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ORIGINAL PAPER

Dialogic Linkage and Resonance in Autism

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Abstract We evaluated how children with autism make linguistic adjustments when talking with someone else. We devised two novel measures to assess (a) overall conversational linkage and (b) utterance-by-utterance resonance within dialogue between an adult and matched participants with and without autism (n = 12 per group). Participants with autism were less able to establish 'cognitive linkage' with an interlocutor. As predicted, only among children with autism was there a positive correlation between the ability to link in with *speaker's meanings* and ratings of emotional connectedness with the conversational partner. Participants with autism were *not* less likely to show a basic form of dialogic resonance across successive utterances (the 'frame grab'), but more often elaborated their responses in an atypical manner.

Keywords Autism · Dialogue · Dialogic syntax · Conversation · Intersubjectivity · Identification · Resonance

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Introduction

This study is concerned with the nature of dialogue between children with autism and a conversational partner. It has a specific focus upon the role that intersubjective processes play in shaping conversational interactions between people, and that may be relevant for understanding atypicalities in the conversations of people who have autism.

Previous studies of conversational dialogue involving individuals with autism have yielded evidence of these individuals' limitations in expressing role relationships between speaker and listener, following pragmatic principles governing the organization of dialogue, and foregrounding and backgrounding information (Baltaxe 1977), as well as their relative failure to respond to questions or offer new and relevant comments (Adams et al. 2002; Capps et al. 1998). Eales (1993) evaluated audiotaped samples of conversation from adults with autism and developmental receptive language disorder, and reported that those with autism showed more utterances that were inappropriate in communicative intention, for example manifesting persistence of or reversion to a previous topic, furnishing irrelevant on-topic information such as excessive detail, or being uninformative, even though these participants were not atypical in choosing words for what they intended to communicate. In conversations, as Ochs and Solomon (2005) and Dobbinson et al. (1998) illustrate, people with autism may respond to another person's contribution by adjusting to the immediate but not global topic of discourse. Happé (1993) considered how individuals who could not infer a speaker's communicative intentions would be left with trying to decipher the 'code' of what was being said from the words alone, and examined breakdowns in comprehension by individuals with autism when they needed to take into account a speaker's (or

implicit speaker's) attitude in modifying the literal meaning of a sentence.

How, then, might intersubjectivity be relevant for analyzing conversational adjustments, and perhaps for explaining atypicalities in the conversations of people with autism? Intersubjectivity refers to the co-ordination of subjective states *between* people. The concept has been adopted from philosophy (see Zahavi 2001) by researchers interested in early human development, notably Trevarthen (1979; Trevarthen and Hubley 1978), Stern (1985) and Hobson (1993; see also contributions to Bråten 1998), and by writers concerned with linguistic functioning such as Itkonen (2008) and Du Bois (2007). Zlatev et al. (2008) define intersubjectivity as the sharing of experiential content (e.g., feelings, perceptions, thoughts, and linguistic meanings) among a plurality of subjects. These authors discuss how as a theoretical approach, the thesis of intersubjectivity contrasts with Theory of Mind theorizing in its emphasis on the developmental primacy of embodied social interactions involving empathic perception, imitation, gesture and practical collaboration. Such processes of non-verbal interaction may contribute to and affect the forms of language manifest in conversational communication.

Once intersubjective engagement is taken to constitute a meaningful unit of analysis for developmental theory (Vygotsky 1962), then questions arise over its sources and structure. According to Identification Theory (Hobson 1993, 2007), from around the end of the first year of life human beings have a specific form of intersubjectively structured experience. They tend to assimilate and (sometimes) assume the bodily-expressed attitudes of other people, as these are directed *from* the bodily anchored position of the other and *with reference to* a shared world. This non-conceptually-mediated, non-inferential and often affective form of role-taking is exemplified by social referencing in infancy (e.g., Sorce et al. 1985). It is proposed that the biologically based propensity to identify with others plays an important role in the development of interpersonal understanding ('theory of mind') and flexible thinking, and in determining pragmatic adjustments in language and conversation (Hobson 2012).

