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ORIGINAL PAPER

Speech Acts During Friends' and Non-friends' Spontaneous Conversations in Preschool Dyads with High-Functioning Autism Spectrum Disorder versus Typical Development

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Abstract In this study, we videotaped two 10-min. free-play interactions and coded speech acts (SAs) in peer talk of 51 preschoolers (21 ASD, 30 typical), interacting with friend versus non-friend partners. Groups were matched for maternal education, IQ (verbal/nonverbal), and CA. We compared SAs by group (ASD/typical), by partner's friendship status (friend/non-friend), and by partner's disability status. Main results yielded a higher amount and diversity of SAs in the typical than the ASD group (mainly in assertive acts, organizational devices, object-dubbing, and pretend-play); yet, those categories, among others, showed better performance with friends versus non-friends. Overall, a more nuanced perception of the pragmatic deficit in ASD should be adopted, highlighting friendship as an important context for children's development of SAs.

Keywords High-functioning children with autism spectrum disorder (HFASD) · Speech acts · Friendship · Peer talk · Pragmatics

Introduction

In typical development (TYP), early peer talk is crucial for pragmatic development. Speech acts (SAs)—the primary illocutionary values conventionally conveyed by utterances as acts—are a crucial component of children's conversational capabilities (Dore 1986). Expressed in real-life social interactions, SAs require knowledge of language as well as appropriate use of that language within the given situation, such as turn taking, requests for clarification, and making clarifications (Adams 2002). Deficient conversational abilities are considered the hallmark of the pragmatic deficit in autism spectrum disorder (ASD; e.g., Bone et al. 2013), but the SAs of this population during spontaneous peer talk has not yet been explored.

In TYP, the first SAs appear in babies in their first year. With increasing age, children's SAs become more diverse, employing more sophisticated forms of expression (Miller-Wetherby and Prutting 1984). For example, at around 32 months, toddlers exhibit SAs such as questioning, claiming, and stating intentions (Snow et al. 1996). By age 3–4 years, the process of acquiring a range of speech actions is almost complete, although some complex SAs such as promise, persuasion, and courtesy are fully acquired only around the age of 9 years (Adams 2002).

Despite researchers' recognition of spontaneous conversation with a peer partner as an important factor in discourse (Plumet and Veneziano 2015), most studies of SAs have examined child–adult dialogue. Some researchers of TYP during preschool found differences between children's peer interactions with a friend as the conversational partner versus their interactions with an acquaintance (non-friend); however, these studies did not specifically investigate SAs (Brachfeld-Child and Schiavo 1990; Dunn and Cutting 1999; Dunn et al. 2002; see review in; Newcomb and Bagwell 1995). Nevertheless, these studies indicated that friend dyads revealed more reciprocal verbal exchanges and coordinated actions, implemented more effective forms of conflict management, and showed a higher frequency of negotiation to reach a solution compared to the non-friend dyads. Considering this higher pragmatic level found

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among friends, higher use of SAs may be expected in conversations between friends than between non-friends.

SAs as Presented in ASD

The pragmatic deficit in ASD—reflected in remarkably deficient conversational abilities—is considered a central characteristic of these children's language deficit (see review in Stefanatos and Baron 2011). Although SAs lie at the core of these pragmatic capabilities, SAs in ASD have almost exclusively been explored regarding child–adult conversation rather than peer talk. Overall, the discourse of children with ASD and an adult partner showed more use of SAs to denote desires and personal needs than SAs related to social-communication goals (e.g., Adams et al. 2002; Jones and Schwartz 2009; Miller-Wetherby and Prutting 1984; Ziatas et al. 2003). For example, Ziatas et al. (2003) compared four groups of children (ages 5:08–8:03 years) during conversations with an experimenter in a free-play situation: low-functioning children with ASD (LFASD; IQ < 70), children with Asperger Syndrome (IQ > 75 and absence of clinically significant language delays), children with a specific language impairment (SLI), and children with TYP. Analyzing their data for the "assertive" category of Dore's (1979, 1986) well-known speech act taxonomy (e.g., evaluation, identification, attribution, explanation, internal states, description), Ziatas et al. found that in comparison to all other groups, the LFASD group demonstrated the highest percentage of assertions in the here-and-now immediate context of the conversation and the lowest percentage of assertions in the broader (interpersonal) context. Compared to the SLI and TYP groups, the LFASD group asserted a significantly higher percentage of object identifications and a significantly lower percentage of assertions involving explanations and descriptions. Moreover, the LFASD group showed a significantly lower percentage of assertions involving internal states and explanations compared to the Asperger group. The assertions of the Asperger, SLI, and TYP groups did not generally differ, except for a higher percentage of internal-state assertions in the Asperger group. Notably, the internal states in both the LFASD and Asperger groups were limited to expressions of desire, with few references to thoughts or beliefs, whereas the SLI and TYP groups showed a higher percentage of references to thoughts and beliefs.

