Parents' Strategies to Elicit Autobiographical Memories in Autism Spectrum Disorders, Developmental Language Disorders and Typically Developing Children

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Abstract Conversations about the past support the development of autobiographical memory. Parents' strategies to elicit child's participation and recall during past event conversations were compared across three school-age diagnostic groups: autism spectrum disorder (ASD, $n = 11$), developmental language disorders ($n = 11$) and typically developing (TD, $n = 11$). We focused on the prevalence of directives versus enrichment of events. Groups did not differ in number of events, length, and total turns. However, parents of children with ASD produced more direct questions, corrections, and unrelated turns than parents of TD children. Results highlight how parents adjusted their conversational style to their child's communication difficulties to maximize interactions and how these strategies may affect the development of personal conversations.

Keywords Autism · Parent–child conversation · Past event · Recall

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Do you remember when you were little and we took a trip to visit great-grandmother? Do you remember that trip? — Parent talking about a shared past event with their child.

Introduction

Talking with children about the past is a cross-cultural activity involved in the development of autobiographical memories. It is through language and communication that children's experiences are transformed into meaningful personal memories (Nelson and Fivush 2004). These conversations rely on reciprocity and an understanding of other's perspective which are known to be compromised in individuals with autism spectrum disorder (ASD). Specifically, children with ASD are characterized by lack of joint attention, empathy, and impaired reciprocity (Leekam and Ramsden 2006; Mundy et al. 1986) as well as deficiencies in identifying emotions and inferring other's mental states (Baron-Cohen 1988; Happe 2003; Hobson 2005; Klin et al. 2009). Concomitantly, parents of children with ASD report more stress and difficulties engaging their child in enjoyable reciprocal play, and, for verbal children, fewer opportunities to build meaningful conversations (Estes et al. 2013; Hall and Graff 2012; Keen et al. 2007; McStay et al. 2013; Oono et al. 2013; Schieve et al. 2007). In turn, parents of children with ASD may often need to adapt their verbal interactions to their child's social and communication impairments during joint activities (Doussard-Roosevelt et al. 2003; Howlin and Rutter 1989; Watson 1998).

From a developmental point of view, conversational practices emerge from acts of joint attention and synchronous pre-verbal play (Stern 1985; Trevarthen and Aitken

2001). These early social behaviors shape the way parent and child initiate and maintain shared interests. Initially parents have the responsibility to ensure joint attention, but as children acquire the ability to coordinate their focus with others, parents gradually “relinquish responsibility to their children” (Siller and Sigman 2008). The level of social participation is known to be compromised in children with ASD and research in the field has highlighted a relationship between parental responsiveness during play and child language development (Haebig et al. 2013a; McDuffie and Yoder 2010; Naigles 2013; Perryman et al. 2013; Siller and Sigman 2002, 2008). More specifically, increased parental directives for language (i.e., requests for object label) and follow-in comments (i.e., a non-obligatory bid for participation) contingent to the child’s focus of attention have been positively related to children’s rate of expressive and receptive language (Haebig et al. 2013b).

Similar to the development of play, parents are initially responsible for most of the conversation when recalling the past. Studies on parent–child conversation identify two main parent communication styles: *paradigmatic* characterized by direct and repetitive questioning and *narrative* based on elaborative commenting. These communication styles shape the content of children’s narratives (Bruner 1986; Fivush and Fromhoff 1988; Reese and Fivush 1993; Tessler and Nelson 1994). As the child’s narrative skills increase, the parent decreases the amount of structure until the child can independently include all relevant elements in a coherent autobiographical narrative (Nelson and Fivush 2004). This ability draws upon social, emotional, cognitive, and linguistic skills, which are variably lacking in children with ASD (Losh and Capps 2003). As such, parents of children with ASD may provide more guidance during conversations than parents of typically developing (TD) children.

