

LEARNING TO COMMUNICATE: INVESTIGATING THE DEVELOPMENTAL MODEL IN STUDENTS WITH SEVERE INTELLECTUAL DISABILITY

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Paper presented to the Australian Association for Research in Education
Annual Conference
Newcastle NSW
27th November - 1st December, 1994

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ABSTRACT

This paper reports on a study designed to investigate the application of a developmental model in relation to the development of communicative competence of students with severe intellectual disability. The theoretical model of developing communicative competence at the pre-intentional, intentional and symbolic stages is explored in relation to students with severe intellectual disability.

A sample of 40 school age students with severe intellectual disability, ranging in age from 4-18 years was assessed to establish levels of object and social skills and adaptive behaviour. Results indicate a high correlation between object and social abilities. There was no

apparent relationship between chronological age and other scores. ANOVA results indicate the development of increasingly complex skills through the stages of learning to communicate supporting the stage related model of learning to communicate for this group of students.

INTRODUCTION

The ability to communicate is an essential part of life. All need to be able to interact with others in order to effect changes in their social or physical world. The overall effectiveness of communication varies across individuals, with particular concern often expressed regarding the ability of students with severe intellectual disability being able to take part in interactive exchanges. (Calculator &

Jorgensen, 1991).

Communication is the process of social interaction, or exchange of ideas or information. It involves initiation and response in a two way process of making one's intentions known and understanding the intentions of others. The means to communicate may be vocal such as sounds and words, and non vocal such as gestures, facial expressions, signs and pointing to pictorial representations. Many students with severe intellectual disability are not able to express themselves either vocally or with a formal nonvocal system (Miranda, Iacono & Williams, 1990). However, with an increasing emphasis on the less formal processes used to communicate, these students are in fact able to take part in communicative events.

In examining the development of communicative competence in normally developing infants Bates, Camaioni & Volterra, (1975), identified a progression of increasingly complex communicative behaviours. In the first stage (perlocutionary or primary forms) the child has a systematic effect on the listener by vocalising and gesturing as a means to have physical and affective needs met (Bates et al., 1975). At this stage the intent of the child's behaviour needs to be inferred by others. In the second phase (illocutionary or conventional forms) nonverbal signals are intentionally used in communicative exchanges. Behaviours are more conventional such as a point or reach, intention is clearly indicated with coordinated attention to person and object (Sugarman, 1984) and satisfaction is displayed when needs are met. In the final phase (locutionary or conventional use), significant progress is evident in the use of words or symbolic forms such as signs or pictures which are used to carry out the same communicative functions as previously achieved primarily through the use of non formal means.

This gradual but identifiable progression in developing the ability to communicate with intent is increasingly being accepted as important in understanding the developing communicative abilities of students with an intellectual disability (Siegel-Causey & Wetherby, 1993). Past

emphasis in communication development for students with severe intellectual disabilities has been on the acquisition of alternative symbolic systems, such as signing or pictures. This model however highlights the importance of the development of the power of being able to effect changes in one's social and physical world regardless of the nature of the form or behaviour used to effect those changes. We need to recognise the effective communication behaviours that students may already have and more importantly the range of functions they can master as an important part of achieving communicative competence.

In addition to the work of Bates et al., (1975). Bloom and Lahey (1979) and Halliday (1975) also examined the development of communicative competence in normally developing infants. Others have examined this model in relation to students with an intellectual disability. Mundy, Seibert and Hogan (1984) assessed the cognitive and communicative abilities in young children with developmental delays and found evidence for the developmental progression in gaining communicative competence. McLean and Snyder-McLean (1987) in a study of 33 non verbal students with severe intellectual disability, aged between 8-21 years found that the three levels reported by Bates et al, (1975), could be expanded for this population. In a later study, McLean, Snyder-McLean, Brady and Etter (1991) further develop the model in relation to the development of gestures from contact gestures to the use of distal gestures. They also noted a difference in the functions used with the more mature communicators (distal gesture users) being able to gain attention in order to share joint attention and communicate for a range of purposes, and the less mature communicators

(contact gesture users) demonstrating the use of functions of request, reject and protest.