In another study, Jones and Schwartz (2009) performed discourse analysis of children's spontaneous conversation during family dinner, comparing families of a high-functioning child with ASD (HFASD; IQ > 70; CA = 3.5–7.0 years) versus families of a child with TYP. Discourse analysis was divided into communication units by type of reference (a question, request, command, comment, other)

and type of response (rejection, disregard, or approval). The TYP group engaged in significantly more directives and comments than the HFASD group, but groups did not differ significantly on questions, requests, and other bids. Moreover, compared to children with HFASD, the children with TYP initiated and responded more frequently and were more likely to confirm and less likely to ignore other persons, but no significant group difference emerged for response to questions. Similarly, in Adams et al. (2002), children with Asperger syndrome (ages 13–14 years) responded to the experimenter's question as frequently as children with severe conduct disorder, but the quality of their responses and comments was lower and more peculiar than children in a control group.

Lastly, one recent study (using a similar sample) compared the pragmatic deficit (not relating specifically to speech acts) during peer talk in preschoolers with HFASD versus TYP, including examination of the interaction partner's friendship status (peer-friend versus acquaintance) during 10-min. free-play/snack time (Bauminger-Zviely et al. 2014). The main results revealed, as expected, a more intact pragmatic profile in TYP than HFASD, with the HFASD group showing the most difficulty on a number of subscales: little reciprocal conversation, unresponsiveness to interlocutor, and out-of-context utterances (on the pragmatic scale); unusual intonation and stereotypic speech (on the prosodic scale); and unusual eye contact, inappropriate facial expression, and inappropriate gesture (on the paralinguistic scale). Interestingly, only in the HFASD group did friend dyads surpass non-friend dyads on the following key pragmatic capabilities: out-of-context utterances, unresponsiveness to interlocutor, stereotypic speech, and facial expression. Moreover, in both groups, reciprocity of conversation and use of eye contact were better in friends' interactions than in non-friends' interactions, but the HFASD group showed larger effect sizes. Overall, target children showed significantly better pragmatic behaviors in interactions with a friend than a non-friend for 30% of behaviors in the HFASD group ($n = 9$) and for 18.5% of behaviors in the TYP group ($n = 5$). Moreover, friend dyads surpassed non-friend dyads on all conversational quality measures (meshing, assertiveness, and responsiveness), thereby suggesting that friendship may enable children to converse in a more socially complex and co-regulated way. Also, children with higher cognitive capabilities, especially in the HFASD group, demonstrated a more intact pragmatic profile.

The Current Study

The sparse prior research on SAs in HFASD (almost entirely on child–adult talk) appears to indicate that some

but not all SAs are hampered. The current study's major aim was to narrow the existing knowledge gap about characteristics of the pragmatic deficit in ASD by comparing the frequency and variety of the SAs used by preschoolers with HFASD versus their peers with TYP during spontaneous peer conversation. We also investigated differences in SA usage not only according to the conversation partner's friendship status (*friend* versus *non-friend*) but also—for the HFASD group only—according to the partner's disability status (comparing *non-mixed* interactions with a peer who has HFASD versus *mixed* interactions with a peer who has TYP). In addition, we examined the frequency and variety of SA abilities as linked with developmental variables: We tested CA and verbal IQ (VIQ) in both groups, and we additionally tested disability severity in HFASD. We predicted that children with TYP would surpass children with HFASD on both their frequency and variety of SAs. We predicted a specific assertiveness difficulty in HFASD as well as more stereotypic speech among HFASD than TYP. We also predicted more frequent and varied SA use with a friend partner than with a non-friend partner in both groups. The VIQ was expected to associate with better SA in HFASD and with older CA in TYP. This novel comprehensive examination of SAs during preschoolers' spontaneous peer conversation, focusing on the role of different partners (friend/non-friend; TYP/HFASD) while denoting individual differences and trajectories, holds important implications for early intervention related to these children's pragmatic deficit.

Method

Participants

This study was part of a larger study exploring social relationships in preschoolers with HFASD and TYP that received approval from the Israeli Ministry of Education and written parental consent for participation. The original study included 177 children ages 3–6 years: (a) 59 recruited research participants (4 girls per group) comprising 29 target children with HFASD (IQ > 75) and 30 target children with TYP; (b) 59 children who were identified by teachers and mothers as friends of the target children; and (c) 59 children who were classmates but were not identified friends of the target participants. Eight children in the original HFASD target sample were excluded from the current study because their verbal free-play interactions were too infrequent to enable reliable coding of SA (less than 3 cumulative minutes out of the two 10-min. interactions). Thus, the current study included 51 target preschoolers (21 with HFASD; 30 with TYP). Each trio of children

(target, friend, and non-friend) attended the same inclusive preschool.

