

Behaviour is Communication: Nonverbal Communicative Behaviour in Students with Autism and Instructors' Responsivity

Nancy L. Freeman, Adrienne Perry, James M. Bebko

Abstract

People with autism have severe communication deficits, with many functioning at a prelinguistic level. Consequently, it is important for adults to recognize and respond to nonverbal behaviours as communicative. In the present study, students with autism were videotaped during a social interaction with a familiar instructor. Communicative behaviours and their perceived functions were later identified by the instructor. Trained coders also identified potentially communicative behaviours and the instructors' responsivity to these behaviours. Overall, students displayed a wide range of nonverbal communicative behaviours, serving a wide range of perceived communicative functions at a high frequency and instructors responded to these behaviours at a high rate.

Individuals communicate within the context of social interaction, suggesting that the onus for communication is shared by both partners in an interchange. If communication is defined as the process of exchanging information, behaviour serves as a communicative cue when others in the environment view the behaviour as conveying a message regardless of whether it was intended that way (Freeman, 1993a; 1997; Stillman & Siegel-Causey, 1989). Within the developmental literature, it is argued that when the social interaction involves an immature communicative partner (e.g., an infant), prelinguistic and unintentional communication is interpreted as intentional by the adult. This provides a type of "scaffolding" to support the infant in achieving the (presumed) intended goal (Bruner, 1975). For example, an infant may look at a toy and an adult interprets this as the child indicating a desire for the toy, even though the infant did not intend to communicate this desire. Given that individuals diagnosed with autism have severe communication deficits (both verbal and nonverbal), with many functioning at a prelinguistic level, a developmental approach would recommend that adults provide a similar level of scaffolding by interpreting and responding to behaviours which they interpret as communication and which frequently appear in nonsymbolic or unconventional form, as well as those

which represent conventional, but developmentally immature forms of communication. There is a substantial research literature supporting the idea that some people with autism display destructive behaviours (e.g., self-injury, aggression) which have been shown to serve communicative functions when properly analyzed, for example a desire for attention, a request for desired object, and to protest or refuse to respond to request (Carr, Robinson, Taylor, & Carlson, 1990; Donnellan, Mirenda, Mesaros, & Fassbender, 1984; Freeman, 1993b). Note that these are not intentional communications on the part of the individual with autism, but can serve a communicative function. Furthermore, the state of the science treatment for problematic behaviours is to replace these behaviours with more acceptable alternatives which serve the same communicative function (Condillac, 2003; Durand & Merges, 2001; Freeman, 1993b; National Institutes of Health, 1991). However, there has been little research examining other spontaneous nonverbal communication shown by people with autism, or familiar adults' perceptions and interpretations of these potentially communicative behaviours. This is a particularly important area for research, as unconventional behaviours may only be recognized as communicative by familiar adults (Freeman, 1993a). Further, there is little known empirically about adults' responsivity to these communicative behaviours when they do occur. While the need for interpretation of such potential cues has begun to be recognized, there is also the possibility for misinterpretation, which clearly carries risks (Brown, Gothelf, Gess, & Lehr, 1998).

Research examining nonverbal communication in children with autism has demonstrated deficits in joint attention, socially directed requesting, facial expression, and eye gaze, based on observations made by trained coders (Dissanayake & Crossley, 1996; McArthur & Adamson, 1996; Mundy, Sigman, & Kasari, 1990; 1994). However the literature has not examined what familiar adults define as nonverbal communication in children they know well. Adults familiar with a child might reasonably be expected to interpret unconventional or idiosyncratic communicative behaviours differently than researchers unfamiliar with the child's particular communicative cues. Further, most of the published research has been conducted in semi-structured or structured situations designed to elicit specific behaviour, rather than examining the range of spontaneous behaviours in naturalistic situations.

In the field of autism there has been little research examining the functions of spontaneous nonverbal communication other than problematic behaviour. In the intervention literature the communicative functions of problem behaviour frequently described include requesting, protesting, commenting/telling, etc. (e.g., Donnellan et al., 1984; Stillman & Siegel-Causey, 1989). The studies conducted have tended to combine behaviour and function into a few categories, have reported limited reliability, or have been qualitative with no reliability determined (Frankel, Leary, & Kilman, 1987; Freeman, 1991; Stone & Caro-Martinez, 1990). Further, the research

that has been conducted has explored communication from a single perspective, either that of trained observers, or adults serving as "untrained" observers reporting on their perceptions of children's behaviour.

