eta = .06$. On the frequency of orientation of character, there was no main effect for group, $F(1, 17) = 0.35, p = .56, \eta = 0.02$, or for language $F(1, 17) = 1.43, p = .25, \eta = .08$, nor was there significant interaction between group and language, $F(1, 17) = 0.03, p = .86, \eta = .002$.

The analyses on the ability to establish and maintain the search theme yielded no main effect for group, $F(1, 17) = 0.08, p = .78, \eta = .005$, or for language $F(1, 17) = 0.64$, 43
\( p = .44, \eta = .04 \), nor was there significant interaction between group and language, \( F(1, 17) = 2.19, p = .16, \eta = .11 \), suggesting that both groups of children were equally able to establish and maintain the story’s search theme, regardless of the language in which the story was told (see Table 3.4).

### 3.2.2 Local Structure of Narrative

The bilingual children’s performances on measures that assess the local structure of narrative, which included story length, reference errors, conjunction, and complex syntax, in the two languages, were analyzed and compared in a series of 2 x 2 (group by language) repeated measures ANOVAs.

Table 3.5 Means and standard deviations for local structure variables, comparing bilinguals with autism and typically developing bilinguals in the two languages

<table>
<thead>
<tr>
<th></th>
<th>Bilinguals with autism (N = 10)</th>
<th>Typically developing bilinguals (N = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td><strong>English narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of clauses</td>
<td>36.10 (9.52)</td>
<td>41.56 (11.41)</td>
</tr>
<tr>
<td>Frequency of reference errors (%)</td>
<td>.20 (.11)</td>
<td>.08 (.08)</td>
</tr>
<tr>
<td>Frequency of ambiguous pronouns (%)</td>
<td>.34 (.23)</td>
<td>.14 (.14)</td>
</tr>
<tr>
<td>Frequency of conjunction (%)</td>
<td>.42 (.33)</td>
<td>.61 (.19)</td>
</tr>
<tr>
<td>Types of conjunction</td>
<td>2.50 (1.65)</td>
<td>3.44 (1.01)</td>
</tr>
<tr>
<td>Frequency of complex syntax (%)</td>
<td>.17 (.15)</td>
<td>.31 (.10)</td>
</tr>
<tr>
<td>Types of complex syntax (%)</td>
<td>.40 (.27)</td>
<td>.56 (.13)</td>
</tr>
<tr>
<td><strong>Mandarin narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of clauses</td>
<td>37.00 (14.87)</td>
<td>38.00 (8.83)</td>
</tr>
<tr>
<td>Frequency of reference errors (%)</td>
<td>.11 (.09)</td>
<td>.05 (.03)</td>
</tr>
<tr>
<td>Frequency of ambiguous pronouns (%)</td>
<td>.21 (.20)</td>
<td>.13 (.09)</td>
</tr>
<tr>
<td>Frequency of conjunction (%)</td>
<td>.39 (.31)</td>
<td>.52 (.24)</td>
</tr>
<tr>
<td>Types of conjunction</td>
<td>2.20 (1.55)</td>
<td>3.67 (1.00)</td>
</tr>
<tr>
<td>Frequency of complex syntax (%)</td>
<td>.21 (.18)</td>
<td>.38 (.12)</td>
</tr>
<tr>
<td>Types of complex syntax (%)</td>
<td>.50 (.29)</td>
<td>.69 (.17)</td>
</tr>
</tbody>
</table>

The means of the total number of clauses used, which quantified story length, are presented in Table 3.5. Analysis of story length revealed no main effect for group, \( F(1, 17) = \)
0.45, \( p = .51, \eta = .03 \), or for language, \( F(1, 17) = 0.375, p = .55, \eta = .02 \), nor was there a significant interaction between group and language \( F(1, 17) = 1.06, p = .32, \eta = .06 \), indicating that both groups told stories of similar length.

A main effect for group was detected for the frequency of reference errors, \( F(1, 17) = 8.95, p = .01, \eta = .35 \), indicating that bilingual children with autism produced more reference errors (see Table 3.5). Furthermore, a significant main effect for language was found, \( F(1, 17) = 6.34, p = .02, \eta = .27 \), demonstrating that both groups of children produced more reference errors in their English narrative (see Table 3.5). There was no significant interaction between group and language, \( F(1, 17) = 1.35, p = .26, \eta = .07 \). Furthermore, the frequency of ambiguous pronoun was investigated and the mean proportions of ambiguous pronouns produced by the two groups in each language are presented in Table 3.5.

Corresponding to the findings on the frequency of reference errors, a group effect was found, \( F(1, 17) = 4.75, p = .04, \eta = .22 \), demonstrating that bilingual children with autism were more likely to use ambiguous pronouns. There was no main effect for language, \( F(1, 17) = 2.06, p = .17, \eta = .11 \), and no significant interaction between group and language, \( F(1, 17) = 1.67, p = .21, \eta = .09 \).

Analysis of the frequency of conjunction used in children’s narratives detected no main effect for group, \( F(1, 17) = 1.93, p = .18, \eta = .10 \), or for language, \( F(1, 17) = 1.24, p = .28, \eta = .07 \), nor was there a significant interaction between group and language \( F(1, 17) = 0.31, p = .59, \eta = .02 \). Therefore, both groups did not differ in the number of conjunctions they used to connect sentences together. With regard to the diversity of conjunctions used, a main effect for group was found, \( F(1, 17) = 5.51, p = .03, \eta = .25 \), indicating that bilingual children with autism used significantly fewer types of conjunctions than the comparison
group (see Table 3.5). No language effect was detected, $F(1, 17) = 0.01, p = .91, \eta = .001$, and no significant interaction was found, $F(1, 17) = 0.55, p = .47, \eta = .03$.

To further investigate the range of conjunction used, the frequency of each type of conjunction used was analyzed. The means and standard deviations for the frequency of each type of conjunction are summarized in Table 3.6. There was only a main effect for group on the continuative conjunctions, $F(1, 17) = 4.87, p = .04, \eta = .22$, indicating that the bilingual children with autism used more continuatives (e.g., while) than the typically developing children. Other types of conjunction remained non-significant.

**Table 3.6 Frequency of major types of conjunction (%), comparing bilinguals with autism and typically developing bilinguals in the two languages**

<table>
<thead>
<tr>
<th></th>
<th>Bilinguals with autism (N = 10)</th>
<th>Typically developing bilinguals (N = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td><strong>English narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additive</td>
<td>0.29 (0.25)</td>
<td>0.50 (0.19)</td>
</tr>
<tr>
<td>Adversative</td>
<td>0.05 (0.06)</td>
<td>0.03 (0.05)</td>
</tr>
<tr>
<td>Causative</td>
<td>0.03 (0.10)</td>
<td>0.02 (0.03)</td>
</tr>
<tr>
<td>Sequential</td>
<td>0.01 (0.03)</td>
<td>0.02 (0.01)</td>
</tr>
<tr>
<td>Simultaneous</td>
<td>0.02 (0.03)</td>
<td>0.04 (0.04)</td>
</tr>
<tr>
<td>Continuative</td>
<td>0.002 (0.01)</td>
<td>0.01 (0.02)</td>
</tr>
<tr>
<td><strong>Mandarin narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additive</td>
<td>0.32 (0.27)</td>
<td>0.37 (0.24)</td>
</tr>
<tr>
<td>Adversative</td>
<td>0.02 (0.04)</td>
<td>0.02 (0.04)</td>
</tr>
<tr>
<td>Causative</td>
<td>0.01 (0.02)</td>
<td>0.06 (0.05)</td>
</tr>
<tr>
<td>Sequential</td>
<td>0.01 (0.02)</td>
<td>0.02 (0.03)</td>
</tr>
<tr>
<td>Simultaneous</td>
<td>0.02 (0.04)</td>
<td>0.03 (0.04)</td>
</tr>
<tr>
<td>Continuative</td>
<td>0.003 (0.01)</td>
<td>0.02 (0.01)</td>
</tr>
</tbody>
</table>

Finally, the means and standard deviations for the frequency and proportion of the types of complex syntax used are presented in Table 3.5. A significant main effect for group, $F(1, 17) = 6.59, p = .02, \eta = .28$, and for language, $F(1, 17) = 5.01, p = .04, \eta = .23$, was detected for the frequency of complex syntax. Thus, the typical group employed more
complex syntax in their narratives and both groups used more complex syntax in their Mandarin narrative. On the other hand, no significant interaction between group and language was found, $F(1, 17) = 0.23, p = .64, \eta = .01$.

Analysis of the range of complex syntax found no group differences, $F(1, 17) = 2.98, p = .10, \eta = .15$. However, a significant main effect for language was detected, $F(1, 17) = 23.11, p < .001, \eta = .58$, suggesting that both groups employed more types of complex syntax in their Mandarin narrative. No significant interaction was found, $F(1, 17) = 0.61, p = .45, \eta = .04$.

### 3.2.3 Evaluation

The ability to provide evaluative comments in bilingual children with autism was compared with that of typically developing bilingual children in a series of 2 x 2 (group by language) repeated measures ANOVAs.

<table>
<thead>
<tr>
<th></th>
<th>Bilinguals with autism (N = 10)</th>
<th>Typically developing bilinguals (N = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>English narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of evaluation (%)</td>
<td>.40 (.24)</td>
<td>.45 (.19)</td>
</tr>
<tr>
<td>Types of evaluation</td>
<td>6.40 (4.03)</td>
<td>8.22 (5.02)</td>
</tr>
<tr>
<td><strong>Mandarin narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of evaluation (%)</td>
<td>.47 (.24)</td>
<td>.60 (.30)</td>
</tr>
<tr>
<td>Types of evaluation</td>
<td>7.20 (3.01)</td>
<td>8.00 (2.96)</td>
</tr>
</tbody>
</table>

Table 3.7 presents the means and standard deviations for frequency and range of evaluation. When examining globally the amount and diversity of the evaluative devices used in the narratives, only significant effects were found for the frequency of evaluation devices. There was no main effect for group, $F(1, 17) = 0.79, p = .40, \eta = .04$, but a significant main effect
for language was found, $F(1, 17) = 5.30, p = .03, \eta = .24$, indicating that both groups had a higher proportion of evaluation in Mandarin (see Table 3.7). There was no significant interaction between language and group, $F(1, 17) = 0.76, p = .40, \eta = .04$. As for evaluative diversity, there was no group effect, $F(1, 17) = 0.65, p = .43, \eta = .03$, no language effect, $F(1, 17) = 0.19, p = .67, \eta = .01$, and no significant interaction between the two, $F(1, 17) = .59, p = .45, \eta = .03$.