Sensorimotor cognitive abilities are developing at the same time as the ability to communicate. In some instances, the attainment of sensorimotor stage v has been described as a prerequisite for formal communication development (Owens & House, 1984). The significance of the developmental model however is to stress that social and cognitive abilities develop in synchrony, and that in fact communicative competence emerges as a result of the child's interactions with both the social and physical world (Seibert, Hogan & Mundy, 1986). Such an emphasis removes the prerequisite aspect of the cognitive hypothesis, and stresses instead a participatory focus on the promotion of opportunities to further the development of both social and object related abilities, through quality interactions.

The purpose of this study was to examine the continuity of development across stages of non linguistic communication within a sample of school age students with severe intellectual disability. Is there a similar process of development as that reported for normally developing infants? The relationship between social communication and object

cognitive domains is mediated by underlying cognitive structures. Can we demonstrate the existence of this relationship in a sample of students with severe intellectual disability?

METHOD

Subjects

A sample of forty students with severe intellectual disability provide the subjects for the study. To be included in the study, students needed to satisfy the following criteria.

- School files indicate the existence of a severe intellectual disability (less than 35 IQ on a standardised test, as reported by the school psychologists)
- Be functioning in the 0-3 years age range on the Vineland Adaptive Behaviour Scale (Sparrow, Balla & Cicchetti, 1984).
- Have sufficient physical ability and functional vision to demonstrate successful reach and grasp for an object.
- Without hearing impairment.
- Not have behavioural problems that would prevent cooperation in the testing situation.

All students attended a school for specific purposes (SSP) across 6 settings. 25% of the sample attended a school in a large rural centre, with 75% of the sample attending metropolitan schools. The majority of students lived at home (90%), with a smaller number living in a group home or institution (10%).

Students ages ranged from 4 years to 18 years, with 82% of subjects aged between 4 years and 12 years and 18% between 13 years and 18 years. The sample consisted of 47.5% male and 52.5% female.

Aetiology as reported by parents and supported by school records, indicates the heterogeneous nature of the sample. Global delay was reported as the major contributing factor (52.5%) with cerebral palsy (12.5%), down syndrome (10%) Englemans syndrome (10%) and autism (5%) being the remaining identified groups. The remaining 10% of the sample consisted of students with a range of individual disabilities.

Instruments

Three assessment measures were used to assess student abilities in the social communication, object manipulation and adaptive behaviour domains. The Early Social Communication Scale (Seibert & Hogan, 1982) provided a measure of social communication abilities. The Adapted

Uzgiris-Hunt Scales (Seibert & Hogan, 1979, adapted from Uzgiris & Hunt, 1975), provided a measure of object skills. The Vineland Adaptive Behaviour Scale (Sparrow, Balla & Cicchetti, 1984), the independent variable, provided a measure of student adaptive behaviours as an indication of each student's functional level of performance.

The Early Social Communication Scale (ESCS) provided a measure of

cognitive skills focused on people, across the communicative functions of social interaction, joint attention and behaviour regulations. For each scale, a measure of initiating and responding behaviours is possible.

The Adapted Uzgiris Hunt Scale (AUHS) provided a measure of cognitive skills focused on objects. The scale provided a measure across the sensorimotor subskills of object permanence, means end, causality, spatial relations and schemes for relating to objects. The adapted version of the Uzgiris and Hunt Scales were developed by Seibert and Hogan (1979) to remove all signs of social interaction thus allowing the scales to provide a measure of only object manipulation skills and to ensure that the ESCS and AUHS did not overlap. For example, behaviours that require participation in a social game or the showing of objects to adults were omitted. Both the imitation scales were omitted because of their essentially social focus.

Both sets of scales share a common or shared set of levels of structural organisation based on the work of Piaget (1952), thus allowing for scoring according to the following groupings. Level 0 provides a measure of behaviours at the reactive, reflexive stage, representing development birth to 2 months. Level 1 (3-7 months) provides a measure of simple undifferentiated actions. Level 2 (8-13 months) represents complex differentiated coordination of two activities and use of simple means end relationships. Level 3 (14-21 months) represents trial and error learning where behaviours are regulated by feedback and there is coordination of social and object skills. Level 4 (22-30 months) provides a measure of anticipatory regulation and symbolic abilities (Seibert, Hogan & Mundy, 1986).