Returning to the case of autism, there is substantial evidence for impairments in intersubjectivity, and more specifically identification, among individuals with the syndrome. Direct observations and retrospective parental reports suggest that even very young children with autism have characteristic impairments in nonverbal communication of a kind that might reflect and/or lead to disruption in intersubjective engagement (e.g., Charman et al. 1997; Wimpory et al. 2000). Such abnormalities are also present in older children and adults (e.g., Hobson and Lee 1998; Sigman et al. 1992). Studies of the propensity to identify with the attitudes of other people have yielded evidence that, when compared with carefully matched children without autism, those with autism: (a) copy the goal and strategy of observed actions, but mostly fail to identify with the style and self-orientation with which the model enacts those actions (Hobson and Lee 1999; Hobson and Hobson 2008); (b) tend not to identify with self- and other-oriented actions when communicating, for example in failing to point-to-own-body when communicating to someone else where she should place a sticker on her own body (Hobson and Hobson 2007; Hobson and Meyer 2005; Meyer and Hobson 2004); (c) display diminished role-shifting and other features of identifying with someone else when engaged in a communication game (Hobson et al. 2007), (d) are limited in linguistic role-taking when providing narratives (García-Pérez et al. 2008), and when using personal pronouns (Lee et al. 1994; Hobson et al. 2009c) and other deictic terms (Hobson et al. 2009a); and (e) according to parental report as well as observations in semi-structured settings, manifest certain complex emotions such as jealousy but are atypical in being relatively unlikely to express those attitudes (e.g., concern, guilt) that require them to respond to someone else's feelings *as* being anchored in the other person (Hobson et al. 2006, 2009b).

One further study of intersubjective communication provides the basis for the present investigation. García-Pérez et al. (2007) rated non-verbal aspects of communicative exchanges in videotaped interviews with children and adolescents with and without autism. In keeping with identification theory, matched participants differed not only on reliable ratings of affective engagement between the conversational partners, but also in participants' head-nodding toward the interviewer when the latter was speaking. Such responsive head-nodding was significantly less prevalent among the children with autism. It was in the context of these findings that we anticipated how in linguistic aspects of conversation, too, individuals with autism would show atypicalities in stance-adjustment with regard to their conversational partner. We employed the same interviews studied by García-Pérez et al. (2007), to see whether these would reveal specific forms of abnormality in verbal aspects of dialogue.

We devised two novel approaches to study dialogue between children with and without autism and the adult conversational partner. First, we examined the relation between participants' linguistic responsiveness to what the adult said over a period of discourse, and affective engagement between the two conversational partners. Affective engagement captures what Kanner (1943) meant by 'affective contact', an individual's experience and feel of being involved with the other, in a personal way. This reciprocal and mutual engagement is expressed in a variety of subtle but often unmistakeable forms of behaviour, such as when people look into rather than at each other's eyes (Hobson and Hobson 2007), and when there is a smooth flow to

communicative exchanges within the dyad (see García-Pérez et al. 2007, for further details).

Second, we evaluated the relation between specific utterances within the transcribed conversations, using the approach of dialogic resonance (Du Bois 2001, 2007). Dialogic resonance refers to discourse patterns that arise when participants in conversation construct their utterances by selectively reproducing aspects of the linguistic structure of an utterance produced in the immediately prior discourse. 'Resonance', a key concept in the theory of dialogic syntax (Du Bois 2007, 2012), is defined as the activation of affinities across successive utterances. Resonance is conceptually related to, but distinct from, parallelism (Jakobson 1960, 1966; Harris 1952) and lexical and syntactic priming (Bock 1986; Branigan et al. 2000) in the study of language, and to similarity and analogy in the study of cognition (Gentner 1983; Gentner and Markman 1997; Holyoak and Thagard 1995; Hummel and Holyoak 1997; Medin et al. 1993).

For the present study, our principal measure of resonance was the *frame grab* (as defined later in this paper, and discussed by Du Bois et al. 2012). The frame grab represents a linguistic structure that calls on a speaker to combine a capacity to orient to the prior linguistic production of a co-participant and to make grammatically appropriate adaptations, while still allowing for creative elaboration in the articulation of the speaker's own perspective. We focused upon participants' abilities to resonate with what the conversational partner had said, and then elaborate on this from their own standpoint, because we anticipated that this measure might capture and clarify specific atypicalities in the conversations of children with autism.

Method

The studies we shall present involve two separate and distinctive sets of ratings of the same videotaped and transcribed conversations. We provide participant details before outlining our predictions for each study in turn.

