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UNSHARED LIVES:
FICTIONAL AND PERSONAL NARRATIVE PRODUCTIONS IN HIGH-FUNCTIONING AUTISTIC CHILDREN

By

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A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

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Abstract

UNSHARED LIVES:
FICTIONAL AND PERSONAL NARRATIVE PRODUCTIONS
IN HIGH-FUNCTIONING AUTISTIC CHILDREN

By

Sylvie Goldman

Adviser: Professor Katherine Nelson

Narrative forms play a critical role in the elaboration of personal memories whose acquisition relies mainly upon social interactions, communicative use of speech, and representational processes. Autism is a pervasive developmental disorder characterized by severe deficits in these areas. The aim of this study is to assess the potential relationships between autism and the acquisition of narrative skills and their implications in the elaboration of personal memories.

Fourteen high-functioning verbal autistic children, aged 9 to 13 were enrolled in the study. Twelve normally developing children and twelve non-autistic children with comparable developmental language disorders matched for chronological age and non-verbal IQ were also included. Medical and behavioral histories were obtained from parents' questionnaires. Verbal and non-verbal abilities were assessed using subtests from the Stanford Binet Intelligence Scale, the Clinical Evaluation of Language Fundamentals, the Wide Range Assessment of Memory and the Peabody Picture Vocabulary Test. Fictional and personal narrative productions were obtained from two picture story-telling tasks and a semi-structured interview about personal past experiences, such as birthday

parties, trips, and holidays. Each parent was interviewed about his/her child's social behavior, conversational practices, and interest about the past.

Psychological screening showed formulation impairments in autistic and language impaired children and no deficits in verbal story memory for either group. All narratives and conversations were audiotaped for transcription and coding. Narrative analyses including story grammar and "high-point" analysis showed no group differences in narrative length, use of mental states, evaluation devices, and temporal and causal markers. Overall narrative scores from autistic children were lower and their stories less goal-oriented than normal peers. Autistic children's narrative productions were remarkable for their lack of high points. Narrative quality across tasks (story retelling, picture story telling and personal past event narratives) was more heterogeneous in autistic children than others. Parents of autistic children reported less initiation and interest for personal past experiences in their children's conversations than other parents.

These results are consistent with social constructivist models that emphasize the role of social interactions, collaborative speech and adult-guided conversation in the development of narrative skills.

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He is my beloved husband, Serge Przedborski.

To my father, "Monsieur le Docteur",

For Sarah and Natasha

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Chapter 1. Introduction

"Discourse is the face of the mind", Latin proverb.

Narrative forms play a critical role in the elaboration of personal memories whose acquisition relies mainly upon social interactions, communicative use of speech, and representational processes. Autism is a pervasive developmental disorder characterized by severe deficits in these three areas. So far, a very small number of studies have tackled the issue of personal narratives in autism. Among these, a few have examined fragments of spontaneous discourse and answers about specific situations. In general, the findings on narratives in autistic children emanate from studies involving different tasks such as wordless picture books or "theory of mind" experiments with different age range and different groups of children including subjects with Down's syndrome. The heterogeneity of the psychological tools and of the characteristics of the children involved in these studies make it difficult to reach a sensible conclusion regarding the status of narrative in autism. Thus, the aim of this study is to assess the potential relationship between autism and the acquisition of narrative skills by comparing three types of narrative tasks and controlling for the children's language and cognitive abilities.

Autism begins in the first 36 months of life and is characterized by severe deficits in language, cognition, and social development. A small number of autistic children develop language and perform at age level on many non-verbal tasks; these children, enrolled in the present study, are called high-functioning verbal autistic children. Yet, the social development of high-functioning autistic children remains significantly impaired as their early developmental history is remarkable for a lack of joint attention, absence of intersubjectivity and symbolic play, associated with no intentional imitation or

communicative pointing. In addition, later they exhibit severe deficits in the communicative use of language (i.e., pragmatics, conversational rules) and are incompetent of taking into account another's mind and intent, through verbal representational processes. In light of these deficiencies and of the notion that memories are made of stories about events involving people, I raise the following question "how do autistic children deprived of natural social understanding of events and communicative skills, construct narratives about their lives?" In an attempt to address this issue, I sought to assess the potential contribution of narrative analyses of personal and fictional productions to the understanding of the development of the autistic child's autobiographical memory. Memory about the self is a uniquely human phenomenon defined as a collection of memories of relevant, personally experienced events. This form of episodic memory (Tulving, 1972) plays a critical role in the acquisition of one's sense of self, and consequently in the development of a person's life story. It also allows the child to enter into the social and cultural history of the family and community. As such, autobiographical memory serves an essential social solidarity function.

Autobiographical memory is the product of social construction in early childhood as the child is inducted into the ways of talking about shared experiences. However, learning to talk about the past is not a matter of acquiring models transmitted from parent to child, but rather involves a dialectic process of collaborative construction of remembered events in linguistic form. According to Nelson (1996), an important development takes place when the process of sharing memories with others through language becomes available as a means of reinstating memory. Language as a medium of reinstatement is not, however, immediately available when parents and their young

children first begin to exchange talk about remembered experiences. Nelson proposes that reinstatement through language requires a certain level of facility of language and especially the ability to use the verbal representation of another person. This allows a representation to be set up in one's own mental representation system, and thus recognition of the verbal account of the reinstatement of one's prior experience.

The goal of this study is to examine the effects of social and communication deficits exhibited by autistic pre-adolescents on the development of narrative forms. The social constructivist model proposes that canonical narrative forms or story grammars (Glenn & Stein, 1979) and psycho-linguistic evaluative ability (Labov & Waletsky, 1967) are acquired through the preschool child's participation in storytelling and adult-guided conversation, setting up the transition of the child's episodic memories into coherently and sequentially organized narratives, constituting autobiographical memories. Therefore, narrative deficits may be expected to have implication for the construction of autobiographical memory and a subsidiary goal is to examine their effects on the concept of self. In this study, I predict that high-functioning autistic children, in comparison to language impaired and normally developing children, would present a distinctive narrative profile. In particular, the verbal accounts about personally experienced events would be less coherent and more scripted. These narratives would be lacking the characteristics of personal episodes that form the basis for autobiographical memory, as defined in developmental models.

This introductory chapter provides background information about autism and language disorders including the criteria used to reach these diagnoses. It also summarizes the theoretical approaches and experimental studies related to narrative development. It is

expected that the present work will prove the usefulness of autism as a model for the study of the acquisition of autobiographical memory and its relation to self-concept.

Review of Relevant Theory and Research Related to the Development of Narrative in Autism

This study is inspired by the Vygotskian view conceptualizing narrative as a socio-cultural linguistic genre, which finds its sources in culturally specific adult-guided interactions and in the development of representational skills (Vygotsky, 1978, 1986). Following this approach narrative analyses are applied to autistic children's stories and personal event accounts. After a definition and a brief description of the autistic spectrum disorder the literature background focuses on communicative aspects of language, which are proposed to be the main factor involved in narrative differences reported among autistic, language impaired and normally developing children.

Autistic Spectrum Disorders

Definition and outcome

Autism is a rare, severely and permanently disabling developmental disorder with a highly suspected, but poorly understood neurological basis. It affects 1 to 2 out of 1,000 children (Lotter, 1966, Dawson, 1989). Some recent higher prevalence rates indicates that there would be between 60,000 and 115,000 children under the age of 15 years in the United States who meet the diagnosis criteria for autism (Rapin, 1987). Traditionally, the overall ratio of males to females has been reported at approximately 3:1 to 4:1. However the ratio seems to vary with IQ, ranging from 2:1 with severe dysfunction to more than 4:1 in those with average IQ (Lotter, 1966, Wing & Gould, 1979). Some feel that fewer females with normal IQ are diagnosed with autism because they may be more socially adept than males with similar IQ (Filipek, Accardo, Baranek, & coll. 1999).

The syndrome of infantile autism was first described by Kanner in 1943: "These children have come into the world with innate inability to form the usual, biologically provided affective contact with other people, just as other children come into the world with innate physical or intellectual handicaps" (p.77). Kanner listed 11 symptoms that were characteristic of the condition, of which he considered failure to develop social relationships and an obsessive insistence on sameness to be the most important. Since then, the diagnostic criteria of early childhood autism have been refined and include qualitative criteria instead of absolute presence of symptoms (see appendix, DSM IV, APA, criteria for autistic disorder, 1994). Also, pathognomonic symptoms remained constant that is, qualitative impairment of social interaction, qualitative impairment of communication, and restrictive and stereotyped patterns of behavior, interest, and activities (Sigman, Mundy, Sherman, & Ungerer, 1986; Ungerer & Sigman, 1981; Waterhouse, 1996).

Asperger syndrome refers to children with autistic features who are verbal or even verbose, whose language is often pedantic, who are obsessionally concerned with some narrow topic, and who are often clumsy (Frith, 1991; Schopler, 1998). These characteristics are considered to fall along the continuum of the autistic spectrum disorders (Wing, 1991). The most popular view seems to be that Asperger syndrome is a synonym for autism of a less severe kind and with better prognosis. This syndrome is differentiated from autistic disorder by specifying that there is no clinically significant general delay in spoken or receptive language or cognitive development up to 3 years of age. Although, abnormalities of social interaction and circumscribed interest or repetitive

behavior fit the criteria for autistic disorders (Ehlers, 1999; DSM IV, APA, 1994; ICD 10 WHO, 1993).

In a review article, Rapin (1997) has reported that approximately seventy percent of persons with autism are mentally retarded and their cognitive level is significantly associated with the severity of their autistic symptoms. Recently, Stevens and collaborators (Stevens, Fein, Dunn, Allen, Waterhouse, Feinstein & Rapin, 2000) described the results of a cluster analysis, supporting the presence of two subgroups among the 138 school-age children with autism enrolled in their study. Different levels of social, language and non-verbal ability could identify these two groups, with the higher group showing essentially typical social deficits but normal cognitive and behavioral scores. More specifically, Fein (1999) reported that in their study all cognitive measures differentiated the two groups, with a non-verbal IQ of sixty-five (abstract scale of Stanford-Binet) providing the best single differentiator (Folstein, 1999; Fein, Stevens & Dunn, 1999). In the present study, the cutoff for inclusion in the sample was seventy-five for performance (PIQ) and verbal (VIQ) composite IQ scores.

Overall, the results of neuropsychological testing typically reveal an uneven cognitive profile, with non-verbal skills superior to verbal skills. Numerous studies using the Wechsler Intelligence Scale for children, WISC III (1991) have demonstrated a particular pattern characteristic of autism: performance IQ (PIQ) superior to verbal IQ (VIQ) and specific inter-subtests scatter, with Block design (comparable to pattern analysis from the Stanford-Binet battery, used in this study) the highest and comprehension usually the lowest. However, the PIQ-VIQ split is severity dependent. When full-scale and VIQ are both above seventy percent (identifying high-functioning

autistic children), eighty percent of autistic children will have no significant VIQ-PIQ disparity, and the remainder are evenly divided between those with PIQ > VIQ and these with PIQ < VIQ (Siegel, Minshew & Goldstein, 1996). Some other studies have shown that individuals with autism whose full IQ is in the mildly retarded range tend to have patchy profiles on psychological testing with one or more subscale scores in the average or high range, making it difficult to assign them to a particular range of ability (Ehlers, Gillberg & Wing, 1999).

To conclude, as Filipek and collaborators (1999) wrote: "there is a substantial variability in the intellectual profiles of people with autism. However, although these patterns may be typical, they are by no means universal and cannot be used for diagnosis or differential diagnosis purposes. No cognitive pattern confirms or excludes a diagnosis of autism" (p. 463).

Autism tends to improve, in some cases substantially, as children start to acquire language and learn to use it to communicate needs and to influence other people (Kanner, 1971, 1972). The outcome depends on the severity of the disorder and the efficacy and timing of early educational intervention. Language skills and intelligence are the main factors predicting outcomes for autistic students and adults (DeMyer, Barton, DeMyer, Norton, Allen & Steel, 1973; Lockyer &Rutter, 1970). Although most patients with autism will remain dependent to some degree as adults, those with better social skills may find a specialized niche that enables them to become self-dependent. Social skills rarely improve enough, however, to permit successful marriage, although mildly affected persons with autism occasionally do marry and have children (Lord & Venter, 1998; Rapin, 1997).

Uneven cognitive profile in autistic spectrum disorders

The uneven cognitive pattern of autistic children is reflected in their memory profile. Commonly cited abilities include an excellent rote memory for both visual and auditory information and proficiencies in tasks demanding visuo-spatial judgment and pattern recognition (Boucher, 1976; Prior, 1979; Prizant, 1983). Impaired functioning has also been shown on individuals with autism make use of structure and meaning to help their free recall (Boucher, 1981a; Tager-Flusberg, 1991). For example, O'Connor and Hermelin (1967) found that, whereas controls with mental retardation, remembered sentences better than random strings of words, children with autism did not.

Recently, Benetto, Pennington and Rogers (1996) documented intact and impaired memory functions and discussed their findings in relationship to executive function deficits (Ozonoff, Pennington & Rogers, 1991). According to Minshew (1992) high-functioning individuals with autism may not experience a memory deficit per se but impairment in the handling of information to be remembered. For example autistic children are specifically impaired on measures of temporal order memory, source memory, and working memory, but not impaired on measures of short-and long-term recognition, cued recall, or new learning ability.

As far as autistic children's memory for personal events is concerned, only two studies are reported in the literature, showing low memory for personally experienced events. The first study conducted by Boucher (1981b) examined memory for recent events in pre-adolescent children with autism compared to typical children matched on age. and children with mental retardation matched on age and language ability. She found that the

capacity of autistic children to recall the order or context in which an event occurred was significantly inferior to both comparison groups.

The second study by Millward and colleagues (2000) compared the children's memory for events experienced by themselves with observed events experienced by peers. They reported that school-aged children with autism recall fewer events in which they have participated than a group matched for verbal ability. The authors suggested specific difficulties experienced by the autistic children in relation to processes involving the self. Also, Powell and Jordan (1993) proposed a deficit in the "experiencing self" which codes events as part of a personal dimension. These findings warrant further investigation in terms of a possibly deficient encoding mechanism of personal experiences into the episodic memory (Tulving, 1972) system through narrativization processes and the relation of this process to an impoverished autobiographical memory system.

Bowler and collaborators compared a group of adults with Asperger's syndrome with an IQ-matched control group on remembering (episodic memory) versus knowing (semantic memory). The material comprised lists of words along with specific instructions targeting the two kinds of memory. Based on the assumption that knowing and remembering are functionally independent and the notion that remembering is associated with a state of self-consciousness, the authors reported no differences in overall recognition performance but a small significant difference in states of awareness of the remembering. The authors speculated that if the learning phase were more structured by giving a specific orienting task rather than just the instruction to memorize, then perhaps individuals with autism would achieve a comparable degree of encoding into episodic memory to that achieved in a control group (Bowler, Gardiner & Grice, 2000). These

studies raised the question as to whether encoding strategy could be used in adult-guided conversation about past experiences to enhance the quality of autistic children's memory of events.

Another reason to suspect that autistic children may have impaired remembering about personal events relates to their pervasive social deficits. Perner and Ruffman (1995) argued that the development of episodic memory depends on the child's ability to understand the representational nature of mental states in self, and in others, which would require the use of a "theory of mind", known to be deficient in autism.

Unshared moments with autistic children

The social impairment in autism is widely recognized as the primary symptom of the disorder (Cohen, 1987, 1997; Rutter, 1983). In 1979, in the area of London, Wing and Gould conducted an important epidemiological survey, from which they concluded that social impairments could be distinguished into three types: social aloofness, passive interaction, and active-but-odd interaction. Their study highlighted that not all autistic children show withdrawn, aloof social behavior (although seventy percent of their autistic subjects fell into this category), and that many do indeed attempt to interact with others, but in inappropriate ways (Wing & Gould, 1979). Wing (1978) reported that the full, classic picture of aloofness and detachment seems much more marked in the younger autistic child of less than five years old. Many authors make the point that one should be careful not to interpret any remittance of withdrawal seen in older autistic children as the onset of normal behavior, since it is possible that it would be only a sign of shifting between the categories of social impairment (Frith, 1982).

For the last two decades, social behavior defined as adapted mutually intentional relations (Damon, 1979; Frye, 1981) has been applied to autism (Mundy, Sigman, Ungerer & Shearman, 1986, 1987; Mundy & Sigman 1989a, 1989b). Curcio (1978) was one of the first to publish a study on deficits in joint attention in autistic children. Instances of joint attention are usually defined in this research as occasions when the child shifted attention to an object marked by the adult while opening or maintaining the channel of communication with the adult. Joint attention has been proposed as a crucial primary social behavior in normal development and as a prominent deficit in autism. Bruner and Sherwood (1983) described joint attention behaviors as a class of prelinguistic social communication skills that involve the use of gestures to share attention vis-à-vis objects or events, for example, eye-contact and pointing to an object that is within the reach of the child (McArthur & Adamson, 1996). Thus, Curcio (1978) showed that preschool autistic children tended to display far fewer joint attention gestures than other types of non-verbal acts, such as requesting gestures. This specific deficit seems to seriously hinder autistic children in sharing an awareness of objects or events with their caregivers. Thereby, the natural regulatory behavior that in normal toddlers is directed at obtaining a person's aid or attention appears deficient in the autistic child's communicative repertoire.

Moreover, research with normal infants has suggested that the observed rudimentary understanding of the roles that persons and objects assume in events is derived from early social interactions, involving imitative and basic imaginative play. Consequently, lack of joint attention and intersubjectivity (Bruner, 1983; Mc Arthur & Adamson, 1996; Stern, 1985; Trevarthen 1979) between the autistic child and caregivers

might undermine the development of symbolic and representational knowledge as well as the communicative use of speech (pragmatic).

Nevertheless, autistic children's social development is not impaired in an absolute fashion. For example, a number of researchers (Dawson, Hill, Spencer, Galpert & Watson, 1990; Shapiro, Sherman, Calamari & Koch, 1985; Sigman & Ungerer, 1984; Sigman & Mundy, 1989) have found that autistic children do show some affective and attachment behavior (Ainsworth, 1978) after reunion with their caregiver and that, overall, autistic children's attachment behavior did not differ from the attachment behavior normal children display at younger ages.

If the diagnostic criteria for autistic social deficits are sometimes difficult to apply reliably, how is it that clinicians seem able to discriminate autistic children from other children with developmental disorders? Perhaps they rely on general impression of how easy it is to relate to a child. If so, what these clinicians are interpreting is the deviant basic social understanding exhibited by all autistic children that is reflected later in their impaired "theory of mind" (Premack & Woodruff, 1978; Perner, 1993). Understanding of other people, awareness of their knowledge, beliefs and affective states together with the ability to attribute mental states with content to others (i.e., "theory of mind") is essential to normal human communication (Bates, 1976a, 1976b; Premack & Woodruff, 1978).

It is well established that the capacity to understand other mind is impaired in autism (Baron-Cohen, 1995). This difficulty of the autistic child in mentalizing other's thoughts and understanding the relationship between mental states and behavior has been shown in a range of experimental paradigms. Baron-Cohen used first-order false belief tasks requiring the participant to infer a story character's mistaken belief about a situation

and reported significantly lower performance compared to non-autistic mentally handicapped children, eighty percent of the children with autism failed the test (Baron-Cohen, Leslie, Frith, 1985). Among the few individuals with autism who passed these tests (twenty percent), the majority was found to be impaired on more complex second-order, tests of false-belief understanding. The author analyzed the children's justification responses and showed that they could not predict a protagonist's behavior on the basis of his/her false belief about another (third) person's true belief about a state of affairs (Baron-Cohen, 1989a). Nonetheless, Bowler (1997) reported two studies showing the ability of young adults with Asperger's syndrome to successfully solve second-order false belief tests requiring an awareness of one person's false beliefs about another person's true belief.

Wimmer and Perner (1983) using the "Sally-Anne task "found that normal 4-year-old children, as well as children diagnosed with Down's syndrome matched for mental age, can attribute a false belief to another person and can use it to predict the person's behavior. In contrast, Frith (1989) and Baron-Cohen (1989a) reported that most non-retarded autistic children failed to distinguish their own belief from someone else's. In several studies Baron-Cohen showed that only twenty percent of autistic children with a mental age of 4 years pass the false belief test compared with eighty percent Down's syndrome children matched on mental age (Baron-Cohen, Leslie & Frith, 1985). Studies using control groups of language-disabled children (Leslie & Frith, 1988; Perner, Frith, Leslie & Leekaam 1989) also showed that language impairment in itself cannot explain the problem, although verbal ability within the autistic group tend to be related to success on the false belief task (Eisenmajer & Prior, 1991; Tager-Flusberg, 1993).

The deficit in the capacity to understand internal states such as emotions, intentions, beliefs, or desires in others has been claimed to be specific to autism (Baron-Cohen et al., 1985, 1986; Happé, 1994; Leekam & Perner, 1991; Tager-Flusberg, 1992) and persistent into adulthood (Bemporad, 1979; Heavey, Phillips, Baron-Cohen & Rutter, 2000; Rumsey, 1985). Theoretically (Ozonoff, Pennington & Rogers, 1990), the timing of the development of a "theory of mind" may coincide approximately with the onset of autistic symptoms and could be related to the impairment of other features of the disorder such as narrative acquisition (Loveland & Tunali, 1993, Tager-Flusberg, 1993). Indeed, Tager-Flusberg (1989, 1992) examined longitudinally the use of internal state lexicons in 6 young autistic children during their conversation with their mothers. The difference reported in the content, the functions and the forms of the children's language referring to internal states compared to a matching sample of children with Down's syndrome was interpreted as evidence of a specific impairment of early acquisition of a "theory of mind".

"Theory of mind" has been a very valuable research tool for considering what underlying psychological mechanism might be responsible for the particular narrative profile in autism because it involves processes relevant to communication skills, and also because it has been applied to different types of population (Baron-Cohen, 1986, 1993; Frith 1989; Happé, 1994; Holryod & Baron-Cohen 1993; Kazak, Collis & Lewis, 1997; Prizant & Wetherby, 1987; Wetherby & Prutting, 1984). Data from several different studies showed that the few autistic children who passed first order "theory of mind" tasks appeared to have more pragmatic skills (Eisenmajer & Prior, 1991) and revealed more social insight compared to children who failed these tasks (Frith, Happé & Siddons, 1994). However, a recent study (Hadwin, Baron-Cohen, Howlin & Hill, 1997) failed to show any

positive effect of teaching autistic children to pass "theory of mind" tasks on two impaired conversational aspects assessed in (a) ability to expand on conversation, (b) use of mental terms in speech. Children were taught emotion, belief and play understanding as well as cognitive cause of behaviors through modeling, verbal guidance and external indicator (e.g., facial expression). The outcome measures focused on conversational behavior and use of mental states in a wordless picture book. The results were interpreted as superficial changes lacking generalization and real psychological understanding. The children learned to pass the test without grasping the conceptual ideas underlying these tasks. Thus, passing theory of mind through teaching program did not result in any enhanced social skills. Nevertheless, Happé (1995) speculated that individuals with autism who passed false belief tasks might be using verbally mediated routes.

