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Sampling communicative behaviours in children with intellectual disability in structured and unstructured situations

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ABSTRACTS

Structured 'communicative temptation' procedures administered by a clinician were compared to unstructured parent–child interactions in sampling intentional communicative acts in 11 subjects with intellectual disability. The subjects were assessed twice over a 5–7-month period. The results indicated that the structured condition was more effective in sampling Requests and Comments, with more Requests than Comments produced. The unstructured condition was more effective in sampling responses, but only during the second assessment. Although there was no difference in the total number of intentional communicative acts produced across assessment times, there was an increase in the use of linguistic forms during the second assessment: that is, the subjects used more speech and signs and fewer gestures and general vocalisations during the second assessment than the first. The findings suggest the usefulness of combining structured and unstructured conditions in providing information on the variety of children's communicative acts and the linguistic level at which these are expressed.

L'on a comparé des procédés structurés 'd'incitation à la communication' administrés par un clinicien à des interactions non structurées entre parents et enfants lors d'une collecte d'actes communicatifs intentionnels auprès de 11 subjets souffrant de déficits intellectuels. Les sujets ont reçu deux évaluations successives au cours d'une période de 5 à 7 mois. Les résultats indiquent que l'état structuré était plus efficace pour récolter des demandes et des commentaires, et que davantage de demandes avaient été produites que de commentaires. L'état non structuré n'était plus efficace pour la récolte de réponses que lors de la deuxième évaluation. Il n'y a pas eu de différence dans le nombre total d'actes communicatifs intentionnels d'une évaluation à l'autre; cependant on a assisté à un accroissement de l'usage de formes linguistiques lors de la seconde, en ce que les sujets ont utilisé à ce moment-là davantage de langage et de signes, et moins de gestes et de vocalisations générales. Ces résultats donnent une indication de l'utilité qu'il y a à combiner la structure et l'absence de structure pour obtenir des renseignements sur la variété des actes communicatifs des enfants et sur le niveau linguistique de leur expression.

In einer Stichprobe intendierter Kommunikationshandlungen von 11 geistig behinderten Kindern wurden strukturierte Verfahren zum 'kommunikativen Entlocken' von klinishem Personal durchgeführt und mit den unstrukturierten Interacktionen zwischen Eltern und Kindern verglichen. Die Kinder wurden zweimal während einer 5–7-monatigen Periode bewertet. Die Ergebnisse zeigten, daß die strukturierte Bedingung für die Elizitation von Bitten und Kommentaren effektiver war; es wurden mehr Bitten als Kommentare ausgesprochen. Die unstrukturierte Bedingung rief insgesamt mehr Erwiderungen hevor, jedoch nur während der zweiten Bewertungsphase. Obwohl

insgesamt die Anzahl beabsichtigter Kommunikationshandlungen während jeder der beiden Bewertungen gleich blieb, nahm der Gebrauch linguistischer Formen in der zweiten Phase zu; d.h., es wurden in der zweiten Phase mehr gesprochen und weniger Gesten oder unbestimmbare Vokalisierungen als in der ersten Phase verwendet. Die Ergebnisse weisen auf die Nützlichkeit kombinierter strukturierter und unstrukturierter Bedlingungen hin, um Information über die Vielfalt kindlicher Kommunikationshandlungen und über die linguistischen Ebenen ihres Ausdrucks zu erhalten.

Before the emergence of first words, children are thought to develop two stages of communication: perlocutionary, in which non-intentional behaviours by infants are interpreted by adults as being intentional and meaningful, and illocutionary, when non-linguistic behaviours are, in fact, produced intentionally and communicatively by the infant (Bates, Camaioni & Volterra, 1975). Although it may be difficult to distinguish between perlocutionary and illocutionary acts, observation of such behaviours provides a method of exploring the prelinguistic communication of children and predicting the emergence of linguistic skills. Assessment of prelinguistic communicative behaviours has assisted in the identification of children with delayed onset of spoken vocabulary (Thal & Bates, 1988; Thal, Tobias & Morrison, 1991; Thal & Tobias, 1992). For children with disabilities, assessment of prelinguistic skills has assisted in developing profiles of communication that explore the relationship between function and form (including non-speech modes, such as signs and picture systems) (Wetherby & Prizant, 1989; 1991).