Participants and Videotaping Procedure

Participants were selected for an interview study of self-concepts, published some years ago (Lee and Hobson 1998). The group with autism comprised 12 adolescents (8 males and 4 females) who satisfied standard diagnostic criteria for autism (DSM-IV: American Psychiatric Association 1994). We confirmed the diagnosis through systematic interviews with teachers using a checklist of DSM-IV clinical features, and by rating classroom behavior on the Childhood Autism Rating Scale (CARS: Schopler et al. 1986, with a conventional minimum score of 30 for a diagnosis of autism), where scores were between 30 and 35.5. These participants were matched for chronological age (CA) and verbal mental age (VMA) according to performance on the British Picture Vocabulary Scale (BPVS: Dunn et al. 1982) with 12 adolescents (9 males, 3 females) who had mental retardation but not autism nor any other diagnosed medical condition. The groups were also similar in Mean Length of Utterance (MLU) for the first 50 utterances of the interview (Table 1).

The interview took the form of a conversation with a familiar adult who asked participants about themselves and facilitated replies with comments and probes. For the present purposes, we selected a relatively early part of the interview that began with the 'self-understanding' question: 'What kind of person are you? How would you describe yourself?' The transcripts ended exactly 3 min after this point on the videotape.

Method Study One: Affective Engagement and Cognitive Linkage in Discourse

The aim of Study 1 was to test whether coherence in the to-and-fro exchanges of ideas between co-participants in dialogue might relate to affective engagement between the conversational partners. Our hypothesis was that among children with autism, difficulties in affectively engaging and identifying with another person's attitudes constrains the children's ability to 'link in with' the other's linguistically expressed meanings. More specifically, we hypothesized that limitations in intersubjective engagement with someone else's psychological stance (as expressed through language) constrain the children's ability to respond to a conversational partner's *intended meanings* rather than the literal meanings of the speaker's utterances (following Grice 1968).

Table 1 Participant characteristics

	Chronological age			Verbal mental age			Mean length of utterance		
	M	*SD*	Range	*M*	*SD*	Range	*M*	*SD*	Range
With autism (n = 12)	15;6	3;6	9;0–19;0	6;6	1;7	4;4–9;9	5.31	1.52	3.3–8.1
Without autism (n = 12)	14;4	1;10	11;0–17;0	6;7	1;6	4;0–9;3	6.10	1.31	4.6–9.0

Note: in years; months format

We made two predictions. Firstly, we predicted that when transcripts were rated as a whole, participants with autism would be given lower scores for 'cognitive linkage' between their own discourse and that of the conversational partner. For this prediction, we had decided a priori to combine two sets of ratings, namely those of linkage with speaker's meanings on the one hand, and linkage with utterance meanings on the other. Secondly, and more critically, we predicted that among children with autism only, within-group individual differences in 'linkage with *speaker's* meanings' would correlate with the children's affective engagement with the speaker, but *not* with verbal MA. We anticipated a group difference, insofar as the discourse of participants without autism would *not* be constrained by, and therefore not correlated with, affective engagement.

Inter-rater Reliabilities

Transcripts from all participants were mixed randomly, and two psychologists who were unaware of participant details rated the transcribed two-person conversations as a whole. Five-point scales were used in relation to the following characteristics:

(a) Linkage with the speaker's meanings: the degree to which the meanings of a participant's utterances are linked with what the interviewer is *intending to mean* in what he says. If the participant appears to mistake what the interviewer is intending to mean, then one would give a low rating for linkage with speaker's meaning. We employed the intra-class correlation (ICC) for assessing inter-rater reliability, as appropriate for a continuous five-point scale (Shrout and Fleiss 1979). The ICC estimate of reliability was .64 (moderate).

(b) Linkage with utterance meanings: the degree to which a participant's statements are linked with the literal meanings of the questions or statements made by the interviewer. The links do not need to be 'normal', and indeed they may be idiosyncratic and odd. The ICC estimate of reliability was .68 (moderate).

Reliability of ratings for affective engagement had been conducted in a previous study (García-Pérez et al. 2007) on a 5-point scale, from 'no emotional connection' to 'strong emotional connection', with high inter-rater reliability (ICC = .77). In the conversations videotaped here, a low score might reflect a strained interactional exchange within the dyad that was reflected in wooden and/or ill-co-ordinated non-verbal expressions and gestures, and a high score would be given to interpersonal interactions that appeared vivacious, emotionally co-ordinated, fluid and natural.