As Piaget (1932) noted, for an exchange to occur, the speaker is required to place him/herself at the point of view of the listener. This is what the autistic child is unable to do. "Because of a lack of empathy and ability to apprehend the hearer's state of mind, the autistic child therefore falls back on non-communicative or demanding speech" (cited in Cunningham, 1968, p. 229-244). According to Hobson (1993) children must have biologically-given capacities for direct perception and empathic responsiveness of the bodily-expressed attitudes of other people, for the development of intersubjective understanding to begin at all. Correspondingly, if for neurobiological reasons, autistic children are lacking such prerequisites, this might account for their relative failure to understand the minds of others (Yirmiya, Sigman, Kasari & Mundy, 1992).

This perspective corresponds to the notion that affective and cognitive processes are interdependent in shaping a person's social understanding and emotional reaction

(Harris, 1994; Strayer, 1980). Thereby, fundamental problems in autism would be seen as the reflection of an absent harmonious integration of affective (i.e., perception of feelings in bodily expressions) and cognitive representational processes. Moreover, the cognitive strengths demonstrated by persons with autism apparently involve tasks that require that non-transient stimulus input be processed in a wholistic or gestalt fashion. Non-transient means that the information is coded such that it can be scrutinized through repeated examination, remaining available over time. In contrast, tasks that require sequential processing of transient information, such as speech, gesture or facial expression, constitute areas of weakness in autism.

In accordance with this theoretical view, Frith (1989) and Hermelin and O'Connor (1985) suggested an integrative approach focusing on cohesion and coherence between emotion and cognition. Cognitive and affective systems would interact in a non-separable way to produce a unified and meaningful socio-cognitive network of knowledge about the world and people that can be expressed and reflected in narrative forms. Therefore, Frith (1989) postulated that the origins of autistic behavior would come from a dysfunctional logico-affective integrative process or a lack of central coherence. This latter concept was defined as the normal tendency to integrate local information in the search for global meaning, a tendency to focus on the whole rather than the parts of any stimulus.

In a recent article Jarrold and collaborators (2000) tested the hypothesis that "theory of mind" deficits and weak cognitive central coherence would be functionally linked. For example, an autistic child with weak central coherence might fail to integrate separate cues into a meaningful model of the global social situation. As Frith (1989),

wrote: "'theory of mind' " can be seen as a cohesive interpretative device par excellence: it forces together complex information from totally disparate sources" (p. 174).

In this dissertation, I explore the contribution of narrative to the understanding of integrative deficits and postulate that narrative coherence and goal-oriented structure require central coherence devices. In particular, story generation requires the identification of the story elements and logical sequenced organization around a goal. In addition, in agreement with the social-constructivist approach, acquisition of narrative forms develops in the context of conversation about shared experiences. Therefore, adequate pragmatic skills become necessary to the foundation of narrative use.

Pragmatic deficits in autistic spectrum disorders

Since the original description of autism by Kanner in 1943, abnormalities in the use of speech for communicating meaning to others have been part of its core symptoms. The non-communicative use of language reported in autistic children seems to represent a serious barrier to the natural emergence of the collaborative framework necessary for letting the conversational activities flow. Indeed, understanding mental states plays a significant role in the pragmatic aspects of language because speakers need to monitor their listeners' mental states (knowledge state) to make utterances relevant and informative (Grice 1957; Loveland & Tunali, 1993; Tager-Flusberg, 1992, 1993). Pragmatics referring to social speech or communicative use of language in social settings is observed quite early in normal children (Bates, 1974). For example, 2-year-olds can adapt their message to what the listener knows or does not know, and respond adequately to listener feedback (Bates, 1976b; Furrow, 1984; Ochs & Schiefflin, 1979; Wellman & Lempers, 1977). In the case of autism, parents' interviews have reported disturbances in the prelinguistic

domains, specifically the absence of pseudodialogue. Poor eye contact, lack of pointing and imitative behavior, echolalia, repetitive sound-play, unpredictable behavior associated with abnormal resistance to changes and insistence for sameness substituted for the early interpersonal exchanges observed in normal children.

Studies of very young children have demonstrated the role of communicative drive in language acquisition. For example, Bates, Camioni, and Volterra (1975), described infants' uses of performatives as precursors of speech, illustrating how early forms of language are used in a social manner by children to make their needs and interests known to the caregivers. Indeed, an important aspect of conversational practices is the acquisition of referential communication that is, for a speaker to make reference to specific things, persons, or events in order to convey information to the listener. Because successful referential communication depends upon social skills such as awareness of the listener's perspective and the ability to adapt communication to feedback, autistic children are expected to be deficient in this pragmatic domain (Loveland, Tunali, Kelley & McEvoy, 1989).

On the whole, many studies have detailed the marked deficits in the communicative use of language in autistic children's speech (Adams & Bishop, 1989; Baltaxe, 1977; Bishop & Adams, 1989; Loveland, Landry, Hughes, Hall & McEvoy, 1988; Tager-Flusberg, 1981). These studies report, delay or lack of spoken language; repetition and echolalia or idiosyncrasies in language; irregularities in prosody (e.g., pitch, intonation); problematic use of personal pronouns; and impairment in initiating and sustaining conversations, (APA, DSM-IV, 1994; McHale, Simeonson, Marcus & Olley, 1980; Rapin, 1996; Rutter & Schopler, 1978; Schwartz, 1981; Simmons & Baltaxe, 1975). A

small proportion of autistic children never develop any speech. About a third develop some words, but do not use them for communicative purposes. However, studies measuring spontaneous speech in natural settings have shown that language abnormalities in older high-functioning autistic children remain quite specific and can be characterized as relatively unimpaired phonological, grammatical or syntactic abilities associated with abnormalities in semantic and communicative speech (Frith, 1989; Tager-Flusberg 1981, 1989, 1994; Wetherby & Prutting, 1984). Parents, relatives and specialists report that even older high-functioning verbal autistic people are difficult conversational partners. Conversations are limited to a small number of topics, often revolving around those that are on their special interests. Even when the autistic person does engage in conversation, it is usually difficult for the non-autistic listener to participate in a mutual manner or learn from the conversational partner. In addition, high-functioning autistic adults remain specifically deficient in any humoristic or metaphorical speech; their comprehension is extremely literal and affects their interactions (Frith, 1989; Loveland & Tunali, 1993; Sacks, 1995). In the same way, Langdell (1980) confirmed that autistic children tended to ask embarrassing and unacceptable questions but also noted the pedantic and formal style of speech as well as the absence of use of mutual gaze and boundary markers (e.g., hello) when initiating a verbal encounter. Finally, autistic children were found impaired in their ability to modify their account of what happened when talking to someone who had or had not been present at the event being reported.

Baltaxe in 1977 compared the discourse of autistic adolescents with normally developing children and reported three main characteristics. First, autistic subjects failed to shift out of the hearer role to become a speaker. Second, they violated conversational

rules about politeness and acceptability, without intending to be rude (Bates, 1976a). Third, their impairment concerns the lack of foreground and background in discourse, that is, the choice of words does not allow the listener to differentiate between old and new information (e.g., definite articles).

Because effective conversation relies on an understanding that people know different things and that these states of knowledge can be shared, another explanation for the specific communicative pattern in autism comes from experimental evidence from "theory of mind" studies showing that autistic children have specific difficulty in understanding and reasoning about mental states (see above). Happé (1994) introducing more naturalistic and complex scenarios, called the "Strange stories" presented twenty-four vignettes, each accompanied by visual sketches and followed by one comprehension and one justification question. These vignettes were comprised different types such as irony, pretense, joke, lie, and persuasion. Results from this study, as well as that of Kazak, Collis and Lewis (1997) suggested two explanations for the strong relationship between verbal mental age and performance on "theory of mind" tasks as found by Astington and Jenkins (1999). First, having an intact "theory of mind" may aid language use and, conversely, "theory of mind" deficit may have a detrimental effect on language development. Baron-Cohen (1988) proposed that pragmatic language skills and "theory of mind" performance ought to be closely related since they draw on similar representational abilities. More recently, the hypothesis that these researchers are concentrating on is the possibility of a common or closely associated organic basis underlying language and "theory of mind" mechanisms that would not be held in common between autistic children

and other clinical groups. In any case, verbal tasks such as conversation and making sense of people's discourse pose an unusual challenge for the person with autism.

Language Deficits in Non-Autistic Children with Developmental Language Disorders

Subtypes in developmental language disorders

Noteworthy, within the developmental disorders field, autistic children are not the only group presenting these high-order communication language deficiencies. Rapin and Allen (1983) identified two non-autistic developmental language disorders subtypes, characterized by pragmatic and formulation impairments. Given that, confounding effects were examined in this present study, by including a group of non-autistic children with similar language abnormalities. These children are described in the next section along with available findings about their narratives.

Problems in language are among the most common issues in the clinical presentation of children between ages 3 and 16 years, regardless of diagnosis (Shapiro, 1989). Furthermore, pragmatic deficits, defined as the communicative use of language can be observed in other common pathologies such as attention deficit hyperactivity disorder (ADHD) (Beichtman, Wilson, Johnson, Atkinson, Young, Adlaf, Escobar & Douglas, 2001).

The DSM-IV criteria for Developmental Language Disorders (DLD) require that the standard score for language development be substantially below the non-verbal IQ scores usually fifteen points (Leonard, 1998; Rapin, 1996). However, the definition of DLD based on the discrepancy between language and IQ scores has been questioned (Toppelberg & Shapiro, 2000). Furthermore, there is a lack of consensus as to the

terminology used, the type of data collected, the type of analysis performed, and the theoretical framework used in many studies.

Given the great variety of clinical phenotypes encountered among children with language disorders, sub-typing is essential in order to provide adequate remediation targeting the specific deficits. In their endeavor to classify children with DLD, Rapin and Allen (1983) attempted to group them according to clusters of symptoms on the basis of their linguistic deficits (i.e., receptive, expressive, pragmatics, oro-motor). These authors proposed 5 subtypes (Allen, 1989) based on clinical assessment of both comprehension and production of selected aspects of phonology, syntax, semantics, and pragmatics:

1. Expressive disorders with good comprehension
2. Verbal auditory agnosia
3. Phonologic-syntactic disorder syndrome
4. Lexical-syntactic disorder
5. Semantic-pragmatic disorder.

The last two subgroups were categorized by Allen (1988) as "disorders of central processing and formulation" and constituted the comparison group for this study, lexical-syntactic and semantic-pragmatic disorders. Given that receptive language and pragmatics are typically areas of relative weakness for autistic children compared to phonology or visual-spatial skill, these two groups offered an autistic-control comparison that maximizes the possibility that group differences on narrative measures merely reflect the differences in another social area known to be correlated with joint attention or theory of mind.

The language deficits exhibited by the children from the "lexical-syntactic disorder group" are characterized by a delayed onset of expressive language and continued

evidence of deficits in mixed expressive and receptive language. Children presenting this disorder usually have severe word retrieval deficit (anomia) and difficulty formulating connected language, especially within the constraints of conversational demands. Although their articulation is usually adequate, they have marked dysfluency with numerous false starts and hesitations and tend to overuse non-specific words such as this, that, get. Their expressive syntax is not so much altered as immature. They often avoid initiating conversation and have difficulty giving a coherent account of a prior incident or retelling a story.

The language deficits presented by the children in the "semantic-pragmatic disorder group" (SPD) is characterized by non-systematic language delay, some children might even talk precociously and fluently in well-articulated syntactically correct utterances (intact syntax and phonology). Many of the children acquire vocabularies that are unexpectedly sophisticated for their age, and overly formal. But on closer examination, they are often using words or scripts that they themselves do not understand. Prosody is often sing-song resulting in a stilted pedantic production. Comprehension of the meaning of verbal messages, notably WH questions, is defective. Immediate echolalia, use of delayed scripts, and verbal perseveration are common. Children may talk to themselves or without the need for an interlocutor (Bishop, Hartley & Weir, 1994). Autistic children with this syndrome may talk with their back turned. They have inadequate understanding of turn-taking rules in conversation. This syndrome is typical but not restricted to verbal autistic children and Asperger's Syndrome (Allen 1988; Rapin & Allen, 1987; Dunn & Rapin, 1997). Bishop and Adams (1989) noted that these children misunderstand implicit or explicit verbal meaning, interrupting too frequently and providing the listener with too

much or too little information. Bishop (1989) recommended using SPD for non-autistic children with inappropriate social speech, language delay and receptive language impairment who speak in full sentences with semantic and pragmatic abnormalities.

There is currently an unresolved and complicated debate concerning the existence of a distinct diagnostic entity of the semantic pragmatic disorder. In brief, in England, it had been strongly argued that SPD and autism are inseparable conditions (Brook & Bowler, 1992; Shields, Varley, Broks & Simpson, 1996). In contrast, Bishop, Chan, Adams, Hartley and Weir (2000) and Boucher (1998) examined pragmatic disorders as a distinct entity. Boucher (1998) tested the hypothesis that: "SPD shares with both Asperger's Syndrome and Kanner-type autism a specific deficit in information processing which impairs the registration and organization of complex experience, and the ability to generate behavior and to plan. I further hypothesize that SPD differs from Asperger's Syndrome and Kanner-type autism not involving a fundamental lack of intersubjectivity (socio-emotional relatedness)" (p. 81).

As far as the children in this study are concerned, I adhered to Rapin and Allen's (1988) position that sees SPD as a distinct behavioral subtype of developmental language disorder, which commonly but not always occurs in autism and in Asperger's Syndrome (Bishop, 1989; Ramberg, Ehlers, Nyden, Johansson & Gillberg, 1996). Therefore, the children included in the comparison group of this study were selected on the basis of their qualitative pragmatic impairments as well as on history of language delay, comprehension of connected speech and formulation deficits (one standard deviation discrepancy with non-verbal subtest, see methods section on participants). None of these children met the DSM IV criteria for autism. It is recognized that the wide-ranging nature of the

communication problem found in autism extends to their non-verbal communication as well. As a result, autistic children often have more severe and more extensive communication deficits than language disordered children with DLD/SPD. The discourse of DLD children is usually characterized by immature or inadequate language in contrast to the frankly abnormal (e.g., echolalia, stereotyped utterances) or inappropriate forms of communication found in children with autism (e.g., inappropriate questioning and remarks, examples in Bishop, 1989, p. 253-256).

In the context of problematical boundaries between developmental aphasia and autism (Rutter, 1978), I stress that it is not helpful to consider DLD and autism as points on a continuum, most children with DLD have communication problems that are more circumscribed than those of autistic children, and which are not associated with any abnormalities of behavior or sociability. The task is even more complicated because the clinical picture changes dramatically with age and with years of remediation. Following Hobson's suggestion (1993) to study systematically conversational behavior in autism to untangle the deficits, I relied on the qualitative approach rather than on strict classification criteria to reveal the characteristics of narrative forms in autistic children.

In the context of normal language acquisition, narratives have been conceptualized as socio-cultural construction of events (Bruner, 1990; McCabe & Peterson, 1991; Nelson, 1996). The transition from knowing to telling through shared adult-child experiences has become a very productive domain of research, as yet mostly applied to typically developing children (Bamberg, 1997). Narrative language consists of goal-directed, sequential discourse organized around canonical elements such as setting, orientation, high point, resolution and evaluation. The acquisition of this particular form of

language has been widely studied in normal children in the context of storytelling (Applebee, 1978; McCabe & Peterson 1991; Neisser, 1982; Stein & Albro, 1997; Stein & Trabasso, 1981).

Conversation about the Past in Normally Developing Children

Event representation

The study of normally developing children's memory and narratives for real-world events offers a window onto how children naturally organize their knowledge of the world and what they remember from their own experiences (Hudson, 1986). The framework that has been used to describe event knowledge organization is based on Schank and Abelson's theory (1977) stressing the dynamic and constructive aspects of schematic organization. Accordingly, schemas are defined as spatial and temporal sets of expectations about what things will look like and the order in which events will occur.

General knowledge about events, organized as event schema or generalized event representations, is acquired relatively early (Farrar & Goodman, 1992; Fivush, Kuebli & Blubb, 1992; Nelson, 1990). Research has shown that children as young as 14 months demonstrate knowledge about the organization of familiar event sequences as displayed in imitation tasks (Bauer & Mandler, 1990). The presence of schema knowledge in young children is further supported by evidence that by the age of 3, most children can verbally report what happens in familiar events such as getting ready for school in the morning, or what usually happens at a birthday party.

The proposal that children's knowledge is organized around sets of expectations for familiar objects, people, places and events has several implications for how children encode and recall information. Schema models stress the dynamic and constructive use of

schema in organizing comprehension and memories. Because they act as unified bodies of knowledge, when particular schema are activated, they automatically operate in a top-down, conceptually driven process to structure and give meaning to material by assigning values to the constituent variables (Nelson, 1983). Comprehension and recall of schematically organized material is therefore highly inferential in nature and allows for flexible thinking. Mandler (1978) showed that children recalled simple stories remarkably well and argued that a general story schema, which specified event categories, guided story recall. Developmental models (Bruner, 1990; Nelson, 1995; Stein & Policastro, 1984) of storytelling have argued that canonical forms embedded in stories catalyze comprehension, retention and meaning-making processes. Moreover, there is evidence that children's memories are heavily context-dependent. Studies have shown that children's memory performance improved when material was embedded in culturally significant or naturalistic contexts (Fivush & Hudson, 1990; Fivush, 1991; Mullen, 1994; Rubin, 1986). Material related to the individual's activity or goals is more easily remembered because the ongoing activity provides context and organization for subsequent recall.

This section presents the social constructivist models explaining the acquisition of narrative formats in normally developing children, including the rationale for the selected age range chosen for the study (9 to 13 years). The emphasis is on the assumption that narrativization of experiences during adult-guided conversation about past events represents the central source for the emergence of personal memories.

In contrast to autism, for the normally developing child, telling stories and learning to talk about the past, start from the human natural capacity to communicate in a dialogic

manner and the innate ability to create meaningful exchanges with the social environment. Using microanalysis of videotaped interactions, researchers have made explicit the conversational context created by infant-mother turn-taking (Clarke-Stewart, Perlmutter & Friedman, 1988). From birth, the normal baby sucks and moves in a regular pattern; the mother picks up on this pattern and acts in synchrony with it. Later on, this prelinguistic turn taking develops into pseudodialogue, with significantly high contingency between the mother and the child's responses. Then, the child gradually develops more sophisticated forms of discourse such as learning to construct meaningful temporally organized stories.

Parents begin in earnest to speak to their children about the past virtually as soon as children begin to talk (Eisenberg, 1985; Engel, 1986; Hudson, 1990a; Nelson, 1989). During this early phase, when the child is about 18 months of age, the adult provides the entire content and structure of the conversation and the child participates minimally; except for being an attentive social interlocutor. Beginning sometime between 24 and 28 months of age, children become more competent conversational partners; they now can provide information about past events, but they are still very limited in their ability to construct a full, coherent narrative and are still predominantly dependent on the adult. Around that period, children are more active participants and may begin to initiate conversations. Finally, sometime between 3 and 4 years of age, children become able to give a reasonably coherent account of a past experience with minimal adult support. The child is now capable of narrating an event independently, although narrative skills will continue to develop throughout childhood (Hudson & Shapiro, 1991; Peterson & McCabe, 1983).

This developmental story is in accord with a Vygotskian view: at first the adult provides content and structure, then, gradually the child becomes increasingly able to organize on his/her own the whole task, based on internalization of the adult's rules and cultural convention. Empirically, studies have illustrated this model quite well, and have showed that, somewhere between 20 and 30 months, children are able to verbally recall details of past episodes from the time they were 14 months (Eisenberg, 1985; Hudson, 1990a). During the preschool and elementary school years, there is an increase in the quantity and quality of information that children report on their own when asked to recall specific events which corresponds to the emergence of narrative forms (Hudson & Nelson, 1986).

In this study, I use the concept of narrative to refer to the method for recapitulating past experiences by matching a verbal sequence of clauses to the sequence of an event. Personal narratives are considered as personal accounts of specific events that have been personally experienced and are characterized by a sequential organization of specific discursive elements, the story grammar. Narrative has been defined in different ways. For instance, Labov (1972) defined a minimal narrative as two temporally ordered clauses in the past tense. Narratives conceptualized as stories follow canonical structure including: (a) a formal beginning and orientation to introduce setting and characters; (b) initiating events, that is, goal-directed actions; (c) a problem or obstacle to achieve the intended goal; (d) a resolution of the problem, and (e) a formal ending device (McCabe & Peterson, 1991; Stein, 1988). According to Bruner (1986), narrative forms corresponding to the canonical form of an event and transforming it into a story with a point, provide a "landscape of consciousness" that goes beyond the "landscape of actions." The narrative

genre contrasts in this way with the simple chronological sequence of script-format. According to Labov and Waletsky (1967) a coherent personal narrative is organized around a high point that is the point of the narrative, why the narrative is told. The authors described the structural components that serve to organize personal narratives as follows: abstracts and introducers that occur at the beginning mark the beginning of the narrative. summarize the story, or summon the listener's attention (e.g., "you know what?"). Orientations provide background and setting information, whereas complicating actions are the actions leading up to and including the high point. The high point is marked by evaluation. This is followed by a resolution capping the event and resolving any complications. A coda can be added at the end to close the story. In order to capture organizational and narrative quality the coding system used in this study combined story grammar and "high-point" analysis.

Narrative cohesion describes the linguistic relationship between two clauses; that is how the surface linguistic elements of a text are linked to each other in order to create a cohesive whole. Botvin and Sutton-Smith (1977) reported the emergence of complex embedded episodes at 11 and 12 years. Roth and Spekman (1986) and Reilly, Klima and Bellugi (1990) later confirmed these data, and found few developmental changes between 8 and 13 years on story construction. Between 7-and 8 years-old children were able to tell structurally coherent stories based on a wordless book, including all the structural elements required for a complete story, and between 10-and 11-years they would even adapt their prosody to their audience. McCabe and Peterson (1991) reported detailed longitudinal data on the use of connectives as semantic and pragmatic markers contributing to narrative cohesion. Semantic connectives refer to their logical properties

providing links between information. Pragmatic connectives refer to the relationship between speech acts, such as in dialogue when individuals need to link their turns. For example, the adversative "but" can be used at the initiation of a turn to signify protest. As the defining property of narrative is recapitulation of temporally sequenced events, one can expect narrative to make use of explicit temporal markers such as "then." In addition, causal relationships between clauses are indicated by "because" and "so".