Work by Wetherby and colleagues (e.g. Wetherby & Prutting, 1984; Wetherby, Cain, Yonclas & Walker, 1988; Wetherby, Yonclas & Bryan, 1989; Wetherby & Rodriguez, 1992) has resulted in a procedure for sampling communicative acts from children functioning from prelinguistic to the early stages of language development. These sampling procedures have been termed 'communicative temptations' by Wetherby and Prizant (1989) and involve creating situations with opportunities to enhance a child's production of communicative behaviours. Examples of such communication temptations include: inflating a balloon in front of the child, deflating it and then handing it to the child; and, eating a lolly in front of the child, but not offering one. Wetherby and colleagues have utilised 12 such communication temptations, each of which has the potential to sample different communicative intentions from children. For example, in response to the deflated balloon, one child may comment on the state of the balloon, whereas another may indicate a request for the balloon to be re-inflated. The combination of samples obtained by use of such structured techniques and brief periods of free play with an adult using a facilitatory style is thought to provide a 'representative sample of [a child's] communicative behavior in a relatively short period of time' (Wetherby & Prizant, 1989, p. 85).

Research using structured and unstructured sampling procedures has yielded data on the communicative rate of children (i.e. the number of communicative acts that occur within a time period), communicative functions, communicative means, and discourse structure (initiations and responses) (Ogletree, Wetherby & Westling, 1992). The result has been detailed profiles of the communication skills of children without disabilities (Wetherby et al., 1988), children with autism

(Wetherby & Prutting, 1984; Wetherby et al., 1989), specific language impairment (Wetherby et al., 1989) and Down's syndrome (Wetherby et al., 1989).

The use of both structured and unstructured conditions increases the opportunity for a variety of communicative acts, but there has been some indication that the two conditions differ in their sampling efficiency and in the types of functions elicited (Coggins, Olswang & Guthrie, 1987; Wetherby & Rodriguez, 1992). Wetherby and Rodriguez (1992) demonstrated that 15-min samples collected in a structured context contained more communicative acts than did longer samples from unstructured contexts. In addition, the structured condition resulted in more Requests than did the unstructured condition whilst Comments occurred with equal frequency across conditions. In the unstructured condition, children interacted with a clinician who used a facilitatory style, although the parent was present. Wetherby and Rodriguez (1992) suggested the need for comparing interactions with parents to those with a clinician in the light of research that has indicated that parents of children with disabilities may be overly directive (e.g. Cross, 1984). A style which was directive could, predictably, expose children to more initiations from the parent, inviting responsive comments. This would leave less opportunity for initiations, in particular in the form of Requests for objects and actions.

Wetherby and Rodriguez (1992) focused on the communicative intentions of Requests for objects and actions and Comments on objects and actions. The reason for this focus was that, in an earlier study by Wetherby et al. (1988), Requests and Comments accounted for 70–75% of the total communicative intentions of children across prelinguistic, single-word and multi-word stages of development. A theoretical rationale for examining these two intentions comes from the work of Bates et al. (1975) who described children's earliest communicative gestures as being either proto-imperative (i.e. requesting an object or action) or proto-declarative (i.e. commenting on an object or action). Camaioni (1993) suggested that the functional difference between proto-declaratives and proto-imperatives results from their structural difference: proto-imperatives are used by the child to modify the 'state of the world' (p. 88) by causing the adult to do something; proto-declaratives are used to 'influence the adult's internal state' (p. 88). Therefore, the use of proto-imperatives is indicative of children's understanding that, once the adult's attention has been directed, they can function as autonomous agents. The use of proto-declaratives is indicative of a child's understanding that adults have mental states which can be influenced; such an understanding requires 'a representational understanding of attention' (p. 88). Camaioni (1993) argued that proto-declaratives require a higher level of representation from evidence of non-human primates who fail to develop proto-declaratives spontaneously, but produce proto-imperatives. It is therefore possible that Requests (imperatives) develop earlier than Comments (declaratives). If so, discrepancies in the frequency of Requests and Comments would be expected to occur only at the prelinguistic stage, when representational skills have not fully developed, in comparison to the single-word and certainly the two-word levels.