HFASD Target Group (n = 21, 1 girl)

All target children with HFASD were previously diagnosed by licensed psychologists unassociated with the current study, based on the *DSM-IV-TR* (American Psychiatric Association 2000). Clinical diagnoses were as follows: PDD-NOS (4.76%, $n = 1$), HFASD (28.57%, $n = 6$), and Asperger syndrome (66.66%, $n = 14$). According to the *DSM-5* (American Psychiatric Association 2013), which was published after these children's diagnostic procedures, all of these diagnoses would fall under the ASD classification. In addition, all 21 children met criteria for autism on the Autism Diagnostic Interview–Revised (ADI-R; Rutter et al. 2003), which was completed with the parents to verify diagnosis. To assess children's IQ, Mullen Scales of Early Learning (Mullen 1995) were administered. Only participants with an IQ of 75 or above were included, to denote high functioning in ASD.

TYP Target Group (n = 30, 3 girls)

As seen on Table 1, the TYP group was matched to the HFASD group on maternal education, on CA, and, using Mullen (1995), on IQ, VIQ, and nonverbal IQ (NVIQ).

Friends (n = 51)

For each target child in both groups, a close friendship of at least 4-month duration was identified by the preschool teacher and verified by the mother. Howes's (1996) criteria for friendship were utilized: (a) mutual preference during spontaneous interaction along different activities (i.e., on playground); (b) demonstration of mutual interest;

Table 1 Sample characteristics for target preschoolers with high-functioning autism spectrum disorder (HFASD) and with typical development (TYP)

	HFASD (n = 21)		TYP (n = 30)		Group differences $F(1,49)$
	M	SD	M	SD	
CA (months)	59.38	11.78	54.83	10.84	0.23
Verbal IQ[a]	106.66	18.66	111.53	15.97	0.46
Nonverbal IQ[a]	109.05	17.83	104.07	15.35	0.94
IQ[a]	108.00	16.28	107.60	14.13	0.26
Mother's education[b]	4.86	1.01	5.23	0.94	1.86

[a]Based on Mullen (1995)

[b]Calculated on 6-point scale: 1, less than 8th grade; 2, some high school; 3, high school with diploma; 4, some college; 5, college degree (e.g., BA); 6, graduate degree (e.g., master's or above)

(c) maintenance of close proximity; (d) showing affection (eye contact and smile, touch); (e) shared fun; and (f) sharing objects during play. Children in both groups had same-age friendships, but the friends' disability status differed between the groups, with 52% of the friends of children with HFASD having a disability (11 of the 21 pairs), whereas no friends of the children with TYP had a disability. For more detailed information about the friends, see Bauminger and Agam-Ben-Artzi (2014).

Non-friends (n = 51)

A classmate who did not meet Howes's (1996) friendship criteria (henceforth a "non-friend") was matched by age and diagnostic status to each target child's friend. That is, same-age non-friends with TYP were matched to friends with TYP, and same-age non-friends with HFASD were matched to friends with HFASD.

Measures

Experimental free-play scenario

To evaluate SA use during spontaneous peer conversations, target children (HFASD and TYP) were observed in their preschools for two 10-min free-play interactions, once with the friend and once with the non-friend, in counterbalanced order. During this videotaped free-play break between structured activities, children received snacks, drinks, and age-appropriate toys such as means-end games, pretend-play toys, and fine-motor games like bead threading. Children received no specific instructions; they were just told that they could do whatever they felt like doing. Children's SA use was assessed from these videotaped spontaneous conversations with peer partners.

Dore's Speech-Acts Taxonomy

All target children's utterances during interactions were transcribed and coded using Dore's (1979, 1986) speech-acts taxonomy (SAT). We used the SAT to code children's SAs during conversation because it is well-established in the literature for children with TYP and has been partly used in the past for children with ASD. The SAT was validated on children with TYP of various ages, from preverbal to school age (Dore 1979). Ziatas et al. (2003) partially implemented the taxonomy for children with HFASD during a conversation with the examiner, using only the "assertives" subcategories (e.g., reports, evaluation, declaration). In the aim of expanding knowledge about SAs during natural conversation in ASD, in the current study we used Dore's full SAT, classifying SAs into four general categories: *Assertives, Requestives, Responsives,*

and *Organizational devices* and their subcategories. The detailed SAT taxonomy enabled a comprehensive perspective on these children's speech capabilities. See the Appendix for elaboration of the first three categories and their subcategories.