One study found that children with ASD supplied fewer responses to verbal bids from adults or peers than TD children during dinner conversations (Jones and Schwartz 2009). More specifically, children with ASD rejected proportionally more comments than questions or directives. Typically developing children, on the other hand, initiated interactions more often and used comments and acknowledgements more frequently than children with ASD. Research also shows that children with ASD require additional input to maintain conversations and stay on topic (Capps et al. 1998). Taken together, these results suggest that parents of children with ASD may primarily utilize questions in order to provide an obligatory bid for participation rather than elaborative comments to co-construct a coherent event narrative.

Memory research has demonstrated that less coherent stories are less well encoded into autobiographical memory and thus more difficult to recall (Farrar and Goodman

1990). Along the same lines, Nelson and Fivush (2004) have shown that children of narrative parents, compared to paradigmatic parents, produce longer and more detailed narratives. Moreover, in interviews with adults, Crane and Goddard (2008) reported that individuals with ASD in comparison to a control group presented deficits in event-specific knowledge (i.e., personal episodic memory) while maintaining relatively intact self-related information (i.e., personal semantic memory). So far these types of analyses have not been reported in children with developmental impairments.

Current Study

The present study is based on the assumption that children learn to tell personal stories about the past through early play interactions and adult-guided conversations. Here, we attempt to bridge a gap in the literature by examining the conversation styles used in parent–child recollection of shared past events in three diagnostic groups: high-functioning children with ASD, children with developmental language disorders (DLD) and TD children. We included a comparison group of DLD parent–child dyads to help identify the presence of conversation styles specific to autism while controlling for language impairment. Additionally, this may allow us to examine how parents scaffold their conversation based on their child’s diagnosis and, more importantly, their particular social difficulties.

Research has demonstrated the significance of maternal reminiscing style on the development of autobiographical memory in TD children (see Nelson and Fivush 2004 for a review) as well as the effect of mothers’ linguistic input on children’s language development in ASD (Howlin and Rutter 1989; Naigles 2013). However, little is known about verbal exchanges between parents and their children with ASD. While many researchers have focused their efforts on investigating the child’s ability to respond to adult—mostly examiner—bids for participation (Goddard et al. 2007, 2014; Jones and Schwartz 2009; Millward et al. 2000; Nadig et al. 2010; Oi 2010; van Balkom et al. 2010), few have examined the specific strategies used by parents to foster joint reminiscing to facilitate recall. Inspired by the emerging literature on autobiographical memory in adults with ASD (Crane and Goddard 2008; Crane et al. 2010) and in view of the role of autobiographical memories in the construction of self (Hobson 2010; Lind 2010), we tested the following hypotheses. First, we expected parents of children with ASD to use more direct questions and corrections to focus more on memory accuracy than parents of DLD and TD children. Conversely, we predicted that parents of TD children would produce more elaborative questions and comments. Lastly, we hypothesized that

Table 1 Demographic information and IQ measures

	ASD (<i>n</i> = 11)	DLD (<i>n</i> = 11)	TD (<i>n</i> = 8)
<i>Demographics^a</i>			
Child mean chronological age (years; months)	11; 4	11; 1	11; 5
Child age range (years; months)	9; 6–13; 0	9; 10–13; 4	9; 4–13; 7
Child gender ratio (M:F)	10:1	8:3	8:3
Parent gender ratio (M:F)	4:7	4:8 ^b	2:9
<i>Stanford-Binet</i>			
Verbal IQ means (<i>SD</i>)	104.27 (21.43)	111.73 (16.75)	119.91 (11.67)
Non-verbal IQ means (<i>SD</i>)	97.36 (16.06)	97.82 (11.63)	103.36 (11.32)
Composite IQ means (<i>SD</i>)	100.64 (19.91)	105.18 (15.27)	112.55 (8.74)

^a All dyads were middle class and mostly Caucasian (1 African American dyad in DLD group)

^b Both parents included in conversation (turns were combined for analyses)

children with ASD would produce more unrelated turns than DLD and TD children.