The aim of the present research was partially to replicate the study by Wetherby and Rodriguez (1992) with a group of children with intellectual disability involved with their parents in an early intervention programme. In addition to varying the nature of the subject group, the present study involved parents in the unstructured communication sampling conditions. The specific aims were to compare (a) the efficiency of a structured condition with an unstructured condition in sampling early communicative behaviours; and (b) the frequency of Requests and Comments obtained in the two conditions and over time. In addition, the study aimed to identify the modalities used by the children for Requests and Comments.

METHOD

Subjects

All the subjects were involved in a university-based early intervention programme. The programme provided parent-focused intervention whereby the children and their parents attended two sessions per week. All the children and their parents attending one of two groups (morning or afternoon) were included in the study. The subjects in the morning group were also involved in a language intervention study by the same authors (Iacono, Chan & Waring, in preparation). Since it was possible that the involvement of the morning group in the intervention study could affect subject performance in the second assessment (the intervention occurred between two assessment times, as described below), it was decided to keep the two groups separate. The morning group consisted of 4 males and 1 female aged from 2;4 to 3;7 (mean 2;4), with diagnoses of Down's syndrome (3 subjects) and developmental disability (2 subjects). The afternoon group consisted of 3 males and 3 females aged from 1;10 to 2;5 (mean 2;1) with diagnoses of Down's syndrome (5 subjects) and developmental disability (1 subject). Developmental age was obtained by administering the *Vineland Adaptive Behaviour Scale* (VABS) (Sparrow, Balla & Cicchetti, 1984). Developmental ages ranged from 1;5 to 1;8 (mean 1;6) for the morning group, and 1;8 to 2;0 (mean 1;9) for the afternoon group. The VABS also yielded Adaptive Behaviour Composite Standard Scores, which ranged from 50 to 65 (mean 59.2) for the morning group, and from 71 to 86 (mean 77) for the afternoon group. Comprehension was assessed by use of the *Reynell Developmental Language Scales — Revised* (RDLS–R) (Reynell & Huntley, 1987) and indicated that language comprehension ages ranged from 1;8 to 2;0 (mean 1;10) for the morning group and from 1;3 to 2;3 (mean 1;9) for the afternoon group, with standard score ranges being from –3.0 to –1.1 (mean –1.9) and from –2.0 to 1.3 (mean –0.4), respectively. In addition, the *Macarthur Communicative Developmental Inventory* (MCDI) (University College of San Diego, 1989) was completed by a parent and indicated that, for the morning group, comprehension vocabularies ranged from 206 to 279 words (mean 230) and production vocabularies ranged from 18 to 72 words (mean 33). For the afternoon group, comprehension vocabularies ranged from 116 to 230 words (mean 163) and production vocabularies ranged from 1 to 58 words (mean 18).

Design

A 2×2 group design was utilised for the morning and afternoon groups. The independent variables were condition (unstructured versus structured) and assessment time (assessments 1 and 2). The dependent variable was the num-

ber of initiated communicative intentions classified as Requests and Comments.

Setting and Materials

All sessions were conducted in a room within the early intervention programme. The room contained a small table and chairs. A Panasonic VHS M7 Movie Camera was set up in a corner of the room and operated by one of two research assistants (both were qualified speech/language pathologists). Two sets of toys and objects were used.

Procedures

Assessments

Each parent and child was seen by a research assistant during a pre-experimental session in which the VABS and the RDLS–R were administered. The parent was also given the MCDI and asked to complete it at her leisure (only mothers were available to participate in the study).