Given that our original ratings of affective engagement were conducted on videotapes of the conversations, the ratings might have been influenced by the content of what was said. Therefore we approached two independent new raters who did not speak English (in fact, Spanish speakers who had retired from work) to rate affective engagement over the 3-min videotape excerpts, with similar inter-rater agreement (ICC = .76).

Study One: Results

Our first prediction was that compared with participants without autism, those with autism would show less 'cognitive linkage' with their conversational partners, when scores for linkage with speaker's meanings and with utterance meanings were added together. As predicted, the group differences were significant for cognitive linkage (for participants with autism, mean rank = 9.4, for those without autism mean rank = 15.6, Mann–Whitney U = 109.5, $z = 2.2$, $p < .05$, one-tailed (and for completeness, also $p < .05$, two-tailed). By way of illustration, scores out of 8 for participants with autism were $M = 4.2$, $SD = 1.9$, for those without autism $M = 6.1$, $SD = 2.2$.

The breakdown of scores into the component parts of linkage with speaker's meanings and linkage with utterance meanings, respectively, are given in Table 2. Using two-tailed tests because no prediction had been made in these respects, group differences were significant for linkage with speaker's meanings (Mann–Whitney U = 31.0, $z = 2.4$, $p < .05$, two-tailed) but not for linkage with utterance meanings (Mann–Whitney U = 47.0, $z = 1.56$, ns).

Our second prediction concerned the correlation between linkage with speaker's meanings and affective engagement. As shown in Table 2, this correlation was positive (.54) among participants with autism, but negative (−.43) for the children without autism. As predicted, there

Table 2 Dialogic linkage between participants and conversational partner

Participants	Mean (SD)	Correlation (rho)	
		Affective engagement	Verbal MA
With autism			
Linkage with speaker's meaning	2.42 (1.38)	.54	−.09
Linkage with utterance meaning	2.75 (.62)	.47	.21
Without autism			
Linkage with speaker's meaning	3.92 (1.31)	−.43	.41
Linkage with utterance meaning	3.17 (.94)	−.37	.42

was a significant group difference in this respect ($z = 2.26$, $p < .025$, one-tailed).

There was specificity to this correlation with affective engagement, insofar at there was a contrasting pattern of correlations between linkage with speaker's meanings and verbal MA (Table 2). For the children with autism, there was little correlation with verbal MA (rho = −.09), whereas in the case of the children without autism, there was a positive correlation (rho = .41), a non-significant group difference.

Finally, we ascertained whether the principal results were replicated with our second set of ratings of affective engagement, conducted by raters who were unable to understand the content of the conversations. The results were closely similar to those already recorded. In particular, the correlations between linkage with speaker's meanings and affective engagement were as follows (one participant's videotape could not be located for the new ratings): autism, rho (12) = .35, without autism rho (11) = −.51.

Method Study Two: Dialogic Resonance

Here we analyzed the transcripts at a more local, micro-analytic level, and focused on the verbal linkages between successive pairs of utterances in which participants were responding to the adult. Our prediction was that participants with autism would show a greater preponderance of atypical forms of dialogic resonance.

Ratings

Four of the transcripts were used by the last author to develop a coding system and to train the second rater, a graduate student in linguistics. Therefore these four transcripts were set aside and inter-rater reliabilities were evaluated on the basis of the two linguists coding the remaining 20 transcripts independently. Throughout, both raters were unaware of which transcripts came from which diagnostic group, and also the predictions of the study. Every utterance made by a participant was evaluated in relation to the preceding utterance(s) by the interviewer, according to the following:

(a) The presence or absence of a 'frame-grab'. A frame grab occurs when an utterance manifests linguistic characteristics that bear a close relation to those of the previous utterance made by the conversational partner. More specifically, to qualify as a frame grab, the resonance between one utterance and another needs to meet a basic threshold of structured or harmonic resonance, that is, subsuming three or more linguistic elements (e.g., words or phrases) resonating across two successive utterances. Types of resonance include semantic relatedness (synonymy, antonymy, hyponymy), referential coherence (e.g., co-reference), and other similarities of form and function. Instances of frame-grabs appear in Table 3 (and see Du Bois et al. 2012, for further examples).