Even though analyses revealed no group differences in the frequency of evaluation and evaluative diversity, it was possible that children with autism and their typically-developing peers might rely on different types of evaluative devices. Since evaluation hinges on theory of mind and social-pragmatic abilities, which can be challenging for children with autism, it was worthwhile to conduct further analyses on a few major evaluative devices. Table 3.8 presents the means and standard deviation of the frequency of these evaluative devices.

**Table 3.8 Frequency of major evaluative devices (%)**, comparing bilinguals with autism and typically developing bilinguals in the two languages

<table>
<thead>
<tr>
<th></th>
<th>Bilinguals with autism (N = 10)</th>
<th>Typically developing bilinguals (N = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td><strong>English narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frames of mind</td>
<td>.05 (.04)</td>
<td>.06 (.06)</td>
</tr>
<tr>
<td>Negatives</td>
<td>.02 (.03)</td>
<td>.02 (.02)</td>
</tr>
<tr>
<td>Hedges</td>
<td>.002 (.01)</td>
<td>.005 (.01)</td>
</tr>
<tr>
<td>Character speech</td>
<td>.06 (.07)</td>
<td>.03 (.02)</td>
</tr>
<tr>
<td>Narrator comment</td>
<td>.002 (.01)</td>
<td>.01 (.02)</td>
</tr>
<tr>
<td><strong>Mandarin narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frames of mind</td>
<td>.03 (.03)</td>
<td>.05 (.04)</td>
</tr>
<tr>
<td>Negatives</td>
<td>.06 (.04)</td>
<td>.04 (.03)</td>
</tr>
<tr>
<td>Hedges</td>
<td>.00 (.00)</td>
<td>.003 (.01)</td>
</tr>
<tr>
<td>Character speech</td>
<td>.05 (.06)</td>
<td>.05 (.03)</td>
</tr>
<tr>
<td>Narrator comment</td>
<td>.002 (.01)</td>
<td>.002 (.01)</td>
</tr>
</tbody>
</table>
Analyses of the frequency of major types of evaluative device yielded no significant main effects and interaction for most types. However, a language effect emerged from the analysis of the proportion of negatives used in the story, $F(1, 17) = 7.51$, $p = .01$, $\eta = .31$, indicating that both groups relayed more negatives in their Mandarin narrative (see Table 3.8). In addition, as illustrated in Figure 3.2, a significant interaction emerged from the analysis of the frequency of character speech, $F(1, 17) = 4.77$, $p = .04$, $\eta = .22$, demonstrating that children with autism used more character speech in their English narrative, while the two groups used the same amount of character speech in their Mandarin narratives (see Table 3.8).

![Figure 3.2 Interaction between language and group on the frequency of character speech](image)

**Figure 3.2 Interaction between language and group on the frequency of character speech**

### 3.2.4 Additional Analyses

Incidences of code-switching and unexpected comments in children’s English and Mandarin narratives were tallied. Table 3.9 summarized the means and standard deviations for code-switching and unexpected comments.
Table 3.9 Means and standard deviations for code switching and unexpected comments (%), comparing bilinguals with autism and typically developing bilinguals in the two languages.

<table>
<thead>
<tr>
<th></th>
<th>Bilinguals with autism (N = 10)</th>
<th>Typically developing bilinguals (N = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td><strong>English narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of code-switching</td>
<td>0.02 (0.05)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Frequency of unexpected comments</td>
<td>.03 (0.07)</td>
<td>.00 (0.00)</td>
</tr>
<tr>
<td><strong>Mandarin narratives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of code-switching</td>
<td>0.12 (0.16)</td>
<td>0.12 (0.27)</td>
</tr>
<tr>
<td>Frequency of unexpected comments</td>
<td>.02 (0.16)</td>
<td>.00 (0.00)</td>
</tr>
</tbody>
</table>

No statistical analyses were carried out to compare the groups on these two variables because of the floor effects observed in the typically-developing group. The typically developing children did not code-switch in their English narrative. However, Table 3.9 shows that both groups of children code-switched more when narrating in Mandarin. In terms of the frequency of unexpected comments included in the narrative, it is notable that, as expected, the typical children did not include any unexpected comments in their narratives, while the children with autism had an average of 3% in English and 2% in Mandarin.
4 Discussion

This study compared narrative abilities of monolingual children with autism, bilingual children with autism, and typically developing bilingual children on the global and local structure of narrative and the evaluative aspects of narrative. The objectives were to fill in the gap in current knowledge on narrative abilities in bilingual children with autism and to investigate the effects of bilingualism on communicative competence of children with autism.

4.1 Narrative Abilities in Bilingual and Monolingual Children with Autism

There were no differences between the monolingual children with autism and bilingual children with autism who participated in the study on all general measures of narrative performance. Somewhat contradictory to the hypothesis, the children not only performed comparably on the global structure of narrative, but their narratives were also equivalent with regard to the local structure and evaluative aspects of narrative. The bilingual children with autism did not use fewer conjunctions, a potential L1-influence as Mandarin allows for complex sentences without the use of linking elements. They also did not differ from the monolingual children in terms of the use of evaluative strategies. For example, the bilingual children could potentially produce fewer evaluative comments because some researchers have found narrators of Asian cultures (including Chinese) tend to provide fewer evaluative remarks (e.g., Huang & Shen, 2003; Kang, 2003).

The fact that the narrative competence of the bilingual children with autism was on par with that of their monolingual peers suggests that bilingualism does not present a negative influence on children’s story-telling ability. Thus, it appears that bilingualism may not have a detrimental effect on children’s communicative development. This conclusion is
in line with previous research findings that suggested bilingualism does not further impede the language development of children with language and cognitive impairments (Bird, Cleave, Trudeau, Thordardottir, Sutton, & Thorpe, 2005; Crutchley, Botting, & Conti-Ramsden, 1997; Paradis, Crago, Genesee, & Rice, 2003; Peterson, 2010). As stated in the introduction, professionals often advise parents to restrict input to their children to a single language (Kremer-Sadlik, 2005). However, as seen in the current findings, there is no sufficient support for the claim that bilingualism interferes with language development in children with autism. Therefore, as Kremer-Sadlik (2005) suggested, it is important for parents of bilingual children with autism to maintain both languages to maximize parent-child interactions, which will facilitate language and social development and enable the children to become bilingual and members of both language communities.

In light of previous research comparing typically-developing monolingual and bilingual children’s narrative abilities, it is somewhat surprising to find that the monolingual children and bilingual children with autism in the present study did not exhibit any differences on all narrative measures. There are two possible explanations for the lack of differences. First, children with autism can have impaired language skills (e.g., omitting grammatical morphology, difficulties with complex syntax), causing their language profiles to resemble, on the surface, that of bilingual children learning a second language. Thus, potential Mandarin influences on the local structure of narrative (e.g., complex syntax, conjunctions) could have been masked because monolingual children with autism experienced similar linguistic challenges, not because of language interference, but due to autism. Second, cultural influences on narrative production may not have been be significant because children with autism are expected to have an inadequate knowledge of sociocultural
expectations that underlie narrative practices (Loveland & Tunali-Kotosky, 2005). Therefore, it is possible that potential differences in evaluation due to cultural differences were not found because both groups of children were not as aware of the cultural and social conventions of story-telling in their culture(s).

4.2 Narrative Abilities in Bilingual Children with Autism and Typically-Developing Bilingual Children

4.2.1 Global Structure

The measure of narrative structure assesses children’s awareness of the global aspects of a story and their ability to construct a hierarchical representation of the main story components, or episodes. Confirming the hypothesis, analysis of narrative structure demonstrated that bilingual children with autism conveyed significantly fewer episodes in their stories than their typically-developing peers. Contrary to Norbury and Bishop’s (2003) finding that the children with autism and the control group did not differ on the story structure measure, the bilingual children with autism in the current study were less able to include the basic components of the story. This discrepancy might have arisen from the differences in the design of the scoring scheme. Norbury and Bishop (2003) adapted the original 8-point scoring procedure used by Reilly et al. (1998) into a 6-point measure, in which the children were no longer required to describe all the major search episodes, possibly making the measure not sensitive enough to capture the differences between children with autism and typically-developing children. The present study used a more comprehensive 10-point scale to measure narrative structure, which was able to distinguish children with autism and typically developing children.

The children in the current study were asked to produce a narrative from a picture book, thus it seems more likely that that children would not omit story components.
However, linking the events in the book and understanding the relationship between them require the child to infer beyond what is readily apparent from the pictures on the pages (Reilly et al, 1998; Berman & Slobin, 1994). Therefore, it was possible for children to fall into a picture description mode from time to time, in which characters were merely identified, without describing their interaction with the protagonists and their relevance in moving the plotline forward. For example, one picture in the book depicts the boy falling in the air. In order to describe that event, the narrator needs to understand that it relates to the previous picture, which shows the boy climbing the tree and peering into a hole. The narrator must then make the inference that the appearance of an owl in front of the hole is related to the boy’s falling.

In an excerpt from the narrative of a bilingual child with autism (1), it is apparent that even though the character of the owl was introduced, a point for the episode “interaction with owl” (see Appendix B.1) was not credited, because no interaction between the two characters was explicitly described. The child did faithfully depict each picture but was unable to connect the isolated events together.

