Features Leading to Judgements of Inappropriacy in the Language of Speakers with Autism: A Preliminary Study

Caractéristiques entraînant des jugements d'incongruité langagière chez les locuteurs autistes : une étude préliminaire

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Abstract

Spontaneous language in children with autism has been consistently described as "inappropriate," yet few studies have explored specific utterance characteristics leading to such judgements. This project represents a preliminary investigation in this direction. Following Bishop and Adams' (1989) procedure, transcripts of conversations from children with autism and appropriately matched controls were examined for utterances judged to be "inappropriate." Such utterances were subsequently classified based on the features leading to that judgement. The frequency of occurrence of the total number of "inappropriate" utterances as well as of each subtype was then compared between groups. Results indicated that children with autism did produce significantly more "inappropriate" utterances. Specifically, they were differentiated from the controls by their production of utterances containing "too little" or "too much" information. In addition, they were unique in the production of utterances of "unusual or inappropriate content or style." Implications of these findings are discussed.

Abrégé

On décrit généralement le langage spontané des enfants avec autisme comme étant « inapproprié », mais peu d'études ont examiné les caractéristiques des énoncés particuliers qui justifieraient de tels jugements. Ce projet constitue un examen préliminaire dans cette direction. En suivant la procédure de Bishop et Adams (1989), des transcriptions de conversations d'enfants avec autisme et de témoins appropriés ont été examinées pour y relever les énoncés qualifiés d'« inappropriés ». Ces énoncés ont ensuite été classés selon les caractéristiques entraînant ce jugement. La fréquence d'occurrence du nombre total d'énoncés « inappropriés » ainsi que de chaque sous-type a ensuite été comparée chez ces groupes. Les résultats ont démontré que les enfants avec autisme produisent un nombre significativement plus important d'énoncés « inappropriés ». Plus spécifiquement, ils se différencient des témoins par leur production d'énoncés contenant « trop peu » ou « trop » d'information. En outre, seuls les enfants avec autisme produisent des énoncés ayant « un contenu ou un style inhabituel ou inapproprié ». La portée de ces conclusions est discutée.

Key words: autism, pragmatic language disorder

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Autism is a developmental disorder characterized by difficulties in reciprocal social interaction and communication, and by the presence of repetitive or stereotyped behaviour (American Psychiatric Association, 1994). For some time now, there has been a consensus that the language and communication problems in autism rest primarily in the area of pragmatics or the appropriate use of language in social situations (Baron-Cohen, 1988; Tager-Flusberg & Anderson, 1991).

Pragmatic language impairments in children with autism have been noted since the earliest descriptions of this condition. For example, the communication of children with autism has been described as "peculiar and out of place in ordinary conversation, irrelevant" (Kanner, 1946, p. 243), "formal, demonstrating a lack of ease in the use of words" (Rutter, 1965, p. 41), "stereotypic, inappropriate" (Bartak Rutter & Cox, 1975, p. 137), and "metaphorical" (Cantwell, Baker, & Rutter, 1978, p.357; Kanner, 1946). One common theme running through these descriptions is that listeners judge the language of persons with autism to be "inappropriate" for a given conversational context.

What particular features in the language of speakers with autism lead to these judgments of inappropriacy? Several attempts have been made to specify the nature of the pragmatic language deficit associated with autism. For example, speakers with autism have been shown to have difficulty initiating a conversation (Langdell, 1980 in Baron-Cohen, 1988; Tager-Flusberg, 1996). They appear to have difficulty taking turns appropriately in a conversation. They fail to signal turn boundaries using eye gaze (Mirenda, 1983 in Baron-Cohen, 1988), they interrupt more frequently (Pacci-Cooper, Curcio & Sacharko, cited in Curcio & Paccia, 1987), and they use inappropriate strategies such as echolalia (Prizant & Duchan, 1981; Prizant & Rydell, 1984). Some also rely heavily on questions (Hurtig, Ensrud, & Tomblin, 1982). Topic maintenance and development also is problematic. Once established, a topic may not always be expanded or developed by the addition of new, relevant information (Baltaxe, 1977; Eales, 1993; Fay & Schuler, 1980; McCaleb & Prizant, 1985; Tager-Flusberg & Anderson, 1991). In addition, topics are not always adequately maintained. Sudden and inexplicable topic shifts may occur (Eales, 1993; Fine, Bartolucci, Szatmari, & Ginsberg 1994).