In one of the few studies specifically examining adult responsivity to nonverbal behaviours during interactions with autistic children, Dawson, Hill, Spencer, Galpert, and Watson, (1990) found parents were less likely to return the smiles of a child with autism than were parents of typically developing children. However, parents of children with autism have been found to be more likely to give positive feedback to their child with autism relative to comparison children, and were as responsive to their child's pointing, showing, and offering as the comparison parents (Kasari, Sigman, Mundy, & Yirmiya, 1988). In classroom settings, initiated expressions of choice or preference by students with disabilities have resulted in low rates of responding by professionals (Houghton, Bronicki, & Guess, 1987), suggesting that choices and preferences may not receive the adult reaction necessary to assist students in achieving what they want. Further, even among those familiar with a child, differences in recognition and interpretation of communicative behaviours have been found (Freeman, 1991; Payne & Ogletree, 1995; Wilcox, Kouri, & Caswell, 1990).

In summary, many people with autism do not communicate effectively using traditional means. Although many have significant deficits in the area of nonverbal communication, when these behaviours do occur, they should be recognized as potentially communicative. There has been little research examining spontaneous nonverbal communication shown by children with autism, or familiar adults' perceptions and interpretations of these potentially communicative behaviours. This is a particularly important area to study, as children may display unconventional behaviours which are only recognized as communicative by familiar adults. Further, there is little known about adults' responsivity to these communicative behaviours when they do occur.

The purpose of this study was to conduct a systematic examination of nonverbal communicative behaviours using multiple perspectives (both trained observers and instructors familiar with children's idiosyncratic communication) and to explore instructors' responsivity to these subtle but important cues. More specifically, the objectives in this study were as follows:

1. To compare the frequency of potentially communicative behaviours displayed by a group of students with autism, as identified by trained observers and familiar instructors;
2. To identify the communicative functions perceived by familiar instructors; and,
3. To determine the proportion of communicative behaviours to which instructors responded.

Method

Participants

Thirty-six students (26 males, 10 females) from a day treatment and/or residential program for individuals with autism participated in the study, along with the one-to-one instructor most familiar with the student. The students ranged in age from 6 to 24 years ($M = 13$ years, 5 months, $SD = 5$ years). All students fell within the range of autism on the Childhood Autism Rating Scale (Schopler, Reichler, & Renner, 1988). Based on DSM-IV criteria (APA, 1994), 34 students were diagnosed with autism, and 2 with Pervasive Developmental Disorder - Not Otherwise Specified. Receptive language age equivalent skills on the Peabody Picture Vocabulary Test - Revised (Dunn & Dunn, 1981) could only be calculated for the 34 students who achieved a basal score, and ranged from 22 to 50 months ($M = 28$, $SD = 7$). Adaptive functioning across all three domains on the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984) was significantly impaired for all students: Communication ($Mdn = 19$, range <19 to 45), Daily Living Skills ($Mdn = 19$, range <19 to 48), and Socialization ($Mdn = 24$, range <19 to 52).

Thirty-six direct-care instructors also participated in the study. The length of time instructors and students had known each other ranged from 0.1 to 14 years ($M = 2.9$, $SD = 2.7$).

Procedure

Students were filmed during a 15-minute unstructured social interaction with a familiar instructor. Two weeks later the instructors viewed the videotape of their own interaction with the student. The instructors were asked to identify student behaviours they thought were meaningful, and the communicative functions served. This videotape playback session was audiotaped, and later coded across 14 behaviours and 10 communicative functions. Nine potentially communicative student behaviours were also coded by trained observers directly from the videotape, based on a coding scheme developed for this project. Finally, the presence or absence of an overt response by the instructor to a student behaviour (that they themselves identified as meaningful) was coded. In order for instructors' behaviour to be coded as a response, it had to be contingent (within 2 seconds), and potentially noticeable from the students' perspective. Due to the difficulties students with autism have understanding subtle nonverbal communication, joint attention, and theory of mind, less salient forms of adult behaviour were coded as non-responses.

Reliability was calculated for each aspect of the coding. Interobserver agreement was calculated for 25% of the audiotapes, selected at random. The overall intercoder agreement for these audiotaped instructors' reports was 89% collapsed across 14

behaviours and 83% agreement collapsed across 10 communicative functions. Interobserver agreement was also calculated for 28% of the videotapes, selected at random. The overall interobserver agreement across 9 behaviours on videotape was 75% agreement for exactly the same behaviour at exactly the same time. This level of agreement increased to 81% when hand gestures were collapsed together (e.g., point with finger, push with finger). Finally, for the responsivity coding, Cohen's kappa was .77 (on 25% of the videotapes selected at random), and there was 89% interobserver agreement.