Method

Participants

The sample of 38 children included here originated from a previous study on narratives of personal events in high-functioning (IQ >75), verbal children carrying a diagnosis of ASD or DLD (Goldman 2008). The current data on parent–child conversation were collected at the time of this original study and included one parent of each child with the exception of one DLD dyad that included both parents (see “Coding” section). Due to the quality of recording, five tapes were eliminated. Thus, 33 parent–child dyads were grouped based on the child’s diagnostic as follows: 11 ASD, 11 DLD, and 11 TD children matched for chronological age (mean ages: ASD = 11 years 4 months, DLD = 11 years, 1 month, TD = 11 years 1 month) and non-verbal IQ (see Table 1). Verbal and non-verbal IQ were assessed using two verbal subtests (Comprehension and Vocabulary) and two non-verbal subtests (Copying and Pattern Analysis) of the Stanford-Binet Intelligence Scale-IV (Thorndike et al. 1986). No overall differences in verbal, non-verbal, or composite IQ scores were found among the groups.

At the time of recruitment all 11 high-functioning ASD children fulfilled criteria for Autistic Disorder according to the DSM III-R (American Psychiatric Association 1987) and the Wing Autistic Disorder Interview Checklist (WADIC; Wing 1996). The 11 non-autistic DLD children were referred by experienced speech and language therapists. Their semantic-pragmatic disorder (see Rapin and Allen 1998; Rapin et al. 1992 for a discussion) was based on referring clinician’s diagnosis and confirmed by the first

author through clinical assessment and three subtests (Formulation, Listening to Paragraphs, and Semantic Relationships) of the Clinical Evaluation of Language Fundamentals-Third Edition (CELF; Semel et al. 1989). At the time of the study none of the ASD or DLD children were enrolled in therapies using *social stories* techniques per se. Based on parent reports none of the TD children had ever been diagnosed with a developmental disorder, learning or social impairments. All children from the three groups were mainstreamed.

Procedure

At the end of the cognitive and narrative assessments (see Goldman 2008), parents were invited to join their child and discuss past events they had experienced together. Parents were informed in advance about this part of the protocol and asked to think about specific and routine events from early childhood that they would like to talk about with their child. Topics such as vacations, birthdays, or holidays were suggested. The examiner encouraged parents to discuss a range of events and used prompts such as “Anything else you can think of?” when conversations came to a lull. All conversations were audio-recorded.

Coding

All conversations were transcribed and coded for events, length of conversation, and speaking turn type. First, the total number of events discussed and the total conversation length were computed for each dyad. Then, the number of events initiated by each parent and child was tallied separately. Second, to control for variable conversation lengths, both the average length in minutes and the total number of speaking turns were tallied. A *speaking turn* was defined as an utterance initiated by one speaker ending with

the start of the conversational partner's next utterance. When an utterance included a pause longer than 3 s, it was coded as two speaking turns. Analyses also focused on the number of turns taken by each parent and child during these conversations. To control for differences in length, the number of turns taken by each speaker served as the denominator to calculate proportions in the analysis of speaking turn type. In one DLD dyad, both parents participated in the conversation. The turns of each parent were combined and coded as one speaker as they typically reiterated each other's utterances. For the few instances in which the two parents' turns differed, utterances were coded as two separate turns.

Analyses of types of speaking turn centered around (1) parent eliciting strategy and (2) child response choice. Speaking turns were coded as a *question*, *response*, *non-obligatory bid for participation*, or *unrelated turns*. Questions and responses were coded as *direct* (e.g., "What month did we go?" or "Room 1020.") or *elaborative* (e.g., "What else can you tell me about that?" or "Because the ride was scary when the fox kept jumping out and then the big drop at the end. It was a big, big drop..."). Non-obligatory bids for participation included *corrections* (e.g., "No, it was a Friday not Saturday."), *comments* (e.g., "I really liked going to Disney. The Dumbo ride was really fun and your sister enjoyed it too."), and *acknowledgments* (e.g., "Yup. That's right. Your shirt was yellow." or "uh huh"). Unrelated turns were used to capture any off-topic remarks (e.g., in the middle of a conversation about a trip to Ellis Island the parent says "Grandma's back. We're going to visit her today."). To determine if the proportion of unrelated turns resulted from multiple instances or were a product of fewer, but longer unrelated discussions, the number of *unrelated events* was coded. The initiator of each unrelated event was recorded for each dyad as well.