Most of these studies investigating the pragmatic language deficit associated with autism have relied on analytic procedures derived from linguistic analyses of normal conversation. Usually, investigators have identified conversational parameters in typically developing speakers and then examined the performance of speakers with autism to determine whether or not the identified feature posed a difficulty. This approach, where studies of language skill in any population are guided by examination of language behaviours derived from normal development, was described as "etic" analysis by Bloom and Lahey (1978). While such an approach is unquestionably valuable for comparing the language of children with autism to their typically developing peers, there is a risk that such research may miss the very behaviours that can make children's conversation appear inappropriate (Bishop & Adams, 1989). In order to fully understand the language of children with autism, we need not only to know how they compare to typically developing peers, but also what makes them stand apart. This requires analytic procedures that move beyond taxonomies based on normal development to more sensitive systems developed from samples of atypical language users. Bloom and Lahey (1978) termed this level of analysis an "emic" approach and recommended that it serve as complementary to broader etic analyses in examining language disorders in children.

Using an "emic" approach to study the language of children with autism might reveal features that have not previously been identified but which cause conversational partners to judge the language of children with autism as inappropriate. If so, there would be important clinical implications. Speech-language pathologists aim to promote the development of communication skills that will enable their clients to participate fully in their community (Paul, 2001). Language characteristics that give rise to negative judgements about the communicative competence of the speaker with autism will impede their effective integration (Koegel, 2000). In order to focus intervention efforts, it is imperative that we gain a fuller understanding of these language features.

Bishop and Adams (1989) developed a system for such an examination of pragmatic language deficits. Instead of looking for occurrences of specific categories of conversational behaviour defined in advance, they began by identifying conversational utterances that were judged to be inappropriate. These utterances were then coded according to the characteristics that led to the judgment of inappropriacy. They found that "inappropriacy," although loosely defined, was a characteristic that could be reliably identified. Bishop and Adams (1989) also demonstrated that their subsequent subcategorization of particular types of inappropriacy was successful in discriminating children with semantic-pragmatic disorder from other language-impaired children and from those who are typically developing.

The project reported herein aimed to investigate pragmatic language skills in children with autism using this protocol in an effort to determine what features of the language produced by speakers with autism led to judgments of inappropriacy. Analyses were conducted on language samples collected from high-functioning children with autism. These samples were compared to samples collected from typically developing children who were similar in age, nonverbal IQ, and expressive language level. Thus, this study employs both emic and etic approaches. By focusing on features that provoke judgements of inappropriacy, we probe the depth and breadth of the pragmatic language deficit associated with autism. By examining the language of typically

developing children matched for age, nonverbal problem solving and standard indices of linguistic sophistication, we can determine what features are attributable to the presence of a pragmatic language disorder and are not accounted for by years of experience, cognitive skill, or general language level.

The following questions were asked: Do young, high functioning children with autism display more inappropriate utterances than control participants selected to be similar on age, nonverbal cognitive ability, and standard measures of expressive language skill? If so, what types of features in their conversation lead to judgments of inappropriacy? Finally, have such features already been identified in the literature documenting pragmatic deficits in autism or do the samples reveal additional "not-yet-specified" abnormalities that contribute to listener perceptions of oddness in the language of speakers with autism?

Method

Participants

The data analyzed in this project were a subset of data collected for a previous study (Volden & Johnston, 1999). Nine participants with autism, ranging in age from 6 years, 10 months to 10 years, 3 months, were recruited from suburban school districts, from local associations providing therapeutic services to people with autism, and from a tertiary diagnostic centre for children in British Columbia's Lower Mainland. These participants had received a diagnosis of "autism" by a child psychologist or child psychiatrist using either DSM-IIIR (American Psychiatric Association, 1987) or DSM-IV (American Psychiatric Association, 1994) criteria, depending upon which was most recent at the time of diagnosis.