Assessment using the Vineland Adaptive Behaviour Scale, Interview Edition, Survey Form, (Sparrow, Balla & Cicchetti, 1984) provided a general assessment of adaptive behaviour. The items provided a measure across the areas communication, daily living skills, socialisation and motor skills with an overall measure, Adaptive Behaviour Composite (ABC), based on scores across all domains used and the independent variable. Scores in the assessment were grouped in the same way as the ESCS and AUHS.

Design

The study was designed to describe in qualitative terms the degree and nature of any relationship between two cognitively derived domains; social communication and object cognition. Evidence of a high correlation in this study will support the case for the application of the developmental sequences in learning to communicate that typically occur in the first two years for normally developing infants, to also be appropriate for students with severe intellectual disability who demonstrate skills similar to those at this early level.

Procedures

Following the granting of permission by Departmental authorities and parents, students were assessed on the three scales. School counsellors administered the Vineland Adaptive Behaviour Interview with the majority of parents while a second person qualified in administration of the instrument, completed 25% of the interviews.

The ESCS was administered through a series of semi structured tasks designed to engage the child's interest and provide a range of opportunities for the child to both respond and initiate communicative interactions. Equipment consisted of objects that produce a spectacle, pictures and books. Social games included tickles, songs and turn taking games with a ball, car or telephone. The materials remained consistent but the order of presentation could vary. For older students age appropriate alternatives were provided for some materials, for example a real telephone, a card game and a torch were used. (Refer to Mundy, Seibert and Hogan (1984) for details of test administration).

Administration of the AUHS followed the procedures that were described by Uzgiris and Hunt (1975) for the administration of the Infant Scale of Psychological Development. The tester sat opposite the child at a table, with items presented in a consistent manner. Testing stopped on any scale when the child failed to score on three successive items. Care was taken to ensure that the materials used in the ESCS were different to those used in the AUHS.

All sessions were video taped with testing continuing only as long as the student was comfortable in the situation. Most testing took 20-30 minutes, although this varied according to student level and amount of items presented overall. All testing was completed within a five week period for any one student.

One tester was involved in implementing all ESCS and AUHS assessments to all subjects. A second tester provided a measure of reliability of test administration and scoring for 25% of the sample. One person provided reliability checks for the AUHS testing and scoring, while three people were involved in the reliability measures for the ESCS testing and scoring. All were trained in the scoring and administration of the instruments prior to working with the students.

RESULTS

Reliability

Reliability for scoring was measured over 25% of the sample. Two people independently administered the test items to ten students. Each then scored both their own video test administration and that of the second person, thus providing a reliability measure on administration of the assessments and on the ratings. All scoring was completed independently for the reliability calculations, and resolved scores

entered in the final analysis. Differences were resolved by reviewing the video and discussion. Resolved scores were based on the highest score or alternatively, the most scored out of a possible of four scores.

All reliability measures were calculated using the formula agreements divided by agreements plus disagreements multiplied by one hundred, to gain a percentage of agreement. This procedure was followed for all scales in both the communication and cognitive assessments, with agreement percentages reported for the overall results.

Table 1 shows the results of the interrater and intertester reliability measures for both the AUHS and ESCS. In the first instance the results are provided for agreement based on the same scores. In the second instance the results are calculated with an allowance made for one difference in scoring either side.

INSERT TABLE 1 HERE

Intertester reliability for the AUHS is strong with 83% being reported in the first instance and 100% agreement with one difference either side allowance. Interrater reliability is also very high with 90% agreement on the same score and 99% agreement with the allowance for one difference either side.

Intertester reliability for the ESCS is not as strong with a lower agreement (68%) calculated on the same score. This result improves to 96.7% agreement when the results are compared with one difference either side. The interrater scores show a higher level of agreement, with 87% agreement on same score results and 98% agreement when allowance is made for a difference of one score either side.