The total number of questions by each individual served as the denominator to calculate the proportions of direct and elaborative questions in order to control for variable frequencies of each speaking turn type. The same method was applied to calculate the proportions of types of responses and non-obligatory bids for participation. A more detailed description of the coding can be found in the "Appendix".

Reliability

Thirty percent of the personal event conversations were randomly selected and coded by the two authors for events, length, and speaking turn types. All coders were blind to diagnostic group status. Agreement between the two authors for events, length and the eight speaking turn types ranged from 90.70 to 99.82 %. All disagreements were

discussed and resolved. In addition, a third coder blind to diagnostic group status and to the study hypotheses coded twenty-percent of the conversations. Agreement between the blind rater and the two authors for all codes ranged from 85.10 to 95.29 %.

Data Analysis

Arcsine transformations were performed on all proportional data (speaking turn types) prior to running statistical analyses. Differences among means were analyzed using either a one- or two-way ANOVA. When multiple ANOVAs were used, a Bonferroni correction was applied (α/n), to adjust the critical α level. When ANOVA showed significant differences, pair-wise comparisons between means were assessed using Tukey post hoc testing. All transformed and not transformed data sets were tested for normality and equality of variance and, should either or both criteria be violated, the appropriate nonparametric test such as Kruskal–Wallis was used. As such, pairwise comparisons were performed using Dunn's procedure with a Bonferroni correction for multiple comparisons and adjusted p values are presented. In addition, to further test the third hypothesis, a regression model was used to examine the proportion of child unrelated turns as predicted by diagnostic group, parent corrections, and parent direct questions. All statistical analyses were performed using IBM SPSS Statistics version 22.0 for Windows.

Results

Conversations were similar across diagnostic groups on several measures. Indeed, none of the seven one-way ANOVAs revealed any differences among the diagnostic groups in terms of the total number of events discussed, the number of events initiated by parent or by child, the length of conversation in minutes, the total number of turns taken, or the number of turns taken by parent or by child (Table 2). However, groups differed in the proportion of speaking turn types (i.e., questions, responses, non-obligatory bids, and unrelated turns), as shown in the summary Table 3 and are individually detailed below.

Questions

To examine differences in the proportion of speaking turns that were questions, a two-way ANOVA with diagnosis (ASD, DLD and TD) and speaker (parent and child) as independent factors was conducted. As expected, this analysis revealed a significant main effect of speaker on the proportion of questions, $F(1, 60) = 230.10$, $p < .001$, $\eta^2 = 0.79$, with parents asking more questions than

Table 2 Comparison (ANOVA) of conversational transaction means among diagnostic groups (standard deviations in parentheses)

	ASD (<i>n</i> = 11)	DLD (<i>n</i> = 11)	TD (<i>n</i> = 11)	<i>F</i>	<i>p</i>
Total number of events	5.09 (3.39)	6.64 (3.80)	5.45 (4.03)	0.51	.61
Events initiated by parent	4.18 (2.82)	5.36 (3.91)	4.00 (2.24)	0.64	.53
Events initiated by child	0.91 (0.94)	1.27 (1.85)	1.45 (2.62)	0.23	.80
Length of conversation in minutes	12.30 (6.43)	12.47 (5.34)	11.07 (9.67)	0.12	.89
Total turns	196.27 (78.85)	184.91 (143.27)	128.82 (91.92)	1.22	.31
Turns taken by parent	99.64 (41.18)	94.91 (73.02)	66.09 (46.52)	1.18	.32
Turns taken by child	96.64 (37.81)	90.00 (70.33)	62.73 (45.49)	1.26	.30