Participants in the control group were obtained through the cooperation of a local school district. They consisted of nine children, identified as "average" by their teachers, and selected to be similar on chronological age, nonverbal IQ, and language level to the participants with autism. For all participants, language level was evaluated by either the primary or intermediate level of the Test of Language Development (Newcomer & Hammill, 1988; Hammill & Newcomer, 1988). Nonverbal cognitive ability was also assessed, using the Test of Non-Verbal Intelligence (TONI; Brown, Sherbenou, & Johnsen, 1990).

Procedure

Transcripts of script narratives generated for an earlier study (Volden & Johnston, 1999) were analyzed. In the original study, the principal investigator directed each participant to generate a script narrative ("Tell me what happens when...") for each of three commonly occurring situations (going to a restaurant, going grocery shopping, going to a movie). Neutral probes (e.g., "Anything else?") were inserted whenever participants paused in recounting their narratives unless they had indicated in their account that the script was finished (e.g., "That's it," "That's the end," etc.). This was done to ensure that they were not presented with the next situation until they were satisfied that they had finished the present one. Generation of all three narratives typically took 15-20 minutes. All interactions were videotaped and transcripts of all three narratives were generated. These transcripts were analyzed for the current project.

For this investigation, an independent rater (i.e., a clinical speech-language pathologist with 20 years experience in dealing with atypical children) blind to diagnosis, age, IQ, or language status of the participants, was trained in the use of the Bishop and Adams (1989) protocol. Training consisted of applying the Bishop and Adams' (1989) procedure to transcripts of language samples of speakers with autism who were not involved in the current study. The Bishop and Adams (1989) protocol involves examining language transcripts in two stages: (a) identifying utterances as inappropriate and (b) determining a reason for their being judged inappropriate. For the training phase, inter-rater agreement between the independent rater and the principal investigator was calculated on two training transcripts using the following formula: number of agreements/(number of agreements + number of disagreements) x 100. The result was 93% for judgements of "inappropriateness" and 85% for subsequent detailed classification of subtypes of inappropriacy. Differences at each stage were resolved by discussion prior to the rater examining transcripts for the study.

After training, the independent rater examined the transcripts included in this project. As previously mentioned, the Bishop and Adams (1989) procedure calls for assessing utterances in two stages. At the first stage, utterances in the transcript that were judged to be "inappropriate" were flagged. An "inappropriate" utterance was defined as one that strikes a competent communicator, on first impression, as odd and/or disrupting the normal conversational flow (Bishop & Adams, 1989). At the second stage, only those utterances flagged in the first stage as inappropriate were examined. They were then classified according to the reason for a judgement of inappropriacy. In the second stage, the coding system developed by Bishop and Adams (1989) to classify utterances as to subtype of inappropriacy was used. Codes included the following:

1. Expressive problems in syntax/semantics: This code was applied if the sense of inappropriacy appeared to arise because of syntactic error(s) or unusual semantic selection(s). For example:

> Child (describing the process of going to the grocery store): After you're finished then you go to the cashier. Then you go out the door. If it's at the *beginning* then you can go to the mall.
>
> Adult: At the beginning?
>
> Child: Then you can just go into the mall.

It appeared that the child intended to describe the grocery store as at the *entrance* to a shopping mall, but chose the word 'beginning' instead. While syntactic form was intact in this utterance, the selection of lexical items is unusual and the utterance appears odd to a listener as a result.

2. Failure to comprehend literal meanings: This code was applied when the child responded to a related topic, not to the one posed by the speaker. For example:

> Adult (attempting to elicit a description of "going to a restaurant"): So, you're going to the White Spot (name of a local restaurant chain). Then what happens?"
>
> Child: "We don't go in the White Spot, we go in van."

Instead of responding to the query about what happens when you go to a restaurant, the child has explained the method of transportation of how he would get there.

3. Pragmatic Problems I: Violation of Exchange Structure. This category was used when a child failed to obey conversational rules about the types of utterances that may follow one another in order to sustain coherent conversation. Possible utterance types include (i) no response to an adult initiation or (ii) ignoring an initiation while remaining on topic. An example (taken from Bishop & Adams, 1989) of the latter is:

> Adult: where did you go on your holiday?
>
> Child: Scotland.
>
> Adult: oh, and how did you get there?
>
> Child: and we went to Spain as well.