(1) The boy looked in a tree. Then the boy fell off the tree. Inside the tree there was an owl. The boy climbing on the rock. (Subject 205)

In contrast, from the same part of the story told by a typically developing bilingual boy (2), the interaction between the protagonist and the owl and the causal connection between the two events (i.e., the owl emerges from the tree hole and causes the boy to fall down from the tree) were explicitly laid out. Also, we can see that the boy’s subsequent action (i.e., climbing on a rock) is motivated by the action of another character (i.e., the chasing of the owl) and the story moves forward through this interaction.
(2) And then the boy looked inside a tree… The boy fell down. Because an owl was inside the tree. Then the owl was chasing the boy. So boy ran to the rock. (Subject 306)

Therefore, the children with autism were less able to express the interaction between the two protagonists (i.e., the dog and the boy) with the other characters to fully depict the various search episodes.

Subsequent analyses of the core narrative components, namely the setting, problem, and resolution of the story, revealed that bilingual children with autism were less likely to provide an adequate resolution to the story than typically-developing children. Although most children with autism mentioned that the boy has found his frog, many of them failed to conclude the story with a resolution to the initial problem—the boy brings home the frog he has lost (or one to take its place). On the other hand, 8 out of 9 typically developing children provided a resolution to the plot in their English narrative, and all of them successfully concluded the story in Mandarin. This is in line Tager-Flusberg’s (1995) finding that children with autism were less likely to include a resolution. It is possible that due to the social-pragmatic deficit, the children with autism might be less aware of the need to conclude the story for the listener so to signal that the story is now finished and that the problem has been solved in an explicit way. In summary, the bilingual children with autism included fewer episodes in their stories and were less able to construct a coherent narrative.

Bilingual children with autism and their typically developing peers differed significantly in their ability to convey the orientation function of a narrative. Even though both groups of children provided a comparable number of orientation clauses, the children with autism relied on a more restricted range of orientation devices. Three main types of
orientation were examined in the study—orientation of time, place, and characters—which are used by the narrator to orient the listener to the context in which the story unfolds (Labov & Waletzky, 1967; Peterson & McCabe, 1983). It is possible that the children with autism were not as sensitive to the listener’s need for information on the time, place of the events of a narrative, and the identities of the characters. This finding corresponds to Bruner and Feldman’s (1993) report that children with autism used fewer pragmatic markers of time and space when telling a story. A recent study on adults with high-functioning autism or Asperger Syndrome investigated the use of temporal expressions (e.g., ‘after’, ‘it was night’), which in essence function like orientation of time, and found limited use of temporal expressions by the subjects with autism (Colle et al., 2008). The authors attributed their finding to a deficit in theory of mind, which makes individuals with autism less able to keep track of the listener’s knowledge to supply just enough information for the narrative to be “informative” (Colle et al., 2008).

Further analyses revealed a significant interaction between group and language on the frequency of orientation of place. When narrating in Mandarin, typically developing children oriented the listener with regards to the location of the events or of the characters in the story more often than did the children with autism. Furthermore, both groups provided significantly more orientation of time in Mandarin. Such a language difference might be due to the fact that Mandarin lacks grammatical tense marking that relates an event to the time of speaking, which could have led the children to more actively locate the events in time for the listener (Sun, 2006). These findings are in line with previous research with monolingual Mandarin-speaking children. For example, Erbaugh (1990, as cited in To, Stokes, Cheung, & T’sou, 2010) found speakers told stories that were temporally precise by using lexical
devices (e.g., temporal adverbials) rather than morphological tense markings. Wang and Leichtman (2000) also found that Chinese children included more temporal and situational details in the narratives than American children.

Finally, both groups of children were comparable in their ability to establish and maintain the search theme of the story. This finding is in line with Norbury and Bishop’s (2003) study with monolingual children with autism that both children with autism and the control group “got the gist” of the story. The bilingual children with autism in the present study were able to understand the motivation for the boy’s behaviour and the general theme of the story. Unlike some of the earlier studies that found children with autism lacked a good grasp of how to narrate and merely described (Loveland et al., 1990; Bruner & Feldman, 1993), bilingual children with autism were able to provide a relatively thematically motivated narrative, and were not merely doing a picture-description task.

As demonstrated by their lower overall narrative score (discussed in the beginning of this section), although the bilingual children with autism grasped the theme of the story on a global level, they were not necessarily able to include all the specific story episodes and to describe the relations between local events and how they contribute to the overall plotline. This finding highlights the difficulty in determining whether their deficient narrative structure is due to deficits in syntactic skills (which are needed to explicitly express causal relationship) or in social-pragmatic abilities (which are necessary to make inferences). Since theory of mind and language are interdependent of each other, it is likely that limited language and pragmatic skills both contribute to the children’s performance seen in the present study.
4.2.2 Local Structure

Analysis of the local structure of narratives investigated the children’s ability to use linguistic devices to establish story cohesion, focusing on story length, reference errors, conjunction use, and syntactic complexity. Confirming my hypothesis, results indicated that bilingual children with autism told stories of similar length as their peers, but in a simpler fashion. In addition, bilingual children with autism included significantly less complex syntax in their stories, a finding that corresponds with previous research with monolingual children (Capps et al. 2000; Losh & Capps, 2003; Norbury & Bishop, 2003; Tager-Flusberg, 1995). To tell a cohesive and informative story, children must acquire syntactic abilities that are necessary in constructing causal and temporal relationships in a narrative. Relative lack of complex syntax and limited explanation of characters’ internal states among children with autism suggests limited appreciation of and access to the social problem-solving function of narratives (Capps et al., 2000). In addition, considering that both groups performed comparably on the standardized language assessment but the children with autism actually employed less complex syntax in their narratives, it is evident that narratives can serve as a more valid and sensitive assessment tool for children’s expressive language ability in real communicative situations.

A language effect was found for both the frequency and range of complex syntax used by both groups. All the children had a higher proportion of complex syntax and more types of complex syntax in the Mandarin narrative. A possible explanation for these findings is that the children might have mastered the use of the types of complex syntax examined in Mandarin earlier and were yet to fully acquire the different complex sentence structures in English.
In terms of the ability to produce linguistically cohesive narratives, the bilingual children with autism and the typically developing bilingual children differ significantly in the diversity of conjunctions used and their ability to maintain clear reference to characters, again confirming the hypothesis. Even though both groups did not differ in the proportion of conjunctions used in their narratives, the children with autism relied on a more restricted range of conjunctions. Thus, their cohesive strategies in using various types of connectives to tie sentences together were not as sophisticated as that of their typical peers.

Furthermore, the bilingual children with autism made significantly more reference errors and included more ambiguous pronouns, confirming previous findings with monolingual children with autism (Tager-Flusberg, 1995; Norbury & Bishop, 2003). For example, a bilingual child with autism (3) began the story by using a pronoun to refer to the protagonists, without introducing them using a nominal expression first. In another example, a bilingual child with autism (4) used the pronoun “he” to refer to the boy, but since another character (i.e., the owl) was introduced immediately before, the pronoun became ambiguous.

(3) They put the frog in the bowl. (Subject 208)

(4) And then the boy went on a rock. The owl went on a tree branch. He called, “froggie!” (Subject 209)

The Mandarin example (5) demonstrates a bilingual child with autism whose use of pronoun 他們 tāmen ‘they’) was ambiguous because it was not clear whether the pronoun was referring to the boy or the dog (represented by the plural pronoun 他 tā ‘he/she/it’). Thus, the bilingual children were not as adept as the typically developing children at using pronominal reference to track the two protagonists in the story.
Another finding of note is that both groups of children made more reference errors in
English, possibly because the children were required to distinguish between the definite
determiner ‘the’ and indefinite determiner ‘a’ in the language (as there is no determiner in
Mandarin), which is a potential source for confusion. Although Norbury and Bishop (2003)
found only a minority of children confused a/the, 8 out of the 10 bilingual children with
autism and 5 out of the 9 typically developing bilingual children in the present study had at
least one incidence where they introduced a character erroneously using a definite
determiner. Thus, the confusion might be due to the influence of their first language
(Mandarin). An example of determiner confusion is shown in (6) where a bilingual child with
autism began the narrative by introducing the frog using a definite determiner.

(6) There was the moon and the frog haded to stay in the cage. (Subject 206)

However, 8 out of the 13 monolingual children with autism also demonstrated the same
confusion (and their frequency of reference errors were comparable with that of the bilingual
children), showing that children with autism in general have difficulties with anaphoric
reference. They were less able to introduce characters appropriately and had challenges using
pronominal reference unambiguously for the sake of the listener.

Referencing has been found to be a distinct challenge for individuals with autism, a
finding that has been consistently replicated across different studies (Loveland et al., 1990;
Norbury & Bishop, 2003; Colle et al., 2008). Norbury and Bishop (2003), in their study
comparing different clinical groups, found that diagnosis only predicted narrative
performance in one area—referencing. Specifically, the use of ambiguous nouns and pronouns were most common in children with autism. Furthermore, Colle et al. (2009) found that even adults with autism with normal language abilities, showed “a subtle but significant deficit when the listener’s needs determined the use of pronouns to maintain reference to a character” (p. 39). Similarly, the bilingual children with autism in the present study also demonstrated inappropriate use of anaphoric reference, confirming previous finding that children with autism are less sensitive to the need to make reference clear for the listener. Proper referencing entails the ability to manage changes in point of view (a challenge for children with autism as demonstrated by their hallmark I/you pronoun reversal), to keep track of the listener’s state of knowledge, and to supply just enough information to meet the listener’s need, all of which requires theory of mind (Colle et al., 2009; Loveland & Tunali, 1993) Therefore, although theory of mind and language are intertwined, the challenge with referencing demonstrated by individuals with autism seems to be more related to pragmatic deficits.

4.2.3 Evaluation

Like Tager-Flusberg (1995), Capps et al. (2000) and Norbury and Bishop (2003) who studied monolingual children, no group differences on the frequency of evaluation were found between the bilingual children with autism and the typically developing bilingual children. Furthermore, the two groups did not differ in their use of frames of mind, or in the frequency of the other evaluative devices analyzed. Although some previous studies have found that children with autism relied on a more restricted range of evaluative devices (e.g., Capps et al., 2000; Losh & Capps, 2003), the bilingual children with autism in this study did not differ significantly from the typically developing children in terms of evaluative
diversity, which is contrary to my hypothesis. Subsequent analyses on the major types of evaluative devices revealed that both groups of bilingual children used more negatives in their Mandarin narrative. In addition, the bilingual children with autism employed more character speech in their English narratives.