(b) In those instances where a frame grab was judged to have occurred, a further mutually exclusive dichotomous rating was made as to whether the frame grab was developed in a typical or atypical manner. In a typically developed frame grab, a person makes a coherent expansion of what has been assimilated from the conversational partner's discourse, or in some instances does not elaborate at all. An atypically developed frame grab occurs when the utterance is incoherent, truncated, unexpanded, or vague in expanding the linguistic expressions that resonate with what the conversational partner has said (see Table 3).

A final evaluation was made at the end of the procedure. Only at this point was the final author informed that there were participants with and without autism, in equal

Table 3 Examples of typically developed and atypically developed frame grabs

Diagnostic group	Frame grabs	
	Typically developed	Atypically developed
With autism	I: What are you good at? P: I am good at, eh, science	I: What do you like most about yourself? P: Most about myself is the teach
	I: So what sort of things will you have to do if you're on your own? P: I have to ask all the people if they got any things	I: And tell me things about yourself that you don't like. P: That I don't like
Without autism	I: What do you like most about yourself, David? P: I like my nose, my nice clothes.	I: Why is it important for me to know that you're good? P: Being good for our teachers
	I: What kind of person are you? P: Kind of [pause] good and bad.	I: What are you proud of about yourself? P: I have myself

I interviewer, *P* participant

numbers. Then he was asked to guess which transcripts came from each group. For clarity of presentation, we report the results here: despite the investigator's intention to sort separate piles of transcripts from the participants with and without autism, each pile turned out to have exactly 50 % of children from each diagnostic group. This surprising result confirms not only that this rater was blind to the children's diagnosis, but also that if measures of dialogue were to discriminate the groups, this would be on some basis other than 'general impressions' of the transcripts.

Inter-rater Reliabilities

From the 20 transcripts used for estimating reliability, there were 448 rateable utterances. Here we employed Cohen's kappa to assess inter-rater reliability in dividing observations into mutually exclusive categories (Cohen 1960). On judgments of whether or not an utterance constituted a frame-grab, the two independent raters achieved almost perfect agreement (kappa = .82, almost perfect). Of the 55 utterances which *both* judges agreed were frame-grabs, the inter-rater reliability on ratings of whether or not there was typical or atypical development of the frame grab was kappa = .73 (substantial agreement). For the remainder of the data, we use ratings from the primary rater (the final author) only, and include the four participants whose transcripts were not used in estimating reliability.

In the 3-min conversations, participants with autism made significantly greater number of utterances than those without autism (with autism $M = 26.42$, $SD = 10.75$, range = 13–53, and without autism $M = 16.58$, $SD = 17.06$, range = 6–26, $t(22) = 2.65$, $p < .05$). Therefore unless stated otherwise, subsequent analyses were conducted on the proportion of utterances featuring each category of response.

Here it may also be noted that, in virtue of the nature of the conversation, the interviewer's turns often included questions. Often, such questions were contained within exchanges that also included supportive and reflective statements such as: 'You say that you are growing. Is that an important thing for me to know?', or 'Well, aren't you lucky, the fact that you are nice?' The percentage of turns (defined as exchanges in floor-holding, $M = 28$ and 19 in the cases of children with and without autism, respectively) that included a question from the adult was similar in the two groups (with autism, $M = 72$ %, without autism $M = 70$ %).

Study Two: Results

Across the 24 transcripts there were 511 utterances, of which 78 were frame grab units. The two groups were *not* significantly different in the proportion of utterances that were judged to be frame-grab units (participants with autism $M = 19$ %, $SD = 15$ %, range = 2–53 %, comparison group $M = 14$ %, $SD = 13$ %, range = 0–50 %, $t(22) = .86$, *ns*). This result indicates that participants with as well as without autism were picking up aspects of language from their conversational partners. Indeed, when we examined the absolute prevalence of frame-grab units across the 3 min of discourse (i.e., not considering the greater number of utterances by participants with autism), the participants with autism made 52 and those without autism made 26 frame grabs.

The principal results are shown in Fig. 1. Nine out of 12 children with autism produced at least one utterance with atypically developed resonance, but only two participants without autism did so (Fisher's exact $p = .006$, two-tailed). There was a significant group difference in participants' percentage of atypically versus typically developed frame grabs: Over 40 % of the frame grabs made by participants with autism but fewer than 10 % of those made by participants without autism showed the features of atypical resonance. (For proportions of atypically developed frame grabs, participants with autism mean rank 14.5, without autism mean rank 7.9, Mann–Whitney U = 24.5, $z = 2.5$, $p < .05$, two-tailed.)