1. *Assertives* These SAs relate to descriptions of the "state of the world" (Ryckebusch and Marcos 2004, p. 884) – reporting facts, evaluating situations and conditions, stating rules, and conveying attitudes. This general category includes three subcategories: *declarations*, like defining conditions (e.g., " This is the sea and here are the bears"), *evaluations*, like personal judgments (e.g., "These are ugly things"), and *reports*, like sharing (e.g., "That hurts").
2. *Requestives* These SAs solicit information or actions. This general category includes two subcategories: *questions*, like process questions (e.g., Why? How? What for? What about? How come?); and *requests*, like actions (e.g., "Give me").
3. *Responsives* These SAs supply information in reaction to Requestives or Assertives. This general category includes two subcategories: *answers to questions* (e.g., "Okay," "He's here") and unsolicited *replies* (e.g., "Exactly," "But I can't do it").
4. *Organizational devices* These non-propositional meta-linguistic acts regulate contact and conversational flow, like: *attention getters* ("Look"); *speaker selections* to show that the turn moved to the other speaker ("Ron, tell me"); *rhetorical questions* seeking acknowledgment to continue ("You know what?," "Really?"); *clarification questions* ("What?"); *boundary markers* ("Hi," "Bye," "By the way"); *politeness markers* ("Thanks," "Please," "Bless you," "Sorry"); *exclamations* ("Wow"); and *repetitions* of sentence parts that were just spoken.

Additions to Dore's Taxonomy

During the coding process, three types of utterances emerged that complemented Dore's original SAT taxonomy. One additional SA, *Object-dubbing*, referred to children's communicative utterances that were expressed during symbolic play with objects (e.g., "I want to eat" while imitating a doll's voice, toward the partner's doll). In addition, two other classifications furnished additional informative data on children's conversational qualities: *Pretend-play* referred to utterances expressed during contexts of planning live imaginary symbolic play with the peer partner (e.g., "I'll be the doctor"), and *Stereotypic speech* referred to stereotypic or repetitive idiosyncratic non-communicative utterances.

Transcription and Coding

Each target child's utterances during the two 10-minute videotaped interactions were transcribed and coded. Transcription was performed by an experienced speech therapist who was blind to children's HFASD/TYP diagnosis (second author). Next, she and another experienced speech therapist—both ASD experts who were blind to children's diagnosis and to partners' friendship status (friend/non-friend)—were trained to code children's data using a randomly selected sample of 25% of the HFASD and TYP groups. Inter-observer agreement of 86% or higher was obtained for the joint coding. Then only one coder completed the rest of the data.

A single utterance was defined as the smallest speech unit along the 10-min conversation that included communicational intent (e.g., "you should do it like that," "it's cool," "look!"). Target children with HFASD demonstrated a total of 2033 utterances (1148 in conversation with a friend and 885 in conversation with a non-friend), and target children with TYP demonstrated a total of 3691 utterances (2169 in conversation with a friend and 1522 in conversation with a non-friend). Coding of each communicative utterance was exclusive, to be coded with one SA's category and subcategory from Dore's taxonomy or only the object-dubbing category. Classification as pretend-play or stereotypic speech was coded separately. For utterances expressed in a live imaginary play context, pretend-play was coded in addition to the Dore SAT category/subcategory. For example, "I'll be the doctor" would be coded as an *Assertives* category, as a Declarations subcategory, and as Pretend-play. Stereotypic speech was coded for relevant non-communicative utterances.

For each participant, we summed up the *total amount* of SAs coded (including the Dore SAT categories and subcategories and object-dubbing) and the *variety of SA types* reflected by these utterances.

Results

Group Differences and Partner Differences in SAs

SA Total Frequency and Variety

We conducted a 2 (Group: HFASD/TYP) X 2 (Partner: friend/non-friend) analysis of variance (ANOVA), with repeated measures on partner, to examine target children's differences on SAs' total amount and variety. As seen in Table 2, significant main effects for Group and Partner emerged, both for total amount and variety, with TYP surpassing HFASD and with friend dyads surpassing non-friend dyads in both groups.

SA's Categories

A series of 2 (Group) X 2 (Partner) ANOVAs, with repeated measures on partner, was conducted to examine differences on the SAT categories (assertive, requestive, responsive, organizational device) and SAT-subcategories as well as on object-dubbing, pretend-play, and stereotypic speech (see Table 3).

ANOVA analyses were followed by non-parametric Mann Whitney analyses to examine group differences and Wilcoxon analyses to examine partner differences, because the standard deviation was larger than the mean for many behaviors.

As expected, overall, children with TYP revealed more types of SAs (a larger variety of categories and subcategories) than children with HFASD, except for stereotypic speech, which was higher in HFASD. Similarly, interactions with friends yielded more varied SA types than interactions with non-friends.