Experimental conditions

Each parent and subject was involved in an unstructured and a structured condition. In the unstructured condition, the parent was asked to involve her child in play, using the toys provided: an assortment of a doll, bath, animals, balls and cars. The research assistant, who was familiar to both parent and child as a result of involvement in the early intervention programme, was present and interacted only in response to initiations from the child which were directed to her. In the structured condition, the parent was asked to take a more passive role (i.e. respond to the child's communicative initiations but to avoid prompting or directing behaviours), allowing the researcher to direct activities. The researcher then proceeded through a series of communication situations, as reported by Wetherby and Rodriguez (1992) (see Appendix). Briefly, these situations involved setting up communicative opportunities and waiting for the child to respond: for example, eating a lolly in front of the child without offering one; giving the child a series of blocks to place into a container and then handing the child a toy animal. The ordering of the 12 communicative temptations was randomly varied across subjects.

Each condition lasted approximately 15 min. The order with which the structured and unstructured conditions occurred was alternated randomly across subjects. The procedures for both unstructured and structured conditions were repeated 7.5 months later for the morning group and 5.5 months later for the afternoon group. Because of practical limitations, the first assessment of the afternoon group was delayed, resulting in the briefer time interval before the next assessment, since all assessments needed to be conducted before the end of the school year. This difference was a further rationale for treating the groups separately.

Data Coding

Each experimental session was videorecorded. The videotapes were then run through a time code generator which stamped time according to minutes, sec-

onds and milliseconds. A researcher (the second author) then observed the tape and recorded the time at which an intentional communicative act (ICA) occurred and the pragmatic function of the communicative act. The definition of an ICA was based on that provided by Wetherby, Yonclas and Bryan (1989):

> an event in which the child directs a motoric and/or vocal act toward the adult as evidenced by eye gaze, body orientation, or physical contact and awaits a response from the adult, as evidenced by looking at the adult, hesitating or persisting in the communicative act (p. 151).

The ICAs were then coded for pragmatic functions according to the categories of 'Requests', 'Comments', 'Responses + Other'. The category of 'Responses + Other' combined discourse structure and pragmatic function categories; however, it was included to allow for the analysis of ICAs other than Requests and Comments. Responses did, in fact, serve to fulfil an obligation, usually to provide specific information requested by the adult. By way of example, a subject's gestural request might lead to an adult's question 'What do you want?' to which the subject might provide a signed label; in this case, the original gesture would be coded as a Request and the sign would be coded as a 'Response' (i.e. to the adult's request for information). 'Other' included mostly protests and rejections. For each Request and Comment, the modality (or combination of) used was also coded: for example, if a child pointed to a lolly and produced a vowel sound, the function of request and the modalities of gesture and vocalisation were recorded. The modality for 'Responses + Other' was also coded. The definitions used for gestural and vocal modalities was based on that provided by Wetherby et al. (1989); however, words produced in sign or speech, which Wetherby et al. (1989) included under 'gestural' and 'vocal', respectively, were categorised separately in the present study. 'Signs' were defined as gestures that were clearly identified as signs found in the *Dictionary of Australasian Signs* (Jeanes, Reynolds & Coleman, 1989), whereas spoken words were defined as those that were identifiable and transcribable. Therefore, the modalities coded were: gesture, sign, vocalisation, and speech.

Reliability

The researcher who conducted the coding underwent training which consisted of becoming familiar with the definitions of each category (above) and coding one tape with the first author. Disagreements were discussed by the two coders until consensus was reached. This procedure took approximately 5 hours, after which time the researcher (second author) coded the remaining tapes. Sections of each video recording were then coded for ICAs, pragmatic function and modality by the first author. Reliability was calculated for 3 min from each condition from each assessment for each child (approximately 20% of the data). Reliability with the original coder was calculated by dividing the number of agreements by agreements plus disagreements and multiplying by 100. Per cent agreement means were as follows:

- For the identification of ICAs, the mean was 89 for both the unstructured and structured conditions (ranges of 64–100 and 75–100, respectively).
- For pragmatic functions, the mean was 94 (range 75–100) for the unstructured condition and 91 (range 57–100) for the structured condition.