On the other hand, all but one participant with autism made at least one typical frame grab, with coherent (typically developed) resonance. Indeed, as a proportion of all utterances, 10 % of those from participants with autism were *typically* developed frame grabs, compared with 12 % of those from participants without autism, a non-significant difference. Therefore the ability to produce typically developed frame grabs was certainly not absent among the children with autism.

The question arises, whether atypically developed frame grabs were subject to grammatical adjustments, or whether they seemed to be unprocessed from a linguistic viewpoint. For example, an utterance that comprises a frame grab might show appropriate verbal inflection for grammatical number, or the transposition of the interviewer's 'you' into the participants co-referential 'I' (see Table 3 for

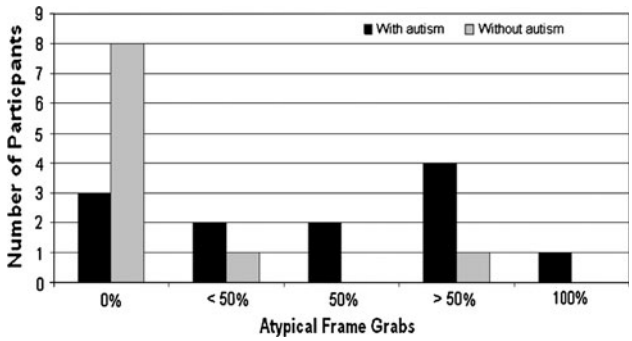

Fig. 1 Proportions of frame grabs that were atypically developed

examples). On the other hand, lack of grammatical processing might be reflected in rigid, unadapted echolalic repetition. In the event, grammatical adjustments were present in many of the atypically developed frame grabs. Of the 9 participants with autism who made atypically developed frame grabs, 4 always made grammatical adjustments when doing so, 4 made such adjustments at least half of the time, and only one never did so. Among the participants without autism, the (rare) atypically developed frame grabs also showed grammatical adjustments.

A subsequent review of transcripts confirmed that participants with autism had at times been able to 'hook into' what the interviewer had said in order to commence a response, and to elaborate upon this in a coherent way. Yet at other times they seemed unable to build upon this starting-point in order to provide a topically coherent contribution. Detailed illustrations of such dialogic patterns appear in Du Bois et al. (2012).

Among participants with autism, the proportion of atypical frame grabs was not associated with verbal mental age, linkage with speaker meaning, linkage with utterance meaning, nor with affective engagement.

Discussion

These studies yielded three sets of results. Firstly, participants with autism achieved lower scores than control participants for cognitive linkage with what their conversational partners said over a period of discourse (where cognitive linkage combined ratings for linkage with utterance meanings and linkage with speaker meanings). Exploratory analyses revealed that the group difference was significant for linkage with what the speaker was intending to mean, but not for linkage with literal meanings of words.

The second, even more striking result was that, in keeping with an ambitious prediction, there was a group difference in the relation between 'linkage with speaker's meanings' and independent ratings of affective engagement between the two conversing parties. Here the correlation was positive only for participants with autism, and for reasons that are unclear, negative among those without autism. On the other hand, 'linkage with speaker's meanings' was *not* correlated with VMA for the participants with autism, whereas the correlation was positive for those without autism (albeit with a non-significant group difference).

A further remarkable finding was that, when the discourse was analyzed for dialogic resonance across successive utterances, there was *not* a group difference in the proportion of utterances that manifested a basic form of dialogic resonance, the frame grab, in which elements of linguistic expression are adopted from the utterances of the conversational partner. Nor was there a group contrast in the proportion of utterances showing *typically* developed frame grabs, involving either coherent expansion or appropriate lack of expansion, over the 3 min of recorded discourse. Yet there was a significant and marked group difference in the prevalence of *atypically* developed frame grabs, that is, atypical forms of dialogic resonance. Nearly all participants with autism but few of those without autism showed instances of dialogic resonance characterized by incoherent, truncated, vague, partly echoic, or nonresponsive elaboration. Here it should be noted that participants with autism produced substantially more utterances (featuring twice as many frame grab units) when compared with those without autism, and in absolute terms they produced no fewer *typically* developed frame grabs over the 3 min of recorded discourse.