children. This ANOVA failed to reveal any other difference. In light of the above results and to address our first hypothesis, we examined whether parents of ASD children were asking more direct questions than parents of DLD and TD children. Accordingly, we ran a one-way ANOVA with diagnostic group as the between-subjects factor to compare the proportions of direct questions asked by parents. A significant diagnostic group effect was found, $F(2, 30) = 6.765$, $p = .004$, $\eta^2 = 0.231$, and the Tukey post hoc test revealed that parents of ASD and DLD children used a higher proportion of direct questions than parents of TD children ($p = .005$ and $p = .018$, respectively).

Responses

To examine differences in the proportion of responses, a two-way ANOVA with diagnosis and speaker as independent factors was conducted. This analysis revealed a significant main effect of speaker, $F(1, 60) = 207.60$, $p < .001$, $\eta^2 = 0.78$, with children producing a higher proportion of responses than parents. This ANOVA failed to reveal any other difference. Further, a one-way ANOVA with diagnostic group as the between-subjects factor was conducted to examine differences in the proportion of direct responses produced by children. No differences were found among diagnostic groups: $F(2, 30) = 1.51$, $p = .238$.

Non-obligatory Bids

To examine differences in the proportion of non-obligatory bids (i.e., corrections, comments, and acknowledgments), a two-way ANOVA with diagnosis and speaker as independent factors was conducted. This analysis revealed a significant main effect of diagnostic group, $F(2, 60) = 5.57$, $p = .006$, $\eta^2 = 0.95$. Results from the Tukey post hoc test showed that TD dyads produced a greater proportion of comments than ASD ($p = .009$) and DLD ($p = .024$) dyads. This ANOVA failed to reveal any other difference. To test our first hypothesis that parents of children with ASD would produce a higher proportion of corrections than parents of DLD and TD children, we ran a one-way ANOVA with

diagnostic group as the between-subjects factor. Results from this second analysis revealed a significant difference among groups, $F(2, 30) = 8.10$, $p = .002$, $\eta^2 = 0.35$. Tukey post hoc tests indicated that parents of both ASD and DLD children produced a higher proportion of corrections than parents of TD children ($p = .003$ and $p = .007$, respectively). To examine our second hypothesis that parents of TD children would produce a higher proportion of comments than parents of ASD and DLD children, a one-way ANOVA with diagnostic group as the between-subjects factor was again conducted. Contrary to our hypothesis, the test failed to reach significance using the Bonferroni adjusted α level, $F(2, 30) = 4.21$, $p = .025$, $\eta^2 = 0.22$.

Unrelated Turns

A Kruskal–Wallis test was conducted to determine if there were differences in the proportion of unrelated turns used by children among the three diagnostic groups. Distributions of unrelated turns were different among all three groups, as assessed by visual inspection of a boxplot. The analysis showed that the proportions of unrelated turns were significantly different among groups, $\chi^2(2) = 12.85$, $p = .002$. Pairwise comparisons using Dunn's procedure revealed significant differences between children with ASD (mean rank = 24.05) and TD children (mean rank = 9.64) ($p = .001$), but not children with DLD (mean rank = 17.32) or any other group combination. A second Kruskal–Wallis test was employed to analyze differences in the proportion of unrelated turns used by parents. Results showed a significant difference among groups, $\chi^2(2) = 12.24$, $p = .002$. Pairwise comparisons revealed significant differences between parents of children with ASD (mean rank = 23.14) and parents of TD children (mean rank = 9.32) ($p = .002$), but not parents of children with DLD (mean rank = 18.55) or any other group combination. Due to the very low proportions of unrelated turns, additional non-parametric tests were conducted on the raw number of unrelated turns produced by parents and children. The results confirmed our previous findings for children, $\chi^2(2) = 13.47$, $p = .001$, and parents, $\chi^2(2) = 13.54$, $p = .001$, with ASD groups producing more unrelated turns than TD groups ($p = .001$ for both).