- For the modalities used, the mean was 99 (range 78–100) for the unstructured condition and 94 (range 75–100) for the structured condition.

Although the mean reliabilities were considered high, there was some concern about the large ranges. It was evident from the data that the examples of poor reliability (e.g. 57%) occurred for subjects who produced very few ICAs, yielding high percentage disagreement when, in fact, the raters disagreed on only one or two ICAs.

RESULTS

Wetherby and Rodriguez (1992) used two measures of children's communicative intentions, as developed by Coggins, Olswang and Guthrie (1987):

- A criterion-referenced measure in which 'a child must produce at least three communicative acts to be credited with the ability to request or comment' (Wetherby & Rodriguez, 1992, p. 133).
- The total number of ICAs used to request or comment.

These measures were also used in the present study, with the addition of the total number of ICAs which were categorised as 'Responses + Other.'

The data for the criterion-referenced measure is presented in Table 1. In the unstructured condition, a number of subjects failed to demonstrate the minimum of three ICAs for Requests or Comments at either assessment time. On the other hand, in the structured condition, most subjects met this criterion at Assessment 1, and all subjects met the criterion at Assessment 2.

Table 1: *Number of subjects (n=11) at each assessment who displayed at least three Requests and Comments*

	Unstructured		Structured	
	Requests (%)	Comments (%)	Requests (%)	Comments (%)
Assessment 1	6 (54)	7 (64)	9 (82)	9 (82)
Assessment 2	8 (73)	6 (54)	11 (100)	11 (100)

The total number of ICAs used for Requests and Comments were compared across the morning and afternoon groups for each condition and each assessment time, by use of the Mann-Whitney U test (Siegel & Castellan, 1988), which was chosen because of the small sample size in each group. No significant differences were found. The two groups were therefore combined for further analyses; parametric procedures were used because of the larger combined sample size. A 2×2 (condition x assessment time) ANOVA for Requests revealed no interaction effect ($F=1.02$, df=1, 10, $p>0.05$), no main effect for assessment time ($F=1.89$, df=1, 10, $p>0.05$), but a significant effect for condition ($F=32.16$, df=1, 10, $p<0.01$) with more Requests produced during the structured than in the unstructured condition. Similarly, for Comments, a 2×2 ANOVA indicated that there was no interaction effect ($F=0.78$, df = 1, 10, $p>0.05$), no main effect for assessment time ($F=0.06$, df=1, 10, $p>0.05$), but a significant

effect for condition ($F=5.86$, df=1, 10, $p<0.05$), with more Comments produced in the structured than in the unstructured condition. The number of Requests, Comments and also Responses + Other ICAs are presented in Figure 1. Inspection of Figure 1 indicates that in the unstructured condition there are fewer Requests than Comments at Assessment 1, whereas they occur with equal frequency at Assessment 2. In the structured condition there is a marked difference between these functions, with Requests outnumbering Comments at both assessments. With regard to Responses + Other, it should be noted that most ICAs in this category were, in fact, Responses, with very few other functions occurring. Responses were produced with greatest frequency during the unstructured condition, in particular at Assessment 2, when they outnumbered both Requests and Comments. This pattern was reversed during the structured condition at both assessment times, with notably fewer Responses than either Requests or Comments.
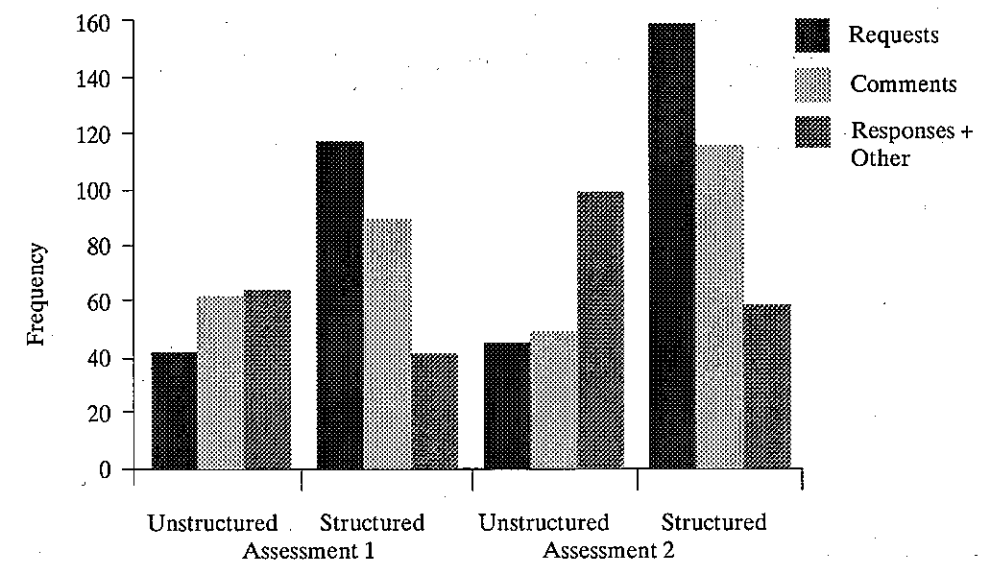