Might the present results reflect general cognitive/linguistic impairments among children with autism? The problem with framing the question in this way, is that it is unclear what 'general' means in this context. Language is complex, and we do not know the degree to which atypicalities in language among individuals with autism stem from domain-general or feature-specific linguistic *or* cognitive/conceptual *or* social-relational processes. In the present context, it is relevant to note how the groups performed at similar levels on the British Picture Vocabulary Scale, a test on which children with autism tend to achieve low scores (Jarrold et al. 1997), and MLU, a commonly-used measure of the complexity of speech production among persons with autism. Moreover, in the study by Lee and Hobson (1998), the interviews from which the current transcripts were abstracted were subject to additional analyses such as participants' abilities to talk about their physical and social attributes, and in these respects, too, they were closely similar. It is against the background of these impressive similarities in *some* aspects of linguistic functioning that one needs to set the group differences in producing atypically developed frame grabs. In addition to this, of course, the groups were similar in their ability to frame-grab. Even in the specific context of conversation, participants with autism were not 'globally' more impaired than those without autism.

It should be acknowledged that the excerpts of discourse analyzed were not only brief, but also unusual in form and content insofar as an adult familiar to the participants was conducting an interview to elicit how participants thought about themselves. Although Eales (1993) reported that pragmatic impairments were not unusually marked when children with autism discussed socio-emotional topics, it remains to replicate the study with naturally occurring conversations about diverse subject matter. Indeed, it is

possible that individuals may alter the manner in which they make and elaborate on frame grabs in conversation, for instance in response to variations in the conversational partner's prior speech act and/or in accord with what they themselves intend to convey. Also, one should not assume that features of discourse are constant across different kinds of conversational partner, for example adults and peers. These considerations point to the potential value of comparing participants with and without autism in different conversational settings, and of conducting further fine-grained analysis of the conditions under which group similarities and group differences are accentuated.

It should be noted that the present samples of discourse were derived from relatively modest numbers of participants. One needs to be circumspect in generalizing the findings to children who have intellectual abilities or clinical characteristics that differ from those studied here.

Having said this, the present results appear to point to a close relation between impairments in intersubjectivity and the elaboration of dialogic discourse among individuals with autism. This was indicated by two features of the results. Firstly, groups of participants who had already been rated as significantly different in affective engagement (García-Pérez et al. 2007) also differed in ratings of cognitive linkage with the same conversational partners. Secondly, and more specifically, the pattern of within-group correlations—especially the positive correlation between affective engagement and 'linkage with speaker's meanings' among the participants with autism but not those without autism—suggests that limitations in intersubjective engagement may constrain dialogic engagement among children with autism. Of course a correlation does not establish a direction of causation, but given the evidence of early and profound impairments in nonverbal communication among children with autism, it would appear unlikely that deficits in verbal communication somehow lead to a broad set of non-verbal and affective communicative impairments. Such embodied, emotionally configured interactions are the behavioral substrate for intersubjective co-ordination, and it is striking that differences among dyads in this regard were related to another characteristic of dyadic exchanges, namely linkage with what a speaker was intending to mean.

The findings on dialogic resonance enriched this picture by providing a novel perspective on clinical/descriptive reports of these children's limitations in registering, responding to, aligning with and complementing other people's utterances. Previous reports have highlighted the children's failures to appreciate and index speaker-hearer role relationships, their tendency to persist in or revert to a previous topic, and their uninformative responses to questions. The present results revealed additional specificity to such abnormalities. It was *not* that participants in the present study were predominantly disconnected from what the conversational partner was saying. At the level of overall discourse, a number of the children achieved reasonable cognitive linkage with the conversational partner; at the level of utterances, not only was the prevalence of frame-grabs from the conversational partner equal to that of the children without autism, but also there was evidence (e.g., in the adjustment of personal pronouns as well as instances of typical frame resonance) that they were making appropriate grammatical adaptations as well as semantic elaborations on the language picked up from the other person.

What distinguished the discourse of participants with autism was the prevalence of atypically developed resonance, where they seemed to lose coherence in discourse. This happened, even when they had achieved a basic form of dialogic resonance with what the conversational partner had said, in the form of a frame grab. The findings may point to something further about the *mechanisms* (involving identification) underlying the group difference in intersubjective (including affective) engagement. Working with the hypothesis that informed this study, namely that children with autism are limited in their propensity to identify with the attitudes and psychological orientations of a conversational partner, we suggest one might express the matter as follows: The participants with autism were inconsistent in establishing an orientation, in part derived from that of their conversational partner, on which to construct their immediately subsequent discourse. Although at one moment, participants with autism were able to adopt and expand on a frame of reference provided by a conversational partner, at another they were liable to show lapses in intersubjective linkage and alignment (also Eales 1993). Whatever might account for these results, it cannot be that participants were unable to register or adapt to linguistic input.