Table 3 Mean proportion of speaking-turn types and percentage of sub-types (italics) among diagnostic groups (standard deviations in parentheses)

	ASD (<i>n</i> = 11)		DLD (<i>n</i> = 11)		TD (<i>n</i> = 11)	
	Parent	Child	Parent	Child	Parent	Child
Questions	0.52 (0.20)	0.10 (0.13)	0.58 (0.15)	0.05 (0.05)	0.41 (0.22)	0.03 (0.04)
Direct questions	63.18 % (15.95 %)*	59.50 % (36.02 %)	60.70 % (11.32 %)*	64.14 % (41.86 %)	42.22 % (15.29 %)*	48.99 % (46.45 %)
Elaborative questions	36.82 % (15.95 %)	40.50 % (36.02 %)	39.30 % (11.32 %)	35.86 % (41.86 %)	57.78 % (15.29 %)	51.01 % (46.45 %)
Responses	0.08 (0.06)	0.46 (0.18)	0.03 (0.03)	0.58 (0.15)	0.03 (0.03)	0.49 (0.23)
Direct responses	72.18 % (27.13 %)	66.89 % (18.18 %)	55.00 % (44.16 %)	63.93 % (15.43 %)	41.01 % (38.40 %)	56.27 % (12.83 %)
Elaborative responses	27.82 % (27.13 %)	33.11 % (18.18 %)	45.00 % (44.16 %)	36.07 % (15.43 %)	58.99 % (38.40 %)	43.73 % (12.83 %)
Non-obligatory bids	0.33 (0.15)	0.33 (0.15)	0.36 (0.10)	0.33 (0.10)	0.55 (0.19)	0.47 (0.20)
Corrections	30.26 % (18.46 %)*	13.77 % (13.30 %)	27.97 % (13.10 %)*	17.64 % (3.21 %)	11.20 % (6.79 %)*	8.30 % (7.04 %)
Comments	36.83 % (21.61 %)	37.76 % (20.58 %)	37.61 % (14.21 %)	44.95 % (19.80 %)	57.55 % (19.62 %)	57.66 % (19.37 %)
Acknowledgements	32.91 % (14.77 %)	48.46 % (22.16 %)	34.42 % (18.87 %)	37.41 % (17.84 %)	31.25 % (18.94 %)	34.04 % (22.54 %)
Unrelated	0.07 (0.06)	0.09 (0.07)**	0.03 (0.05)	0.03 (0.05)	0.01 (0.02)	0.01 (0.03)**

* One-way ANOVA, ASD = DLD > TD, $p < .01$ ** Kruskal–Wallis, ASD > TD, $p < .001$

To determine if the proportion of these unrelated turns resulted from multiple instances or were a product of fewer, but longer unrelated discussions, a Kruskal–Wallis test was conducted analyzing the frequency of unrelated events initiated by children. Distributions of unrelated events were different for all groups, as assessed by visual inspection of a boxplot. A significant difference among groups was found, $\chi^2(2) = 18.05$, $p < .001$. Pairwise comparisons revealed significant differences between children with ASD (mean rank = 25.55) and TD children (mean rank = 9.05) ($p < .001$), but not between children with DLD (mean rank = 16.41) or any other group combination.

To evaluate the two-way conversation transactions among the dyads of children with ASD and DLD we used a regression analysis with diagnostic group, parent corrections, and parent direct questions as predictors of the proportion of unrelated turns taken by children. The results of the regression indicated that the three predictors explained 50.3 % of the variance, $R^2 = 0.503$, $F(3, 29) = 9.77$, $p < .001$. It was found that diagnostic group significantly predicted the proportion of child unrelated turns ($\beta = -0.358$, $p < .05$), as did the proportion of parent direct questions ($\beta = 0.421$, $p = .01$).