The structure of a narrative provides the coherence of the story by making the flow of information meaningful to the listener. A large body of evidence shows that the structure of narratives changes with age (Mandl, Stein & Trabasso, 1984; McCabe & Peterson, 1991; Peterson, 1993). Stein and Albro (1997) reported that kindergarten children included more descriptive and action sequences in their stories production than older children did, and that eighty-three percent of the kindergarten children told at least one goal-based story. These latter children were as likely as older children to adhere to canonical and coherent organizations of episodic memory. The majority of episodes contained all the units necessary to meet the criteria of a well-formed story according to Stein and Glenn's criteria (1979). Other studies on narrative comprehension and production also confirm that the organization of episodic information is largely intact by five years of age (Botvin & Sutton-Smith, 1977; Peterson & McCabe, 1983; Trabasso & Nickels, 1992). Kindergartners' performances in organizing the content of an episode strongly suggest that children are capable of maintaining a coherent organization of their memories for events they initially understood.

Fivush, Haden and Adam (1995) report a longitudinal study of narrative coherence. Even at forty months of age, children were able to provide reasonably long and

coherent accounts of their personal experiences, with orienting and evaluative information for the listener to help place the event in both a descriptive and affective context. The basic structure of the children's narratives was remarkably stable across the developmental period studied. Yet, their findings showed that over time, children used more complex referential and temporal markers, both serving to link actions together in a more explicit and cohesive way. With age, children increasingly used more cohesive devices such as adjectives, adverbs, and modifiers, marking particular parts of the narrative as more interesting, more meaningful and significant. Also, Hudson and Shapiro (1991) found that narrative genre (i.e., scripts, stories, personal narratives) influenced the quality of cohesion. Narrative cohesion is found to depend on the effort the child has to put into the translation of knowledge about the event into appropriate narrative forms. Older children are better able to restructure knowledge into different types of narratives.

Vygotsky (1981) claimed that the psychology of the individual could only be understood through the analysis of social interaction and believed that the acquisition of skills, strategies, and processes of thinking is directly related to how the child interacts with adults and peers in specific problem-solving situations. Children internalize the kind of help they receive from others and eventually use the same means of guidance to direct themselves. From this theoretical perspective, social interaction during the process of eliciting stories from young children, for example, becomes the unit of analysis for studying the development of children's narratives.

Parents acculturate their children in many ways, but guidance into narrative is quite specific, not some by-product of global socialization. There is substantial evidence that parents play a critical role in shaping many aspects of their children's narrative skills.

Two connected issues need to be addressed in clinical perspective: (a) the impact of children's specific communication impairment on parents' conversational style and (b) the effect of communication style of parents of severely socially impaired children on children's narrative performance, although these issues are not specially addressed in this study.

Narrative development has been studied in terms of specific linguistic and narrative forms, topic familiarity, emotional content, age, gender, and cultural differences in conversational styles and storytelling practices. Most of these studies have related their findings to the issue of memory, by examining the interaction between telling and remembering and the effects of language and organization of information on event recall. (Haden, Ornstein, Eckerman & Didow, 2001; Han, Leichtman & Wang, 1997; Harley and Reese, 1999; Hudson & Nelson 1983; Mullen & Yi, 1995; Nelson, 1991, 1993; Stein & Nezworski, 1978; Tessler, 1991; Tessler & Nelson, 1994).

Several studies have analyzed the way in which mothers structure their conversation about past events and how the adult's structure might become incorporated into the child's independent narrative recall (Engel, 1986; Fivush & Fromhoff, 1988; Hudson & Shapiro, 1991). For example, in line with Bruner's (1986) characterization "narrative" versus "paradigmatic", two maternal styles have been identified for talking about the past, one labeled elaborative or reminiscers, and the other repetitive or practical rememberers. These styles have been shown to have definite effects on the organization and content of children's memory. It may be speculated that maternal styles themselves might be influenced by the communicative deficits presented by the autistic children. Consequently, changes in maternal style might similarly influence the autistic child's

organization of information about past events and the acquisition of narrative forms. So far, studies of parental behavior with autistic children have not analyzed the possible effects of different communicative strategies on specific skills such as encoding and recalling personal experiences (Kasari, Sigman, Mundy & Yirmiya, 1988, 1990).

One means for developing event structure in normal children would be increased actual experiences with those events (Hudson & Nelson, 1986). The experience with an event can also, however, be indirect. That is, events can be experienced (or re-experienced) through the retelling of the events and conversations about other related experiences. During the period when children are acquiring general knowledge of events, adults guide them through experiences before they happen, as they occur, and after they have already taken place (Nelson, 1993a). Thus, actual participation in conversations about the past may have the general effect of providing the linguistic forms for describing experiences, illustrating to children how to think about such events, and how to internalize the information in such a way that they can report it without further support (Hudson, 1990b).

Nelson (1995) proposed that sharing memories with others restructures the memory into a coherent temporally and spatially marked, oriented, whole narrative, providing a rehearsal, a sort of reinstatement ensuring its retention, and, more importantly, giving social and cultural validation to the personal experience. Likewise, Bruner (1986) emphasized that narrative is a primary means of making meanings, and proposed that sharing narrativized memories provides a frame for making sense of past events.

Another important situation that seems to help children in mastering the narrative genre is pretend play or dramatization in dialogic or group context (Pellegrini, 1984). The

work of Paley (1981) showed how children enjoyed and developed their narrative skills by acting out stories and creating dramatizations of events. The crucial aspect of this form of theatrical narration lies in its social function that is telling for others, co-constructing with others, and sharing experiences with others.

In accordance with this approach to representational processes and social construction of personal memories, "theory of mind" represents a link between autism and normal children. As Nelson (1995) stressed, mental functioning changes strikingly when storytelling becomes part of one's mental and social life. Neither memory nor language itself are sufficient predictors of the ability to talk about past events since, for example, typically developing children demonstrate their memory for events in non-verbal ways before they actually talk about those same events. A fundamental factor necessary to have a successful conversation about a past experience is the ability to recognize that the listener may not know about the event and will not be able to understand a description of it, unless the narrator provides certain pragmatic elements.

Evaluation in narratives

Thus far, I have reviewed the studies that showed how (participating in conversation, storytelling, play), when (every day as soon as they start talking), what (script formats, narrative organization about events) and from whom (older peers, adults, books) young children learn to talk about the past; now I will ask why. Indeed, children may not only be learning how to talk about the past during early adult-structured conversations; they may also be learning why we talk about the past (Engel, 1986; Fivush & Fromhoff, 1988; Hudson & Shapiro, 1991). Learning to share past events has different functions: (a) it helps the child to make sense of experiences, (b) it contributes to the

development of a concept of self, (c) it provides a frame for the child in becoming a competent member of one's culture, (d) it provides a reinstatement of the event and possibly a long-lasting representation in one's life story, (e) it allows feed-back and interpretation. Many studies documenting differences in the way mothers talk with their young children about the past are beginning to address a few of these points. For example, mothers who provide richly elaborated and evaluative narratives about past events may implicitly be teaching their children that talking about the past is an important, enjoyable way of interacting socially with others (Fivush, Haden & Reese, 1993).

Furthermore, the linguistic forms conceptualized as evaluative devices (Labov & Waletsky, 1967) represent the link between narrative discourse and "theory of mind". According to Bamberg and Damrad-Frye (1991) while narrative clauses refer to the actual events, evaluating clauses suspend the sequentially of events and describe behaviors and mental states from an evaluative perspective. Descriptions of mental states take the discourse outside its action context and shift focus onto the narrator's view or personal understanding of the event. The question for the autistic children's personal narrative lies in their deficient ability to shift focus from events to interpretation, which would be partly related to their impaired "theory of mind" (Baron-Cohen, 1995).

Indeed, the use of the evaluative form, studied by Labov and Waletsky (1967), represents the means by which parents, engaging with their children in conversations about the past, identify or linguistically mark those events that are important in defining the child's life story. Within narrative accounts, evaluations can be expressed by explicitly stating internal reactions, emotions and thoughts of the participants, but evaluations can also be conveyed through a variety of linguistic techniques, which carry affective

overtones, such as exaggerated intonations or affectively marked repetition. In general, by the age of 10 to 12 years children's understanding of emotion such as happiness, sadness, embarrassment or pride in terms of internal or uncontrollable events resembled that of adults (Capps, Yirmiya & Sigman, 1992). Bamberg (1991) examined the children's ability to provide evaluative comments as a measure of narrative competencies. The narratives collected from a wordless picture book showed that by the age of 9, children used mental states as a prevalent evaluative device.

Studies documenting the relationship between mother's and children's talk about emotions and internal states suggested that the acquisition of feeling-denoting terms might be of special importance because of their focus on the interpretation, evaluation and motivation of actions. Further, it has been shown that the development of the ability to share information about what governs behavior dramatically affects the nature of interaction (Bretherton & Beeghly, 1982; Bretherton, Fritz, Zahn-Waxler & Ridgeway, 1986; Fivush, 1993; Dunn, Bretherton & Munn, 1987).

Fivush (1991) examined longitudinally the relationship between mother's and children's inclusion of evaluative information. Because evaluative information goes beyond the objective aspects of the past and discusses the subjective aspects of experience, when children include evaluative information they place past events into relationship with themselves, making sense of events. According to the author, children seemed to internalize in their repertoire, ways to talk about events. By using evaluative devices (e.g., intonation, attention getting devices), the children were including information about their thought and feelings about the event and learned to place it into a social context. Thereby,

evaluative components may allow events to become part of the developing life story (Bruner, 1987; Labov, 1982).

McCabe and Peterson (1991) reported that children's narratives about unshared experiences to a naive listener were generally more coherent than the narratives about experiences for which the listener had knowledge. Their interpretation was that, since the interlocutor was present, the child may not have considered it necessary to frame the narrative with the appropriate pragmatic markers, omitting the cohesive elements of the event, suggesting that the children were applying some kind of "theory of mind" strategy to their discourse by using knowledge about their interlocutor's mental state.

To conclude, as adults we know that telling our stories and sharing our past is a means for better understanding ourselves, and is usually an enjoyable way of forming bonds with others. As parents, relatives, or educators, as soon as we begin talking about the past using evaluative forms, we teach children why these activities are important for their relationships with others and for themselves. Therefore, in addition to guiding children about what content and which structure of past experiences are to be used, we implicitly instruct them about the pragmatics of memory talk. Consequently, what children recall about the past may increasingly conform to adult standards of relevance.

Knowing the severity of the pragmatic deficits and the difficulties in "theory of mind" tasks presented by autistic children, I anticipated that these children would exhibit severe difficulties in understanding and learning the social function involved in reminiscing practices.

Past memories versus unconnected experiences

Narratives and their particular markers provide structure and meaning to experiences, as well as a cultural and emotional framework. Bruner (1990) convincingly illustrated this functional approach to narrativization and claimed that, for memories to become part of the life story, they must be organized as coherent narratives because it is the canonical narrative form that gives personal memories their structure. Consequently, memories for events which are not organized as coherent narratives would be less likely integrated into the developing life story and therefore less likely recalled than personal memories that are narratively organized (Fivush & Hamond, 1990). Some of the earliest investigators of autobiographical memory suggested that its development might be related to the acquisition of language and to schematic organization. For example, Bartlett (1932), Schachtel (1947) and Neisser (1962) proposed that autobiographical memory is more the outcome of a reconstructive process using existing "adult-like" schemas than the simple reproduction of an event.

The dramatic change from infantile amnesia to a life history in memory results from the child's emerging ability to use language in extended forms of discourse in exchanging stories with others and thus acquiring the conventional cultural narrative forms that characterize personal memories. The onset of memories for oneself is thus related to the developing dialectical process of talking about shared memories, while the memories become valued for their solidarity function (Nelson, 1993b).

In this study, I propose to consider a particular neuro-psychiatric condition as the environmental factor influencing the interaction surrounding conversation about the past: the autistic syndrome.

Narratives in Autistic and Language Disordered Children

In light of the particular pattern of performance that characterizes memory and executive function in autism, such as difficulty organizing and recalling the order of information to be remembered, and inflexible or perseverative cognitive strategies, it is plausible that the narrative profile of autism would reflect these specific difficulties. In contrast to normal children, autistic children do not benefit from contextual cues or general information knowledge to infer elements to be remembered. Yet, autistic children show intact, or at least fairly good memory for meaningless material, for example, rote memory, digit span or unrelated-sentences are better recalled than stories.

Further, Perner (1990) claimed that memory of events improves with the increase of experiential awareness, which is itself dependent on the developing ability to differentiate between seeing and knowing ("theory of mind"). The ability to understand others' mental states (Dunn, Brown, Slomkowski, Tesla, Youngblade, 1991) represents an important step in memory development, for the ways it will influence discourse about events. Marked changes are found in cognitive and communicative functioning between the ages of three and five years, changes that appear to relate to emerging narrative skills (Astington, 1993; Whiten, 1991). The autistic child's specific deficit in acquiring such mentalizing ability represents a potential obstacle for developing and sharing meaningfully a discourse about the past. So far, there has not been research using personal narrative to explore how autistic children might recall and represent their past. This study will attempt to fill this gap.

To review, clinical findings reported qualitative differences among communicative behaviors (i.e., rules of conversation, politeness, discourse) between children with

language disorders (SPD) and children with autism, which might play a role in differences in narrative abilities. Indeed, adequate basic pragmatic development observed in SPD, such as communicative intent and mother-child conversational turn-taking, constitute the scaffolding for the emergence of lexicon, then grammar and eventually narrative (Toppelberg & Shapiro, 2000). Two studies confirm this proposition showing that non-autistic language disordered children (Rom & Bliss, 1981) and Down's syndrome children (Van Kleeck & Frankel, 1981), in contrast to the autistic children, overall exhibited a normal range of speech acts and pragmatic competence.

McArthur and Adamson (1996) showed also that in contrast to the autistic children the children with language disorders did not show significant deficits in adult-initiated episodes of joint attention despite their delays in the development of expressive language. The authors concluded that joint attention and emergence of language could be separable. Thus, it could be speculated that despite their difficulties with language, these children may be seeking and using second order representations of their local surroundings and interpreting people's behavior in a meaningful way. That is, they may attend to, remember, and consider what their partners know about the events. This is a prerequisite for effective two-way communication (with or without language) and as Frith (1989) argued, one that individuals with autism appear to lack.

Bishops and Adams (1989) studied and compared the conversation of fifty-seven language impaired children with a control group of normally developing children. They examined a wide range of pragmatic peculiarities interfering with the conversation flow and identified as leading to a sense of inappropriateness (i.e., oddness, disruption). Their results showed that children with semantic-pragmatic disorders produced a significantly

higher rate of inappropriate utterances (e.g., too little, too much information and unusual content/style). These children were remarkable for their inability to adapt their conversation and answers to the needs of the listener. These findings confirmed the earlier description of SPD by Rapin and Allen (Rapin & Allen, 1983; Rapin, 1997) on tangential answers to questions or misunderstanding of the illocutionary force of an utterance. Further Bishops and Adams (1989) noted that abnormality in the message itself, not merely the way it was conveyed was only observed in autistic children with SPD.

In terms of storytelling in pathological conditions, very few studies are available, and certainly less so in autism (Donahue, Pearl & Bryan, 1980; Lord & Pickles, 1996; Stone & Coro-Martinez 1980). McCabe (1997) reviewed studies of narratives collected from several special population including specific language disordered children (SLI). Mirenda, McCabe and Bliss (1991) reported in an unpublished presentation, that 8-to 9-year-old SLI children displayed substantive narrative impairment, compared to their non-impaired peers. SLI children delivered leapfrog narratives, with confused sequencing and missing information, which made them difficult to comprehend.

Merritt and Liles (1987) described three story tasks performed by language impaired and non-language impaired children aged 9- to 11 years. The three tasks were: generate a story based on a story stem; retell an adventure story; answer comprehension questions about the retelling story. The narratives were quantitatively analyzed using an adapted version of Glenn and Stein's (1979) story grammar. The coding allowed for between groups comparison of the number of story elements (e.g., initiating events, attempts, etc). The results showed that the control children produced more complete episodes and a greater frequency of story grammar components than did the language-

impaired children. Yet, the episode unit remained a powerful guideline for the two groups when generating or retelling stories. The two groups did not differ in their ability to answer factual questions after the story retelling. Overall length of narrative production was quantitatively similar between groups, although the authors noted that qualitatively, the language impaired group tended to say less. Also adequate storage and recall ability was reported for the two groups.

Using story grammar to analyze stories from a wordless picture book in pre-adolescents with autism and developmental delayed children, Tager-Flusberg (1995) showed that the narratives produced by autistic children were impoverished, shorter, and less complex. These children lacked explanatory statement but did not differ from the developmental delayed children in regard to the use of referential devices or story elements.

Clinically, Dunn (1997) has illustrated the role of executive functions in formulation and narrative discourse deficit in developmental language disordered. The author reported the existence of inadequate language organization in non-autistic language disordered children's strategies: "already at preschool, inadequate language organization makes it difficult for children to express themselves coherently, say what they know [...]. Such children have difficulty identifying the main theme, subtopics, and lower level details of what they are trying to talk about [...]. Work on formulation promotes more varied speech acts and more appropriate use of learned forms of cohesive devices, and it fosters conversational turn-taking and topic maintenance" (p. 140). Based on specific remediation strategies, the author explains that: "Depending on the children's needs, story organizers in the form of trees can help them formulate an oral narrative or organize the meaning of a

story by bridging out its hierarchical structure. Enhancing organization improves the ability to remember what was heard or read" (p.140).

Loveland and Tunali (1993) described four types of narratives on the basis of what is known in communication and social behavior in autism, then speculated about the effect of autism for each of the following types: (a) story-narratives (b) script-narratives, (c) informative/didactic narratives (d) recitations/performances. Of interest, is the original comparison with language-learning disabled children (LD), in which the authors reported a number of similarities between the language disabled (LD) and the autistic children regarding their impaired narratives. These difficulties included: immature and overly descriptive style, poorer use of cohesive devices, less complexity (Feagans & Short, 1986; Liles, 1985) and less informative narratives (Graybeal, 1981; Loveland, Fletcher & Bailey, 1990). The data on social understanding reflected in LD children's narratives (Feagans & Short, 1986; Gerber & Zinkgraf, 1982; Noel, 1980; Spekman, 1981) suggest that these children present to a lesser extent than ASD children, difficulties in understanding other's needs and emotions. Taken together, these findings raise the issues of the possibility of narrative characteristics specific to autism, such as unusual and idiosyncratic meanings assigned not only to words, persons or objects but also to events. Indeed, according to Loveland (Loveland, McEvoy, Tunali & Kelley, 1990), in some cases it seemed that the very notion of story was lost for the autistic narrator.

A study on familiar routinized events compared the correctness of language disordered and autistic children's answers (Klicpera, Mückestein & Innerhofer, 1988). The authors explored the existence of two complementary information-processing systems, one based on language schemata and one based on imagery schemata. The protocol included a

set of twenty short stories completion tasks, distributed respectively between routine events and imaginary events. The results confirmed the autistic children's difficulty (10 to 15-years-old) in verbally completing a story, when compared to learning disabled children matched for IQ and to a group of younger normally developing children. Also, the profile of responses tended to show better answers when the stories to be completed involved familiar events; here the child did not need to infer or use imaginary skills to find an appropriate end but could use knowledge about the routinized events. Therefore, I speculate that for my protocol event familiarity might also affect the narrative forms.

Indeed, scripts as described in terms of sets of expectations for human behavioral events (Nelson, 1986; Schank & Abelson, 1977) allow for the recognition of commonalties among certain kinds of events, and with experience one expects them to unfold in similar ways (i.e. it usually happens that way, with that person, in that situation). To behave appropriately in many social situations, one must be able to detect the nature of the situation and identify the social script that applies. The task of identifying an appropriate script to guide behavior might be difficult for the children with autism and has been found to disrupt autistic children's communication. Adequate conversational behavior requires sensitivity to a wide range of social information, as well as a fluent knowledge of cultural values and expectations.

One study exemplified quite well the difficulty of an autistic child in acquiring social scripts and her poor awareness of social script governing her communication. Baltaxe and Simmons (1977) recorded the bedtime soliloquies of an eight-year old autistic girl, and noted the lack of imitated dialogue structure characteristic of normal children's speech in a similar context (Weir, 1962). Instead, her monologic discourse spoken

uniquely from the hearer's perspective was missing the reflective social function of such discourse, as well as the process of re-enactment of social scripts (Nelson, 1989). This description contrasts with Emily's crib monologues [reported and analyzed by Nelson and collaborators (1989)] in which the young girl put social events into problem-solving narratives or temporal narrative frames, and used narrative forms to create meanings for the experiences in her life.

There have been remarkably few investigations of the ways in which children with autism participate in informal conversation. Capps and her collaborators (1998, 2000) reported findings from autistic and developmental delayed children on storytelling and conversational competence when talking about familiar events. Analysis focused on novel and relevant information (Capps, Kehers & Sigman 1998; Capps, Losh & Thurber, 2000). The studies included "theory of mind" tasks and stories from a wordless picture book. The authors reported no difference between autistic and developmental delayed children in production length, use of evaluative devices, references to character's affective and cognitive states (Tager-Flusberg, 1995; Tager-Flusberg & Sullivan, 1995) or in use of causal statements. Specifically, in comparison with the normally developing children, children with autism and developmental delays used a significantly more restricted range of evaluative forms and tended to label emotions and explain actions rather than identify the causes of internal sates. Conversational contribution of novel, relevant information was positively correlated with performance on "theory of mind" tasks. In addition, children with autism failed more often to respond and produced fewer narratives of personal experience. Capps (1998) concluded that autistic children were less likely to respond to

open-ended questions and demonstrated limited involvement in the co-construction of a shared conversational trajectory through non-verbal as well as verbal channels.

Fine, Bartolucci, Szatmari and Ginsberg (1994) investigated the use of cohesive links to create reciprocal conversation in individuals with autism, Asperger syndrome, and a control group of children with non-specific social problems. They reported that autistic individuals used fewer cohesive devices and more links to physical environment rather than to previous stretch of conversation, which tend to affect the quality of reciprocity.

The literature points out the strength of the young child's impulse to tell stories, and described how much the social environment encourages children to enter into this activity. Bruner and Feldman (1993) speculated that the "communicative problem in autism is due to a weak or absent impulse to rework life experiences into narratives, beginning around the second or third year of life, when most normal young children seem driven to encode their lives in story-talk" (p. 285). According to Bruner and Feldman's comments on their unpublished data, there is evidence for this, both in the pictures-story narration and in interviews. When compared with controls, autistic individuals showed a real paucity of pragmatic marking and a tendency to convert the storytelling task into a descriptive one. The authors also noted that very high-functioning children, despite a general competence in understanding narratives, could not carry on an interesting and socially appropriate conversation when unsupported by their partners' scaffolding.