Figure 1: *Frequency of ICAs according to functions.*

To determine the modality used for Requests and Comments (combined), the number of ICAs containing vocalisations, gestures, speech or sign were tallied across subjects according to conditions and assessment times. This figure was then divided by the total number of Requests and Comments used by all subjects during each condition and across assessment times, and multiplied by 100 to yield a percentage score. This data is depicted in Figure 2. This procedure was repeated for ICAs used for Responses + Other and this data is depicted in Figure 3.

From Figure 2 it is apparent that more vocalisations and gestures than speech and sign were used for Requests and Comments during Assessment 1. In fact, speech and sign were each used for less than 10% of these ICAs, whereas gesture was the most frequent modality to be used during Assessment
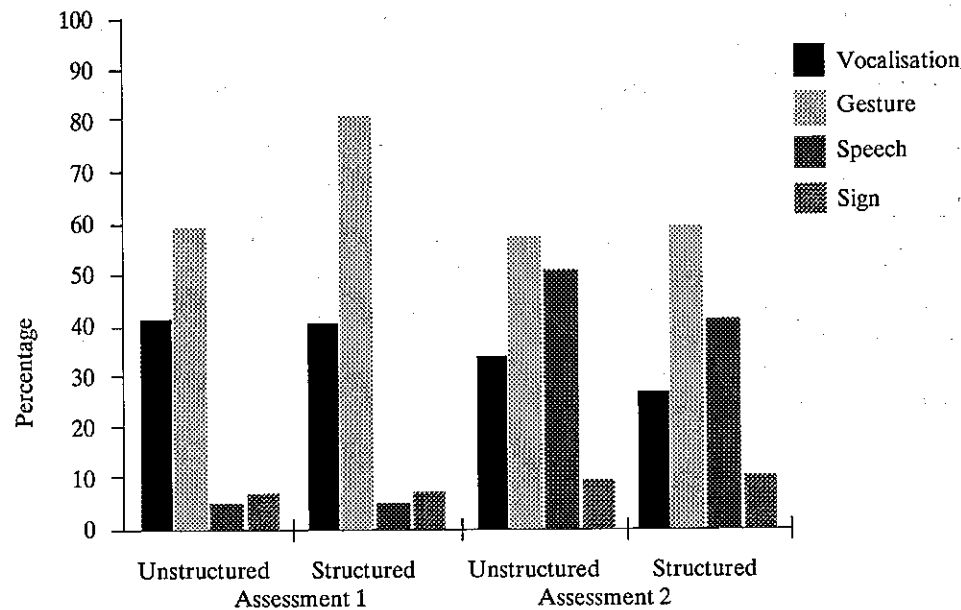
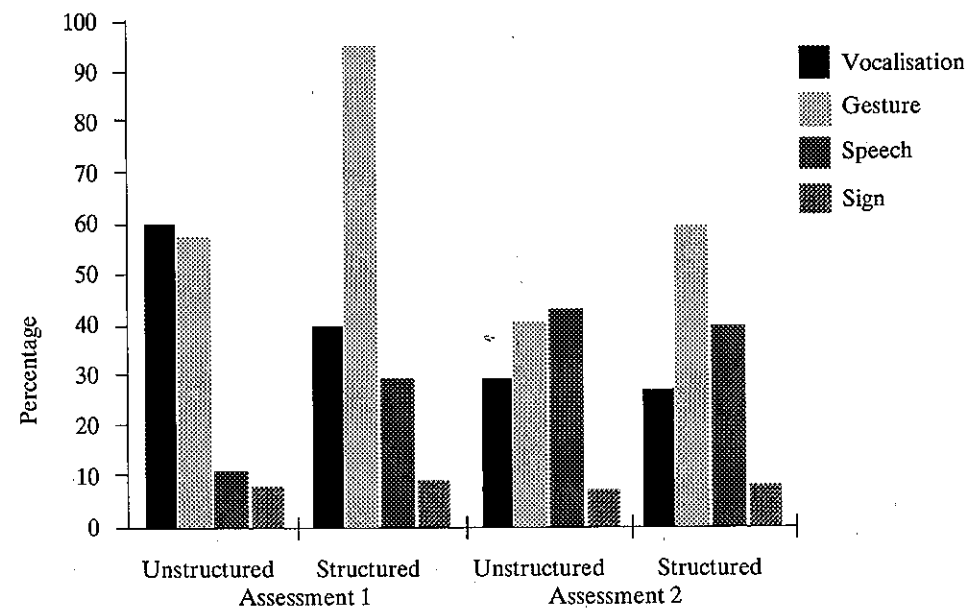**Figure 2:** *Modalities used for Requests and Comments.*