Discussion

This study examines the ways in which parents from three diagnostic groups engage their school-age children in conversation about the past. Following a socio-constructivist approach, we focused on parents' strategies to elicit shared past experiences and their children's responses. Specifically, we analyzed parent–child transactions and the use of directives, non-obligatory bids, and unrelated turns among the three groups. Our results showed that all parents were successful engaging their child in past event conversations. We found no difference in number of total turns, length of conversation, and number of events discussed among the three groups, which is consistent with previous research (Capps et al. 1998, 2000; Jones and Schwartz 2009). However, the conversational strategies used by each group differed in terms of types of questions, non-obligatory bids and unrelated turns.

As expected given our procedure and the format of the conversations, all parents asked more questions than children. Among parents' questions, the proportion of direct versus elaborative questions differed among diagnostic groups. As hypothesized, parents of ASD children used more direct questions to probe for specific details than parents of TD children. This implies a greater emphasis on external, objective and factual elements of the experience. Jones and Schwartz (2009) note that questions are useful in

garnering responses and gaining the attention of a child with ASD; however, a child's answer to a direct question often ends the exchange rather than promoting a continuous interaction in which the event is co-constructed over numerous turns. Research has shown that children with ASD reject maternal bids for attention more often than TD children (Doussard-Roosevelt et al. 2003) and that of these rejected bids, children with ASD ignore more comments than questions or directives (Jones and Schwartz 2009). Therefore, because parents were instructed to elicit memories from their children, the parents of children with ASD, concerned with their child's performance, may have used more questions to ensure higher response rates. In regard to parents of children with DLD we found that, like parents of children with ASD, they also used more direct questions than parents of TD children to facilitate conversation. Further studies, with targeted content analyses, are needed to move beyond these similarities to unravel potential differences in the content of their direct questions. Parents of both ASD and DLD children might be using the same strategy, direct questioning, but their questions may be eliciting different aspects of the child's personal memory (e.g., concrete facts vs. emotions).

It was found that TD dyads used a higher proportion of non-obligatory bids for participation than the ASD and, to a lesser degree, DLD dyads. To the extent of our knowledge this is the only study to examine parents' use of corrections during parent-child conversations about the past. As predicted, parents of children with ASD used a greater proportion of corrections than did parents of TD children. This finding highlights the more directive style of parents of children with ASD who tended to focus more on specific details and the accuracy of their child's memory than parents of TD children. This communication style may lead to a conversation that more closely resembles an interview than a natural dialogue. Concurrently, this study revealed that parents of children with DLD also used a higher proportion of corrections than parents of TD children. One explanation that should be examined in follow-up studies could be that these parents are focusing their corrections on their child's linguistic output rather than on the content.

In regards to parents' use of comments, contrary to our hypothesis, statistical analyses did not reveal differences among groups using the adjusted α level. However, it is reasonable to expect that a larger study would reach significance and therefore help to disentangle the quantitative similarities found among groups. Overall, the pattern of results shows qualitative differences among the diagnostic groups within the three sub-types of non-obligatory bids. For example, both the DLD and ASD groups produced a comparable proportion of corrections, comments, and acknowledgements; whereas parents of TD children differentially use these three sub-types, with greater

proportions of comments than acknowledgements or corrections. This emphasis on commenting leads to greater co-construction of the experience by allowing parents to bring in their own recollections.

Lastly, ASD dyads produced a higher mean proportion of unrelated turns than TD dyads confirming previous findings (Goldman 2008; Losh and Capps 2003; Oi 2010). Specifically, regression analyses demonstrated that children's use of unrelated turns was predicted by parents' use of direct questions, as well as diagnostic group. Our dyadic coding highlights how parents are following-up their children's unrelated turns during these conversations. In particular, all but one parent of ASD children produced an unrelated turn, whereas only two parents of TD children did. This suggests that the latter group followed up their child's unrelated turn with one of their own and continued to discuss the unrelated event for longer than TD dyads. Additionally, most children with ASD initiated more than one unrelated event, while less than twenty-percent of the children with DLD and none of the TD children did. One interpretation may be that parents of children with ASD may be more willing to continue on unrelated tangents than parents of TD children stemming from the awareness of their children's pragmatic difficulties. This adaptive strategy may carry the risk of disrupting the flow of the conversation and allowing the child to move away from the topic of interest.