4. Pragmatic Problems II: Failure to use Context in Comprehension. Utterances were coded in this category if they were judged to be inappropriate by virtue of the child understanding the literal meaning of the adult utterance but misunderstanding the intention due to a failure to use linguistic, environmental or social contexts. An example might be responding to an indirect request such as "Can you pass the salt?" with "Yes" (and not passing the salt).

5. Pragmatic Problems III: Too Little Information Provided to Partner. This code was used when utterances were judged to be odd because they did not provide the listener with enough information (Grice, 1975). Three types of inappropriate utterances were included:

(i) inappropriate presuppositions – where the child omitted one or more elements apparently wrongly presupposing that the listener had knowledge of the omitted words. An example is:

> Adult: Where do you get the skytrain?
>
> Child: At the end.
>
> Adult: At the end?
>
> Child: At the end of the track.

(ii) unestablished referents – where a term was used for which the reference had not been sufficiently established. For example:

> Adult: What happens when you get to the grocery store?
>
> Child: Buy it.

or (iii) a logical or critical step was omitted in a sequence.

> Child: You finish eating.
>
> Adult: And then what?
>
> Child: Walk.
>
> Adult: Walk?
>
> Child: Walk in the mall.

In the latter case, the child had clearly left out information about paying the bill and leaving the restaurant.

6. Pragmatic Problem IV: Too Much Information Provided to Partner. Codes were assigned in this category when unnecessary information was provided to the conversational partner. Two types of behaviours occurred within this category: (i) excessive elaboration and (ii) unnecessary reiteration. An example of excessive elaboration is the following:

> Adult: So tell me what happens when you go to the grocery store.
>
> Child: You buy carrots.
>
> Adult: Uhhuh.
>
> Child: Potatoes.
>
> Adult: Uhhuh.
>
> Child: Apples.
>
> Adult: Um.
>
> Child: Oranges.
>
> Adult: Uhhuh.
>
> Child: Lettuce.
>
> Adult: Uhhuh.
>
> Child: Macaroni.

Adult: Uhhuh.

Child: Cheese.

Etc.

The child's script narrative describing what happens in a grocery store provided a long list of specific foods to be purchased, each as a separate step in the process.

An example of unnecessary reiteration, where a child reiterated a piece of information that had already been established, is as follows:

Child: (describing how one goes to a movie) You get in the car.

Adult: Uhhuh, and then what?

Child: You get in the car and go.

7. Unusual or Socially Inappropriate Content or Style. Utterances coded in this category included those where the content was bizarre or the style inappropriate for the conversational context. Examples include instances of topic drift, as in:

Adult: You get to the end of skytrain and then what?

Child: Well seabus is the way you get to skytrain.

or unmarked topic shift such as:

Adult: So, you watch the movie. Then what?

Child: A cabbage keeps rolling up in my head.

Shifts of this sort are often so abrupt that a listener judges the semantic content to be bizarre.

This category also included utterances that were unusual because of socially inappropriate remarks, such as questions that were over-personal (e.g., Asking an unfamiliar adult whether or not she had ever been a bridesmaid) or marginally rude (e.g., "I don't wanna tell you that." in reference to a question about what happens next in a restaurant.)

Inter-rater Agreement

The independent rater's "flags" and her subsequent "codes" were compared to the ratings of the principal investigator on 20% of the transcripts selected at random. Inter-rater agreement was established at 95% for "flags" and 88% for subsequent "codes" by applying the following formula: Number of agreements/(Number of agreements + number of disagreements) x 100. Differences at each stage were resolved by discussion before proceeding.