How might this formulation be reconciled with the patchiness of atypicalities in the discourse of children with autism? Here it should be noted that patchiness in perspectival adjustment has been a feature of other aspects of the functioning of children with autism, for example in their limited but not absent role-taking when asked to re-tell stories from the vantage-point of different protagonists (García-Pérez et al. 2008), or their limited but not absent role-reversals and sharing looks in tests of imitation (Hobson and Hobson 2007). It would seem that there are alternative means by which a person can adopt and adapt speech forms from someone else in and beyond dialogue (Happé 1993). Not always does this require identification with or other responsiveness to the attitudes and communicative intentions of the other person. Here there is a close analogy with non-linguistic forms of imitation, where it is possible to copy actions without this entailing that one

identify with the person whose actions they are (e.g., Hobson and Lee 1999). It is in keeping with this perspective (also Happé 1993) that the group differences were not so marked for linkage with utterance meanings as for linkage with speaker's meanings.

A second option is to suppose that many verbal children with autism have a weaker, rather than missing, propensity to identify with the attitudes and stances-in-speaking of other people. Given that identifying with someone else *is* to be 'moved' to adopt an initially other-person-centred stance, a motivational as well as cognitive process, a weak propensity to identify with someone else might result in patchy but not absent dialogic co-ordination. After all, participants with autism often picked up some kind of linguistic frame from the interviewer, and every child in *each* group made at least one appropriate adjustment in adopting what the interviewer had said. The problem was that often they failed to assimilate this to their own stance in order to provide a coherent expansion of their own.

On a theoretical level, our interpretation of the findings differs from Theory of Mind accounts for atypicalities in the conversations of individuals with autism. In Theory of Mind theorizing, prominence is given to these individuals' conceptual impairments that extend to a failure to understand other people's communicative intentions. For example, Tager-Flusberg and Anderson (1991) considered that 'autistic children show specific impairments …in acquiring the conceptual understanding of mental states in themselves and other people which show up in the paucity of the content of their communications' (p 1132), and Happé (1993) stressed how a lack of 'the ability to recognize the intention to inform' might be critical for 'the autistic communication handicap' (p 102). The account offered here does not gainsay that such understandings are important for sustaining certain aspects of dialogue, but locates the primary abnormality at a level that antedates, underlies, and extends beyond these limitations. The grounding of identification theory is to be found at the level of human beings' natural and often affectively configured *preconceptual* tendencies to be 'moved' to assimilate, and in part assume, the bodily-expressed attitudes and stances of other people, including those manifest through language. In our view, the propensity first to engage with the attitudes and stance of someone else, and then to align with, contradict, or otherwise respond in relation to that stance—propensities that have affective and motivational as well as cognitive dimensions—are ill-characterized by primary cognitive/conceptual abilities, whether from the viewpoint of ontology, development, or online processing in the dialogic moment. As Du Bois (2007) has argued, intersubjectivity grounds the sociocognitive aspects of stancetaking in dialogic interaction. The elaboration of intersubjectivity is achieved at least partly through processes of verbal engagement that include dialogic resonance.

On the side of the children's strengths, it is clear that often children with autism find ways to sustain conversational interaction, even if their attempts are partial and sometimes inadequate. For example, Ochs and Solomon (2005) highlight how high-functioning children with autism may have strengths in formulating utterances as sequentially appropriate and 'proximally relevant' to a prior conversational move. They can do this by means of relating to the local if not the global topic of the discourse, and by shifting the focus away from personal states and situations to locally salient yet impersonal, generalized, or objective cultural knowledge. Note again, attention to 'local topics' might be achieved with little attention to a conversational partner's stance in relation to those topics. The present study further illuminates how persons with autism can achieve coherence across conversational moves, for example through frame-grabs. At the same time, our results highlight how patchy and partial such communicative adjustments may be.

In conclusion, abilities and limitations among persons with autism in the production and comprehension of dialogic discourse are likely to reflect cognitive abilities and limitations *and* primary social-relational abnormalities that have affective and motivational as well as cognitive dimensions.

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