However, as seen on Table 3, significant Group differences emerged only for the Assertives category and Assertives declarations subcategory, Organizational devices category, Object-dubbing, Pretend-play category, and Stereotypic speech category. Significant Partner differences in total frequencies emerged for the Assertives category,

Table 2 Group (HFASD/TYP) and partner (friend/non-friend) differences on mean speech-act frequency and variety during 10-min interaction

Speech act	HFASD (n=21)		TYP (n=30)		$F(1,49)$ η^2	
	Friend	Non-friend	Friend	Non-friend	Group	Partner
Frequency						
M	53.81	41.62	71.93	50.53	4.24*	6.64*
SD	39.56	24.98	38.00	24.93	0.08	0.12
Variety						
M	15.86	13.81	19.03	16.97	7.63**	4.58*
SD	4.91	5.10	4.40	6.28	0.13	0.09

HFASD high-functioning autism spectrum disorder, TYP typical development

*p < .05. **p < .01

Table 3 Group (HFASD/TYP) and partner (friend/non-friend) differences in mean frequency of speech-act categories and subcategories

Speech acts	HFASD (n=21)		TYP (n=30)		Group		Partner	
	Friend M(SD)	Non-friend M(SD)	Friend M(SD)	Non-friend M(SD)	$F_{(1,49)}$ η²	U Mann–Whitney	$F_{(1,49)}$ η²	Wilcoxon
Assertives	1.32(0.86)	1.20(0.75)	2.22(1.44)	1.88(1.01)	7.42** 0.13	171.50*	4.84* 0.09	2.04*
Declaration	0.79(0.73)	0.52(0.78)	1.54(1.36)	1.04(1.07)	8.84* 0.15	135.0***	3.27 0.06	1.71*
Evaluation	0.69(0.78)	0.66(0.73)	1.12(1.08)	0.55(0.61)	0.72 0.01	276.0	4.05* 0.08	2.14*
Reports	2.80(1.85)	2.76(1.86)	3.76(1.86)	3.09(1.78)	2.45 0.05	239.0	1.21 0.02	1.05
Requestives	2.92(2.89)	1.93(1.94)	3.35(3.46)	2.26(1.46)	0.47 0.01	268.0	4.77* 0.09	1.80*
Questions	0.67(0.71)	0.31(0.33)	0.53(0.41)	0.53(0.49)	0.18 0.00	293.5	3.46 0.07	1.08
Requests	2.25(2.47)	1.62(1.82)	2.82(3.25)	1.73(1.33)	0.44 0.01	267.0	3.97 0.07	1.82*
Responsives	0.59(0.62)	0.51(0.38)	0.67(0.49)	0.62(0.38)	0.56 0.01	244.0	1.63 0.03	0.97
Answers	1.21(1.27)	0.60(0.70)	1.53(1.32)	1.01(1.25)	1.94 0.04	243.0	7.14* 0.13	2.87**
Replies	0.36(0.50)	0.25(0.26)	0.35(0.32)	0.27(0.27)	0.001 0.00	286.5	1.63 0.03	0.97
Organizational devices	1.62(1.99)	1.26(1.10)	2.20(1.44)	1.35(1.03)	1.30 0.03	217.5*	5.11* 0.09	2.21*
Object-dubbing	0.79(1.94)	0.62(1.63)	1.57(2.37)	1.25(1.86)	2.54 0.05	185.0**	0.46 0.01	0.66
Pretend-play	2.09(5.33)	3.48(6.14)	7.80(11.13)	3.70(6.19)	3.07 0.06	228.5*	0.87 0.02	1.12
Stereotypic talk	0.81(1.66)	0.47(0.75)	0.07(0.36)	0.001(0.00)	14.95** 0.23	160.0***	1.20 0.02	0.98

HFASD high-functioning autism spectrum disorder, *TYP* typical development

*$p < .05$. **$p < .01$. ***$p < .001$

Assertives declarations and evaluations subcategories, Requestives category, Requestives requests subcategory, Responsives answers subcategory, and Organizational devices category.

Correlations of SAs with Developmental Variables

We examined how developmental variables (CA, VIQ) correlated with the SAs total sum and variety and with the SAs categories.

SA Total Amount and Variety

In TYP, children's CA correlated positively with the total amount of SAs exhibited in friend dyads ($r = .38$, $p < .05$) and also with the variety of SAs shown both in friend dyads ($r = .31$, $p < .05$) and non-friend dyads ($r = .47$, $p < .01$). With increasing age, children with TYP showed more frequent and varied SAs. This age trend was not observed in HFASD. However, in HFASD, VIQ correlated positively with the total amount of SAs exhibited in non-friend dyads ($r = .40$, $p < .05$); thus, children with higher VIQ exhibited more SAs during interactions with an acquaintance.

SA's Categories

In TYP, children's CA correlated positively with requestives toward non-friends ($r = .38$, $p < .05$), responsives toward non-friends ($r = .41$, $p < .05$), and organizational devices toward both friends ($r = .47$, $p < .05$) and non-friends ($r = .32$, $p < .05$). Also, CA correlated negatively with stereotypic speech toward friends ($r = -0.31$, $p < .05$).