To conclude, another source and approach for studying narratives of personal events in autism would be to examine the published accounts from autistic adults (Bemporad, 1979; Cesaroni & Garber, 1991; Grandin, 1984; Volkmar & Cohen, 1985; Williams, 1992, 1994). However, this type of narrative material presents several draw-

backs: (a) these narratives did not follow any controlled protocol across studies, (b) the data were collected from a heterogeneous group of autistic individuals, (c) the motivation and contexts that supported the production of these narratives are very different, (d) most of the data are written forms of narratives and not transcriptions of verbal production, (e) there is no assurance about the originality of these excerpts, since most of them have been interpreted by clinicians or re-edited for publishing purposes. These aspects constituted evident obstacles for appropriate comparisons, analysis or conclusions about the specificity of narrative deficits in autism.

The series of studies reviewed in this chapter illustrates the lack of focused and systematic investigations (i.e., comparison group, stimulus, tasks, context) regarding narrative in language disordered and autistic children. Nonetheless, this study attempts to show that the prolific literature on narrative acquisition in normally developing children represents a helpful source for understanding how cognitive organization and social behavior might affect narrative in impaired children.

Summary

The development of a socially accessible memory system in which experiences are stored in a canonical form makes them available to be retrieved and shared as narratives. Converting memories into narratives influences the retention of events, since experiences that are organized into story structure are better comprehend and recalled. Narrative forms have been analyzed with regard to young children's development of memory for events and the construction of autobiographical memories (Fivush, 1994; Nelson, 1996). The acquisition of storytelling and canonical narrative structure for personal past events

finds its social origins in active participation in scaffolding conversations with adults as reflected among traditional oral practices (Rubin, 1995).

On these grounds, the language of autistic individual has been described as primarily instrumental, and non-communicative. There is no dispute that high-functioning autistic children can use language intentionally, just as they can use tools intentionally, although there is strong evidence showing that autistic children lack the desire to share knowledge or emotions with others and that their discourse is specifically missing the natural social drive.

In addition, experiments in social understanding, "theory of mind", emotion processing and executive functions demonstrated the autistic child's incapacity in organizing interpersonal encounters into socially meaningful canonical forms, which in normal condition captures the dialogic regularities involved in social discourse. Findings on narratives and conversation in autistic children have shown that these children rarely talked about mental states, and produced less complex, shorter and strictly descriptive narratives. Yet, some high-functioning autistic children are able to take turns and respond in the conversational context but remained unable to extend the conversation by adding new or relevant information.

Due to the lack of methodological consensus, especially in terms of tasks and matching procedure, it is difficult to draw conclusions about autistic children's ability to narrate fictional stories and personal past experiences. The design of this study allows for systematic analysis of the narrative profile (across tasks) obtained from three groups of children and examine how the natural narrativizing impulse proper to human species might be disrupted in autism.

Specific aims

The aim of the study is to assess the effect of autism on the acquisition of the narrative speech genre. To address this question in a more direct fashion, the present study, based on semi-directive interviews, focuses on different type of narrative tasks, from story retelling to personal accounts. In addition, compared to previous studies, the design of this project includes a comprehensive battery of measures related to narrativization, focusing on narrative analysis (story grammar and high point) as well as psychometric measures (verbal and non-verbal performances, verbal recall, formulation). To elucidate the particularities of the autistic children's narrative profile, the data are compared with an age- and nonverbal IQ-matched group of normally developing children. To tease out the confounding effects of language deficits presented by autistic children a third group of non-retarded language impaired children matched for chronological age and with similar language deficits is included.

In addition, information from parents is collected about the child's social and communication past and present behavior, and the family's interest and style regarding conversation about past events.

The rationale for using narrative as a unit of analysis to examine the factors involved in the construction of personal narratives lies in the fact that narrative acquisition requires the integration of social, emotional, cultural, linguistic and cognitive processes. Therefore, I propose that narrative represents a perfect candidate for an integrative approach to autism.

Research Questions and Hypotheses

The narrative analyses concentrate on qualitative and quantitative differences between narrative tasks within and between groups of children. The focus is on organizational structure and socially related features.

Question 1: Are the autistic-related deficits affecting the narrative speech genre?

Hypothesis 1: High-functioning autistic children's narratives differ in form (narrative structure) and content (theme adequacy) from the two other groups.

Question 2: (a) Are the quantitative and qualitative patterns of performance across tasks (i.e., story retelling, picture storytelling, personal narratives) different between the three groups of children?

(b) Is there a general semiotic deficit for organizing narratives (i.e., overall lower performance across tasks) in the group of high-functioning children?

Hypothesis 2: (a) Autistic children present a different pattern of performance compared to the two other groups. Narrative quality and quantity decrease from story retelling to picture storytelling to personal narratives. This latter narrative task will be the most complex and personal and thus will show the lowest level of organization. In contrast, children from the comparison groups show a different or more homogeneous profile of narrative performance across tasks.

(b) When narrative tasks are combined, autistic children have an overall lower narrative level compared to the other groups.

Question 3: How do autistic children, compare to normal and language disordered children, make use of the different linguistic evaluative markers in the context of personal event narratives?

Hypothesis 3: Autistic children's personal event narratives present fewer evaluative terms, and fewer interpretative forms compared to the other groups.

Question 4: Is there a relationship between impaired conceptualization of "theory of mind" and the use of mental state terms in autistic children's narratives?

Hypothesis 4: The use of mental state terms and socially marked terms in autistic narratives are significantly lower compared to the other groups, supporting the relationship between social understanding, "theory of mind" and narrative quality.

Chapter 2. Methods

Participants

The study comprised three groups of subjects (table 1): 14 children with Autistic Spectrum Disorders (ASD), 12 language disorders (LD) and 12 normally developing children (ND).

Autism was defined clinically as deficient sociability, language, communication, and imaginative play, with rigidity and an atypical range of interests and activities.

The overall inclusion and exclusion criteria were as follow:

Overall inclusion criteria: children were between the age of 9 and 13 years. All had a non-verbal IQ not less than 75 as assessed by the Stanford-Binet Intelligence Scale-Revised. 1986.

Overall exclusion criteria: children were excluded from the recruitment list if they had hearing loss, frank neurological and neuromuscular deficits. Children from multi-lingual environment and children who could not be accompanied by a parent or legal guardian were also excluded from the study.

Autistic Children: the autistic children were recruited through child-neurologists, child-psychiatrists and child neuro-psychologists from Albert Einstein College of Medicine. The sex ratio in favor of boys in the population of interest (4 to 1) was maintained in the sample, 12 boys and 2 girls were included in the study. Autistic children were between

9; 6 and 13 years. Six children were still in special school programs. Four children are in regular class with full or part-time aide. Three children are in regular class and received

speech or psychology treatment and one child is in regular class and does not receive any treatment.

Inclusion criteria: all enrolled children were monolingual English speaking and fulfilled the DSM-IV criteria for the diagnosis of autistic disorder (American Psychiatric Association, 1994) as well as the Wing Autistic Disorder Interview Checklist (WADIC). As part of the diagnosis all children had a history of language impairment and verbal communication deficits. Six children fulfilled criteria for Asperger syndrome (Schopler, Mesibov & Kunce, 1998) with absence of language delay. Standard scores on formulated sentences (CELF) were at least one standard deviation below the standard scores of Pattern Analysis (Stanford-Binet). Children's non-verbal IQ was higher than or equal to 75 (measured by the Stanford-Binet Intelligence Scale-Revised, 1986); as such the referring specialist diagnosed the autistic children as high-functioning verbal autistic children.

Exclusion criteria: as described above.

Five additional children were tested and excluded, 4 based on IQ criteria and one on diagnostic criteria.

Language Disordered Children: the 12 language-disordered children (9 boys, 3 girls) were recruited through private speech pathologists, neuro-pediatricians and child neuro-psychologists from Albert Einstein College of Medicine. All children had a history of language impairment that required evaluation and intervention. For ten children, parents reported a significant language delay. Children were between 9; 10 and 13; 4 years. Their non-verbal IQ was higher than or equal to 85 (measured by the Stanford-Binet

Intelligence Scale-Revised, 1986). Five children were in special school programs and 7 were in regular classes, receiving speech or psychological treatment.

Inclusion criteria: all enrolled language disordered children were English monolingual. They presented formulation deficits assessed by the referring professional, and documented by the subtest of the CELF, "formulated sentences". All children had at least one standard deviation discrepancy between formulated sentences (CELF) and Pattern Analysis (Stanford-Binet).

Normally Developing Children: the 12 normal children (9 boys, 3 girls) were all English speaking. They were recruited among the author's friends and acquaintances at the Albert Einstein campus and Manhattan. They were between 9; 6 and 13 years. Their non-verbal IQ was higher than or equal to 90 (measured by the Stanford-Binet Intelligence Scale-Revised, 1986).

Inclusion criteria: see above.

Exclusion criteria: normal children were not included in this study if they suffered from any medical conditions that may interfere with their ability to perform the tasks or if they had known hearing loss, neurological or psychiatric disorders. Children were also excluded if they had known language disabilities or language impairment. Five additional children were tested and excluded; one because he was a Jehovah's Witness -not mentioned in the contact- and thus did not experienced most of the events proposed in the interview (e.g., birthday), one was excluded because of lack of compliance. Three children were tested but not included in the analysis because after being tested it was found that they were adopted after the age of 3, which raised concerns about the accuracy and content of their personal memories.

Table 1. Descriptive Characteristics

Group	ASD Mean (SD) N = 14	LD Mean (SD) N = 12	ND Mean (SD) N = 12
Chronological age (years) (months)	11; 3 y 136.9 (9.8) m	11; 6 y 134.4 (15.6) m	10; 9 y 131 (14.2) m
Ethnicity			
Caucasian	14	11	10
African American	0	1	2
Sex Ratio (M: F)	12: 2	9: 3	9: 3

Matching Procedures

Twelve out of the fourteen high-functioning verbal autistic children were individually matched for chronological age (within 12 months) and gender, and for non-verbal IQ (+/-16 points or one standard deviation) with a normal and a language disordered child.

Procedure

Prior to their visit, each family was contacted by letter. Two history forms, the Wing Autistic Checklist Disorder Questionnaire (WADIC) and consent forms were mailed by the experimenter to the participants and returned on the day of the testing. The experimenter had a phone conversation with the mother or father to explain the procedure, gather information about specific important past events and remind the parent to bring a picture of their child at the age of 5.

On the day of the testing, the child and the mother or the father were greeted and accompanied to a quiet testing room by the experimenter. The testing took place in two locations based on parents' convenience choice: the Kennedy Center at Albert Einstein or the Graduate Center at CUNY, Developmental Psychology laboratory. Each child was tested individually for approximately two hours; breaks were offered. The testing session comprised a similar sequence of standardized measure (see appendix). First, two verbal and two non-verbal subtests of the Stanford Binet, the Peabody Vocabulary test (PPVT), two immediate story-retelling (SR1-2) tests from the Wide Range Assessment of Memory and Learning (WRAML), first picture story (PS1), two delayed story-retelling (SRD1-2) from the WRAML, second picture story (PS2), three subtests from the Clinical Evaluation of Language Fundamentals (CELF) were administered. Then after a ten minutes break two "theory of mind" tasks (TOM) were presented; an adaptation of the "deceptive Smarties box" called the "Raisins Box" (RB) (Plesa, Goldman & Edmondson, 1995) and the "Sally-Anne" task (Wimmer & Perner, 1983) (see appendix). After a snack-break, the experimenter introduced the semi-directive interview about personal events (PE). All verbal tasks throughout the entire session were audiotaped and transcribed for coding or scoring purposes.

At the end of the session, the accompanying parent was invited to join the child and asked to initiate a conversation of approximately ten minutes about a specific past event with their child. The experimenter audiotaped and observed the conversation and noted any unusual non-verbal behavior such as rocking, or fingers stereotypies.

Finally, when the child was relaxing in the hallway, the experimenter conducted and audiotaped a ten minute semi-directive interview with the accompanying parent

about the child's language and social development and the family practices about conversation about the past.

Coding

The following coding refers to the form (e.g., coherence) and content (e.g., social components) of the narrative productions. Data were obtained according to the following coding rules. Qualitative and quantitative analyses were generated among and within groups. For the purpose of this research, the coding was applied to the child's initial response, including a maximum of three prompts, although the complete transcripts of the answer might include more prompts. Coding for each narrative task is presented in the order of appearance in the session.

* Indicates codes that were recorded but not entered into the analysis because of their low frequencies. They were used in the description of the children's narrative profile.

Story Retelling (Immediate and Delayed): SR1-2, SD1-2

Number of words: actual number of child's words; omit repetitions and retracing.

Number of intrusions: actual number of intrusions.

Definition: non-related, out of context, aberrant, deviant word.

Number of errors: actual number of errors.

Definition: semantically related word, contextually coherent.

Coherence:

Score: 0-1, adapted from Trabasso, Secco & van den Broeck, 1984.

Rule: 0: if story violates the logical sequence of events.

1: if story follows a logical sequence (presence of causal markers). Coherence is a property of the whole in that units or subsets themselves become interconnected.

Narrative element: adapted from Stein & Nezworski, 1978.

Rule: Presence: 1

Absence: 0

Formal opening: 0-1

Definition: scripted beginning (e.g., once upon a time, once there was a boy)

Place: 0-1

Time: 0-1

Persons: 0-1-2 (if names)

Action:0-1

} Orientation/Setting (where, when, who, what) [a]

Definition: simple or complex activity undertaken by protagonists, usually the initiating event.

Obstacle: 0-1

Definition: Event that complicates or interrupts the course of the initiating action contributes to story plot.

High point: 0-1

Definition: Climactic moment, usually preceding the resolution of the action and/or evaluation.

Resolution: 0-1

Definition: the portion of the narrative that follows the evaluation, which resolves the event. Movement leading to a decision or new state.

Ending: 0-1

Definition: final point of the course of action.

Evaluation: 0-1, adapted from Labov & Waletsky, 1967 and Fivush, Haden & Adam, 1995

Definition: Narrative clauses that reveal the attitude of the narrator towards the event by emphasizing the relative importance of some narrative units as compared to others. Goes beyond what is directly observable in the pictures. Information that provides affective commentary on the event.

*Coda: 0-1

Definition: additional element at the very end of a story that is not a description of the event. Functional device for returning the story to the present moment. Usually separated from the resolution by temporal markers.

[a] - Orientation: clauses that place the event in spatial-temporal context or provide background information to help the listener understand the event.

- Setting: introduction of the protagonist (physical, social information.)

- Initiating action sequence: an action, an event, which serves to initiate or to cause a response in the protagonists.

Picture Storytelling: PS1-2

Number of words: actual number of child's words; omit repetitions, such as retracing.

Number of connectives: adapted from Fivush, Haden & Adam, 1995, Actual number of connectives.

Number of causal connectives:

Definition: all words referencing causal relations, e.g., because, so, in order.

Number of temporal markers: actual number of temporal markers.

Definition: all words referencing chronological time, e.g. then, until, before after, first, last, before, when, now.

*Number of supposition terms: actual number of supposition terms.

Definition: words referring to optional states, e.g., probably, maybe, sometimes, usually.

Number of mental terms:

Cognitive: actual number of mental terms.

Definition: words providing information about the desires, beliefs, and motives of the characters of the story; e.g., want, dream, think, believe.

Affective: actual number of occurrence.

Definition: words providing information about the emotional states of the characters of the story, e.g., be happy, scared, sad, angry, upset, nervous.

*Affective enhancers:

Number of character speech: actual number of occurrence.

Definition: use of direct quotation of the story character.

Number of audience hookers: actual number of occurrence.

Definition: exclamatory phrases, e.g., suddenly, lo and behold, that maintain the listener's attention.

Number of intensifiers: actual number of occurrence.

Definition: devices that add intensity or emphasis to actions, or descriptions, e.g., "it was a huuuuuge dog"; e.g., very slowly, including repetitions, e.g.. very very nice.

*Number of inappropriate comments (statements or questions): Bishop & Adams, 1989, actual number of occurrence.

Definition: content or style of child's message is abnormal: abrupt shift of topic, socially inappropriate remarks (over friendly or personal).

Coherence: see above

Narrative elements (10 elements): see above

Compliance:

Rule: 0: If child refuses or shows strong resistance towards the task.

1: If child needs some support or encouragement in order to cooperate, interested.

2: If child readily and spontaneously is willing to cooperate for the task, motivated and interested.

Goal directed: refers to a goal-directed sequence of events that are temporally and causally linked e.g., "It was a little girl, her birthday was coming and she really wanted to have a hammer and a saw, she knew her father wouldn't buy it for her so she talked to her grandfather and told him what she really wanted, and the next day she got the hammer and the saw".

Rule: 0: If the story is constructed without a goal, no motive, descriptive only.

1: If the story is constructed around a goal, a motive.

Topic:

Rule: 0: If the topic is bizarre, inadequate, and overly violent.

1: If topic is adequate, related to the picture–stimulus and does not deviate.

Type of story (structure): adapted from Labov & Waletsky, 1972, McCabe & Peterson, 1991 and Stein & Albro, 1997.

- Absence of sequence structure: refers to narratives containing no temporal or causal organization, e.g., "it's a boy, he had a grandmother".

- Descriptive sequence: refers to a temporal descriptive or series of actions narrative, where the information units are not causally linked, e.g., "She was the teacher, her name was Mrs. Smith, she had long hair, she always had a skirt"..

- Action sequence: refers to a list of actions that are chronologically rather than causally ordered e.g.. "Once there was a little boy who lived with his mother, he had a grandmother, he went to his grandmother, he brought her butter, he carried the butter on a leaf, and he came back".

- Intentional: refers to temporal and causally linked sequences of events, e.g., "There was a boy he really wanted to win the contest and he went to get help and he decided to go to the moon, but he lost because he was too young.

Rule: 0: no structure or descriptive only.

1: action only.

2: intentional.

Social components:

Rule: 0: no people involved

1: people are not described; only mentioned.

2: relationships are explicitly elaborated.

Evaluation (overall score):

Rule: 0: no evaluation, flat rendering.

1: scripted evaluation, e.g., it's great.

2: evaluation concerns only physical environment, e.g., this is the darkest cave.

3: evaluation concerns elaborated people's behavior or mental states, e.g., she was so sad, because they didn't believe her.

*Scripts: these particular language forms were only identified and used to illustrate the children's narrative style.

Definition:

1. Verbalization of routinized events, e.g., going to the restaurant, "You wait for the waitress, you sit, you order, you eat, you pay, you leave".

2. Linguistic devices referring to quoted or verbatim repetition:

- Quoted speech: "My mother said".

- Commercial, delayed echolalia: "Who said McDonald?"

- Songs, rhymes, poems, tales: "See you later, alligator, in a while crocodile".

- Formulaic speech: "Hi, how are you?"

Personal Events: (PE1-8)

Overall narrative score: proper global narrative format (at least two sequenced temporally linked clauses answering the question.

Score: 0-1

Rule: 1: presence of a global narrative format

0: absence of a narrative format, as follow:

S: one sentence format (e.g., I have a party).

W: one word format (e.g., party).

D: "I don't know" answer.

Off: off topic (inadequate answer, e.g., I took the 2 train).

No: not applicable because the child did not experienced the event.

R refusal.

M: missing question.

The remaining of the coding procedure follows the same rules as described in Picture Storytelling.

Analysis

The author scored the transcripts according to the coding rules described above. For reliability purpose, fifty percent of the entire corpus of narratives was randomly selected and coded by a female person, blind to the group diagnostic and the hypotheses tested in the study. The level of inter-rater reliability reached at least 85 % for all scores combined, with no code unusually disparate. Consensus was reached on all disagreements. For each data set of standardized measures, descriptive statistics were generated. Results were expressed as mean ± standard deviation. Differences between means were tested by two-tailed Student t-test. However, all data sets were subjected to equality of variance and normality tests and thus should any or both of these conditions be violated, differences between means were tested by using a non-parametric test such as Mann Whitney test. In all cases, the null hypothesis was rejected at the level of .05. Differences among the three groups on continuous variables were analyzed using analysis of variance (ANOVA) and with repeated measures for within group comparisons. When comparisons between different scales were necessary scores were converted into Z scores to control for differences in scaling. When performance was scored by categorical variables (e.g., presence or absence), the frequencies were compared among the groups

with chi-square and partitioning chi-square analyses (Rindskopf, 1996). Multiple logistic regression analysis was used for correlation analyses.

Chapter 3. Results

To review, a total of 38 children aged from 9 to 13 years were included in this study. Of these, 14 had a diagnosis of Autistic Spectrum disorder (ASD), 12 were previously diagnosed with a language disorder (LD) such as semantic pragmatic or syntactic lexical subtype (Allen 1989; Rapin & Allen, 1987, 1988), and 12 were normally developing children (ND). Diagnosis criteria as well as inclusion and exclusion criteria can be found in the methods section. The same protocol was administered by the author to each child in the same order of presentation. All children included in the study completed all tasks.

The first section of the results reported in this chapter describes the children in the three groups on the battery of standardized verbal and non-verbal tests providing background information and comparability among groups. The second section reports results from the four different types of narrative activities that each child engaged in. The final section reports results from two "theory of mind" tasks ("Raisins Box", "Sally-Anne").

The following tests for statistical analyses were used: for overall comparison among the 3 groups on categorical variables, Pearson's chi-square tests and partitioning chi-square for pair-wise comparison; analysis of variance (ANOVA) for continuous variables on standard scores of standardized tests (CELF, Stanford-Binet). When different tests were compared, data were transformed to Z scores to control for the unequal scaling of the variables. For all analyses, $p < .05$ was considered statistically significant.

Differences among means were analyzed using one-way analysis of variance with the different groups of subjects as the independent factor. When the ANOVA showed significant differences pair-wise comparisons between means were tested by Newman-Keuls post-hoc testing.

Descriptive characteristics of the three groups are summarized in table 1 (see methods section) and table 2. Children in the three groups did not differ on chronological age, gender, SES (Hollingshead scale), ethnicity and overall cognitive level. ASD and LD children were also matched on receptive and expressive language abilities.

Background Characteristics

Overall level of cognitive functioning of all the participants, as assessed by 4 subtests (2 verbal and 2 non-verbal) of the Stanford-Binet Intelligence Scale (4th Edition, 1986) was in the average range (M = 105.84 ± 14.99). Analyses of variance found no significant difference among groups on overall IQ, F (2, 37) = 2.132, p = .134, verbal scale F (2, 37) = 2.015, p = .149, and non-verbal scale F (2, 37) = 1.026, p = .369. To examine whether there was a difference between verbal and non-verbal IQ scores among the 3 groups, data were analyzed by a two-way repeated measures ANOVA. This analysis showed that the mean verbal score was significantly higher than the mean non-verbal score (two way-repeated measures, ANOVA $p < .001$). Of note, verbal IQ scores were significantly higher than non-verbal IQ within each of the 3 groups as shown by paired Student t-tests, ND, t = 3.71, p = .003; LD, t = 4.35, p = .001; ASD t = 2.51, p = .026. This unexpected finding may reflect the selection of the subtests in the cognitive screening and is addressed below

The scores from ASD children on copying geometric forms and answering WH questions were consistent with the literature on deficient graphomotor skills and impaired comprehension in autism. LD children also obtained low scores for these two tasks but did not significantly differ either from the ASD or from the ND's means.