Relationship between social and object skills.

To demonstrate the existence of a stage related basis to the development of object skills and social abilities the results of scores on both measures were analysed using Spearman's Rank correlations. The same procedure was used to examine the relationship between chronological age and adaptive behaviour scores and the object and social domain scores.

The results of this analysis for the total sample indicate that object skills and communication skills are significantly correlated ($p < .0001$) for all scores. As expected there was no correlation with CA and object or communication scores. Adaptive behaviour composite scores on the other hand did show a positive correlation ($p < .0001$) with both object and social scores.

Subjects were then placed into four groups based on the scores on the independent variable, Adaptive Behaviour Composite (ABC). Groups

represent the levels of scoring for the social and object skills scales with 3 subjects in group 1, 17 in group 2, 15 in group 3 and 5 in group 4. These groups then formed the basis for further analysis to determine the nature of communication and cognitive development across the increasing functional ages.

Further support for the appropriateness of the developmental model is an expected increase in complexity of skills at each stage. That is, for example, students in group 2 should perform at a higher level than those students in group 1. To determine if there was a significant increase across the level of responding, a Kruskal-Wallis analysis of variance by ranks was used to compare groups on the sensorimotor and early communication scales.

The means for object skill scores (AUHS) and social interaction scores (ESCS) in the four groups based on the Adaptive Behaviour Composite (ABC) scores are presented in Table 2, along with the resulting H values and their significance levels (chi-square approximations).

These results showed that level scores on all object (AUHS) and social (ESCS) measures increased significantly across the four mental-age groups.

INSERT TABLE 2 HERE

DISCUSSION

While efforts were made to cover for reliability of results, the percentage of agreement particularly in relation to intertester results is worthy of discussion. The lower results here may have been due to several factors. In the first instance, three different people were involved in the administration of the reliability checks and thus may

have contributed to a range of skills in the administration, affecting the results. Additionally the students may have responded differently to the main examiner who in this instance was a relative stranger, while the people providing the reliability checks were familiar. A further factor could be the nature of training provided prior to administering the assessment. The main examiner had more experience in the administration of the scales which required sensitive response to the students individual behaviours to direct the flow of the assessment.

The fact that there is a strong relationship between the development of object and social skills for this sample of students with severe intellectual disability indicates the parallel development across these two domains as found in normally developing infants. In addition the results of the ANOVA provide evidence of significant increases in complexity of skills across the functional age groups. This supports

the appropriateness of the developmental stages model represented by the measures in both the social and object domains in the sample of school age student with severe intellectual disability. Students do appear to be progressing through the same stages of development of non linguistic communication as normally developing infants.

The significance of this study is to support the application of a developmental model of acquiring communicative competence in understanding the needs of students with a severe intellectual disability in relation to communication development. In so doing emphasis is placed on the quality of social interactive procedures which initiate the learning process at the very early stage of development. It is important that students are recognised as communicators regardless of their level development of communicative maturity if continued development is to take place. Students need to have opportunity to develop an understanding of their power to have an effect on others around them, so that with the eventual application of a formal or symbolic means of communication, they are competent in communicating across a range of functions or purposes.

The role of the educator is to ensure that students have opportunity to gain effective behaviours which will provide a balance of control across the social and physical world. While we may be very good at increasing physical participation in activities through detailed task analysis, we also need to remember the importance of social interaction and ensuring opportunities are provided to develop this interpersonal aspect as well.

The key to the student's acquisition of communicative competence is therefore dependent on the communication partners responsiveness and ability to provide opportunities for social interaction. Partners need to gradually increase the complexity of their own behaviours and their expectations for the student to participate in socio-communicative interactions. The developmental stage model has implications for increasing the complexity of behaviours for both partners.

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Table 1. Intertester and interrater reliability for the Adapted Uzgiris and Hunt Scale and Early Social Communication Scale Assessment

TESTSAME SCOREONE DIFFERENCE

IntertesterAUHS83%100%
Interrater90% 99%

IntertesterESCS68% 96.7%
Interrater87% 98%