Results

Trained observers identified a mean of 55 (SD = 24) behaviours per student across the 15-minute interaction, indicating that, on average, students displayed a potentially communicative behaviour every 16 seconds. This is an extremely high rate given the communicative deficits considered typical in autism. Further, even at the lowest end of the range, a student displayed 11 behaviours, a rate of one potentially communicative behaviour every 82 seconds. The most frequently occurring nonverbal behaviour was gazing at the adult, followed by grabbing an object. Both of these behaviours were observed more than once in every student participating (see Table 1 for mean frequency of individual behaviours).

Instructors reported a mean of 48 (SD = 23) nonverbal behaviours. The most frequently reported behaviours by instructor-therapists was a general "other" category (which included behaviours such as motor exploration, vocalization, looking away, etc.), followed by grabbing an object. These two categories of behaviours were identified in the largest proportion of students, and had acceptable levels of interobserver agreement. Interestingly, instructors reported very few "Gaze at Adult" and "Grab Object" behaviours relative to trained coders.

Table 1: Mean Frequency of Potentially Communicative Behaviours in Students with Autism

	<i>Coded by Trained Observers</i>		<i>Reported by Familiar Instructors</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Behaviours Coded¹</i>				
Gaze at Adult	28	22	2	3
Direct Adult	1	2	1	1
Touch Adult	2	2	1	1
Grab Object	15	7	5	4
Push Away	2	3	1	2
Give Object	3	4	2	3
Point	2	4	1	2
Learned Gesture	1	1	0	1
Decrease Proximity	2	3	1	2

	<i>M</i>	<i>SD</i>
<i>Additional Behaviours Reported by Instructors</i>		
Gaze Object	4	4
Facial Expression	4	7
Stereotypic Behaviour	2	3
Formal Communication	5	8
Other Behaviour	23	13

¹See appendix for coding scheme of behaviours.

Instructor-therapists reported a wide range of perceived communicative functions for most students (see Table 2). The functions frequently reported included requesting, protesting, answering, and surprisingly the most frequent communicative function was to express feelings. Further, examination of the second set of columns in Table 2 shows how many students displayed each function at least once. It is noteworthy that virtually all students displayed the communicative functions of explicit request, implicit request, explicit protest, implicit protest, and expressing feelings, as perceived by their instructors.

Table 2: Frequency of Communicative Functions Interpreted by Familiar Instructors

<i>Function²</i>	<i>Frequency of Function</i>		<i>Number of Students Displaying Function</i>	
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>Percent</i>
Tell	0.6	2.2	9	25%
Feelings	9.4	7.0	33	92%
Attention	2.5	3.7	24	67%
Explicit Request	9.1	6.1	35	97%
Explicit Protest	6.2	4.8	35	97%
Implicit Request	7.6	8.2	30	83%
Implicit Protest	4.4	5.2	33	92%
Answer	4.4	7.2	27	75%
Pain	0.9	1.8	13	36%
Other	4.1	4.1	27	75%

²See appendix for coding scheme of communicative functions.

Coding of responsivity indicated that instructors "responded" overtly (in the manner described earlier) to 61% of the behaviours they identified during videotaped playback. Given the stringent coding criterion used, this level of responsivity is very high. However, staff may have been highly attuned to and monitoring the student during the interaction or may have deliberately not responded, and this may have been clinically appropriate (e.g., the child looks at a desired toy which is perceived as an implicit request, and the instructor does not respond, instead waiting for more

advanced communication such as pointing to make an explicit request) but it would not have received high responsivity scores based on our definition. As a result, this should be considered a conservative estimate of responsivity to perceived communicative behaviour. Further, responsivity varied widely across communicative behaviours and functions. Instructors were more likely to respond overtly: when more than one behaviour was reported by the instructor at the same time; when behaviours were more salient or clear (directing adult, pushing away, giving object); and for more sophisticated functions than for less sophisticated functions (e.g., telling vs. implicit request).

Discussion

Students with autism displayed a wide range of developmentally early nonverbal communicative behaviours, at a high frequency. The frequency of occurrence, collapsed across categories and students was very high, averaging one potentially communicative behaviour every 16 seconds. Given the general communication deficits experienced by individuals with autism, and the overall functioning level of the participants in this study, this high frequency is quite remarkable. It suggests that many potentially communicative signals occur even during brief social interactions. Trained observers and instructors reported a similar frequency of behaviours, however the two types of observers reported somewhat different forms of behaviour as communicative. This is not particularly surprising, given that trained observers were constrained by an objective coding scheme, while familiar instructors reported subjective interpretations based on their experience with a particular student.