Scores for receptive language from the ASD and LD groups were quite heterogeneous and highly related to the type of verbal demand (table 2). Children in each group performed in the average to superior range in tasks such as pointing to pictures that matched words orally presented (PPVT) as well as answering multiple-choice questions about semantic relationships (CELF). In contrast, ASD children performed below average and significantly lower than the ND group when they were asked to articulate complete and adequate responses about common situations (comprehension, Stanford Binet) or answering questions about an orally presented paragraph (listening to paragraphs, CELF). In terms of story comprehension, there was a significant difference on "listening to paragraphs" (CELF) among the 3 groups $F(2,37) = 5.867$, $p < .006$. Pairwise multiple comparisons analysis showed significantly lower scores for the ASD children ($p < .004$) compared to the ND children; the scores of the LD children were in the low range and did not significantly differ from those of the ASD or of the ND children.

On expressive language, ASD children showed clear difficulties in formulating sentences based on pictures using a specific word stimulus (formulated sentences, CELF). Together with their impairment in organizing ideas in the comprehension subtest of the Stanford Binet, these results underscored their impaired ability to compose logical and meaningful verbal responses. Scores from the LD children on the formulation task (CELF) were also in the deficient range and displayed the particular pattern of language

impairment presented by these children. Analysis of variance with scores on formulated sentences as the dependent variable reported overall significant differences among the 3 groups, F (2, 37) = 28.650, $p < .001$. Pairwise multiple comparisons (Student-Newman-Keuls) showed significant difference between LD and ND children $p < .001$ and between ASD and ND children $p < .001$, but no significant difference between ASD and LD's scores ($p = .069$). This indicates that while ASD and LD children were quite comparable with respect to their performance on this narrative related task, their performance differed from that of the ND children.

To further investigate the language profile, comparisons between groups on the dependent variables, verbal (CELF) and non-verbal (Stanford-Binet) were carried out. The results showed overall statistical difference between groups (F (2,37) = 6.916, p = .003). Differences between groups were found only for the CELF; ASD and LD's score were both lower than the ND's $p < .002$, but these two groups did not differ significantly between themselves ($p = .06$). Children (3 groups) did not differ on composite non-verbal IQ scores from the Stanford-Binet, $p > .35$. To illustrate the discrepancy between the verbal formulation and the non-verbal visual reasoning in both ASD and LD children the performances for formulated sentences (CELF) and pattern analysis (Stanford Binet) were compared within these two groups. To control for the unequal scaling of the variables the data were first transformed into Z scores. Results from multiple comparison procedure demonstrated that verbal formulation was significantly lower than pattern analysis in both ASD and LD children (two-way repeated measures ANOVA, Tuckey post-hoc Test, $p < .001$), while this was not true for ND.

Based on these results and clinical data, both ASD and LD children presented high order expressive language processing impairment corresponding to "semantic-pragmatic" or "lexical-syntactic" subtypes (Allen 1989; Bishop, 1989; Boucher, 1998; Rapin & Allen, 1987). As expected on the basis of prior literature, no language delays were reported for autistic children with suspected Asperger syndrome (Lord & Venter, 1993; Shopler, Mesibov & Kunce, 1998). In contrast 10 out of the 12 LD children presented a history of language delay, 5 were enrolled in special education programs, all were receiving speech or psychological intervention (Toppelberg, 2000). Several LD and ASD children exhibited false starts and syllable repetitions, some also spoke with bizarre sing-song prosody and used pedantic language (Baltaxe, 1977; Baltaxe and Simmons, 1987; Dawson, 1989; Rapin & Allen, 1983). Expressive vocabulary and phonology were not impaired in the three groups. Only ASD children violated conversational rules and made frank inappropriate comments.

Verbal memory was assessed in retelling, memorizing and recognizing elements of a story (WRAML). The composite score for the two delayed recall stories was converted into a standard score provided by the WRAML test manual. The results of this test support the assumption that retention of verbal memory is not deficient in these groups (LD and ASD). No significant group difference was found for numbers of errors and intrusions, although as expected, more autistic children produced inadequate comments.

To summarize, the screening presented above was not a comprehensive diagnosis evaluation and was not used to re-diagnose the children. The tests were selected on the basis of their role in narrative tasks such as sentences formulation and story

comprehension. Although these standardized measures may have some limitation (reduced number of tests and subtests and generation of composite score), the results are relevant to this study examining the role of the specific aspect of development that are uniquely deviant in ASD children (i.e., social communication and pragmatics) and their impact on the development of narrative skills. These results support the assumption that "language impairment" may not be the main factor that could explain narrative performance in ASD children and that the lack of social and psychological understanding (pragmatics, TOM) need to be taken into account.

In summary, as stated in the study design, participants were generally well matched on overall cognitive abilities and the ASD and LD groups were equivalent on receptive and expressive language. However, ASD children were overall the most impaired and heterogeneous group. Most importantly, the screening was able to characterize the ASD children's receptive language impairment. Indeed, the children's impairment concerned more their comprehension and interpretation of language when it was imbedded in context (i.e., stories) than their literal comprehension. This suggested a deficit in the use of language with quite intact linguistic knowledge and rote verbal memory. The following narrative analyses addressed directly this hypothesis.

Table 2. Cognitive Characteristics

Group	ASD Mean (SD) N = 14	LD Mean (SD) N = 12	ND Mean (SD) N = 12
STANFORD BINET			
Verbal subtests [b]	106.1 (20.4)	111.5 (16)	119.2 (11.3)
Vocabulary	54.0 (8.6)	54.7 (6.7)	56.7 (5.6)
Comprehension [a]	51.4 (11.6)	55.9 (9.4)	61.2 (6.4)
Non-verbal subtests [b]	95.3 (16.4)	99.1 (11.9)	102.7 (9.9)
Copying [a]	41.9 (5.0)	44.8 (4.1)	49.1 (7.0)
Pattern Analysis	51.4 (8.9)	54.2 (7.1)	53 (4.7)
Total IQ	100.4 (18.1)	105.7 (14.7)	112.2 (8.3)
PPVT	106.3 (23.7)	102.2 (14.7)	108.9 (11.7)
WRAML (Story Memory)	9.2 (4.4)	11.2 (4.4)	10.7 (2.6)
CELF			
Formulated Sentences [c]	4.79 (1.97)	6.67 (2.06)	12.17 (3.43)
Listening to Paragraphs [a]	7.14 (3.74)	9.42 (4.17)	11.83 (2.17)
Semantic Relationships	10.79 (3.87)	12 (2.66)	11.92 (1.98)

[a] $p < .05$ between ASD and ND groups
[b] $p < .05$ for each group
[c] $p < .05$ between ASD and ND and between LD and ND, ASD = LD

Narrative Analyses

The narrative protocol (see methods and appendix sections) comprised telling and retelling stories and an interview on personal narratives. Three different semi-standardized narrative tasks were presented; each task included two stories. The fourth narrative activity was a semi directive conversation about personal past experiences. One story retelling with delay was missing due to recording failure and there were a few missing answers from the interview (discussed later).

Narrative tasks:
1. Retelling a story (SR).
2. Retelling a story with delay (SRD).
3. Telling a story based on a picture (PS)
4. Formulating answers about personal past events (PE).

Narrative Coding

The first phase of the coding - the "quantitative surface coding"- focused on specific measures related to the tasks, for example for SR and SRD, amount of words and errors, for PS, amount of connectives and for PE, amount and type of prompting. Subsequently, for each task a second coding was applied -"qualitative composition coding". This second coding was inspired from research on narratives and combined two different approaches, the structural analysis (Fivush, Haden & Adam, 1995; Stein & Nezworski, 1978; Stein & Glenn, 1979; Trabasso, Secco & van den broeck, 1984) and the "high-point" analysis (Labov & Waletsky, 1967; McCabe & Peterson, 1991). This coding identified significant narrative components such as formal opening, ending or high point and was applied in an identical way to all four narrative activities. It allowed for comparison across narrative tasks on measures such as coherence, and contributed to

the creation of a narrative profile. Chi-square analyses were carried out on these categorical (presence vs. absence) variables. To further characterize the narrative profile of each group, partitioning chi-square analyses (Rindskopf, 1996) were applied by collapsing the comparable groups.

Story retelling (SR, SRD)

The two stories were selected from the WRAML test. The first story was about 7 sentences long and involved a boy going fishing with his cat. The second story, of similar length, described a high school girl looking for a job. The second story had a less familiar topic for the children's age range and was comprised of more complex and detailed sentences.

The two stories were always presented in the same order. The delay between the immediate (SR) and the delayed recall (SD) was about 5 minutes. During the interval a picture story task was presented to the children.

For the four story retellings (2SR + 2SRD), the quantitative surface coding showed no effect of group for total number of words (table 3). Errors and intrusions were found in all groups. These results are consistent with the previous results on verbal memory and ruled out a potential disability in retelling or recalling a story for ASD or LD children enrolled in this study.

Table 3. Story Retelling and Story Delayed - Number of Words

Group	ASD Mean (SD)	LD Mean (SD)	ND Mean (SD)	ANOVA
Story 1 Story Retelling Words	59.5 (27.7)	61.2 (16.5)	52.7 (15.8)	F (2,37) = .556 p = .578
Story 2 Story Retelling Words	78.8 (31.4)	77.83 (29.8)	88.6 (18.5)	F (2,37) = .572 p = .570
Story 1 Story Delayed Words	60.1 (23.0)	61.2 (11.1)	63.0 (24.0)	F (2,37) = .062 p = .940
Story 2 Story Delayed Words	92.4 (4)	91.2 (30.9)	107. 2 (24.9)	F (2,37) = .874 p = .427

Story retelling-immediate recall (SR): Children were asked to recall the story as soon as the experimenter had finished reading it. Their story was tape-recorded and analyzed. Results are reported on overall chi-square and partitioning chi-square analyses collapsing comparable group scores.

In story 1, chi-square analysis on presence of narrative components (table 4) revealed that the story high point, defined as the main narrative feature, the point of personal interest, differentiated the groups χ^2 (2, N = 38) = 13.46, p = .001. Partitioning chi-square analysis showed that the story recall from the autistic children contained significantly fewer high points than the stories produced by the LD and ND children (LD = ND) χ^2 (1, N = 38) = 13.46, p = .000. In story 2, on the high point variable, a trend for

group difference on overall chi-square analysis was found χ^2 (2, $\underline{N}$ = 38) = 5.46, $\underline{p}$ = .065. However, all ND children included the high point in their recall, and thus a partitioning chi-square analysis revealed a significant difference between normally developing children and the two groups of impaired children χ^2 (2, $\underline{N}$ = 38) = 5.44, $\underline{p}$ = .020. Of note, autistic children's recall of the second more complex story was significantly less coherent than the ND and LD children's recall (ND = LD) χ^2 (2, $\underline{N}$ = 38) = 6.41, $\underline{p}$ = .011.

Story retelling with delay (SRD): After a 5 minutes delay the children recalled the two stories. ASD children showed similar results. In story 1, describing a boy going fishing with his cat, ASD children's scores for coherence χ^2 (1, $\underline{N}$ = 38) = 6.62, $\underline{p}$ = .010, high point χ^2 (1, $\underline{N}$ = 38) = 6.39, $\underline{p}$ = .011 and obstacle χ^2 (1, $\underline{N}$ = 26) 8.57, $\underline{p}$ = .003 were all significantly lower than the other two groups of children (ND = LD). In story 2, their scores were marginally statistically different for coherence χ^2 (1, $\underline{N}$ = 38) = 3.60, $\underline{p}$ = .058, time χ^2 (1, $\underline{N}$ = 38) = 3.60, $\underline{p}$ = .058 (ND and LD collapsed), and high point χ^2 (1, $\underline{N}$ = 38) = 3.21, $\underline{p}$ = .073.

These findings contrasted clearly with the previous result about absence of group difference for memory performance and quantitative measures, suggesting that, although the cognitive and memory performances of the ASD children mirrored the other children, they showed a deficit in more specific narrative organization.

Table 4. Story Retelling and Story Delayed - Chi-square Analysis Differences in Presence of Narrative Elements between Autistic and Non-Autistic groups. Only p < .10 included in table

Narratives Codes	Story Retelling p values		Story Delayed p values	
	Story 1	Story 2	Story 1	Story 2
Opening	ns	ns	ns	ns
Place	ns	.043 [a]	ns	ns
Time	ns	ns	ns	.058 [a]
Person	ns	.055 [a]	ns	ns
Action [c]	ns	ns	ns	ns
Obstacle	ns	- [d]	ns	- [d]
High point	.000 [a]	.020 [b]	.003 [a]	.073
Resolution	ns	ns	.011 [a]	ns
Ending	ns	ns	ns	ns
Evaluation	ns	ns	ns	ns
Coherence	ns	.011 [a]	.010 [a]	.058 [a]

[a] LD + ND combined are statistically (or marginally) different from ASD, df = 1
[b] LD + ASD combined are statistically different from ND, and all ND included a high point
[c] All subjects included an action in story 1
[d] Story 2 did not have an obstacle

Picture storytelling (PS)

This task required children to tell a story in response to a picture. Two pictures depicting novel scenes were presented to each child the first picture represented a futuristic scene with an astronaut searching the ground on the moon, and a rocket ship in the background. The second picture represented an "old time" scene, from the 1900s depicting visitors on a boat in the sewers of Paris. The "quantitative surface coding" included the total number of words for each story together with the frequencies of four

selected linguistic units: connectives, temporal markers, mental states (cognitive and affective) and intensifiers. These raw scores were subsequently transformed into proportions based on the total number of words. Group comparisons on these four variables were calculated using analysis of variance. However for the mental states variable because of the low frequency, the mental state scores were transformed into categorical values and analyzed with chi-square analysis.

Table 5. Picture Storytelling - Analysis of Variance
Number of Words and Frequencies of Connectives, Temporal Markers, Intensifiers. No significant Difference, all $p > .05$

GROUP	ASD Mean (SD)	LD Mean (SD)	ND Mean (SD)
Story 1			
Number of words	128.8 (67.2)	105.1 (55.3)	190.9 (197.7)
Connectives	1.2 (1.1)	1.8 (1.4)	1.4 (1.7)
Temporal Markers	2.5 (1.7)	2.75 (1.9)	2.7 (1.1)
Mental States [a]			
Affective	.1 (.3)	.00083 (.3)	.0083 (.3)
Cognitive	.7 (1.1)	.8 (.8)	1.9 (2.5)
Intensifiers	1.2 (1.2)	0.8 (.7)	1.2 (.9)
Story 2			
Number of words	109.5 (71.7)	105.7 (65.4)	186.6 (154.8)
Connectives	1.5 (1.2)	2.2 (1.3)	2.3 (2.1)
Temporal Markers	2.5 (3.3)	2.7 (1.6)	1.8 (1.1)
Mental States [a]			
Affective	.2 (.6)	.7 (1.2)	.7 (1.0)
Cognitive	.4 (1.1)	.6 (1.2)	1.7 (2.0)
Intensifiers	.9 (1.1)	1.1 (1.0)	1.0 (1.0)

[a] because of the very small frequencies, raw scores were transformed into categorical scores for chi-square analysis, ≤ 1 and ≥ 2
All p values were non significant, $p > .05$.

There were no statistically significant differences for the four quantitative measures. Thus. in this picture story task, the basic structural aspects of the children's

narrative language did not differ. What differed between the three groups of children was brought to light with the qualitative coding.

The "qualitative composition coding", focused on canonical narrative components (e.g., high point) and also included organizational measures such as coherence, evaluation, and goal-oriented narrative. The raw scores for presence of elements were entered into chi-square analysis with group diagnosis as the independent variable (table 6).

Table 6. Picture Storytelling - Chi-square Analysis
Group Differences in Presence of Narrative Elements

Narratives Codes	Story 1 p values	Story 2 p values
Opening	ns	.027[a]
Place	ns	ns
Time	ns	ns
Person	ns	ns
Action	ns	ns
Obstacle	ns	.004 [a]
High point	.000 [a]	.007 [a]
Resolution	.001 [a]	.012 [a]
Ending	ns	.006 [a]
Evaluation	ns	.027 [b]
Coherence	.002 [a]	.012 [a]
Goal	.011 [a]	.003 [a]
Type	.010 [a]	ns
Social Components	ns	.032 [a]

[a] LD + ND combined are statistically different from ASD, df = 1
[b] Overall difference between groups, df = 2

The analysis showed that on both picture stories ASD children differed from the other two groups in their lower scores on: coherence, goal, high point and resolution. For

the first picture, ASD children's stories compared to the two others groups were significantly more descriptive (type of story). In the second story, ASD children differed from the other two groups in the absence of obstacle and ending. Although statistical analysis did not show significant difference, only some children in the ASD group produced stories without mentioning a person, 1 ASD child in story 1 and 3 ASD children in story 2. All together these missing narrative elements clearly altered the overall quality of their stories. In terms of evaluative devices the results showed that in the first story all ND children evaluated their story in contrast to 7 (50 %) of the ASD children and 7 (59%) of the LD children. In the second story only 5 (36%) of the ASD children evaluate their story in contrast to 8 ND (77%) and 9 LD (75%) children. Moreover, ND children were using more causal evaluation (e.g., he was so scared because they all left) as opposed to scripted (e.g., it was great) or physical (e.g., it was really dark).

Thus, despite the fact that the stories from the ASD children did contain typical narrative items, they were consistently missing the essential function of a story, that is, to provide an interesting, comprehensible, coherent story for the interlocutor. Overall ASD children's narratives were remarkable for their flatness and/or lack of social meaningfulness, (i.e., absence of plot).

Of note, irrelevant and/or inappropriate comments violating conversation rules were only observed in the ASD group (4 children). Yet no significant group differences were found for the compliance variable.

Interview on personal events (PE)

In the case of the interview on personal events, some aspects of the coding had to be modified due to the variability in length of answers. In light of the picture story analysis reporting no difference in linguistic forms, and the large variability in children's answers (length, topic, interest) no quantitative analysis at the word level was carried out. Instead, relevant measures on behavior and conversation skills were included (e.g., compliance, inadequate behavior, informative answers, type and numbers of prompts). Eight events were selected from the entire interview and numbered from 1 to 8 according to the general order of appearance during the interview. The total numbers of answers analyzed were respectively ASD = 112, LD and ND = 96. To control for the difference in total number of answers, data were transformed into percentages. Although all the questions referred to personal past events, they shared different features:

- Scripted events: Weekend (2), Halloween (3), birthday (4),
- Unique events: first day at school (5), first memory (8)
- Emotionally driven events: hospital (1), happiest event (6), saddest event (7)

Three types of analyses were performed on the 8 events, each examining the children's narrative abilities from general (overall quality of narrative answers, analysis I) to more specific perspective (effect of topic on narrative device in each group, analysis II, III). Personal past event analysis:

Analysis I: narrative analysis across 8 events among groups

Analysis II: narrative analysis by event, among groups

Analysis III: narrative analysis across 8 events by narrative codes among groups.

Analysis IV: group profile on major variables across tasks

Table 7. Personal Past Events - Design Analysis

TOTAL Narratives 38 x 8 = 304	EVENTS (1-8)							
	1 Hospital.	2 week end	3 Halloween	4 Birthday	5 1st day school	6 happiest event	7 saddest event	8 1st memory
ANALYSIS I By group	ANALYSIS I Overall narrative score							
ANALYSIS II By group By event	II	II	II	II	II	II	II	II
ANALYSIS III By group	ANALYSIS III Narrative codes Across events by group							
ANALYSIS IV By group	ANALYSIS IV Narrative profile across tasks							

Analysis I: Analysis across the 8 events of the overall narrative quality score among groups.

For the 8 events, each answer received a general narrative score reflecting the quality of the child's response before the experimenter offered further prompting (see coding section). The narrative scores corresponded to the different categories of answers:

1. Narrative format (proper format)
2. One sentence format (e.g., I have a party)
3. One word format (no narrative, e.g., party)
4. "I don't know" answer
5. Off topic (inadequate answer, e.g., I hate my brother)
6. Not applicable because the child did not experience the event
7. Refusal
8. Missing question

The complete distribution of answers for personal events questions is presented in table 8.a. Subsequently, these 8 categories of responses were combined to create a dichotomous system: narrative versus non-narrative answers (table 8.b). Chi-square analyses among the three groups for each category of answers -expressed in percentage to adjust for total number of answers- showed that the percentages of answers coded as narrative in ND (92.70%) and LD (82.29%) children were significantly higher than the percentage of the ASD (66.96%) answers, overall χ^2 (2, $\underline{N}$ = 38) = 21.87, $\underline{p}$ = < .001 LD and ND scores on overall narrative quality score did not differ, (1, $\underline{N}$ = 24) = 3.86, $\underline{p}$ = .052. Of note, the "OFF" category, was only observed in ASD children (7.14% of total ASD answers), and the analysis among groups showed a χ^2 (2, $\underline{N}$ = 38) = 14.08, $\underline{p}$ = < .001. Although statistical analysis failed to show significant result for the "I don't know" response, as a first reply to a personal question, LD children seemed to use it quite often (8.33 %) compared to ND (2.08%) and ASD children (4.46%). Spontaneously, ASD children showed a higher proportion (11.60%) of "only sentence" responses, such as " I go trick or treat" or "I have a party" than LD and ND children (LD = ND) ", χ^2 (1, $\underline{N}$ = 38) = 8.74, $\underline{p}$ = .003. They also refused more than the other children to answer the questions (4.46%), χ^2 (1, $\underline{N}$ = 38) = 3.86, $\underline{p}$ = .049.

Table 8.a. Analysis I
Overall Quality of Answer across the 8 Events (Percentage)

	1	2	3	4	5	6	7	8	TOTAL
ASD	(74) 66.1	(13)[b] 11.6	(4) 3.6	(5) 4.5	(8)[a] 7.1	(2) 1.8	(5)[b] 4.4	(1) 0.9	(112)[c] 100
LD	(79) 82.3	(3) 3.1	(4) 4.2	(8) 8.4	(0) 0.0	(1) 1.0	(1) 1.0	(0) 0.0	(96)[d] 100
ND	(89)[a] 92.7	(2) 2.1	(2) 2.1	(2) 2.1	(0) 0.0	(1) 1.0	(0) 0.0	(0) 0.0	(96)[d] 100

Values represent raw sores in brackets followed by their expression in percent of total number of observations.
1 = proper narrative; 2 = sentence only; 3 = one word only; 4 = "I don't know" answer; 5 = off topic; 6 = not experienced the event; 7 = refusal; 8 = missing (question absent from interview).
[a] Chi-square analysis, p <.05, ND > ASD, LD > ASD, LD = ND
[b] Chi-square analysis, p <.05, ASD > LD and ND, LD = ND
[c] Total number of answers, 14 x 8 = 112
[d] Total number of answers, 12 x 8 = 96

Table 8.b. presents the comparisons among the 3 groups between the proper narrative format category and the combined defective narrative categories. The significant overall chi-square analysis χ^2 (2, N = 38) = 23.21, p = < .01, showed a significant effect of the category variable on the 3 groups. Further to examine how groups differ between themselves two by two analysis were carried out and showed that ASD scores differed from the LD's, χ^2 (1, N = 26) = 35.57, p = .02, and that LD and ND scores were statistically comparable χ^2 (1, N = 24) =3.86, p = .051.