Tager-Flusberg (1995) pointed out that the lack of differences in the use of evaluative devices might be because many of the evaluative devices, such as onomatopoeias and emphatics, may be learned by rote, and that children with autism can reproduce them without having a genuine understanding of their function in engaging the listener. It is also possible that children with autism may rely on character speech, onomatopoeia, and expressives (e.g., “wow”, “oh boy”) in their narration, instead of verbally describing the events, which can be more linguistically demanding. The author’s observations during data collection may provide some qualitative support to this speculation. Both monolingual and bilingual children with autism seemed more “animated” in their story telling, as shown in their dramatic intonation and embellishments of sound effects, expressives, and character speech in their narratives. For example, one monolingual boy with autism often used character speech (e.g., “get away from me you ‘owly’ pest” for the episode of interaction with owl) and expressives (e.g., “oh boy gosh”) to represent an event or an episode. The excerpt in (7) shows that instead of describing the episode of the protagonists falling into a pond, he used a single expressive (“wow”) to represent the event. Consequently, the investigator had to probe for more information.

(7) CHI: wow!
INV: what happened here?
CHI: they fall into a cliff. (Subject 107)
Also, contrary to the theory of mind hypothesis, the children with autism did not produce less mental state language than the typically developing children. One possibility for this finding is that since narratives were elicited using a picture book, the children with autism might have been simply labeling what was represented in the picture, without truly understanding the relevance of the emotion, or the mental state involved. For example, a bilingual child with autism (8), in describing the picture that depicts the boy falling off the tree because of an owl appears, made a reference to intention using the verb “want.” It was apparent that the child was not able to infer the accidental nature of the boy’s falling and inappropriately used a mental state verb.

(8) The boy look in the tree. The boy wants to fell down. (Subject 208)

In addition, since both groups provided limited number of reference to the characters’ mental or emotional states, it may be that the story was not conducive for eliciting frames of mind, resulting in a floor effect. Furthermore, evaluation is a skill that continues to develop throughout the school years (Berman & Slobin, 1994). Consequently, the typically developing children might still be developing this skill and differences between them and the children with autism may not be apparent until later in life.

Another possibility for this finding is that the bilingual children’s cultural background can exert influences on the use of evaluative devices of narratives. Studies have found that Japanese and Korean narrators avoid making explicit evaluative comments (Kuntay & Nakamura, 1993; Kang, 2003) and that Asian (Japanese, Chinese and Korean) mothers elicit fewer evaluative and descriptive information than European-American mothers (Han, Leichtman, & Wang, 1998; Minami, 2002). Tardif and Wellman (2000) found that Chinese caretakers are less inclined to talk about thinking with young children and the use of terms
for thinking was infrequent even for Mandarin-speaking adults. Moreover, it has been found that even older school-age Mandarin-speaking children in Taiwan made infrequent references to characters’ mental states and emotions (Huang & Shen, 2003). Thus, both groups of children might have expressed fewer explicit evaluations, especially frames of mind, due to culturally-specific socialization practices and narrative styles.

However, both groups of bilingual children had a higher proportion of evaluation in Mandarin. Since Mandarin is the primary language spoken at home and that Chinese children are encouraged to share their personal stories within their families but not outside the immediate household (Cheung, as reported in Owen Jr., 1996), it is possible that children are more accustomed to (or had more practice/exposure) providing evaluative comments in Mandarin than in English. Further research is warranted to confirm this speculation.

4.2.4 Additional Analyses

Qualitative differences were evident in that none of the typically developing children included any irrelevant comments in their narratives. On the other hand, like previous research (Loveland et al., 1990; Norbury & Bishop, 2003), some children with autism (4 of the 13 monolinguals and 3 of the 10 bilinguals) included unexpected or off-topic remarks in their narratives. For example, one child from the monolingual group (9) mentioned a cat and a robot in her story; another talked about how the frog likes drinking ice (10).

(9) Once upon a time there was a frog who lived in the house. If the cat get a robot.
   (Subject 112)

(10) Once upon a time a boy had a frog. It was named Jumpeth and he like drinking ice. (Subject 109)
In addition, a bilingual boy with autism started talking about a waterslide for the picture that depicts the boy falling into the pond. This pragmatic violation seems to be unique to this clinical population (Loveland et al., 1990; Norbury & Bishop, 2003).

Finally, both bilingual groups were more likely to code-switch during story telling in Mandarin. A possible reason for code-switching is to fill a linguistic need for a word or an expression (Grosjean, 2010). In other words, bilingual children code-switch because they do not know the appropriate word in the target language (Lexical Gap Hypothesis; Genesee et al. 2004). The children in the study tend to substitute an English word for the name of various animals that appeared in the story (e.g., gopher, owl), possibly because they acquired these words in English and did not know the translation equivalent in Mandarin (11).

(11) Uh-oh 那個 dog 跑 走 with the moose 了
nāge pāo zǒu le
that-classifier run away participle
“Uh-oh, that dog raw away with the moose”

It was observed that some children in both groups seemed to be aware of the perceived negative social attitudes associated with code-switching (Grosjean, 2010), and were reluctant to code-switch, as was evident in the long pauses of hesitation before an unknown word. One child in the typical group was so unwilling to code-switch that he paused whenever he did not know a word in Mandarin and asked the examiner in a whisper how to say the target word.

It is of note that code switching is not an indicator of language confusion or a lack of differentiation between the two language systems of the bilingual children. In fact, code-switching may be a manifestation of bilingual competence (Lanza, 1997; Genesee, 2002; Reyes, 2004). Reyes (2004) found that bilingual children with the greatest degree of bilingual
competence are the ones who most frequently code-switch as a strategy to meet their conversational goals. Genesee (2002) goes further to state that “true bilingual communicative competence entails the ability to adapt one’s language use on-line in accordance with relevant characteristics of the situation” (p. 174). Such an ability to adapt one’s language, which indicates a level of control of linguistic processing and a degree of flexibility to decide between languages (Bialystok, 1988), is evident in how bilingual children, even ones with autism, were able to perform the narrative task in the two languages in one sitting and to code-switch when necessary.

4.3 Summary

In summary, monolingual children with autism and bilingual children with autism performed comparably on all measures of the global and local structure of their narratives and on the evaluative function of narratives. These finding suggests that bilingualism may not impede communicative competence of children with autism. Some group differences were found between bilingual children with autism and their typically developing bilingual peers. Adding to the existing literature, it was found that children with autism experience challenges with certain aspects of narrative production, notably in the global structure and the local structure of narratives. Bilingual children with autism relayed fewer episodes in their story and were less likely to provide a resolution, a finding that replicates some studies with monolingual children (Diehl et al., 2006; Losh & Capps, 2003; Teger-Flusberg, 1995). They also provided a more restrictive range of orientation remarks, possible due to a lesser appreciation for the need to orient the listeners to the context in which the story takes place (Colles et al., 2008). Also, it was found that both groups of bilingual children provided more
orientation of time in their Mandarin narrative, perhaps because of an inclination to provide more time references for the listener in a language that lacks tense marking.

In line with previous research with monolingual children with autism, bilingual children with autism in the present study also made more reference errors and were more likely to use ambiguous pronouns in their narratives (Loveland et al., 1990; Norbury & Bishop, 2003; Colles et al., 2008). In terms of the use of conjunctions to establish story cohesion, bilingual children with autism employed conjunctions as frequently as the typically developing children, albeit with a significantly more restricted range. Furthermore, corresponding to previous studies, although bilingual children told stories of similar length as their peers, they were less likely to use complex syntax (Capps et al., 2000; Norbury & Bishop, 2003). Moreover, both bilingual groups used more types of complex syntax in Mandarin.

Similar to previous research, no group differences on the number of evaluative devices used were found (Tager-Flusberg, 1995; Capps et al., 2000; Norbury & Bishop, 2003). It was found that the children with autism did not display a more restricted range of evaluation, a finding that is different from previous research (Capps et al, 2000; Losh & Capps, 2003). However, both groups of children used more evaluative devices in the Mandarin narrative. Finally, additional analyses revealed that both groups of bilingual children were likely to code-switch, and did so more frequently in Mandarin, and that in line with previous studies, a few children with autism sometimes exhibited pragmatic violation by including off-topic remarks (Loveland et al., 1990; Norbury & Bishop, 2003).
4.4 Implications and Future Research

This was the first study to investigate narrative abilities in bilingual children with autism. Even though no significant differences between the monolingual children with autism and bilingual children with autism were found, it appears that bilingualism does not have a detrimental effect on the children’s language development. Both groups of children performed comparably on all measures of narrative skills. Considering that telling a story is a complex task that taps into children’s cognitive, social, and linguistic knowledge, it was remarkable that the bilingual children with autism were able to narrate in both of their languages relatively successfully. Contrary to popular belief that bilingualism poses unnecessary challenges for the language development of children with cognitive and/or language impairment, verbal children with autism seem to have the capacity to become competent speakers of two languages. As previous research has shown that bilingualism may increase children’s metalinguistic awareness, and that it was evident that the bilingual children with autism in this study had a degree of flexibility and control of their two languages, as seen in their ability to switch between their two languages in storytelling and their code-switching to meet a linguistic need, it would be interesting to probe possible bilingual advantages using metalinguistic tasks in future research (Bialystok, 1988).

Furthermore, as narrative abilities continue to develop into adulthood, follow-up research with older children, adolescents or adults would provide further evidence whether or not more striking differences in narrative abilities (e.g., evaluative skill) between individuals with autism and typically developing individuals will emerge. Berman and Slobin (1994) found that only adults display full rhetorical flexibility in the range of expressive devices, which they employ to construct a truly thematically organized and cohesive narrative and to
imbue the narrative with their personal style. It would be interesting to investigate whether older individuals with autism would demonstrate the same mature conception of the narrative genre or would they tell stories that have a stereotypical style.