The results suggest that many nonverbal communicative behaviours serve a variety of communicative functions to those who know students with autism well. One of the more surprising findings was that the most commonly reported function was to express feelings, and this function was identified in all but three students. This suggests that most instructors believe that students can convey at least some feelings through their behaviour. The frequency of reported explicit requests was only slightly lower, and was displayed by all but one student. It is important to emphasize that the communicative functions were staff interpretations, not the result of a functional analysis or of preplanned events intended to elicit specific functions.

Overall, instructors responded to students' communicative behaviours at a high rate. Responsivity was only coded for instructor behaviours which might be more likely to be recognized by students, and which might convey to students that their communicative message was understood. At a more basic level, students likely receive the intermittent reinforcement necessary to increase the probability of engaging in further communicative behaviour. It is not surprising that responsivity was highest among more salient behaviours, as these are easier to respond to than more subtle behaviours. The level of responsivity also tended to increase if the

instructors reported more than one communicative behaviour, suggesting that they may be more inclined to respond overtly when they feel they have received more information from the student.

Future directions for research include the exploration of behaviours serving a communicative function for additional care providers such as parents, as a form of convergent validity, and the development of a more thorough understanding of the communication displayed. Second, it would be interesting to run analogue functional analyses (i.e., testing the effect of different learning conditions) to determine whether the reported functions are empirically validated. Further, a more elaborate approach to responsivity coding, including a broader range of instructors' responses and sequential analysis, would provide a richer understanding of social interactions. Future research could lead to the development of training to assist instructors in recognizing and responding to potentially communicative behaviour displayed by people with autism.

In summary, the results of this study suggest that all people with autism, including those who do not communicate using traditional means, display a basic repertoire of behaviours which serve to communicate to others in their environment, even if this is not intentional communication in the usual sense. In order to improve the efficacy of communication for students with autism, it is important that adults recognize that behaviour is communication.

Acknowledgements

This research was conducted, in part, to fulfil the Ph.D. requirements for the first author at York University. We would like to thank the TRE-ADD program, Thistleton Regional Centre, particularly participating staff and clients, and research assistants Carol Hadad and Mike Clayton. This research was generously supported by a Doctoral Research Studentship awarded by the Ontario Mental Health Foundation, and a Doctoral Fellowship awarded by the Social Sciences and Humanities Research Council. The views expressed are those of the authors and do not necessarily represent the views of Surrey Place Centre, Thistleton Regional Centre, the Ministry of Community, Family, and Children's Services, or York University.

References

- American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.). Washington, DC: Author.
- Brown, F., Gothelf, C. R., Guess, D., & Lehr, D. H. (1998). Self-determination for individuals with the most severe disabilities: Moving beyond chimera. *Journal of the Association for Persons with Severe Handicaps*, 23, 17-26.
- Bruner, J. S. (1975). The ontogenesis of speech acts. *Journal of Child Language*, 2, 1-19.

- Carr, E.G., Robinson, S., Taylor, J.C., & Carlson, J.I. (Eds.). (1990). Positive approaches to the treatment of severe behavior problems in persons with developmental disabilities: A review and analysis of reinforcement and stimulus-based procedures [Monograph # 4]. *Journal of the Association for Persons with Severe Handicaps*.
- Condillac, R.A. (2003). Behavioural intervention and developmental disabilities. In I. Brown & M. Percy (Eds.) *Developmental disabilities in Ontario* (2nd ed.). Toronto, ON: Ontario Association on Developmental Disabilities.
- Dawson, G., Hill, D., Spencer, A., Galpert, L., & Watson, L. (1990). Affective exchanges between young autistic children and their mothers. *Journal of Abnormal Child Psychology*, 18, 335-345.
- Dissanayake, C., & Crossley, S. A. (1996). Proximity and sociable behaviours in autism: Evidence for attachment. *Journal of Child Psychology and Psychiatry*, 37, 149-156.
- Donnellan, A. M., Mirenda, P. L., Mesaros, R. A., & Fassbender, L. L. (1984). Analyzing the communicative functions of aberrant behavior. *Journal of the Association for Persons with Severe Handicaps*, 9, 201-212.
- Dunn, L. M. & Dunn, L. M. (1981). *Peabody Picture Vocabulary Test - Revised*. Circle Pines, MN: American Guidance Service.
- Durand, V. M., & Merges, E. (2001). Functional communication training: A contemporary behavior analytic intervention for problem behaviors. *Focus on Autism and Other Developmental Disorders*, 16, 110-119.
- Frankel, R. M., Leary, M., & Kilman, B. (1987). Building social skills through pragmatic analysis: Assessment and treatment implications for children with autism. In D. J. Cohen & A. M. Donnellan (Eds.), *Handbook of autism and pervasive developmental disorders*. (pp. 333-359). New York: Wiley.
- Freeman, N. L. (1991). *In search of meaning: Adults' perceptions of "signals" emitted by a child with autism*. Master's thesis, University of Guelph. Guelph, ON.
- Freeman, N. L. (1993a). Behaviour is communication. *Journal on Developmental Disabilities*, 2, 20-29.
- Freeman, N. L. (1993b). Toronto: Ontario Mental Health Foundation.
- Freeman, N. L. (1997). *Behaviour is communication: An empirical exploration of communicative behaviours in autism and adult responsivity*. Doctoral dissertation, York University, Toronto, ON.
- Houghton, J., Bronicki, G. J. B., & Guess, D. (1987). Opportunities to express preferences and make choices among students with severe disabilities in classroom settings. *Journal of the Association for Persons with Severe Handicaps*, 12, 18-27.
- Kasari, C., Sigman, M., Mundy, P., & Yirmiya, N. (1988). Caregiver interactions with autistic children. *Journal of Abnormal Child Psychology*, 16, 45-56.
- McArthur, D., & Adamson, L. B., (1996). Joint attention in pre-verbal children: Autism and developmental language disorder. *Journal of Autism and Developmental Disorders*, 26, 481-496.
- Mundy, P., Sigman, M., & Kasari, C. (1990). A longitudinal study of joint attention and language development in autistic children. *Journal of Autism and Developmental Disorders*, 20, 115-128.
- Mundy, P., Sigman, M., Kasari, C. (1994). Joint attention, developmental level, and symptom presentation in autism. *Development and Psychopathology*, 6, 389-401.