In HFASD, children's VIQ correlated positively with pretend-play talk toward non-friends ($r = .66$, $p < .01$), and children's disorder severity (according to ADI-R) correlated positively with two categories. A more severe social deficit correlated with more stereotypic speech toward friends ($r = .41$, $p < .05$), and less severe repetitive behavior

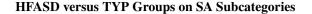correlated with more use of organizational devices toward friends ($r = .41$, $p < .05$).

Overall, as expected, the TYP group showed improvement with age, whereas VIQ seemed to contribute more in the HFASD group. Yet, Z Fisher scores yielded no significant differences in the two groups' correlations for CA or VIQ.

SA Differences in HFASD by Conversation Partner's Disability Status

To compare the interactions of target children with HFASD while interacting in mixed, heterogeneous dyads (with a TYP peer, either friend or non-friend) versus interacting in non-mixed, homogenous dyads (with a peer with HFASD, either friend or non-friend), we executed a series of 2 (Homogeneity: mixed/non-mixed) X 2 (Partner: friend/ non-friend) ANOVAs, with repeated measures on Partner, for all SAs variables. No significant differences emerged. Due to the high standard deviations compared to means, we verified the ANOVAs results with non-parametric analyses, which yielded only one significant finding between mixed and non-mixed dyads, in the friend situation ($U = 29.5$, $p < .05$). In mixed dyads with a friend with TYP, children with HFASD used more varied SAs ($M = 17.8$, $SD = 4.76$) than in non-mixed dyads with a friend with HFASD ($M = 14.09$, $SD = 4.55$).

Discussion

To the best of our knowledge, this is the first study exploring SAs during spontaneous peer conversation, despite their potentially vital role in the pragmatic and conversation deficit across ASD functioning levels (e.g., Eigsti et al. 2011; Stefanatos and Baron 2011). More specifically, we assessed SAs in HFASD compared to a matched control group, while examining the role of friendship and the role of a non-disabled partner as possible mitigators of the pragmatic deficit in HFASD, followed by exploration of individual differences in SAs by looking at their links to VIQ, CA, and ASD severity. Our hypotheses were confirmed with regard to general assessments of SA frequency and variety. Children with TYP surpassed peers with HFASD, and interactions with friends yielded more frequent and more varied SA usage in both groups. However, a more in-depth look at the SA subcategories, although revealing the same direction, demonstrated a more scattered SA profile in HFASD than in TYP. Not all SAs were inferior in HFASD compared to TYP, calling for a more nuanced view of pragmatic dysfunction in autism.

HFASD versus TYP Groups on SA Subcategories

Based on Dore's (1979, 1986) taxonomy, the HFASD group demonstrated greater difficulty than the TYP group on *assertive* SAs (and assertive declarations) and on SAs involving *organizational devices*, whereas *requestive* SAs (questions and requests) and *responsive* SAs (answers and replies) were more preserved. Children use *assertives* to describe the world—reporting facts, sharing experiences, evaluating situations, and establishing rules. In other words, these SAs do not aim to fulfill the speaker's needs (like *requestives*) but rather to share information, opinions, or positions with listeners. The assertive declaration is used to create social facts, to establish norms and rules ("We don't do that"), claims ("Me first"), jokes or teasing ("Told you so"), and warning ("Watch out!"). In general, these declarations are mainly social initiations used to lead social interaction, rather than to respond to a social act that was already established. Difficulties in initiating social overtures, rather than responding, are well-documented characteristics of children with ASD across functioning levels (e.g., Kasari et al. 2011; Lord and Magill-Evans 1995; Sigman and Ruskin 1999).

The current finding that *Assertives* capabilities were lower in HFASD than in TYP also coincides with prior results (e.g., Capps et al. 1998; Jones and Schwartz 2009; Ziatas et al. 2003). In Capps et al. (1998), children with ASD ages 9–12 shared very few personal experiences and narrated less frequently in conversational interactions than did controls matched for mental age. In Jones and Schwartz (2009), preschoolers with HFASD "commented" less than those with TYP during family dinner, where comments were defined by the authors as corresponding to our definition of *assertives* as utterances that reflect point of view (not necessarily requiring reply), that aim to maintain conversational flow, and that create opportunities for interaction and further dialogue (e.g., "My father is working now").

Support for this claim that the preschoolers with HFASD show difficulties in maintaining conversational flow is also provided by their lower performance on *organizational devices* compared to their peers with TYP. This category includes meta-linguistic SAs that aim to regulate conversational flow using boundary markers, attention getters, etc. Organizational devices are interactive acts aiming to achieve social consequences like focusing attention, initiating, and leading social routine – rather than instrumental consequences such as responses that satisfy physical wants or needs like requesting objects. Thus, it is unsurprising that preschoolers with HFASD revealed difficulties in establishing social routines or in using devices to maintain ongoing social conversations.