The coding scheme used in the present study can be modified and improved, which may increase its sensitivity to the differences in evaluative function between children with autism and typically developing children. For example, since all children used very few evaluative comments across the types, resulting in very small numbers for each type of evaluative devices, it may be a good idea to collapse some of the categories to form a few general categories of evaluation. For example, Reilly and colleagues (2004) combined sound effects, character speech, and audience hookers under a single category of “social engagement devices.” In addition, further investigation on reference strategies employed by the bilingual children with autism can be performed using a widely used coding scheme designed by Van der Lely (1997). This procedure allows a more in-depth examination of how children introduce, maintain, and reintroduce characters throughout the story.

Narrative assessment provides a wealth of information about a child’s linguistic, cognitive, and social abilities. Furthermore, the importance of narrative performance as a predictor for children’s developing language, literacy and discourse skills has been widely recognized (e.g., Botting 2001; Fey, Catts, Proctor-Williams, Tomblin & Zhang, 2004; Johnston, 2007; Westby, 1991). Due to the lack of bilingual norms on standardized tests and the culturally-biased format of testing, narrative assessment can serve as a more ecologically valid way of investigating children’s communicative competence because cultures all over the world use narratives to relate and interpret experiences (Gutierrez-Clellen, 1995; Fiestas & Peña, 2004). Narrative samples are a valuable diagnostic tool because they supply
information about a child’s ability to plan discourse at the extended level and provide a window into language in use, whereas standardized language tests yield information about performance at the single word or utterance level in a decontextualized way (Fiestas & Peñas, 2004). The results of the study demonstrate that narratives provide more detailed and intervention-relevant information on children’s skills in multiple domains, which were not evident from the standardized testing, supporting the use of narrative assessment. In light of the fact that narrative practice is grounded in a cultural context, further research on bilingual children from different language communities and their differences with the monolingual children speaking those languages, is needed to equip clinicians for culturally-sensitive assessment of narrative skills in children.

It would be illuminating to compare children’s performance on different types of narrative, such as accounts of personal experiences. Personal anecdotes may be more challenging for children with autism because they must convey information that was gained through experience, requiring them to select what informant is important to present and organize the information in a coherent and cohesive way, and accommodating the needs of the listener (Loveland & Tunali, 1993). Losh and Capps (2003) found that children with autism performed relatively well narrating with a storybook but exhibited difficulties imbuing narratives of personal experience with the more sophisticated characteristics exhibited by the control group. Future research on personal narratives in bilingual children with autism would shed light on their narrative abilities in a more socially and pragmatically demanding context without the structured support of a picture book.

In conclusion, this study demonstrated that bilingual Mandarin-English children with autism were able to tell stories in both of their languages and that their narrative performance
in English was comparable to that of monolingual children with autism. Furthermore, significant differences were found between bilingual children with autism and typically developing bilingual children with regards to different aspects of the global and local structure of narrative and of evaluation. Due to the limited sample size of this study, these findings are preliminary and need to be replicated. Currently there are only a few existing studies on the narrative abilities of children with autism and of bilingual children. Further research in each population, and in bilingual children with autism, is needed for us to understand fully the complex interaction between bilingualism and the deficits associated with autism.
References


Appendices

Appendix A  Sample Narrative

The following stories were chosen to represent two distinct styles that are common among the children: 1) Animated storytelling with many evaluative comments, and 2) Concrete, straightforward, stick-to-the point style.

A.1  English Narrative of Two Monolingual Children with Autism

@Begin
@Languages: eng
@Participants: CHI Target_Child, INV Investigator
@ID: 101
@ Date of Recording: 08-JUN-2010
@Age of CHI: 8;3
@Sex of CHI: male
@Activities: Frog Story Narrative based on "Frog, where are you?"

*INV: ok now tell me the story.
*CHI: a boy's watching a frog.
*CHI: and frog watching the boy.
*CHI: the dog is looking in the frog.
*INV: ok turn the page.
*CHI: but the frog got out.
*CHI: he's <gonna go find> [[]] going in the forest.
*INV: ah <ok> [>.
*CHI: <and> [>] the boy was sleeping.
*CHI: when he waked up (.) the frog is gone.
*CHI: the boy looked everywhere for <the dog> [[]] I mean the frog.
*INV: &=laughs ok.
*CHI: the dog put the glass in +... 
*CHI: and the boy just got outside.
*CHI: and the dog xxx it.
*CHI: dog was falling and the boy caughted him.
*CHI: there are some bees.
*CHI: and then the forest.
*CHI: xxx the boy found a hole.
*CHI: and <he> [[]] there is something stinks (.) in there.
*CHI: it was a gopher.
*CHI: the dog knocked down the beehive.
*CHI: um the dog just needs to run away.
*CHI: the boy's still looking.
the boy fell down.
the dog ran away.
a owl came.
he said whoo@o ["].
and he find the frog.
um +...
itz a deer.
there's a deer butt [?] in the boy.
and the dog <who's gonna> [/] is falling.
+" &=yells.
%com: child narrates in an animated way.
splash@o and the boy got in the water.
+" sh be quiet dog.
+" what's there?
+" hey a family of frogs!
and xxx he said bye ["].
the end.
aw.

@Begin
@Languages: eng
@Participants: CHI Target_Child, INV Investigator
@ID: 107
@ Date of Recording: 07-JUL-2010
@ Age of CHI: 12;0
@Sex of CHI: male
@Activities: Frog Story Narrative based on "Frog, where are you?"
frog where are you.
um it's night time.
and the boy the dog and the frog are going to bed.
but later that night the frog decide to escape.
the boy and dog don't know
where frog is.
oh my goodness.
is he under the right boot?
no he is not.
ot in the left boot.
frog where are you?
he's not here.
but the dog accidentally broke the jar by mistake.
oh no.
now the boy is angry.
yikes!
frog where are you?
%com: child speaking with rising intonation.
yikes!
*CHI: oh my god ground hog!
*CHI: wo:w.
*CHI: +" hello?
*CHI: no he's not in here not in the beehive.
*CHI: <oh boy god> [>!]
*INV: <who said not> [<] in the beehive?
*INV: sorry can you go back to the previous page?
*INV: who said not in the beehive?
*CHI: bees.
*INV: ok.
*CHI: frog where are you?
*CHI: ah gosh.
*CHI: an owl.
*INV: =&laugh.s.
*CHI: get [/] get away from me you owly@n pest!
*CHI: um frog where are you?
%com: child narrates with a dramatic intonation.
*CHI: +" oh you're not under his back huh?
*CHI: +" oh froggie where are you?
*CHI: <wow> [>!]
*INV: <what happened here> [<]?
*CHI: they fall into a cliff.
*INV: oh no.
*CHI: &=grunts.
*CHI: +" <sh> [>].
*INV: <can you> [<] tell me what happened here?
%com: investigator turned to the previous page.
*CHI: they get jumped into a pond.
*INV: oh I see.
*CHI: sh!
*CHI: +" &=whispers we must be quiet.
*CHI: +" &=whispers the frog could be anywhere.
*CHI: and the frog has a wife.
*CHI: a:nd (.) they have little kids.
*INV: oh!
*CHI: +" there you are frog!
*CHI: +" bye see you later.
*INV: good job!
@End

A.2 English Narrative of Two Bilingual Children with Autism

@Begin
@Languages: eng
@Participants: CHI Target_Child, INV Investigator
@ID: 205
@ Date of Recording: 10-AUG-2010
@Age of CHI: 7;3
@Sex of CHI: male
@Activities: Frog Story Narrative based on "Frog, where are you?"

*INV: go ahead.
*CHI: the boy and the dog was looking at the frog.
*INV: um.
*CHI: when they fall // fell asleep.
*CHI: the frog came out.
*INV: umhm.
*CHI: they were surprised.
*CHI: that the frog went away.
*INV: oh no.
*CHI: they searched everhwere.
*CHI: but they cannot find it.
*INV: umhm.
*CHI: <they yelled for> // they yelled for the frog under the window.
*INV: they yelled for the frog ok.
*CHI: under the window.
*CHI: the dog fell off.
*CHI: the boy picked him up.
*INV: umhm.
*CHI: they // they said +"/
*CHI: +" where are you froggie &=laughs?
*INV: hehe.
*CHI: the boy searched in a hole.
*INV: umhm.
*CHI: he found an (..) +/.
*INV: that's probably a gopher.
*CHI: +, gopher.
*CHI: <the tree> // the // the boy looked in a tree.
*INV: umhm.
*CHI: then the boy fell off (.) the tree.
*CHI: inside the tree there was an owl.
*CHI: the boy climbing on the rock.
*CHI: the boy climing on the rock yelling (.) froggie ["].
*CHI: then the boy got on a moose.
*CHI: then the moose chased the dog.
*INV: umhm.
*CHI: then the boy and the dog fell off.
*CHI: they // they fell into the water.
*INV: umhm.
*CHI: they got up.
*CHI: the boy went sh ["].
*CHI: they looked under the log.
*INV: ok.
*CHI: <the frog> [/] the frog had a family.
*INV: oh!
*CHI: they watched.
*CHI: they took their [?] frog and went bye ["].
*INV: they took what?
*CHI: they took the frog.
*INV: they took the frog ok.
*CHI: and went bye ["].
*INV: and went bye very good!
@End