Results

Preliminary analysis of participant characteristics, to confirm that the groups were comparable, included t-tests on the following measures: language age, nonverbal IQ, and chronological age. There were no significant differences between the groups on any of the measures. There were not significant between-group differences for mean language ages (Autism M = 6 yrs 8 mos, *SD*= 2 yrs. 5 mos., Range = 4 yrs. 8 mos. – 12 yrs. 11 mos.; Control M = 6 yrs. 8 mos., *SD* = 1yr. 8 mos, Range = 5 yrs. 2 mos. – 10 yrs. 7 mos; t (16) = .03, $p > .05$, n.s.). Similarly, there were no significant between-group differences for nonverbal IQ means of 102.9 (*SD* = 20.9; Range = 83-136) for the group with autism, and 108.22 for the typically developing controls (*SD* = 7.8; Range = 93-118), (t (16) = .72, $p > .05$, n.s.) Average chronological ages of 8 years, 1 month for the group with autism (*SD* = 1 yr; 2 mos, Range = 6 yrs; 9 mos – 10 yrs; 3 mos) and 8 years for the controls (*SD* = 2 yrs; 10 mos; Range = 5 yrs; 6 mos – 14 yrs.; 9 mos.) were not significantly different (t (16) = .15, p>.05, n.s.).

As shown in Table 1, the first analysis examined overall frequency of inappropriate utterances across all three narratives. Utterances flagged as "inappropriate" were tallied for each participant and the proportion of flagged to total utterances calculated. The group diagnosed with autism produced a mean proportion of inappropriate utterances of .19 (*SD*=.18, *Range* = 0 - .43) compared to a mean proportion of .02 (*SD* = .04, *Range* = 0 - .10) in the control group. Average proportions of total utterances judged to be "inappropriate" were significantly different between groups using a *t*-test [t (16) = 2.8, $p < .02$].

The second analysis examined specific types of inappropriacy coded from the detailed examination of the flagged utterances (See Table 1). Each subtype of inappropriacy occurred too infrequently within the control group to allow for a meaningful examination of central tendency. Instead, the number of cases producing one or more of each subtype of inappropriate utterance was compared between the group with autism and the control group (Fisher's Exact Probability; Siegel, 1956) in order to assess the extent to which individual participants varied in utterance type between diagnostic groups.

Significant differences were found on three of the seven subtypes identified by Bishop and Adams (1989). Six of the nine participants with autism produced utterances containing "too little information" compared to one of nine children in the control group (Fisher's Exact Probability of this occurring by chance = .02). Utterances classified as having "too little information" included instances of (a) pseudo-ellipsis (where the child

Table 1
Number and Proportion of "Inappropriate" Utterances by Group

Group	Total Utterances	Total Flagged	Proportion Inappro-priate	Number of Utterances by Subcategory						
				Exp. Syn./Sem.	Literal Comp.	Exch. Struc.	Fail Context	Too Little**	Too Much**	Soc Inap.**
Autism (*n* = 9)										
1	59	3	.05	2	0	0	0	0	0	1
2	54	21	.39	4	0	0	0	1	4	12
3	33	3	.09	0	0	0	0	1	0	2
4	42	18	.43	0	0	1	0	11	4	2
5	251	17	.07	0	1	6	0	5	2	3
6	34	1	.03	1	0	0	0	0	0	0
7	75	0	0	0	0	0	0	0	0	0
8	54	13	.24	6	0	0	0	6	1	0
9	73	29	.40	11	0	0	0	12	3	3
Mean (*SD*)			.19* (.18)							
Range			0 - .43							
Control (*n* = 9)										
1	31	0	0	0	0	0	0	0	0	0
2	42	0	0	0	0	0	0	0	0	0
3	34	3	.09	1	0	0	1	1	0	0
4	28	0	0	0	0	0	0	0	0	0
5	30	0	0	0	0	0	0	0	0	0
6	53	0	0	0	0	0	0	0	0	0
7	38	0	0	0	0	0	0	0	0	0
8	27	0	0	0	0	0	0	0	0	0
9	30	3	.10	3	0	0	0	0	0	0
Mean (*SD*)			.02*(.04)							
Range			0 - .10							

Notes. * Means significantly different using *t*-tests, $p < .02$
** Significant differences found between number of cases with autism producing these types of inappropriacy and number of cases in typically developing contol group, Fisher's Exact Probabilities = .02 for "too little", .01 for "too much" and .004 for "socially inappropriate"

omitted a word, apparently wrongly presupposing that the listener had knowledge of the omitted word), (b) using an unestablished referent, or (c) omitting a logical step in an argument or a sequence.