Lower use of communicative functions to achieve social consequences was also found by Miller-Wetherby and Prutting (1984). Taken altogether, children with HFASD may show adequate levels of more basic, less socially oriented SAs (e.g., requesting), although other functions (e.g., attaining joint attention, leading and maintaining conversation flow, sharing experiences) may be delayed and present differently in HFASD versus TYP (e.g., Kissine et al. 2015; Paparella et al. 2011; Plumet and Veneziano 2015; Stone and Caro-Martinez 1990).

Regarding the three new categories that we added to Dore's taxonomy, significant group differences emerged showing less symbolic-play talk (object-dubbing and pretend-play) and more stereotypic talk in the HFASD group than the TYP group during the interactive free-play situation. These findings coincide well with the *DSM-5* (American Psychiatric Association 2013) neuropsychological profile of ASD, highlighting restricted, repetitive, and stereotyped behaviors (RRBs) as a core feature of autism, along with the hallmark symptoms of social and communication problems (see reviews in Kasari and Ya-Chin 2013; Jarrold 2003; Jordan 2003 for difficulties in play; see review in; Leekam et al. 2011 for RRBs). These play and RRB difficulties, alongside difficulties in assertives and organizational devices, exemplify the multifaceted nature and integrative complexity of building and sustaining social interactions with social partners.

SAs toward Friends versus Acquaintances

We focused on friendship's possible mitigating role for the SA difficulties found in children with HFASD because friendship was shown to be a source of growth in social-communicative skills in TYP (e.g., Newcomb and Bagwell 1995). Child–adult interaction research indicated that conversational partners affect SA usage in very young 20–23-month-old children with TYP (Ryckebusch and Marcos 2004). As far as we know, our study is the first to comparatively examine SAs exhibited in peer friend dyads versus peer non-friend dyads in preschoolers with HFASD and TYP. Our findings suggested friendship's developmental importance both in TYP and HFASD as a growth-promoting context for pragmatic complexity. Friend dyads outperformed non-friend dyads not only in the variety of SAs that they exhibited in both groups but also in the total frequency of SAs that they demonstrated for three out of four of Dore's categories (all except Responsives) and for multiple subcategories. Namely, significant friend versus non-friend differences emerged for the Assertives category and its declarations and evaluations subcategories, for the Requestives category and its requests subcategory, for the answers subcategory (in the Responsives category), and for the

Organizational devices category. It appears that friends can indeed mitigate the social-communicative deficit in HFASD.

The fact that both the HFASD and TYP groups showed the same trend toward more enhanced pragmatic capabilities when interacting with friends than with non-friends—as reflected in their SA performance—holds important implications for understanding peer conversation in ASD. Why might this trend occur? To speculate, perhaps consistent durable interactions with the same peer over long time periods may provide space for more complex socio-communicative skills to evolve. Research examining similar HFASD samples also showed the same trend where friends surpassed non-friends concerning other components of conversation: the pragmatic deficit (Bauminger-Zviely et al. 2014) and social conversation quality (Bauminger and Agam-Ben-Artzi 2014). Future research on multiple settings and contexts for friends' interactions utilizing various in-depth minute-by-minute coding of observed peer interaction, while employing other linguistic dictionaries such as the Linguistic Inquiry and Word Count (Pennebaker et al. 2001) measures to assess broader related language capabilities, may substantiate friendship's speculated protective role for pivotal deficits in ASD.

SAs and Developmental Variables

Only children with TYP showed more frequent and varied SAs with increasing age, specifically for requestives, responsives and organizational devices. In contrast, the pragmatic deficit in HFASD appeared to remain consistent during the preschool developmental period. However, VIQ and ASD severity seemed to play important roles. Children with higher VIQ generated more frequent SAs as well as better pretend-play conversation during interactions with non-friends. Non-friend interactions may pose a higher social challenge for children with HFASD than interactions with friends, thereby necessitating investment of more verbal-cognitive efforts. This provides support for the "cognitive-compensation hypothesis," which assumes that children with HFASD use their relatively strong cognitive capabilities to compensate for their low social-emotional functioning (Hermelin and O'Connor 1985). These findings substantiate previously documented links between cognition and language (e.g., Kjellmer et al. 2012). Furthermore, children with a less severe social deficit (ADI-R) showed less stereotypic talk, and those with fewer RRBs (ADI-R) showed more organizational devices with friends. Hence, children who are less preoccupied with their stereotypies may attune more to conversational flow and conversational interlocutors.