Table 8.b. Analysis I
Proper Narrative Category versus All Defective Categories of Answers across 8 Events

	Narrative format* (column 1) (raw) %	Defective format (columns 2-8) (raw) %
ASD	(74) 66.1	(38) 33.9
LD	(79) 82.3	(17) 17.7
ND	(89) 92.7	(7) 7.3

*Chi-square analysis, overall $p < .01$
ASD < LD, LD = ND

Thus, the narrative format of the ASD's answers about personal events was significantly more deficient compared to the other 2 groups. Since the narrative format of the children's answers seemed to be defective in different ways, subsequent analysis were performed. When the S and W categories were combined (S = sentence only and W = word only), Chi-square analysis reported an overall group difference χ^2 (2, N = 38) = 8.11, $p = .02$, and no difference between ASD and LD χ^2 (1, N = 26) = 2.42, $p = .12$ and between LD and ND, χ^2 (1, N = 24) = 39, $p = .53$.

When the four categories of no answer were combined (S + W + D + Off) (table 8.c). The analysis showed an overall group difference χ^2 (1, N = 38) = 22.69, $p = <.001$. A different pattern between LD and ASD emerged; LD composite scores were significantly different from ASD' s χ^2 (1, N = 26) = 6.54, $p = .01$. None of the ND or LD gave "off topic" answer, LD = ND.

Table 8.c. Analysis I
Comparison among Groups between Defective (S + W + D + Off) and all other Narrative Categories (N) across 8 Events

	Defective * (raw) %	Others (raw) %
ASD	(30) 32.60	(62) 67.39
LD	(15) 15.62	(81) 84.37
ND	(6) 6.25	(90) 93.75

*Chi-square analysis, overall $p < .05$
ASD > LD, ASD > ND, LD = ND

Two findings stand out from these last 3 tables. First, in terms of the ASD children, their lower number of proper responses underscored their specific impairment in generating adequate personal narratives. Their inappropriate social communicative behavior was also reflected in their tendency to shift topic, refuse to answer or give limited answers.

Second, as for the LD children, on average they showed the ability to respond adequately to the questions as well as to use general narrative format. However, the language difficulties were recognized in their difficulty in elaborating an answer on their own.

Based on these findings, group differences on "no answers" ("I don't know", refusal and off answers) were analyzed and the results revealed the following interesting pattern (table 9). Most of these "no answers" were observed for the last 4 questions (events 5-8). Two possible reasons are suggested, most of these questions came at the end of the interview when children were getting tired and these topics were the most personal

and emotionally charged (i.e., first day at school, happiest and saddest event, first memory). Comparisons for each groups between the two sets of questions (1-4 and 5-8) on "no answer" responses showed that ASD χ^2 (1, N = 14) = 8.009, p = .005 and LD χ^2 (1, N = 12) = 7.847, p = .005 had a significant higher number of no-answers for the second set of questions 5-8. Although statistical analysis failed to show the same effect in the ND group, the only two "no answer" produced were also found in the second part of the interview.

Table 9. Analysis I
Comparison of "no answer": "I don't know" and Refusal, between Events 1-4 and 5-8

	Events 1-4	Events 5-8	χ^2 (dfl)
	"No answer" (raw) %	"No answers" (raw) %	p values
ASD %	(3) 5.35	(15) 26.78*	p = .005
LD %	(0) 0	(9) 18.75*	p = .003
ND %	(0) 0	(2) 4.16	p = .49

*Chi-square analysis within group, p < .05

Analysis II: Narrative analysis by event among groups.

This narrative analysis focused on form and content and was performed separately on each topic (event). For each of the 8 topics, using chi-square analysis, the frequencies of the presence of the categorical variable (e.g., opening, place, high point, etc.) were compared among the three groups. When 2 groups were statistically non-different ($p > .05$), partitioning chi-square analysis collapsing these 2 groups was applied and their results were reported in table 10 together with the p values. Overall comparisons with p values $.10 \leq p \geq .05$ are reported.

Table 10. Analysis II – Comparison of Narrative Elements by Event: 1= Hospital; 2 = Weekend; 3 = Halloween; 4 = Birthday; 5 = 1st Day at School; 6 = Happiest Event; 7 = Saddest Event; 8 = First Memory.

	1	2	3	4	5	6	7	8
Opening	ns	ns	ns	ns	ns	ns	ns	ns
Place	ns	.024[a]	.014[a]	.018[a]	ns	ns	ns	ns
Time	.020[c]	ns	.007[a]	.019[a]	.021[c]	.008[c]	ns	.ns
Person	ns	ns	ns	.005[a]	.011[a]	.036[a]	ns	.021 [c]
Action	ns	ns	ns	ns	.004[a]	ns	ns	ns
Obstacle	ns	ns	ns	ns	ns	ns	ns	ns
High point	.051	ns	.000 [a]	.000[a]	.001[a]	.004[a]	.000[a]	.020[a]
Resolution	ns	ns	ns	.051[a]	ns	ns	ns	ns
Ending	ns	ns	.004[a]	.001[c]	.000[a]	.015[a]	.003[c]	ns
Evaluation	ns	.079	.001[c]	.018[c]	.003[c]	ns	ns	.048[c]
Coherence	ns	.005[a]	ns	ns	.004[c]	.105	.030[a]	.028[a]
Goal	ns	.004[a]	.004[a]	ns	.012[c]	ns	.006[a]	ns
Type	ns	.051[c]	.009[a]	ns	.007[c]	.014[c]	.000[c]	.040[c]
Social comp.	ns	.015[c]	.033[a]	.014[a]	.015[a]	.008[a]	.000[c]	ns
Informative	ns	.008[c]	.041[a]	ns	ns	.037[a]	ns	ns
Prompt open	.022[a]	ns	ns	ns	ns	ns	ns	ns
Prompt forced	.013[a]	.024[d]	ns	ns	ns	ns	ns	.028[e]
Compliance	ns	.000[c]	ns	ns	.039[c]	.030[c]	.016[c]	.027[e]

[a] ASD < LD and ND, LD = ND, p <.05
[b] ASD > LD and ND, LD = ND, p <.05
[c] ASD = LD, ASD and LD < ND, p <.05
[d] ASD = LD, ASD and LD > ND, p <.05
[e] ASD ≠ LD ≠ ND, p <.05

Event 1 (hospital visit)

This first topic did not produce significant difference between groups among any of the codes, however ASD children showed a strong tendency to omit a high point in their response. One child in each group never went to a hospital and these answers were coded "not applicable".

Event 2 (last week end)

ASD children were significantly less compliant than the other children in answering this personal but quite common question. Their answers were more descriptive, less informative and coherent. On average, their narratives were not goal-oriented and did not include a high point or many social components.

Event 3 (Halloween)

For this child-oriented theme, comparisons analyses revealed that LD and ND children gave more informative narratives including location and time as well as ending. In contrast, ASD children's narratives were characterized by their highly descriptive nature, missing goal, high point and personal affective evaluation. However, no difference was found for coherence.

Event 4 (birthday)

Birthday events are intrinsically temporally marked, recurrent, personal and usually very socially involving. ASD children's narratives were again remarkable for their low score in social components, qualitative evaluation, high point and ending. ASD children mentioned significantly less often who attended their birthday (9 ASD children omitted completely to mention a person). Again, for this familiar event no difference was found for coherence.

Event 5 (1st day at school)

This topic involves a unique personal experience well located in time and usually affectively charged. In addition to their poor compliance talking about this topic, the ASD stories showed many of the previously described differences. In accordance with the hypothesis of this study, autistic children seemed to have significantly more difficulties constructing coherent and complete goal-oriented stories. The difficulties of the ASD children might be related to the fact that this event was more personally distinctive and may not be encoded according to a routine or a script like Halloween or a birthday event.

Event 6 and 7 (happiest event and saddest event)

These two questions were openly targeting the children's ability to identify emotional events of their past and their ability to recall and share their stories. ASD children showed more resistance and less ease when talking about these experiences. Many ASD children first gave inadequate answers illustrating their trouble with the topic and when redirected would describe briefly an event of their life. Of note 5 ND children used more elaborated and causally related evaluation in event 7 (e.g., I felt sad because ....), revealing their knowledge on how the mind and affects work.

Event 8 (1st memory)

This last question was the most difficult to comprehend for autistic children. It required more scaffolding on the part of the experimenter in the sense of significantly more forced choice prompts. Despite the fact that narratives among the three groups did not differ in terms of their main narrative constituents, ASD children scores were significantly lower on coherence, high point and evaluation. Of note, all ND children's

narrative included people in their narrative in contrast to 4 ASD and 3 LD children who did not.

Analysis III: Analysis of narrative components across 8 events.

This analysis was a continuation of analysis II with the 8 questions combined, comparing groups for use of narrative devices across type of events to provide children's narrative profiles in a semi-directed conversation. For each group, the score corresponding to the presence of a narrative component was added across the 8 events. Chi-square results on frequencies of narrative components along with p values are presented in table 11.

Results from the promptings variable showed no difference in number or type of prompting given by the experimenter; open prompts χ^2 (2, N = 38) = .770, p = .680, forced choice prompts χ^2 (2, N = 38) = 5.059, p = .080. As with the other narrative measures, ASD children showed a pattern of lower scores on specific type of codes. Of note, compliance sores were low for ASD as well as for LD children. Indeed, LD children of that age might be conscious of their formulation difficulties and were uncomfortable with the interview setting, even though they knew how to talk about their experiences. However, LD children's low initial compliance was usually overcome with the support and the scaffolding of the answers provided by the experimenter. In general, ND children's narratives were the most informative. The purpose of their stories was to tell explicitly what happen to them (high point) how, where and when it occurred and who was involved. They also marked more often the end of their stories. Overall comparison among the three groups on ending variable, χ^2 (2, N = 38) = 45.204, p = < .001. Finally,

two questions were addressed in these analyses (1) how LD and ASD children differed from ND children (see ASD = LD)? and (2) how LD and ND were similar and different from ASD children (see LD = ND)?

First, as for the similarities between ASD and LD children, the results showed that their narrative responses shared comparable scores for: place, time, action, obstacle, resolution and ending. These codes represent the presence (i.e., quantity) of canonical story elements. Thus, the children with language impairment and with autism produced narratives that contained the same amount of basic elements. Their knowledge of narrative composition is not deficient. Yet, all three groups of children differed, in terms of how they organize their narrative around these constituents to form the entire narrative piece. The qualitative scores that captured this complex and integrative process of elements into whole narratives were: goal-oriented, type of story (description, action, intention) and evaluation. Noteworthy, ASD children tend to produce the less coherent (weak central coherence, Frith, 1989) and goal-oriented stories, and would give the most physical or scripted evaluation.

Second in terms of LD and ND similarities, both groups produced more coherent stories and included a highly significant larger number of high point compared to the ASD children. Moreover, in accordance with the literature social components and people were less elaborated in ASD's responses. All together, these findings showed first, the effect of high order language processes impairment (LD and ASD), and second, pointed out how specific severe developmental social deficits found in ASD might affect their narrative production.

Table 11. Analysis III
Presence of Narrative Components across 8 Events

TOTAL 8x38=304 N = 38 Events = 8	ASD % (raw) N = 14x8 = 112	LD % (raw) N = 12x8 = 96	ND % (raw) N = 12x8 = 96	Chi-square Comparisons*	P values
Opening	5.3 (6)	6.2 (6)	8.3 (8)	NS	
Place	31.2 (35)	46.8 (45)	66.6 (64)	ASD = LD	.030
Time	34.8 (39)	46.8 (45)	73.9 (71)	NS	
Person	37.5 (42)	61.4 (59)	79.1 (76)	LD = ND, ASD ≠ LD	.001
Action	66.0 (74)	78.1 (75)	82.2 (79)	ASD = LD	.001
Obstacle	24.1 (27)	35.4 (34)	47.9 (46)	ASD = LD	.002
High point	9.80 (11)	47.9 (46)	71.8 (69)	LD = ND, ASD ≠ LD	.001
Resolution	16.9 (19)	28.1 (27)	39.5 (38)	ASD ≠ ND ≠ LD	.001
Ending	25.0 (28)	39.5 (38)	70.8 (68)	ASD = LD	.035
Evaluation	8.90 (10)	22.9 (22)	45.8 (44)	ASD ≠ LD ≠ ND	.001
Coherence	41.9 (47)	66.6 (64)	84.3 (81)	LD = ND, ASD ≠ LD	.007
Goal	35.7 (40)	55.2 (53)	81.2 (78)	ASD ≠ ND ≠ LD	.001
Type	21.4 (24)	47.9 (46)	80.2 (77)	ASD ≠ ND ≠ LD	.001
Social components	27.6 (31)	52.0 (50)	71.8 (69)	ASD ≠ ND ≠ LD	.001
Informative	50.0 (56)	61.4 (59)	86.4 (83)	ASD = LD	.001
Prompts open forced	19.6 (22) 29.5 (33)	10.4 (10) 35.4 (34)	11.4 (11) 20.8 (20)	NS NS	
Compliance	66.9 (75)	72.9 (70)	82.3 (79)	NS	

* When overall chi-square among 3 groups $p < .05$, then, paired comparisons are reported

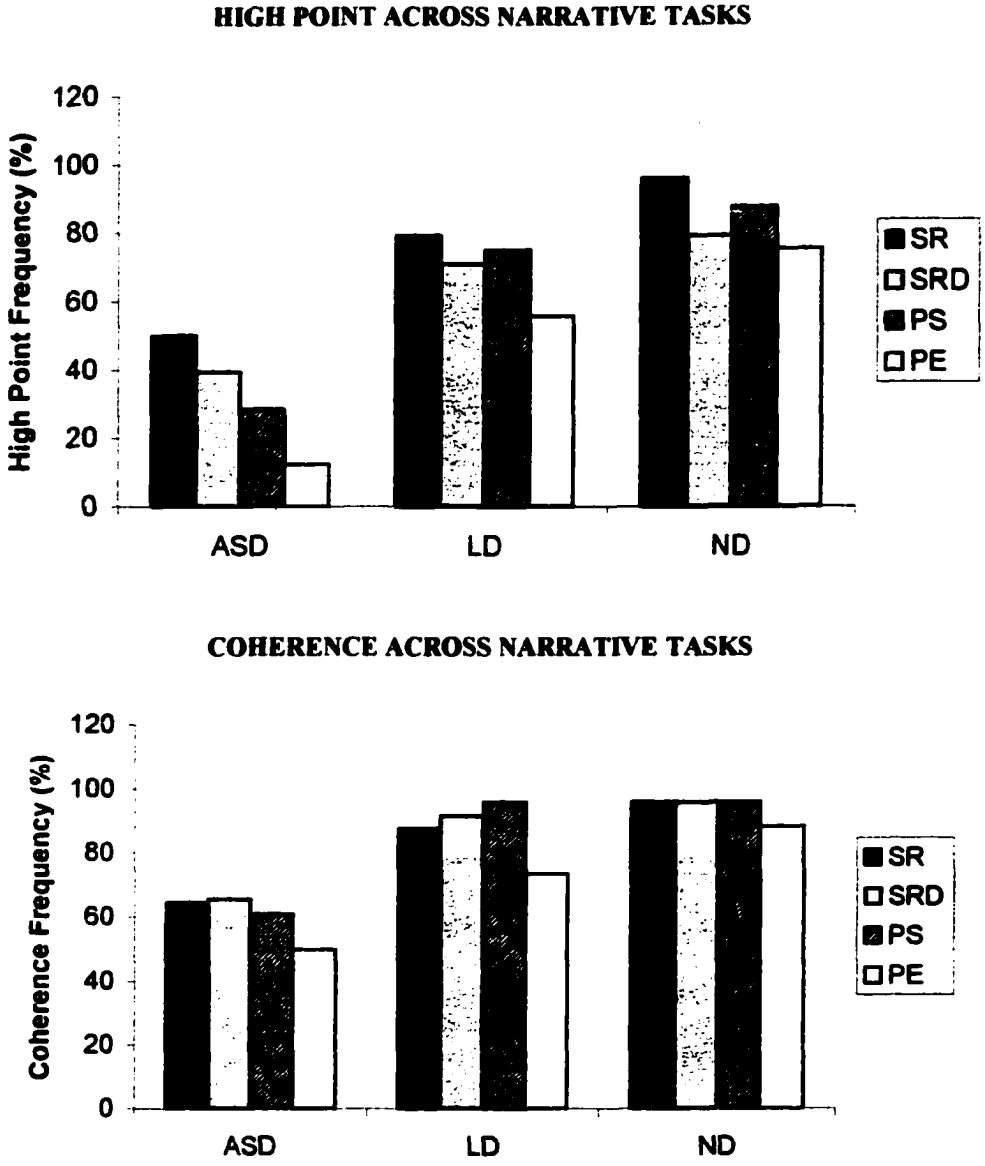
Analysis IV: Group profile on major narrative variables across the tasks.

One hypothesis of this study was that narrative quality would be best in story retelling, less adequate in picture storytelling and least well organized in responses about personal events. The curve was expected to be steeper in ASD than in LD and ND children. The assumption was that verbal skills, representation processes, planning, pragmatics and socially shared memories would constitute factors affecting ASD children's narratives specifically. Given the number of children enrolled in the study and the number of tasks, the approach to this issue consisted of a graphical representation of two essential narrative features, high point (HP) and coherence (C) across tasks. Average frequencies of presence of high point scores and coherence were calculated for each specific narrative activity (comprised of 2 to 8 answers). To control for differences in total number of responses, these means were transformed into proportions (number of HP or C over total of responses). The data are presented in table 12 and figure 1.

Table 12. High Point and Coherence in Mean percentage across the Four Narrative Tasks: Story Retelling, Delayed Story Retelling, Picture Storytelling and Interview.

4 TASKS	ASD N = 14		LD N= 12		ND N = 12	
%	High Point %	Coherence %	High Point %	Coherence %	High Point %	Coherence %
1. SR=2	50.0	64.3	79.2	87.5	95.8	95.8
2. SRD=2	39.3	65.5	70.8	91.6	79.1	95.8
3. PS=2	28.5	60.6	74.9	95.8	87.4	95.8
4. PE=8	12.2	49.7	55.6	73.4	75.3	88.1
Total mean	40.6	60.0	70.1	87.0	84.4	93.8

Figure 1. Illustration of Children's Narrative Profile



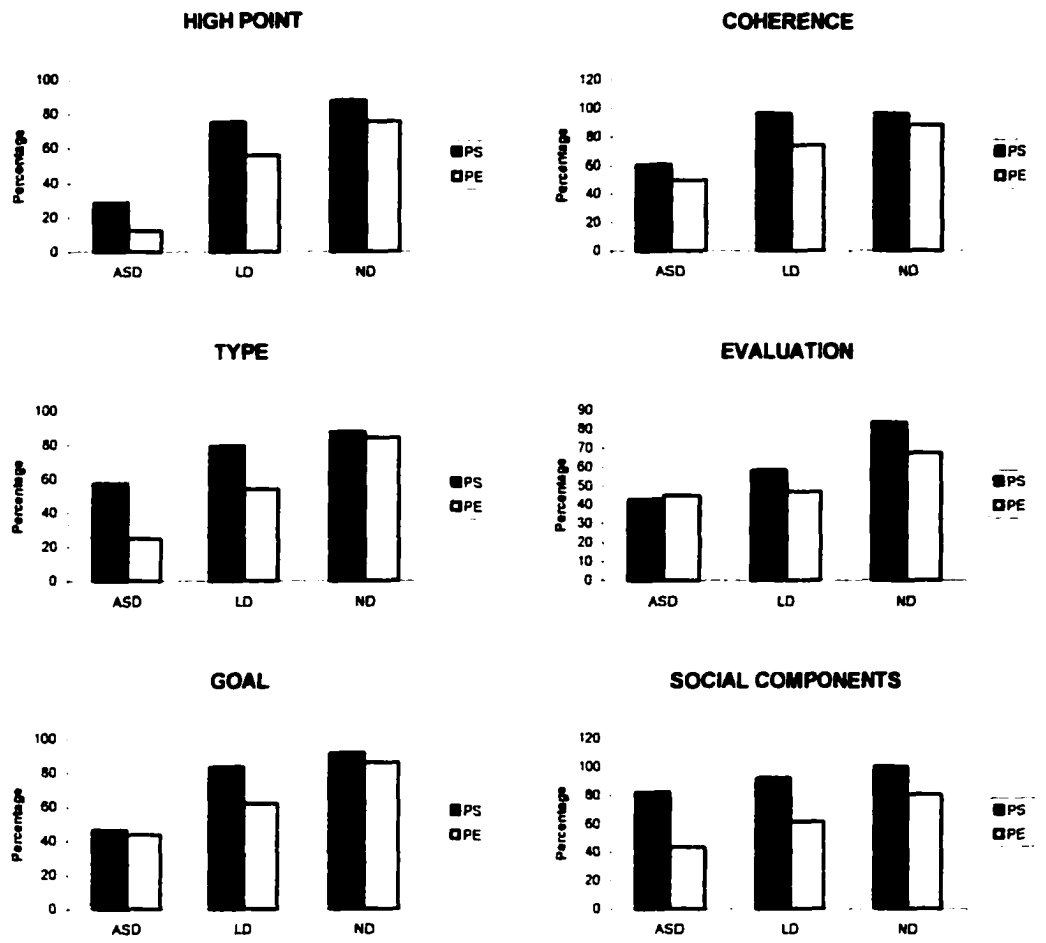
The challenge between the narrative tasks appears to be intrinsically different. Indeed, children appeared more at ease to retell stories rather than talking about personal events. Furthermore, telling a story based on a picture allowed for the use of scripted format (e.g., movie like "Titanic"). Personal events required more complex and original input such as, representation of events, information, understanding of affects and autobiographical memories. To illustrate the notion that ASD children are lacking social understanding of how to share experiences about the self and that their narrative forms are qualitatively more impaired, comparisons between the picture story task (PS) and personal events (PE) on a series of essential narrative variables (see table 12 for generating means) were computed and presented in table 13 and figure 2.