*CHI: there was a [//] the moon [?].
*CHI: and the frog haded@n to stay in the cage.
*CHI: everyone haded@n to go to bed.
*CHI: &=whispers so they went to sleep.
*CHI: but just then the frog hopped up [//] off.
*CHI: and then it was gone.
*CHI: and then the boy woke up.
*INV: umhm.
*CHI: the [/] the boy saw in his shoe.
*CHI: +" frog where are you?
*CHI: +" are you in there?
*CHI: xxx but [/] but the forg wasn't there.
*CHI: so they haded@n to get out.
*CHI: so the dog got his home for his hat.
*CHI: but then it was broken.
*CHI: and then the boy said +"/.
*CHI: +" humph that was bad.
*INV: &=laughs oh no!
*CHI: then they went to look for the frog again.
*CHI: +" frog where are you.
*CHI: the boy said +".
*CHI: and then they [//] the dog screeched <in the> [/] in the sky.
*CHI: the boy said +"/.
*CHI: +" forg where a:re you?
*CHI: he [//] the [/] dog saw the honey bee.
*CHI: um then <the &mo> [//] something hopped out of the hole.
and then he said ew ",
hehe did you say that was a mole?
yeah.
ok.
and then the dog saw the honey.
so he brought it down.
and all the bees were out.
oh no!
the bees were chasing.
the owl came out the tree.
and then the boy fell over.
and the bees were so: mad!
child was narrating in a faster pace and with an animated voice.
and chased the dog.
ok.
chased the boy went on the rock.
umhm.
frog where are you?
he said on the rock +
umhm.
and then he hopped on something on a goat.
and then they got on the goat.
and then they threwed them in the water.
but um the goat saw they were getting closer and closer and closer until came a spash!
child was creating suspension.
hehe.
they got in the water.
and they were super wet!
oh my goodness.
&=whispers the boy said +
" sh don't speak ?.
child was whispering.
what did the boy say?
&=whispers sh don't xxx.
don't what?
don't look.
oh don't look.
and then they hopped see through the log.
there you are!
said the boy with the other frog +
so he brought him out.
and then he get a frog and went home.
oh the end?
yeah!
good story!
A.3 English Narrative of a Typically-Developing Bilingual Child

*CHI: a boy caught a frog.
*CHI: and when it was night.
*CHI: the frog got out the thin [?] hole.
*CHI: when the boy awake +/. 
*INV: sorry the frog got out of what?
*CHI: the glass.
*INV: ok.
*CHI: and he hppped into a pond I guess.
*CHI: then when <the boy> [/] the boy woke up.
*CHI: he found out.
*CHI: the frog was gone.
*INV: oh no!
*CHI: he forgot to put the lid on.
*INV: hehe.
*CHI: the problem is I think they don't have lids.
*INV: &=laughs ok.
*CHI: he look in one of his (.) cowboy boots.
*CHI: and the dog just tried to look in the one of other the cowboy boots.
*CHI: but he got stuck in the glass instead.
*CHI: I think he went off the bed.
*CHI: and bounced into [/] into the glass.
*CHI: and the dog didn't see clearly.
*CHI: and the boy called out the window.
*CHI: and then [/] then the dog fell down from the window.
*INV: oh no.
*CHI: and the boy quickly got down.
*CHI: he had to wear his boots.
*CHI: because of the glass.
*INV: ok.
*CHI: and he called it outside.
*CHI: then the dog liked honey.
*CHI: and tried to yeah like eat the honey and the hive.
*CHI: but instead he shook the tree.
*CHI: and the boy just got hit by a [/] some uh kind of squirrel that
[1] that uh +...
*INV: I think it's a gopher.
*CHI: a gopher bunked in his nose <that he> [//].
*CHI: the hole he was looking.
*INV: ok.
*CHI: then the dog got the beehive down!
*INV: oh!
*CHI: the boy looked in a (. ) hollow tree.
*INV: umhm.
*CHI: and then the owl came out & gasps!
*CHI: and the bees flew [/] flew crazy at the dog.
%com: child was narrating in a faster pace with animation.
*CHI: and that's what made the boy fall down.
*CHI: he [/] yikes ["] he said.
*CHI: and he fall down like bing@o boom@o.
*INV: ok.
*CHI: and then the owl [?] tried to get him but the boy +./.
*INV: did you say the owl tried to get him?
*CHI: yeah.
*INV: ok.
*CHI: and the boy quickly got onto a rock.
*CHI: and he called fro:ggie ["]!
*CHI: but he got stuck on a reindeer instead.
*CHI: and he was carrid by to a (. ) cliff.
*INV: umhm.
*CHI: he got thrown off!
*CHI: but the good thing was.
*CHI: it wasn't a big cliff.
*CHI: <it was just> [/] they were land in a pond.
*CHI: and they splashed.
*INV: & =laugh.
*CHI: and the boy heard froggie croaking.
*CHI: and they looked on the other side.
*CHI: and they found out (.).
*CHI: they made a girl friend.
*INV: who made a girl friend?
*CHI: froggie made a girl friend.
*CHI: and then they found out that they had babies.
*INV: oh & =laugh.
*CHI: and then they said +"./.
*CHI: +" bye bye.
*CHI: and then they took just one frog away.
*CHI: but they didn't notice.
*CHI: the other frogs right here.
*INV: ok yeah.
*CHI: the end.
*INV: good story!

A.4 Mandarin Narrative of a Bilingual Child with Autism

@Begin
@Languages: zh
@Participants: CHI Target Child, INV Investigator
@ID:
@Date of Recording: 25-SEPT-2010
@Age of CHI: 6;5
@Sex of CHI: male
@Activities: Frog Story Narrative based on "Frog, where are you?"

*CHI: 在晚上一個小男孩 <名字> [?] 叫 +/-...
*INV: 一個小男孩什麼?
*CHI: +/- 叫 Remy.
*CHI: 還有他的狗叫羅羅思.
*INV: 小孩叫 Remy他的狗叫?
*CHI: 羅羅思.
*CHI: 還有他有一個青蛙在這裡.
*CHI: 媽媽說+"./.
*CHI: +" Remy睡覺了.
*CHI: 他們都睡覺.
*CHI: 青蛙就想找一個家呢.
*CHI: 在早上時候他看來狗[/]青蛙不見了.
*CHI: +"咦青蛙到哪去了?
*INV: 非常好.
*CHI: Remy跟羅羅思要找青蛙.
*CHI: 但是他沒有找到.
*CHI: 他們看在外邊.
*CHI: 沒有啊.
*CHI: 哎呀.
*CHI: 羅羅思要掉下來.
*CHI: 把花瓶都要打破了.
*CHI: Remy拿住牠.
*INV: umhm.
*CHI: Remy又說+"./.
*CHI: +"青蛙你在那裡?
*CHI: 咦羅羅思在把蜜蜂弄出來.
*CHI: Remy就在看這裡也有嗎.
*CHI: 但是裡面也沒有就xxx.
*INV: 就什麼?
A.5 Mandarin Narrative of a Typically-Developing Bilingual Child

@Begin
@Languages: zh
@Participants: CHI Target_Child, INV Investigator
@ID: 308
@Date of Recording: 30-NOV--2010
@Age of CHI: 9;5
@Sex of CHI: male
@Activities: Frog Story Narrative based on "Frog, where are you?"

*CHI: 有一天有一個男生他就是抓到一隻青蛙.
然後他把牠放到玻璃的 <玻璃的> [//] <玻璃:> [//] 玻璃的 罐子 裡.

然後 <半夜> [//] <半夜 他們 睡覺> [//] 半夜 他 跟 他的 狗睡覺 的 時候.

那隻 青蛙 偷偷地 跑 出來.

&丢 [//] 留出窗 外.

隔天 () <他> [//] <那個 小朋友> [//] 小 男孩 跟 他的 狗 就 找 不 到 牠.

<他們 開始 找 牠> [//] <他們> [//] 他們 開始 找牠.

<他們 看> [//] 他們 尋找了 鞋子 裡面.

椅子 下面.

都 找 不 到 牠.

他的 狗 不 小心 把 頭 <纏到> [x 3] 那個 玻璃 瓶 裡面.

他們 <開始 打開> [//] 打開 窗戶 一直 叫喊 著.

他的 狗 因為 有一個 很重 很重的頭.

所以 牠 不 小心 掉 下去.

撞破了 玻璃 罐.

那個 小 男孩 趕緊 把 他的 狗 救 起來.

hehe.

嗯.

<他們 開始 一直 叫喊 來 到> [//] 他們 一直 一直地 叫喊.

後來 來到 一個 森林.

<那個 小 男孩> [//] <那個 小男孩 把> [//] 那個 小男孩 找 到 一個 洞.

他 把 鼻子 伸 進去.

child narrates with varying pace (animation)

hehe.

他的 狗 他的狗 開始> [//] 他的 狗 則 對著 一個 蜂窩 叫.

那個 小男孩 不 知道 為什麼.

就 突然 叫了一聲.

因為 有一隻 地鼠 咬 到 他的 鼻子.

&=laughs

然後 呢 那隻 狗 也 開始 <搖> [//] 搖著 那棵 大 樹.

後來 那個 蜂窩 <掉> [//] 掉 下來 砸 到 地上!

uhoh.

那個 小 男孩 找到了 一個 樹洞.

[x 3] 爬 上 那個 大 樹.

然後 呢 往 裡面 看!

結果 是 <一個> [//] 一隻 <貓頭鷹> [//] 貓頭鷹的 樹洞.

那隻 小 狗狗 被 蜜蜂 追著 很 慘[?].

小 男孩 <被> [//] 被 貓頭鷹 趕 出去.

然後 呢 <他> [x 3] 後來 跑到 一個 大 石塊 上.

然後 坐 下來.

那個 貓頭鷹 也 <坐 在> [//] 坐 在 [//] 坐 在 大 樹上.

<那隻 小 狗狗> [//] 那 隻 很 痛苦 的 小 狗狗 走到 那個 大 樹.