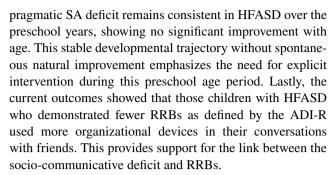## Partners with or without Disability

This last assessment, only within the HFASD group, yielded only one significant difference between mixed and non-mixed dyads. Children with HFASD who interacted with a partner with TYP (mixed dyads) exhibited a greater variety of SAs than children with HFASD who interacted with another peer with HFASD (non-mixed dyads). Therefore, preschoolers' mixed conversations appear more fruitful and rich than non-mixed conversations. Likewise, Bauminger et al. (2008) found that mixed interactions were linked with better conversation qualities at older ages (8–12 years).

Conclusions and Limitations

Although many dyadic interactions were observed and coded for SAs in this study, the number of participants was relatively low. This may have limited detection of more subtle differences and correlations. Future studies would do well to expand the sample size and provide comparative examination of peer friendship for other important components of language in ASD.

As mentioned, this is the first examination of SAs in natural spontaneous peer conversation among preschoolers with TYP and HFASD, comparing two types of partners (friend, non-friend) and partners' disability status (HFASD, TYP). Our study adds to the existing literature in at least four important ways. First, the current findings demonstrated that the pragmatic deficit in ASD—which is considered a core deficit—is not an all-or-nothing phenomenon but rather is characterized by variations and discrepancies. The sensitive examination that we executed in the current study by using a very detailed and comprehensive SA taxonomy enabled detection of areas of difficulty and areas that remained more intact. Preschoolers' development in several SA categories—mainly those with social consequences and those involving relatedness—indeed appears to be hampered in HFASD versus TYP, whereas the more basic and less socially oriented SAs (e.g., requesting) appear more preserved. This variability in pragmatic functioning areas holds important implications for designing more personalized socio-communicative goals in early intervention.

Second, this study highlighted the role of the friend as a conversational partner, which may offer an important context for preschoolers' growth in SA complexity and frequency. Thus, friendship development should be emphasized as a vital early intervention goal. It is also important to note that this study is novel by showing the importance of a friend partner, too, in relation to SA development in preschoolers with TYP. Third, we pointed out that the pragmatic SA deficit remains consistent in HFASD over the preschool years, showing no significant improvement with age. This stable developmental trajectory without spontaneous natural improvement emphasizes the need for explicit intervention during this preschool age period. Lastly, the current outcomes showed that those children with HFASD who demonstrated fewer RRBs as defined by the ADI-R used more organizational devices in their conversations with friends. This provides support for the link between the socio-communicative deficit and RRBs.

As expected, higher VIQ and less severe social and behavioral disability also helped denote individual differences in pragmatic performance among preschoolers with HFASD. These characteristics, along with attention to the aforementioned variation in pragmatic domains and growth-promoting friendship context, may furnish theoretical and practical implications for designing better tailored early interventions targeting the socio-communicative pragmatic deficit in HFASD during preschool.

Compliance with Ethical Standards

Conflict of interest All authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

Appendix

Dore's (1979) Taxonomy Subcategories: Description and Examples of Assertives, Requestives, and Responsives

Assertives

Declarations These utterances create social facts, such as: *procedural*s for invoking norms or rules, setting procedures, or defining conditions ("This is not the right way to

build a pyramid," "This is the sea and here are the bears"); *claims* for the speaker's rights ("I'm first," "My turn now"); the use of *jokes* ("We throw soup on the roof"), *teasing* ("You can't catch me"), and *warnings* ("Pay attention," "Be careful").

Evaluations These utterances judge situations/conditions, such as:*evaluatives* that express personal judgment or attitudes ("These are ugly things," "This is fun"); *attributions* that express beliefs about another's state ("He wants to go," "He loves her"); and *explanations* that express casual relations, give reasons, or make predictions ("He's crying because he got hit," "I did it because it was fun").

Reports These utterances represent existing states, such as:*identifications* that label objects and/or events (e.g., "This is a car"); *descriptions* ("It fell," "It's the same"); *sharings* that describe events referring personally to the speaker, beyond the "here and now" ("My friend Orr had grape juice in his old house"); and *internal reports* of mental states and emotions ("I like it," "That hurts").

Requestives

Questions These utterances include:*choice* questions (Yes or no?); *product* WH questions (Who? Which? Where? When? What?); and *process* questions that seek explanation or extend description (Why? How? What for? What about? How come?).

Requests These utterances include *actions* ("Sit," "Give me"); *permissions* ("Can I take this?"); and *action suggestions* ("Let's do this").

Responsives

Answers These utterances provide answers to *choice* ("Yes;" "No"), *product* ("He's here"), and *process* ("I wanted to") questions, as well as *compliances* ("Okay") and *clarifications* that are not necessarily in reply to questions ("I said no," "Really," "Just kidding").

Unsolicited replies These replies to non-soliciting utterances include:*descriptions of qualifications* ("But I can't do it"); *agreements* ("Exactly") or *rejections* ("Not true"); and *acknowledgments* ("Aha").

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