"Too much information" was coded when (a) a fact was unnecessarily asserted or denied, (b) a child tended to over-elaborate on a topic, (c) a child attempted to reiterate a piece of information that had already been established, or (d) ellipsis was not used. Five of nine

participants with autism produced utterances with "too much information" compared to zero of nine children in the control group. The Fisher's Exact Probability of this constellation of scores occurring by chance equalled .01.

Finally, six or nine participants with autism versus zero of nine children in the control group produced utterances with "unusual/socially inappropriate content or style" (Fisher's Exact Probability = .004). Utterances falling in this category were generally characterized by being abnormal in content (i.e., the expression might be clear but the utterance seemed inappropriate or bizarre within the context). While Bishop and Adams (1989) identified five classes of conversational behaviour that would be coded in this category (including topic drift, unmarked topic shift, stereotypic language, inappropriate questioning, and unusual or socially inappropriate content or style), many of the utterances in the current project clustered in the last of these classes. Children in this sample tended to make socially inappropriate remarks (remarks which were over-friendly or over-personal, or remarks that would be construed as rude within the context).

Discussion

Overall, children diagnosed with autism produced significantly more "inappropriate" utterances than typically developing children who were similar in chronological age, nonverbal IQ, and language age. Subsequent analysis to determine subtypes of inappropriacy revealed that three of the seven subtypes described by Bishop and Adams (1989) were most prevalent. They were (a) utterances containing "too little" information, (b) utterances containing "too much" information, and (c) utterances that contained unusual content or employed a socially inappropriate style. Of these, the category described as "too little" information has previously been identified, albeit indirectly, as an area of difficulty for speakers with autism. Fine et al. (1994) demonstrated that speakers with autism had difficulty appropriately using strategies that would ensure joint reference between speaker and conversational partner. One effect of inadequate referencing is the production of utterances that supplied too little information to the partner. Utterances containing "too much" information have not previously been identified in empirical investigations specifically, but previous references to such utterances can be found in anecdotal case reports and clinical accounts (Baron-Cohen, 1988).

The third significant category of "inappropriate" utterance was labelled "unusual or socially inappropriate content or style." Bishop and Adams (1989) identified several types of utterances to be coded in this category. Two of these, unmarked topic shift and topic drift, have been specified previously as problematic for speakers with autism by Tager-Flusberg and Anderson (1991), Eales (1993), and Fine et al. (1994). The children in this sample though, also made remarks that were coded as being odd solely by virtue of their being socially inappropriate. These utterances were structurally sound and fully comprehensible, but rated as disruptive to the conversational flow because something about either the content or the delivery led the independent rater to judge them as odd or unusual.

On examination, the feature that distinguished the "inappropriate" utterances was that they were delivered in a conversational style that was inappropriate for the situation. In other words, utterances included in this category might be totally appropriate in another context, but inappropriate in the experimental one. For example, asking an acquaintance "Have you ever been a bridesmaid?" is regarded as normal if said by one of two women who were being introduced at the wedding rehearsal of a mutual friend. The same question could be a part of an appropriate conversation if two girls were playing with dolls in a role-play involving a wedding. However, such an utterance is inappropriate when it is used to initiate conversation between a child of eight and an unfamiliar adult in a school classroom when the adult has just finished explaining an task, when nothing in the room, the task, the materials, or the adult's demeanour suggested weddings in any way. Similarly, refusing to answer a question (e.g., "I don't wanna tell you that") is well within the rights of any conversational partner and might well be an appropriate response in a casual conversation between two individuals who are friends. Given the context of a semi-structured test situation with an unfamiliar adult, such a remark, following a neutral request like "And then what happens?" or "Anything else?" struck both the conversational partner and the independent rater as odd. This conversational feature (i.e., using a conversational style that is inappropriate for the situation) has not been previously identified in experimental studies as a specific area of pragmatic dysfunction for speakers with autism.