For this study, there are several limitations to consider. First, our results are limited by a small, homogenous, high-functioning sample and therefore limit the generalizability of the current findings to a broader autism population. The small samples also limit the power of the study to detect differences among several of the low-frequency categories. As such, future studies with larger samples would help to better disentangle differences and similarities between the two clinical groups (ASD and DLD). Second, the interview format and the instructions given to the parents prior to the conversation may not provide a true naturalistic context for these exchanges. On the other hand, using parent-child dyads is perhaps a more genuine exchange than studies using examiner-child dyads.

A third limitation concerns the inability to directly analyze the effects of parent-child conversation style on the content of autobiographical memory using the current coding scheme. Because of the stressful load of emotion surrounding the life of ASD families, these parents may not be particularly at ease eliciting self-defining memories that are more emotionally charged and connected to other significant personal events. As such they may choose to avoid certain painful topics and instead target everyday factual memories. Follow-up studies should therefore add targeted content analyses to address the influence of parent eliciting strategy on personal memories.

Fourth, the lack of information about parent's habits towards personal conversation and the possibility of carrying traits of the Broader Autism Phenotype (Losh et al. 2008; Piven and Palmer 1999) may affect their interactions. Similarly, no information was obtained on the children's restricted interests that may be responsible for some of the unrelated utterances in the ASD group. Lastly, future studies should examine non-verbal bids and responses using video recordings, as prior research (e.g., MacDonald et al. 2006) has demonstrated differences in non-verbal communicative behaviors between children with ASD and TD children.

In light of Nelson's (1993) findings about the effects of reminiscing style on children's narratives and the development of *self*, our results underline how social and language impairments affect parent-child conversation about the past. This study highlights the need to develop strategies for parents to not only elicit joint participation but, most importantly, to support meaningful self-defining narratives. Parents of children with ASD should be encouraged to create more opportunities to discuss personal experiences and to effectively use non-obligatory bids for participation. These exchanges might help the child to develop a stronger sense of self among others.

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Appendix: Speaking Turn Types

Questions

- **Direct** A close-ended or forced choice question probing for a specific, known response (e.g., "What month did we go?").
- **Elaborative** An open-ended question or request that requires elaboration from the responder (e.g., "What else can you tell me about that?" or "Tell me why you like wrestling so much").

Responses

- **Direct** When a turn directly recognizes something that the initiator has said and responds with a specific, typically short, response (e.g., "Room 1020").
- **Elaborative** When a turn directly recognizes something that the initiator has said and provides a detailed

response going beyond the known factual information about the event (e.g., "Because the ride was scary when the fox kept jumping out and then the big drop at the end. It was a big, big drop...").

Non-obligatory Bids

- **Correction** The correction of the interlocutor's memory; meant to correct factual information (e.g., "No, it was a Friday not Saturday").
- **Comment** A turn that adds new information but does not obligate a response (e.g., "I really liked going to Disney. The Dumbo ride was really fun and your sister enjoyed it too").
- **Acknowledgement** When a response acknowledges or directly recognizes something that the initiator has said (e.g., repetition of the target's words, "Yup. That's right. Your shirt was yellow." or "uh huh.").

Unrelated

- This code occurs when a turn is unrelated to the topic at hand (e.g., in the middle of a conversation about a trip to Ellis Island the parent says "Grandma's back. We're going to visit her today." This would be coded as an unrelated turn as it is irrelevant to the topic of Ellis Island).

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