很 痛苦 的 小 狗狗 &=laughs.
*CHI: <後來> [\]後來 小男孩 突然 感覺 到 他 坐 到 一個 東西 上面.
*CHI: 他 往下 看 結果 是 一隻 鹿.
*CHI: <那隻> [\]那隻 鹿 把 那個 小 男孩 跟 那隻 狗 趕 到 <一個> [\]一個 懸崖.
*CHI: 把 他 丟 下去.
*CHI: 他們 墜 到 一個 小 池塘.
*CHI: 他們 坐 起 來 了 以後.
*CHI: 小 男孩 突然 聽 到 青蛙 的 聲音.
*CHI: 他 叫 他的 狗 +".
*CHI: +" 噓 安靜.
*CHI: <然後 呢 他 就 xxx 從 一個 木 頭 上 下> [\] 那個 聲音 是 在 木頭 旁邊.
*CHI: 那個 小 男孩 叫 那隻 狗 安靜.
*CHI: 然後 他們 爬 上 木頭 一起 看.
*CHI: <結果> [\] 結果 是 一隻 青蛙 跟 很 多 青蛙 寶寶.
*INV: 嗯.
*CHI: 青蛙 寶寶 裡面 有一 隻 是 小 男孩 的 小 青蛙.
*CHI: 所以 小男孩 就 把 小 青蛙<帶 走> [\] 帶 回家.
*CHI: <然後 呢> [\] 然後 那個 青蛙 家族 也 很 開心.
*INV: 喔:.
*CHI: 結束.
*INV: 講得很棒.
@End
Appendix B  Coding Manuals

B.1  Narrative Structure 10-point Scale

The child will receive one point for mentioning each of the following episodes.

1. **Setting**
   The child will receive one point for **setting the scene**, by **introducing** the protagonists and/or describing “the social, physical, or temporal context in which the remainder of the story occurs” (Stein & Glenn, 1979).
   
   “one night, a boy had a pet frog”
   “a boy and a dog were watching their pet frog in the room”
   “once upon a time, a boy got a frog”
   “there was a boy, a dog, and a frog”

2. **Initiation/Problem**
   The boy **discovered** that the frog was missing
   
   “the next morning, the boy saw the frog was gone”
   “they wondered where frog was”
   
   Do not count phrases such as “the frog was gone” if there is no explicit mention of the boy’s discovery of the problem

3. **Search in the house**

4. **Interaction with the bees**
   Interaction is the key here (e.g., *the dog was looking in the beehive; the dog knocked down the beehive and all the bees came out*). Do not count mere mentions of the existence of the bees (e.g., *there were some bees in the sky*). The same principle applies to the following episodes.

5. **Interaction with the gopher**

6. **Interaction with the owl**

7. **Interaction with the deer**

8. **Fell into the pond**

9. **Found his frog/Found a frog family**

10. **Brought a little frog home/Brought his frog home**
B.2 Search Theme 4-point Scale

The child will receive one point for mentioning each of the following:

1. The frog was missing
2. The boy was searching for the frog
3. One or two additional mentions of the search theme
4. Multiple additional mentions of the search theme

B.3 English Coding Manual

Coding Unit

The unit of analysis is the clause, following Berman and Slobin’s (1994; p.660). Definition: “Any unit that contains a unified predicate… that expresses a single situation (activity, event, state)”. A single verbal unit includes:

- Infinitives and participles (“he tried to reach”)
- Verbs accompanying modal verbs (“couldn’t find”)
- Semi-auxiliary verbs accompanying verbs that indicate beginning, end, continuation or repetition of an action ( “kept running”, “continue calling the frog”, “stopped running”)
- Internal state verb and accompanying infinitive verbs (“want to go”, “decided to go”)
- Interactional markers at the beginning of an utterance are coded as separate clauses (“oh”, “oh my god”, “well”, “yes”, “I guess”, “you know”, etc.)
- Main verb + infinitival/participal complement (“He ran shouting”)

Moreover, the following will constitute a single clause:

- Single clause with two verbs and one subject ("he stopped running”; “they had begun to search all over.”)
- Single clause with different subjects (narrator comments) (“I think the boy misses his frog”; “it appears that the frog is happy”)
- Verbless clauses that are critical to the story line:
  and then he climbed over.
  and (.) little (. ) baby frogs!
- Character speech
- Ellipsis and gapping
  the boy looked in his boots
  and the dog in the jar
- Subordinate complements
  he thought
  he could get the bees
Coding Manual

TENSE AND ASPECT CODING

%ten tier

$TSWT Tense switch: When there is a switch from the present to the past, or from the past to the present tense.

NARRATIVE STRUCTURE CODING

%nas tier

$ORIEN Complete clauses describing setting (place and time) or introducing and describing characters. Phrases within a clause may fulfill this function.

:PLACE Place where events occur
“one night in Wiesbaden West Germany a little boy was sitting with his pet frog…”
“in the room”

:TIME Location of the story in time
“It’s late at night”
“one night”

:CHAR First mention of characters and their characteristics in a formal way (not incidentally)
“there is a little boy”
“there is a frog…”
“there was a boy and a dog…”
“a deer appeared from behind the bush”

$APP Appendages

:ABS Abstract. Clauses which introduce the narrative, forecasting or summarizing the main points in the story.
“This is a story of a little kid”

:PRO Prologue. Clauses that contain formulaic story beginning
“Once upon a time…”

:CLO Clauses that mark explicit conclusion to the narrative.
“The end”
“They lived happily ever after”
“That’s it”
$PIC Picture description. Clauses that simply describe the pictures and do not advance the plot line or serve a narrative function.
  “there are some bees and then the forest”
  “and the boy is sitting on the log; and the boy is standing on the log”

$BIZ Bizarre/irrelevant comments. Statements that deviate from the information expressed in the story picture.
  “and the dog followed the cat’s tail”
  “waterslide”

EVALUATION TIER

%eva tier

$EVA Evalutive clauses, words, or phrases which describe characters’ mental or emotional states, character intentions, narrator prediction and defeats of narrative expectations.

:EMO Expressions of emotion
  (e.g. happy, feel, have fun, cry, afraid, angry, sad, like, mad, worried, smile/grin, etc.)
  “the boy is mad at the dog”
  “the boy loves his frog”

:COG Expressions of cognition
  (e.g. think, know, remember, believe, forget, guess, realize, imagine, sense, curious, etc.)
  “the boy climbs a tree ... thinking the frog might be there”
  “the child thought that the strange thing was a branch of a tree”.

:PHY Expressions of physical state
  (e.g. wet, sleepy, hurt, tired, hungry, etc.)
  “so they were wet”
  “luckily, they were not hurt”

:INTN Expressions of intention
  (e.g. try, want, decide, hope, need, must, have to, etc.)
  “the boy tried to look for him in the hole”
  “they decided to look outside”

:REP Reported speech

:DIR Direct quotation of the character speech
  “Where are you, frog?”

:IND Indirect report of character speech
  “He asked the ground hog if he saw the frog”
<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>:HED</td>
<td>Distancing device that lessen narrator commitment to a proposition. “kind of”, “probably”, “looks like”, “seems like”, “maybe” etc.</td>
</tr>
<tr>
<td>:NEG</td>
<td>Clauses that refers to negative states and action. “the boy didn’t see the frog” “but the frog was not there”</td>
</tr>
<tr>
<td>:REPT</td>
<td>Repetition of words or ideas for emphasis “He looked again and again”. “looked and looked…”</td>
</tr>
<tr>
<td>:CHA</td>
<td>Character delineation “the little boy” “baby frog” “cute boy”</td>
</tr>
<tr>
<td>:VERB</td>
<td>Verbs that are more sophisticated/descriptive (e.g., sneak, escape, hide, whisper, peek, scratch, toss, sniff, etc.)</td>
</tr>
<tr>
<td>:ADJ</td>
<td>Evaluative adjectives in all clause types (e.g., old tree) “The frog escaped the little jar.”</td>
</tr>
<tr>
<td>:ADVB</td>
<td>Adverbs and phrases indicating manner in which an action is performed. (e.g. suddenly, accidentally, finally, eventually, quietly etc.) “searching frantically for his frog…” “he accidentally ran into a deer”</td>
</tr>
<tr>
<td>:INT</td>
<td>Intensifiers that reflect narrator’s emphasis on some information (e.g. very, really, so, do, only, just, whole bunch of, etc.) “he was quite angry” “the boy and the dog are really shocked” “the dog eventually does fall”</td>
</tr>
<tr>
<td>:ONO</td>
<td>Onomatopoeia and sound effects (e.g., splash, woof woof, etc.)</td>
</tr>
<tr>
<td>:EXP</td>
<td>Interactional markers/expressives (e.g., oh my gosh, yes, well, oh boy, look!, etc.)</td>
</tr>
<tr>
<td>:MET</td>
<td>Metaphor and other comparative figures of speech “his ears are standing up like bunny’s ears” “the dog was running as fast as a bullet”</td>
</tr>
</tbody>
</table>
:NAM Names given to characters (code once for each name used)
“there was a boy named Jack”
“Max fell out of the window”

:NAR Narrator comments/narrator’s cognition, state of mind
“but I don’t understand why”.
“I think he is angry now”
“where could he be?”

COHESION--REFERENCE CODING

%coh tier

$REF Different linguistic strategies to refer back and forth to characters.

:NP Noun phrases including an actual noun.

:IND Indefinite articles to introduce an entity for the first time in the story.
“a boy has a pet frog.”

:ER Erroneous use of the indefinite article.
“a boy had a frog and a frog escaped”

:DEF Definite articles for second mention of an entity in the story
“the boy looked everywhere.”

:ER Erroneous use of the definite article.
“once there was the boy and the dog”

:NA No articles to introduce/refer back to an entity
“___ boy was in his room with his pets”

:NO Non-obligatory use of noun phrase (When the narrator uses NP where pronouns could have been used)

:DEM Demonstrative NP (e.g., this boy)

:POS Possessive NP (e.g., the boy’s dog, the frog’s jar)

:COM Comparative NP (e.g., other/ another + noun)
“he found another frog”

:QUA Quantifier NP (e.g., some/many/all/both/etc. + noun)
“he takes one of the little frogs”

:PRO Pronouns used for second mention
“he looked everywhere for the frog.”
“the dog was barking at them”

:ER Erroneous use of pronoun where NP should have been used

:POS Possessive pronouns (e.g., his dog)
“the frog was his”

:ER Erroneous use of possessive pronoun where a possessive NP should have been used

:DEM Demonstrative pronouns (e.g., this, that)
“this is my frog”

:ER Erroneous use of demonstrative pronoun

:QUA Quantifying pronouns without the NP (e.g., both, all, anything, nothing, one)
“both went out to find the frog”

:ER Erroneous use of pronoun where NP should have been used

:COM Comparative pronoun without the noun phrase
“the boy found one frog, and the dog another”

:ER Erroneous use of pronoun where NP should have been used

:ZERO Zero anaphora. The subject is dropped when it is recoverable from contexts.
“The dog fell and _____ broke the glass jar”

:ER Erroneous use of zero anaphora where NP or pronoun should have been used
“the boy went to bed…the frog was gone when ____ woke up”
Name as a reference device
“there was a boy named Jack. Jack had a frog.”