Neither the number of utterances classified as "socially inappropriate" (see Table 1) nor the proportion of socially inappropriate to total utterances was large (M = .044, SD =.07, Range = 0 - .22), yet they clearly contributed, in this study, to perceptions of inappropriate language in speakers with autism. As Prutting and Kirchner (1987) noted, the frequency of occurrence of a specific pragmatic dysfunction is not by itself a sufficient index of the severity of its impact on communicative competence. Volden and Lord (1991) suggested that heightened salience of relatively rare phenomena might, at least partially, be accounted for by the overall

communicative profile of the child with autism compared to the typically developing child. When typically developing young children ask personally intrusive questions (e.g., a child of three or four years of age asking an unfamiliar adult their age), they are often met with an indulgent smile and their intrusiveness excused as a natural extension of a developing child's boundless curiosity. When the same type of stylistically inappropriate utterance appears in the language of older children with autism, it may occur in the context of a communicative profile that includes sophisticated sentence construction and semantic content. Perhaps the differing listener expectations of older, bigger children in less playful social situations and within the context of apparently well-developed language skills account for increased sensitivity to relatively rare linguistic phenomena.

The group with autism was unique in producing stylistically inappropriate utterances. Utterances of this sort were not present in the control group, so it is unlikely that they would be included in any analysis that was generated by parameters typical of normal conversation. This finding lends some support to the contention of Bishop and Adams (1989) that analyses which spring from the tenets of typical conversation may risk losing the very features that make the language of populations with special needs so unusual.

In addition, because utterances that violate social expectation did not occur in the control group, intriguing questions about the source of such utterances arise. One possibility is that the speaker with autism may not have the social knowledge required to perform appropriately (Schopler & Mesibov, 1995) that is, they may not understand the various social roles (e.g., authority vs. social intimate) adopted within interactions or the need to vary language style according to the situation. Alternatively, children with autism may understand differences in social roles but not possess the ability to manipulate language style. While the language skills required to adjust style develop by the age of four in the typically developing population (Andersen, 1984; Sachs & Devin, 1975; Shatz & Gelman, 1973), and even the least able children in this sample had language skills well beyond this level, it is possible that children with autism specifically do not understand the parameters of a variety of language registers. For example, they may not understand the dimensions of language that render it more or less polite. Finally, they may understand all of the individual elements listed above but be unable to choose the appropriate option when faced with the complexities of a constantly changing conversational environment. This suggests a fundamental difficulty in executive processing as suggested by Ozonoff (1995). None of the above alternatives with reference to difficulties in the use of language style have been specifically investigated in the population with autism and all of them present intriguing questions for future work in this area.

Any conclusions drawn from this investigation must be considered preliminary for several reasons. Due to the small sample sizes employed, these analyses should be extended to larger groups of speakers with autism at varying developmental levels to determine if they persist throughout the population. In addition, other groups with language disorder (e.g., the developmentally disordered) also should be examined to determine whether these types of inappropriate utterances, if they persist, are specific to the population with autism or a more general characteristic of disordered language.

The reader also should note that the children in the control group have unexpectedly low language scores given their chronological age, their nonverbal IQ score, and their teacher's rating as "average." Larger samples may reveal children with more typical language levels. Still, even with language skills that were lower than would be expected, children in the control group made significantly fewer errors in appropriacy than their counterparts with autism. It seems likely that a comparison group with better language skills would only exacerbate the differences. Finally, in this project, judgements of inappropriacy were made from transcripts alone, without the benefit of audio or videotapes. While this was a deliberate decision to ensure that the independent rater would not be influenced by idiosyncratic or bizarre behaviour or the unusual physical appearance of some of the participants, it should be noted that gestures and prosodic cues also are influential in judging whether or not a speaker is behaving appropriately. A review of the videotapes by the principal investigator revealed no instance where gestural or prosodic cues would have rendered an utterance flagged as inappropriate to be judged as normal. However, paralinguistic cues remain an important factor and should be considered in future work on this topic.

In summary, the group with autism was unique in using socially inappropriate language styles and bizarre semantic content. While these descriptors have sometimes been applied to the language of children with autism, they have received little systematic research attention. Findings of this project suggest that these types of inappropriate utterances do influence listeners' perceptions of inappropriacy in the language of children with autism. From a clinical perspective, speech-language pathologists, teachers, and other service providers should be mindful of the possible influence of such utterances on the ability of children with autism to

integrate successfully into schools and the larger community. Theoretically, because such utterances were not found in the typically developing control group, identifying the underlying deficits that might explain their presence should yield important clues about the nature of the fundamental deficit in autism.

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