Table 13. High Point, Type, Goal, Coherence, Qualitative Evaluation, and Social Components
Mean % for: Picture Story (PS) and Interview of Personal Events (PE)

Picture Story [a] / Personal Events [b]	ASD N = 14			LD N= 12			ND N = 12		
Mean %	PS	PE	TOT	PS	PE	TOT	PS	PE	TOT
High point	28.5	12.2	20.3	74.9	55.6	65.2	87.4	75.3	81.3
Evaluation	42.8	45.0	43.9	58.3	46.9	52.6	83.3	67.3	75.3
Coherence	60.6	49.7	55.1	95.8	73.4	84.6	95.8	88.1	91.9
Goal	46.4	44.0	45.2	83.3	61.6	72.4	91.6	85.8	88.7
Type	57.1	24.8	40.9	79.1	53.9	66.5	87.4	83.9	85.6
Social Components	82.1	43.9	63.0	91.7	61.4	76.5	100	80.4	90.2

[a] mean of two picture stories
[b] mean of eight events

Figure 2. Illustration of Children's Performance toward Fictional and Personal Events



"Theory of Mind"

Based on the assumption that "theory of mind" (TOM), reported as impaired in ASD children, would be related to narrative skills, two TOM tasks were administered. The "Raisins Box" (RB), adapted version of the "deceptive Smarties Box" task (Plesa, Goldman & Edmondson, 1995), and the "Sally-Anne" task (SA) (Wimmer & Perner, 1983) were both presented in the same order. Each response was coded as passed or failed and entered as frequencies scores into chi-square analysis. The results of comparison analysis are presented in table 14.

Overall comparisons (SA + RB) showed significant group differences χ^2 (2, $\underline{N}$ = 38) = 9.074, $\underline{p}$ = .011. Comparison among groups between the 2 tasks showed a significant lower score for SA, χ^2 (2, $\underline{N}$ = 38) = 8.493, $\underline{p}$ = .014. Partitioning chi-square (Fisher-exact) combining comparable groups LD and ND showed a significant lower performance of ASD on SA task, p = .006. However, despite the fact that ASD children tended to fail the SA task more than RB, statistical comparison within the ASD group between the 2 tasks did not reach significance p = .103. Of note, the 2 ASD children who failed RB also failed SA, and one of them had the lowest formulation standard score.

Table 14. Theory of Mind, "Raisins Box" and "Sally-Anne"
Frequencies of Passed and Failed Responses
Percentage for Total Scores

	ASD N = 14 Tot = N x 2 = 28		LD N = 12 Tot = N x 2 = 24		ND N = 12 Tot = N x 2 = 24	
Tasks	Passed	Failed	Passed	Failed	Passed	Failed
"Raisins Box" (%)	12 (85.7)	2 (14.2)	11 (91.6)	1 (8.3)	12 (100)	0 (0)
"Sally-Anne" (%)	7 (50)	7 (50)	11 (91.6)	1 (8.3)	11 (91.6)	1 (8.3)
Total (%)	19 [a] (67.8)	9 (32.1)	22 (91.6)	2 (8.3)	23 (95.8)	1 (4.1)

[a] total passed: ASD < LD and ND, ND = LD, $p < .05$

Chapter 4: Discussion

In this study I assessed the narrative abilities of autistic children relative to language impaired and normally developing children, matched on chronological age and receptive language. This assessment was achieved by comprehensive analysis of stories and personal accounts based on the comparison of story grammar, selected word use and functional understanding of storytelling practices among the three groups. Notably, all 14 ASD children completed the protocol despite their severe deficit in social interaction. Thus it appears that they all were willing to engage in conversation and were quite able to sustain short dialogues. This observation is in agreement with the study of Yirmiya et al., (1992) in ASD children in which the authors state, "Most children were able to give examples from their lives about times in which they had experienced the various feeling states " (p. 143). In addition, all children showed the ability to organize fictional and personal happenings into event schemas, although the quality of the narrative production varied among both ASD and LD children.

The discussion will first describe the similarities found between ASD and LD children's narratives. Then, I will show how the study successfully identified the features that appear specific to the ASD children's narratives.

Overall, autistic children's narratives were quite similar to those of non-autistic children with comparable language impairment and to normally developing children in terms of structural elements and factual knowledge, a finding that is in line with recent investigations of the narrative performance of autistic children (Capps et al. 1998, 2000; Tager-Flusberg, 1995; Tager-Flusberg & Sullivan, 1995). The comparable strong effect of narrative canonical structure in all three groups is illustrated by the presence of similar

story grammar and the equivalent ability to express structural relations in discourse. In contrast, Loveland and collaborators (1989) reported disabilities in autistic children compared to Down's syndrome children in the use of referential terms considered to be involved in the quality of structural organization of the speech. The authors asked autistic children to explain to a naive listener how to play a simple board game, and then described how these children differed from Down's syndrome by being less informative, including irrelevant material and not adjusting their answers to what their partner knew or needed to know. For example, they omitted telling how the game began or ended. The lack of story ending was also observed in autistic children's stories in this study. Thus, even though the children here and in Loveland's study had factual knowledge about the game, the stories, or their personal experiences, ASD children did not provide the necessary referential information in order for the listener to follow their discourse. In the context of this research, I did not create a code for referential terms, as did for example, Loveland et al. (1989) and Tager-Flusberg (1985), although referential elements were part of the qualitative coherence measure.

Merritt & Liles (1987) indicated that story grammar analysis fails to distinguish between non-mentally retarded LD and normally developing children. My study confirms and extends this observation by showing that none of the three groups could in fact be differentiated based on linguistic attributes such as story length, measured by number of words, story hierarchies and frequency of selected cohesive ties in either story retelling (immediate and delayed) or picture story generation. Contrasting with this observation is the study of Tager-Flusberg (1995) eliciting narratives from a wordless picture book, which revealed shorter and less complex stories for autistic children compared to

mentally retarded children matched on chronological and verbal mental age and to a group of younger normally developing children matched on mental age. I believe that the discrepancy in story length between these two studies may stem from the difference in overall IQ level and in verbal mental age being higher in my sample of autistic children.

Narrative enrichment devices such as evaluation, exclamations, audience hookers, and repetitions for emphasis provide a rich narrative that holds the attention of the listener and gives the complete structure of the story. Unexpectedly, I found that the number of narrative enrichment devices did not consistently differ among the three groups (see personal event paragraph for more details). However, many ASD and LD children used these devices in a rigid and inappropriate manner. This suggests that ASD and LD children differ from ND children in the use of narrative enrichment devices from a qualitative rather than a quantitative standpoint, most likely related to the ASD and LD children's known pragmatic problems (Baltaxe, 1977; Bishop & Adams, 1989; Prutting, 1982). Typical pragmatic impairments recorded in ASD and LD children with semantic-pragmatic disorder include pedantic style, odd prosody, overly detailed discourse, bizarre topics, inappropriate and intrusive questions, highly scripted stories incorporating verbatim pieces of TV shows. These behaviors were usually more marked and pervasive in the ASD children's speech. Of note, Merritt and Liles (1987) have previously emphasized the impact of TV on narrative style and content in children with language disorders.

As Sleight (1985) observed in LD children, I found that many LD and ASD children gave details that were less relevant than the ND children, presumably due to their language-related difficulties. However, as anticipated, ASD children included

statistically significant fewer social components (e.g., parents, friends, relatives) in their accounts compared to the two other groups. This was exemplified by the fact that many ASD children could not adjust the amount of information they were supposed to provide to the listener; some gave too much while others gave too little, which is consistent with the description made by Bishop & Adams (1989) of conversational characteristics of children with semantic-pragmatic disorders.

Like story grammar analysis and the use of narrative enrichment, the use of mental states is another narrative feature that appears similar among the three groups of children. In my study essentially two types of mental states were identified, cognitive (e.g., think, know, guess) and affective (e.g. sad, happy, scared). This finding corroborated that of Tager-Flusberg (1995) but diverged from that of Baron-Cohen et al. (1986) that showed that autistic children were significantly less likely than either Down's syndrome or normal children to include mental states in their discourse. It also contrasted with the results of an earlier study of Tager-Flusberg (1992) in which the author found a paucity of cognition terms in the spontaneous speech of young autistic children. Overall, across all groups, the children enrolled in this study used relatively few mental states, which, in addition to the small sample of subjects, may have reduced any significant differences among groups.

One reason for the apparently normal narrative length (i.e., number of words) and basic structure (i.e., story grammar) in ASD and LD reported here, as well as in the use of selected narrative elements such as cohesive markers, narrative enhancers and mental terms, may be the fact that these children may have learned them by rote. Indeed, since the ASD and LD children's overall cognitive level was not below the average range, and

since they exhibited intact verbal memory, as well as having been exposed for several years to storytelling practices in family and school settings with or without remediation, I can assume that they have learned to use some of these linguistic features. Although this view is plausible I am aware of the fact that it should be advanced cautiously since it is difficult to assess the exact role of each of these frameworks such as the type of remediation strategy the children received, and that autistic children's learning may be limited to only a superficial modeling-type of ability of these devices without a genuine understanding of their influence on their listener's attention (Loveland & Tunali, 1991). This may explain the dichotomy found in the profiles of ASD and LD children, who showed no difference in number of causal markers expressed, but yet manifested an impaired inferential and causal understanding of connected speech (e.g., story comprehension).

The similarities found among the groups in terms of canonical story elements stresses the fact that story schema is only one aspect of children's narrative production and subsequently raises the issue of the use of a method that can only partially capture the essence of abnormalities in narrative practice expected in ASD and LD children. For example, story grammar can record missing elements or quantity and relevance of details. Yet, this type of structural narrative analysis is not directed toward the understanding of the social value of telling stories.

Thus, to learn about the features of narrative expression that lead to the perception of inappropriateness upon listening to ASD and LD children's stories, I went beyond the finding of comparable story schema and examined whether ASD and LD children were orienting their production around a main goal including a high point, that is the climatic

moment of a story, which is generally marked by evaluation devices. I found that "high-point" analysis was a successful means to differentiate the stories of ASD from LD and ND children and to identify deviant narrative aspects possibly specific to autism. "High-point" analysis focuses more on story meaning and, like Roth and Spekman (1986), I noted many instances of structurally intact stories according to story grammar that were clearly lacking natural story flow and relevance from the listener's point of view, probably due to the children's peculiar pragmatic characteristics (e.g., dysfluency, odd prosody, bizarre theme).

Thus, I proposed that the consistent absence of high point in ASD stories, found across tasks (SR, PS, PE), might be in part responsible for the perception of atypical stories reflected in the lower overall narrative score in ASD. I interpreted this finding as a difficulty in grasping the story as a representation of a meaningful event. In line with Dunn's description of the discrepancy between normal structure and deviant story gist (Dunn & Sebastian, 2000), this study showed that, by not organizing their stories as an overall topic around a goal, the ASD children usually "missed the point" in their personal accounts. Furthermore, ASD children's significantly lower scores on resolution, story type (PS1), ending (PS2), coherence and presence of goal showed that these children usually produced very highly descriptive events while the other children constructed goal-oriented stories. In agreement with Capps, et al, (1998) description, the narrative productions of ASD children appeared impoverished, without extended relevant elements, and also less captivating from the listener's standpoint.

The constant lack of high point in ASD children together with fewer resolution and ending markers in comparison to non-autistic children with comparable language

impairment may be related to their pervasive early deviant social behavior. These children seem able to learn how to tell stories but do not understand why we tell them. Although autistic children demonstrate an ability to identify and match emotions and mental states (Hobson, 1991), they remain significantly impaired in meta-representation processing and understanding of the causal relationships of emotions; again, although one can teach autistic children to pass a "theory of mind" task (Baron-Cohen, 1997), they will not be able to generalize that skill to other related activates such as natural conversational practices (Mundy, Sigman & Kasari, 1993).

The uneven pattern of results of ASD children on the two "theory of mind" tasks with lower scores on the "Sally-Anne" task contrasted with the even profile of LD and ND children revealed that ASD children were specifically impaired in the task requiring representational ability about people's behavior and intention while they successfully pass the less figurative false belief "Raisin Box" task (Baron-Cohen, et al. 1986). These results imply that the development of a "theory of mind" may be related, through similar underlying psychological processes, to the quality of the children's narrative skills (Bruner, 1986, 1990).

Several authors have suggested that autistic children may lack a culturally based understanding of narrative, illustrated by their limited involvement in the co-construction of a shared conversation trajectory through the verbal channel and their profound difficulty in exchanging meaning and making use appropriately of conventional knowledge (Bruner & Feldman, 1993; Loveland &Tunali, 1991, 1993; Tager-Flusberg, 1993). However, another suggestion is that autistic individuals create their own meaning, but do not participate in the cultural meaning of social groups and that some high-

functioning autistic people like Temple Grandin or Donna Williams may achieve some level of awareness of people's social attitudes using different means, different underlying psychological processes. A series of published first accounts of autistic children and cases studies (Cesaroni & Garber, 1991; Millward, Powell, Messer & Jordan, 2002; Volkmar & Cohen, 1985) exemplifies this alternative approach (Bemporad, 1993; Fleche, 1997; Powell & Jordan, 1993; Tantam, 1988).

In addition to integrating "high-point" analysis into story grammar, I also include different types of narrative tasks (i.e., retelling and telling fictional stories and personal events) to create, and compare among the three groups of children their narrative profiles and assess the possible effect of task on narrative performance. In theory, narratives (e.g., SR, PS) include opening and closing and orderly organized units around a goal, in a monologic manner, while conversation about events is a dialogic activity requiring pragmatic skills such as turn taking to monitor exchanges through verbal and non-verbal feedback. Thus, like Loveland & Tunali (1993), I expected that, in contrast to ND children, LD and ASD children would exhibit different performance patterns across the narrative tasks, relative to the cognitive and social demands embedded in the tasks.

Performance in the story-retelling task (SR), measured by standardized scores and story grammar analysis, was comparable among the three groups. The picture storytelling task (PS) used in this study differed from story generation in previous studies (puppet show, story stem, wordless picture book) in that the effort required from the child was much greater here. The child was asked to initiate and create two original stories from a black and white picture, representing respectively a futuristic and an old time scene. Chi-square analyses of the presence of narrative features reported a distinctive pattern of

significantly lower scores in the ASD group for high point, resolution, coherence, goal, type (PS1) and social components (PS2). These differences underscore the failure of ASD children to construct complete, rich and meaningful fictional stories. Remarkably, while the numbers of cohesive temporal and causal markers were comparable among the three groups, the stories of the ASD children were coded as less coherent. Coding the quality and the errors may help clarify this inconsistency.

In ASD children, a lack of coherence in their narratives was observed across all three narrative tasks. Relevant to this observation is the work of Hudson and Shapiro (1991) in which the authors claimed that one must have knowledge about the event (i.e., familiarity) in order to produce a narrative and that the event topic exerts a significant effect on the narrative structural cohesion, "the use of cohesive device was strongly influenced by the topic of the narrative" (p.125). As obvious this point seems, children are not always asked to produce narratives about events they know about, and not all events carry the same emotional weight, such as a visit to the hospital (PE1); most of the children of the three groups, when asked to elaborate on their visit to the hospital, generated a poorly constructed narrative. It must be indicated, however, that this specific question was one of the first in the interview and thus the potential unease of the children at the beginning of the semi-directive interview setting may have impacted the scores.

Aside from the knowledge of the event, the cognitive effort is another known factor that influences the coherence of a narrative (Hudson & Shapiro, 1991). The assumption is that narrative cohesion depends on the effort the child has to put into the translation of event knowledge into appropriate narrative forms. In the present study, the three selected tasks were of increasing levels of cognitive effort: in story recall, the child

was provided with a full narrative model; in picture storytelling, the child could make use of TV, books, and other available scripts; and in personal events questions, the child had first to understand the experimenter's inquiry, then find an event that matched the question, reminisce about the experience and translate it into a meaningful narrative. Moreover, as far as personal memory is concerned not all personal event topics are equivalent, as some were routinized (birthday), some were unique events (first day at school), some were neutral (last weekend), and some were affective (happiest event).

Nelson (1986) proposed that, before an event can be recalled and retold in canonical narrative forms, young children's memories are represented in script-like formats, spatially and temporally organized sequences of actions around a central goal or act. Later on, cognitive development and increased experiences lead to more complex and organized narrative formats that will guide recall, support discourse, and allow the child to infer and make sense of events in the world. Consequently, it has been postulated that a less coherent story would be less well-remembered.

Given the aforementioned notions, I wondered whether the narrative coherence would depend upon the event topic and therefore I conducted a narrative analysis of personal event by topics. This analysis confirmed that, as in ND children from the literature and from this work, the organization of personal narratives produced by ASD and LD children was affected by the topic of the events recalled and that greater coherence was found when there was less translation from knowing to telling. Indeed, the narrative quality improved when the children were familiar with the topic and when the event was experienced around a routine with a consistent chronological sequence such as birthdays and Halloween (Fivush et al., 1992, 1995). Conversely, ASD children tended to

give less coherent and goal-oriented narratives for unique or non-routinized events that required the most translation from knowing to telling, such as saddest event or first memory. Curiously, the answers of the ASD children to the question: "Tell me, what did you do last weekend?" also obtained a significantly lower score on coherence compared to LD and ND children, which may be related to the poor quality of the orientation (e.g., time, place) and the difficulty for ASD children to initiate and elaborate spontaneously on their life experiences.

According to Farrar and Goodman's argument (1990) less coherent events would be less encoded into autobiographical events and thus more difficult to recall. They documented that children generally recall more about scripted events than about deviation events. On an average basis, ASD children produced fewer and poorer narratives about personal experiences and gave more "no response" or "off topic answers" than LD children who took refuge in the "I don't know" response. This pattern was especially pronounced for PE 5 to PE 8, which are all unique (e.g., tell me about the first time you went to school) and highly emotionally charged (e.g., tell me about the saddest event of your life). Also, while LD children were often helped by the experimenter's scaffolding and prompting, the ASD children were much less so. Moreover, interviews conducted with autistic children's parents enabled me to provide further evidence of the limited spontaneous conversations of the ASD children about their personal life experiences.

These findings raise the question as to how qualitative differences in narrativization of experiences impact on event memory. Retention of personal experiences has been related to the use of evaluative devices. Narrative evaluation,

defined as interpretative and emotional aspects added to a narrative, influences the retention of an event. In ND children, the acquisition of high point and evaluation are linked (Bamberg & Damrad-Frye, 1991; Hudson & Shapiro, 1990; Labov & Waletsky, 1967). So, why were ASD children's stories missing a high point while they did not differ in the number of evaluations? First, a finer-grained coding for evaluation devices such as that used by Reilly and collaborators (1990) may shed light on more subtle differences and offer more detailed comparison of the use of evaluative devices between LD and ASD children. In fact, the coding system applied in this research originally comprised three qualitative categories (i.e., scripted, physical, causal evaluation); however, for statistical purposes and due to the small frequency of some variables and small samples of children, these categories had to be collapsed into a dichotomous variable (i.e., presence vs. absence). Remarkably, none of the 14 ASD children's evaluations was coded as causal, and their evaluations were often perceived as formulaic expression instead of real intention to enrich the story for their listener. Second, the discrepancy in ASD children between high point and evaluation may be related to other typical uneven developmental patterns (e.g., visual higher than verbal reasoning) reported in these children and which, presumably, result from a weak central cognitive and social coherence (Frith, 1989). From my point of view, it seems that autistic children do acquire the skill of using enrichment devices but lack its discourse function. Alternatively, this unexpected dissociation between high point and evaluation may be accounted for by the same explanation proposed by Tager-Flusberg (1995) on rote learning of mental states in ASD children.

Taking into consideration the fact that self-concept is at least in part constructed from narratives about personal experiences (Bruner, 1987; Budwig, 1997; Daiute & Nelson, 1997; Miller, Mintz, Hoogstra, Fung & Potts, 1991; Nelson, 1995; Polkinghorne, 1991), it seems advisable for autistic children and their families to enhance meaningful conversation, to try to share minds in order to preserve the richness of their autobiographical memory, and not limit therapy to behavioral techniques focusing on superficial changes in their communicative discourse. Dunn (1997) proposed strategies to facilitate and enhance meaning of conversation and shared experiences, by teaching autistic children to find for themselves the goal of their narrative and to improve their comprehension of relationships by linking critical parts of stories.

The next issue related to narrative and self, concerns the autistic child's deviant emotional appraisal, defined as a non-analytical way of knowing based on direct perception of a situation in terms of its meaning for the self. This aspect of emotion processing has been evidenced and characterized by Loveland (1991) and labeled affordances. In her work, the author demonstrated that autistic children were unable to take advantage of the social affordances of situations to make sense of them and consequently to develop meaningful behavior. In the context of this framework, it is proposed that personal meaning is created out of objective facts through emotional appraisal, including curiosity, anxiety, anger, etc. Accordingly, Frith (1989) has suggested that the core difficulty in autism may be an inability to search for and failure to recognize meaning, which I believe is reflected in autistic children's "specific" atypical narrative practices.

Finally, autistic children show deficits in developmental tasks that are typically learned and co-constructed in interaction with others. This represents the foundation for using the autistic syndrome as an experimental model, a micro-culture, for examining the relationships between narratives, personal event memory and self-concept. Yet, while many developmental psychologists have tested the transactional aspects of their model, most of the research on autism has focused on only one side of the interaction, the child's behavior. A few studies on interaction and communication in autism were conducted with autistic preschoolers and older children. However, these studies did not directly investigate the profound effect of the autistic children's disturbances in reciprocal interaction on others' attempts to engage with them socially (Kasari, Sigman, Mundy & Yirmiya, 1988; Konstantareas, Mandel & Homatidis, 1988, Konstantareas, Zajdeman, Homatidis & McCabe, 1988; Watson, 1998; Wolchick, 1983). Nor have any of these studies assessed in depth the implication of these verbal and non-verbal communication deficits on the acquisition of cultural conventions embedded, for example, in storytelling rituals. A natural next step to the present study is to determine the relationship between the conversational styles of the parents of autistic children and their child's narrative ability. From the literature on parent-child conversation profiles, two main parent cognitive styles have emerged, namely, paradigmatic and narrative (Bruner, 1986; Engel, 1986; Fivush & Fromhoff, 1988; Reese & Fivush, 1993; Tessler & Nelson, 1994). Based on this nomenclature and on my preliminary data on parent-child conversation, I predict that parents of ASD children will exhibit a more directive style (i.e., paradigmatic: direct detail inquiries, forced choice questions) whereas parents of LD and ND children will exhibit a more elaborative style (i.e., narrative: evaluative inquiries, open-ended

questions). A future transactional approach (Pellegrini & Galda, 1990) would complement a study conducted by Landa, Folstein and Isaacs (1991) describing spontaneous narrative production of parents of autistic children. The authors remarked that stories of parents of ASD children resemble their children's stories, in that they are poorer, less complete, less complex, and less coherent than those of parents of ND children.