Erroneous use of name

COHESION--CONNECTIVES CODING
%coh tier
$CONJ Conjunctions/connectives
:ADD Connections of addition (e.g., and, then, and then, also, too, etc.)
:ADV Adversatives (e.g., but, although, however, instead, etc.)
:CAUS Connection of cause and effect (e.g., because, so...that, since, etc.)
:SEQ Connectors of sequence (e.g., before, after, until, first, etc.)
:SIM Connectors of simultaneity (e.g., when, while, as, meanwhile, at that time, etc.)
:CONT Connection of continuation (e.g., again, still, etc.)

COMPLEX SYNTAX CODING
%syn tier
$SYN Sentences in which the syntactic structures underlying two simple sentences were combined within a single utterance contour (Bloom, 1991)
:COR Coordinate sentences (and, or, but)
“the boy went to the forest and looked for the frog”
“the boy looked in a hole but an owl lived there”

:ADB Adverbial clauses (e.g., when, where, since, because, etc.)
“when he woke up, the frog was gone”
“the boy was worried because the frog went missing”
“the boy put on his clothes before he went out”
“although he searched everywhere, he couldn’t find the frog”
:VER Verb complements (say (that) + S, try + V, start + V, keep + V, want + V/S, etc.)
“he tried to find the frog in the forest”
“the boy asked the dog to be quiet”
“they started looking for the frog”
“he didn’t know that a gopher was in the hole”

:REL Relative clauses (e.g., who, that)
“the bees, who were living in the hive, chased the dog”
“the deer that was behind the bush...”

:PAS Passive voice
“the beehive was knocked down.”

$COS Code switching.
“他說 frog where are you?”
“裡面有一隻owl”
B.4 Mandarin Coding Manual

NARRATIVE STRUCTURE CODING

%nas tier

$ORIEN Complete clauses describing setting (place and time) or introducing and describing characters. Phrases within a clause may fulfill this function.

:PLACE Place where events occur
   “在房子裡”
   “他們到了森林裡”

:TIME Location of the story in time
   “在晚上”
   “第二天”

:CHAR First mention of characters and their characteristics in a formal way (not incidentally)
   “有一個小男孩和他的狗”
   “有一隻青蛙”
   “出現一隻鹿”

$APP Appendages

:ABS Abstract. Clauses which introduce the narrative, forecasting or summarizing the main points in the story.
   “這個故事是關於一隻青蛙”

:PRO Prologue. Clauses that contain formulaic story beginning
   “很久以前...”

:CLO Clauses that mark explicit conclusion to the narrative.
   “沒了”
   “他們過著幸福快樂的日子”
   “講完了”

$PIC Picture description. Clauses that simply describe the pictures and do not advance the plot line or serve a narrative function.
   “有一顆樹, 一些蜜蜂...”
   “小男生坐著; 小男生站著”

$BIZ Bizarre/irrelevant comments. Statements that deviate from the information expressed in the story picture.
“UBC 有waterslide”
“那裏有海豚”

EVALUATION TIER

%eva tier

$EVA  Evaluative clauses, words, or phrases which describe characters’ mental or emotional states, character intentions, narrator prediction and defeats of narrative expectations.

:EMO  Expressions of emotion
(e.g. 高興, 生氣, 擔心, 哭, 笑, 嚇 etc.)
“然後他生氣了.”
“貓頭鷹把小男孩嚇到樹下去.”

:COG  Expressions of cognition
(e.g. 想, 以為, 知道, etc.)
“他忘記放蓋子.”

:PHY  Expressions of physical state
(e.g. 濕, 痛, 累, 困, etc.)
“他們全身都濕了.”

:INTN  Expressions of intention
(e.g. 想, 要, etc.)
“青蛙想出去”
“小男孩要去找青蛙.”

:REP  Reported speech

:DIR  Direct quotation of the character speech
“青蛙你在哪裡?”

:IND  Indirect report of character speech
“他叫他的狗安靜.”
:HED Distancing device that lessen narrator commitment to a proposition (e.g., 可能, 也許, 好像, etc.)

:NEG Clauses that refers to negative states and action.
“他找不到青蛙.”
“這裡也沒有.”

:REPT Repetition of words or ideas for emphasis
“他找找找”.
“好多好多”

:CHA Character delineation
“狗狗”
“青蛙寶寶”
“小男生”

:VERB Verbs that are more sophisticated/descriptive (e.g., 溜出去, 躲, 偷看, 逃走, 尋找, 追擊, 衝, 甩, etc.)

:ADJ Evaluative adjectives in all clause types (e.g., 大樹, 漂亮)

:ADVB Adverbs and phrases indicating manner in which an action is performed.
(e.g. 突然, 偷偷地, 不小心, 輕輕地, 慢慢地 etc.)

:INT Intensifiers that reflect narrator’s emphasis on some information
(e.g., 很, 非常, 都, 太, 只有, 一大堆, etc.)
“他很生氣”
“裡面只有貓頭鷹”
“那裏有一大堆小青蛙“
“都找不到”

:ONO Onomatopoeia and sound effects (e.g., 噗通, 咻)

:EXP Interactonal markers/Expressives (e.g., 哇, 你看, 他呢就… etc.)

:MET Metaphor and other comparative figures of speech
“他跑得像子彈一樣快”

:NAM Names given to characters (code once for each name)
“有一個小男生叫小明”
NARRATOR comments/narrator’s cognition, state of mind
“我覺得他很生氣.”
“我不知道他在哪裡.”

COHESION--REFERENCE CODING

%coh tier

$REF Different linguistic strategies to refer back and forth to **characters**.

:NP Noun phrases including an actual noun.
“小男孩睡覺了”
“他在找青蛙”

:NO Non-obligatory use of noun phrase (When the narrator uses NP where pronouns or zero pronouns could have been used)

:DEM Demonstrative NP (e.g., 這個男生, 那隻鹿)

:POS Possessive NP (e.g., 男孩的青蛙)

:COM Comparative NP (e.g., 另外/別的/etc + noun)
“還有其他青蛙”

:QUA Quantifier NP (e.g., 一些/許多/全部/一個/etc + noun)
“一個小男孩”
“兩隻青蛙”

:PRO Pronouns used for second mention
“他找不到青蛙”
“鹿把他們丟下去”

:ER Erroneous use of pronoun where NP should have been used

:NO Non-obligatory use of pronouns (When the narrator uses pronouns where zero pronouns could have been used)
“小男孩和狗去找青蛙, 他們找了好久”
Demonstrative pronouns (e.g., 這個, 那個)
“那是他的青蛙”

Erroneous use of demonstrative pronoun

Possessive pronouns (e.g., 他的狗)
Erroneous use of possessive pronoun where a possessive NP should have been used

Quantifying pronouns without the NP (e.g., 全部, 兩個, etc.)
“兩個都出去了”
Erroneous use of pronoun where NP should have been used

Zero anaphora. The subject is dropped when it is recoverable from contexts.
“(他)就把狗帶出去”
“早上(小男孩)起床的時候(他)就發現青蛙不見了”
Erroneous use of zero anaphora where NP or pronoun should have been used

Name as a reference device
“有個小男生叫小明. 小明有養青蛙.”
Erroneous use of names.

COHESION--CONNECTIVES CODING

%coh tier

Conjunctions/connective adverbs

Connections of addition (e.g., 和, 跟, 以及, 然後, 還有, 並且, 接著, 又)

Adversatives (e.g., 然而, 不過, 但是)
:CAUS Connection of cause and effect (e.g., 所以, 因為, 結果)
:SEQ Connectors of sequence (e.g., 首先, 先...後, 以後, 第一/二)
:SIM Connectors of simultaneity (e.g., 當, 的時候)
:CONT Connection of continuation (e.g., 再, 又, 還是, 仍然)

COMPLEX SYNTAX CODING

%syn tier

$SYN Sentences in which the syntactic structures underlying two simple sentences were combined within a single utterance contour (Bloom, 1991)

:COR Coordinate complex sentences (並列複句). A coordinate complex sentence is composed of clauses with coordinate relations. In a coordinate complex sentence all the clauses are equal, there are no primary-secondary relations (e.g., 不是, 還是, 然後, 而且, 又, 或, 一邊).
“小男孩找來找去, 還是找不到”
“他穿了衣服才去找青蛙”
“那隻鹿很大, 跑得又快”“他離開家, 到了森林裡”

:SUB Subordinate complex sentences (偏正/主從複句.) A subordinate complex sentence is composed of clauses with a subordinate relation. There are a primary clause and a secondary clause (e.g., 如果, 因為, 的話, 既然, 要是, 除非, 才, 就, 則, etc.)
“然後那個小朋友起來的時候, 就看到青蛙跑走了”
“因為狗的頭太重, 所以他掉下去”
“如果找不到青蛙, 他會很難過”

:BA The ba-construction (“disposal” sentence)
“牠把玻璃弄破了”
“貓頭鷹把小男生嚇跑了”

:BEI The bei-construction (passive voice)
“狗被蜜蜂叮了”
“他們就被那些東西追著”
$ASP$ Aspect marker. (No space between the verb and the marker)

:PER Perfective marker 了
“他看了洞裡有沒有”

:EXPE Experiential marker 過
“他去過森林”

:DUR Durative marker 著
“狗看著罐子裡的青蛙”

:PROG Progressive marker 在
“男孩在游泳”

:INC Inchoative aspect marker 起來 (not the adverb e.g., 收了起來)
“鹿跑了起來”

$COS$ Code switching.
“他說 frog where are you?”
“裡面有一隻owl”