- National Institutes of Health. (1991). *Treatment of destructive behaviors in persons with developmental disabilities*. Consensus Development Conference, September 11-13, 1989. Bethesda, MN: Author.
- Payne, H. W., & Ogletree, B. T. (1995). Training team members to respond to the communicative behaviors of children with profound handicaps. *Focus on Autistic Behavior, 10*, 1-15.
- Schopler, E., Reichler, R. J., & Renner, B. R. (1988). *The Childhood Autism Rating Scale*. Los Angeles, CA: Western Psychological Services.
- Sparrow, S. S., Balla, D. A., & Cicchetti, D. V. (1984). *Vineland Adaptive Behavior Scales*. Circle Pines, MN: American Guidance Service.
- Stillman, R., & Siegel-Causey, E. (1989). Introduction to nonsymbolic communication. In E. Siegel-Causey & D. Guess (Eds.), *Enhancing nonsymbolic communication interactions among learners with severe disabilities* (pp. 1-13). Baltimore: Brookes.
- Stone, W. L., & Caro-Martinez, L. M. (1990). Naturalistic observations of spontaneous communication in autistic children. *Journal of Autism and Developmental Disorders, 20*, 437-453.
- Wilcox, M. J., Kouri, T. A., & Caswell, S. (1990). Partner sensitivity to communication behavior of young children with developmental disabilities. *Journal of Speech and Hearing Disorders, 55*, 679-693.

Appendix

Coding Scheme for Potentially Communicative Behaviours in Students with Autism

Gaze at Adult	orients or turns toward adult's face
Direct Adult	pulls, places or directs adult's hand to make adult do something
Touch Adult	nonaccidental touching of adult other than to direct or push adult's hand
Grab Object	instrumental grab of object
Push Away	pushes or attempts to push object or person away
Give Object	handing or showing object to adult
Point	point with extension of finger toward adult or object
Learned Gesture	conventional gesture, e.g., high five, wave, nod
Decrease Proximity	moves away or pulls away from adult grasp

Additional Behaviours Reported by Instructors

Gaze Object	looks, orients, or turns toward object
Facial Expression	any facial reaction or movement (other than gazing)
Stereotypic Behaviour	repetitive or stereotypic movements
Formal Communication	speech, sign, picture or word cards, echolalia
Other Behaviour	any nonverbal behaviour reported by instructors can not code elsewhere

Frequency of Communicative Functions Interpreted by Familiar Instructors

Tell	student tells or shares ideas, comments
Feelings	student communicates emotions or feelings (e.g., anger, upset, needing comfort)
Attention	student wants social interaction or physical contact with staff
Explicit Request	student communicates for wants, needs, or, help
Explicit Protest	student communicates to protest, reject action or object, to avoid or escape
Implicit Request	student doesn't know, is having difficulty, needs information or clarification (staff typically inferring a thinking state)
Implicit Protest	student is not interested, bored, not motivated (staff typically inferring a thinking state)
Answer	student answers, responds, complies
Pain	student communicates about physical pain, discomfort, or illness
Other	student communicates a function other than those above