From my point of view, parents' conversational styles, discourse contingencies, and prompting techniques are interrelated issues with regard to autistic children. In the present work I have not formally analyzed these aspects, although I do have preliminary observations relevant to these questions. For example, like Hurtig Ensrud and Tomblin (1982), I found more conversational discontinuations in the speech of autistic children when the experimenter did not ask questions back to the child. This suggested that the children were inept at maintaining the conversation without prompting (scaffolding). In addition, autistic children appeared to use questions as their main device to initiate and continue conversation. Also, in agreement with Curcio and Paccia (1987), ASD children were more likely to respond to direct questioning than to open-ended questions, which was not the case for LD children. These atypical conversational behaviors contributed to the oddity of dialogic encounters with autistic children and were frequently accompanied by peculiar non-verbal behaviors such as variable eye gaze, inconsistent face-to-face posture, finger stereotypies, odd prosody or high voice pitch. Since no videotaping was available, the experimenter's notes about these behaviors were incorporated in the child's file after testing for further descriptive purpose.

Following this last methodological comment, this study calls for natural follow-up studies including second order "theory of mind" tasks and a narrative topic category to examine in more details the kinds of experiences that constitute the autobiographical memory of autistic children (Grandin & Scariano, 1986); along with self-description (Hobson, 1990). As for the parents' interview I plan first to use to it to check the children's' memory accuracy and second to code their conversational style and relate it with the child's narrative performance, personal memory richness and the duration of the infantile amnesia period. Also, to reduce variability within the ASD and LD groups, in my future studies, I might restrict the analyses to children with Asperger syndrome and semantic-pragmatic disorders, respectively.

Results of this study suggest application for work with ASD children including the reinforcement of procedures to facilitate and increase meaningful conversation with at home and at school together with the enhancement of appropriate and flexible use of evaluation devices using real-life scenarios (e.g., a trip, a loss, a birth) and fictional material (e.g., books, movies). These procedures would use intact canonical story schema and cued memory (Boucher & Lewis, 1989) and would be integrated, for example, into social communication and executive functions remediation.

Conclusion

This study showed that high-functioning verbal autistic children compared to non-autistic children with comparable high-order language disorders (e.g., formulation and discourse organization) and to normally developing children, all matched for chronological age and non-verbal IQ, were specifically impaired in their ability to narrate

fictional stories and personal experiences in a coherent and meaningful form, including a story high point. As such, their stories were perceived as impoverished and incomplete renderings, suggesting that they lacked the ability to place the events in an explanatory context. In light of ASD children's conversation abnormalities and their limited ability to negotiate understanding of experiences, I showed that the narrativized form of personal accounts in autistic children is defective in the absence of shared experiences. This approach is in accord with Baron-Cohen's (1988) and Tager-Flusberg's (1995) position about the existence of a strong relationships between "theory of mind" and pragmatic language (e.g., conversation and narrativization) based on similar underlying representational knowledge and understanding of people's mind. This finding may have implications for the acquisition of autobiographical memory, yet evidence is only indirect at this stage of the study (Harley & Reese, 1999).

These results on narrative skills in autism show that, along with their deficits in joint attention, impairment in theory of mind, and weak central coherence, autistic children exhibit difficulty participating in the scaffolding conversational framework for the grasp and adequate use of the narrative genre. This suggests that the autistic child's failure in acquiring the "level of facility of language" required for integrating verbal representation of another person's behavior or thought may influence the quality of their narratives.

The study confirms also the findings reported in the literature on language (including multiple subtypes) and learning disabled children's narratives (Feagans & Short, 1984; Liles, 1985; Roth, 1986) in that the LD children exhibited difficulties at the formulation and organization level, their spontaneous productions were less explicit or

informative about setting conflicts and probably less complex. However their stories were meaningful and organized according to the canonical story schema, around a main goal and high point.

Story grammar analysis was not sensitive to the kinds of narrative abnormalities presented by ASD and LD, presumably because of the specific deficits exhibited by ASD children coupled with spared or above average cognitive skills. However "high-point" and coherence analysis led to the identification of specific deviant aspects of ASD children's narratives. The patterns of narrative profiles obtained from the three narrative activities confirmed the literature about the effect of narrative task and topic event on story organization. The concentration on unique and routinized real-life experiences may help us to understand how these events become transformed into meaningful and shareable narratives, a prerequisite for sharing minds.

Appendices

1. Testing Protocol

1. STANFORD-BINET:
   (1) Vocabulary
   (2) Comprehension
   (3) Pattern Analysis
   (4) Copying

2. PPVT

3. WRAML: (Immediate recall)
   (1) Fishing Story
   (2) Job Story
   (3) Recognition (Job Story)

4. PICTURE-STORY 1 (Moon)

5. WRAML: Delayed recall
   (1) Fishing Story
   (2) Job Story

6. PICTURE-STORY 2 (Paris)

7. CELF:
   (1) Formulated sentences
   (2) Listening to Paragraphs
   (3) Semantic Relationships

8. "THEORY OF MIND" (TOM:
   (1) Raisins box
   (2) Sally-Anne

9. INTERVIEW (Past Events)

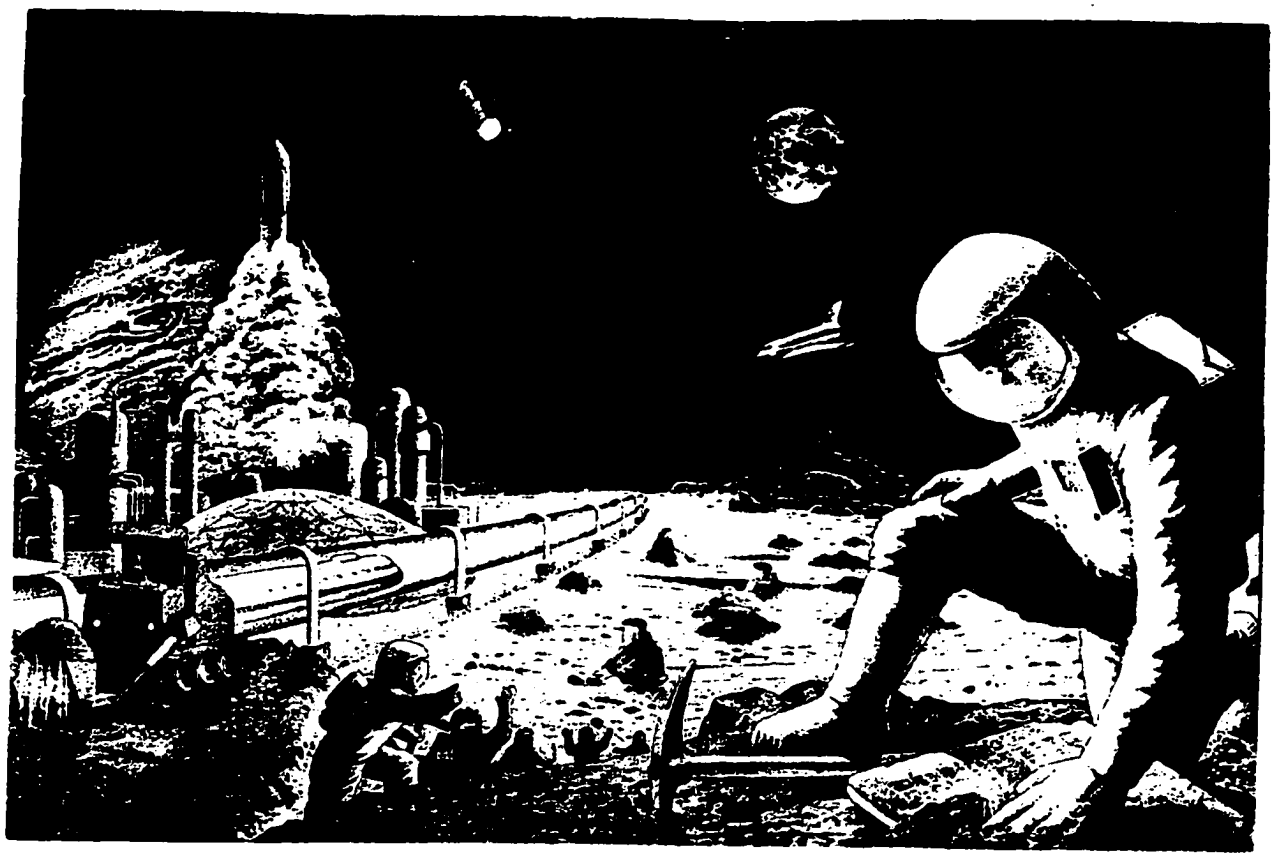
10. MOTHER/FATHER-CHILD CONVERSATION (Specific Past Event)

11. MOTHER/FATHER INTERVIEW

12. QUESTIONNAIRES:
   (1) DSM IV
   (2) Rapin's history form
   (3) History form
   (4) WADIC
   (5) Consents Forms

2. Picture story-telling

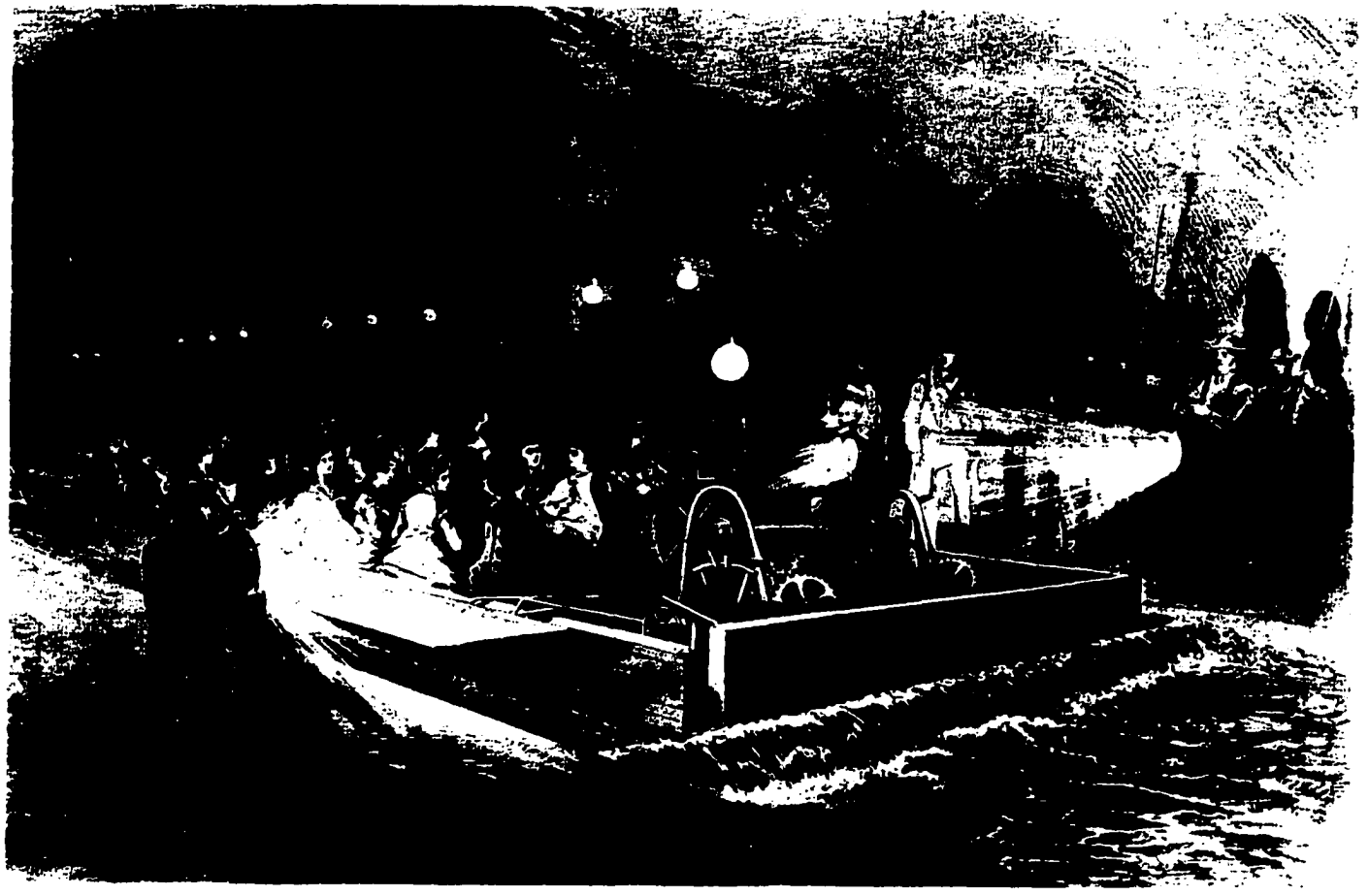
PS1. Adapted from the Test of Written Language-TOWL.



PS2. Tourists in the Paris sewers,

Illustrated London News, 29 January 1870.

Girouard, M. (1985).



3. "Theory of Mind"

The "Raisins Box" task

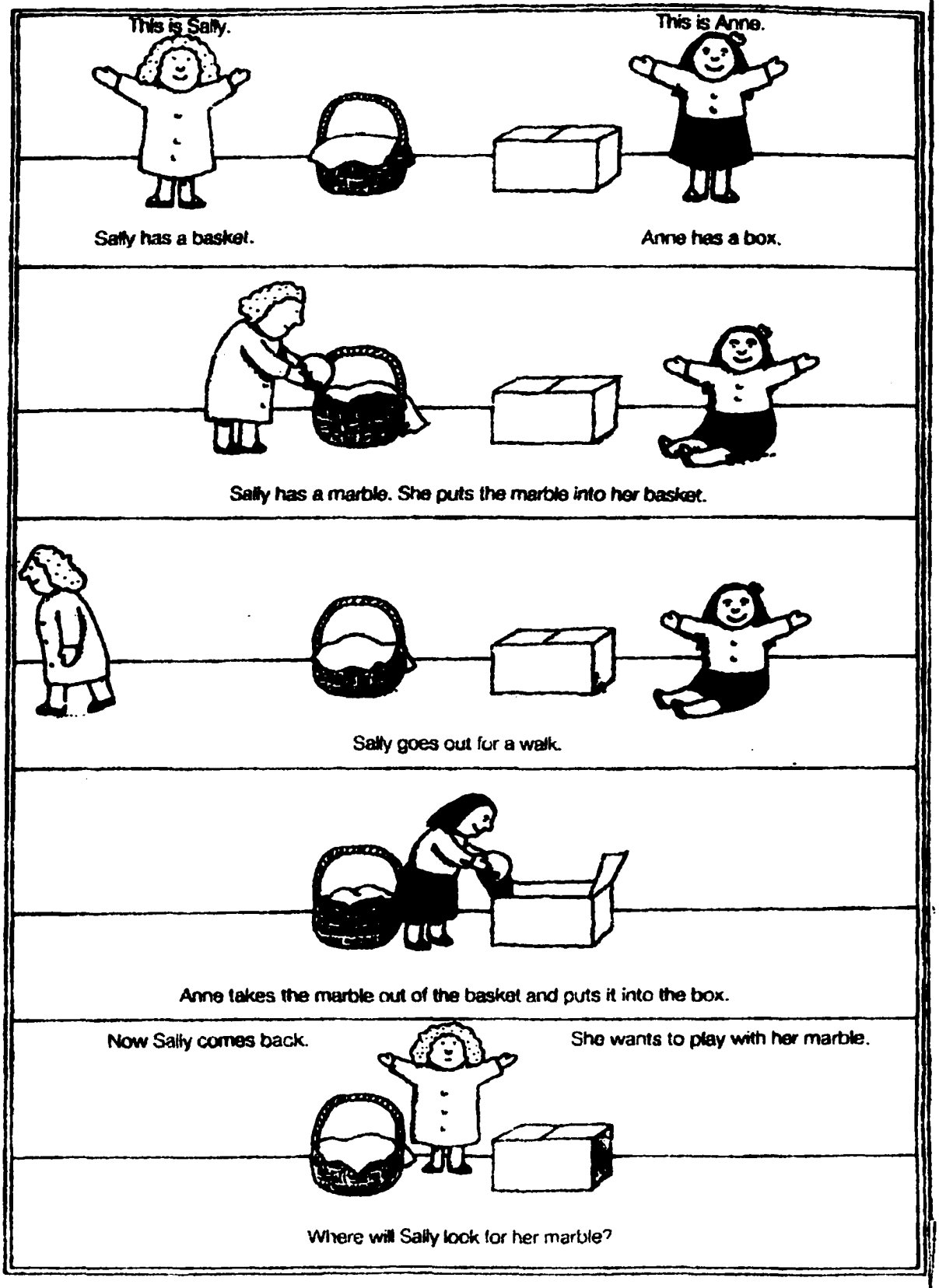
E: Look here's a box. What do you think is inside this box?
C: [raisins]
E: What do raisins look like?
E: Let's look inside now; you open it, what is inside this box?
C: [crayons]
E: Really, that's funny! Well let's put them back again. Can you close the box, so that it looks just like you first saw it, when I first put it on the table?
E: Remember when you first saw the box, at the beginning, when it was closed, what did you first think was in the box?
C: ---
E: why did you think that?
C: ---
E: Remember what did you say was inside, when I first showed you the box, when it was closed?
C: ---
E: Why did you say that?
C: ---
E: If we ask your Mom/Dad, she/he did not looked inside the box, lets keep is closed, like this , so you can't see inside, and we ask her/him "what's inside the box?"
E: What will she/he first think is inside the box?

If C is correct
E: Why will she/he think that?

If C is incorrect
E: How will she/he know?

E: And what is really really inside the box?

The "Sally-Anne" task



4. Interview about Personal Events

Child's protocol

Hi, my name is Sylvie, and today we are going to spend some time together talking about what you like to do, and what you remember from the time you were little. Also, I am going to read you stories and ask you to tell me stories.

You need to know that at any time if you want to stop the interview or if don't want to answer some questions, you just let me know and we will stop or do something else. All right, are you ready for some questions?

1. Short-term memory

Do you remember my name?

2. Warm-up question

2.1. Can you tell me how you did you get here today?
2.2. Is this the first time you are coming here?
2.3. (if not) Do you remember when you came here for the first time?

3. Past memory related to the interview context

3.1. Do you remember who did you see? What did you do?
3.2. Did you like it? Were you scared?
3.3. Have you ever been in a hospital before? When? For what? With whom?

4. Routine question

4.1. What do you usually do in the morning?
4.2. What time do you get up?
4.3. What do you eat for breakfast?
4.4. How do you get to school (camp)?
4.5. What do you usually do after school (camp)?

5. Scripted event

5.1. Do you go to a restaurant?
5.2. What happen when you go to a restaurant? What happen first? and then what happen? and then?

6. Social activities

6.1. Do you go to school on weekends?
6.2. What is your favorite activity during the weekend?
6.3. Do you see friends on weekends?
6.4. Do you have a best friend at school? When did you become friends?
6.5. Tell me, what did you do last weekend?

7. Autobiographical memories

7.1. OK, so now I know a little bit more about you, but I would like to ask you some other questions, like: what do you usually do for the 4th of July? With whom do you celebrate it?
7.2. What about Halloween, what did you do last year?
7.3. What costume did you wear, was it scary?
7.4. Where did you go?
7.5. What is the first Halloween party you remember? How old were you? And the next one do you remember? And the next one? etc.
7.6. Which one was your best Halloween party? Why? How old were you? What did you do?

8. Autobiographical memories

8.1. Wow, this sounds like fun, and what did you do for your last birthday party?
8.2. Who came? Did you get presents? A cake?
8.3. What was you favorite thing at this party?
8.4. What is the first birthday party that you remember?

9. Autobiographical memories

9.1 Where do you live? In a house or an apartment?
9.2. Did you always live there? Did you ever change rooms? Was your room always the same?
9.3. (if not) Do you remember when you moved? How did you feel about moving?

10. Family oriented autobiographical memories

10.1. Do you have brothers or sisters? How many?
10.2. What do you like to do with them? How do you get along with her, him, them?
10.3. Can you tell me about something really nice that happened to you and your sisters, brothers?

11. Autobiographical memories

11.1. Now I would like to know if you also remember things that happened when you were very little. Do you remember the first time you went to school? Or your first day in Kindergarten?
11.2. Who went with you?
11.3. Do you remember how you felt (sad, scared, happy)?
11.4. Did anyone cry?
11.5. How many teachers were in the classroom?
11.6. Do you remember their names?

12. Autobiographical memories

12.1. Do you remember when you were that little? (show a picture of child at 5)
12.2. How old were you?
12.3. What do you remember about that time?
12.4. I'll help you. What did you like to play with? Who were your friends? What did you wear? What did you like to eat when you were that age?
12.5. Do you remember what made you feel scared when you were little?

13. Autobiographical memories

13.1. What is the most exciting event that you remember?
13.2. What is the saddest event that you remember?

14. Autobiographical memories

14.1. Do you travel a lot? Can you tell me about a special trip when you were little?
14.2. When was that? Where did you go? Who went with you?
14.3. Have you ever been on a plane? A train? Which one do you like the best? Why?

15. Onset of autobiographical memories

15.1. This is a little bit difficult, but we are going to try. What is the first event that you remember about yourself or your family? Try to recall the first story about you.

16. Particular past event

16.1. You know your mother told me about (particular past event), do you remember?
16.2. Tell me what happen?

Parent's protocol

1. Language development

1a. At what age did your child start to speak? What were the first recognizable words?
1b. Did your child talk to him/herself when playing alone or in bed?

2. Conversation about the past

2a. How do you go about talking with your child about past events?
2b. How much do you feel your child enjoys or is interested in these conversations?
2c. Does your child ask questions about the time when he/she was younger?
2d. Does your child ask questions about your childhood?

3. Material souvenirs

3a. Do you retain toys, books, clothes, artwork, or other objects from your child when he/she was an infant or a toddler?
3b. Do you take pictures, videos of your child regularly?
3c. Do you have objects from your childhood in your house?
3d. Does your child take interest in these pictures, videos and objects?

4. Child's past memories

4a. What kind of past experiences does your child remember?
4b. Do you think that your child remembers personal events more, less, or the same as other children?

5. Future talk

5a. When a specific event is coming up -- a party, a trip, a holiday, a visit -- how do you prepare your child?
5b. Let's say your child is going on a field trip and the routine is different, what would you tell him/her?
5c. Is your child usually interested in these conversations?
5d. Does he/she ask questions?

6. Check questions

6a. Which holidays do you usually celebrate with your child?

6b. How do you celebrate his/her birthday?

6c. What is your child's favorite activity at school/ outside school (indoor, outdoor)?

6d. Who is your child's best friend?

6e. What do you usually do on weekends and when you are on vacation? Do you travel a lot?

6f. What do you remember from your child's first day in Kindergarten?

6g. What does your child like to watch on television?

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