Figure 3: *Modalities used for Responses + Other pragmatic functions.*

1. There was a noticeable decrease in the use of gestures and vocalisations, with concomitant increases in sign and especially speech at Assessment 2 for both conditions. The increase in speech was more apparent during the unstructured than the structured condition. Figure 3 displays similar patterns for gesture and vocalisations across conditions and assessment time for Responses + Other. In

comparison with speech used for Requests and Comments, more speech was used in the structured condition at Assessment 1, but the proportionate frequency of sign production was fairly consistent across conditions and assessment time. Speech was the most-used modality (though differences with gestures were small) at Assessment 2 in the unstructured condition, although its use increased in the structured condition from Assessment 1 to Assessment 2. In summary, it is evident that the use of speech and, to a lesser extent, sign increased across time for all ICAs.

A further analysis reported by Wetherby and Rodriguez (1992) examined the effectiveness of each communicative temptation in sampling Requests and Comments. This information for subjects in the present study is presented in Table 2, which also presents the data obtained by Wetherby and Rodriguez (1992). Remembering that the figures represent different subject numbers across the two studies (11 in the present study and 15 in that of Wetherby and Rodriguez (1992)), the overall pattern is similar. Wetherby and Rodriguez (1992) found that the temptations *'bye-bye'* and *'disliked food'* failed to result in Requests or Comments. In our study, *'bye-bye'* only rarely resulted in these

Table 2: *Total numbers of the 11 subjects who used one or more Requests, Comments and both Requests and Comments during each communicative temptation at each assessment*

	Assessment 1			Assessment 2		
	Requests	**Comments**	**Both**	**Requests**	**Comments**	**Both**
Desired food	8 (3)*	0 (3)	1 (1)	7 (6)	1 (5)	2 (3)
Wind-up toy	5 (7)	1 (5)	1 (3)	7 (13)	2 (9)	0 (9)
Blocks in box	3 (0)	3 (9)	0 (0)	1 (4)	8 (11)	0 (2)
Books	0 (2)	6 (12)	3 (2)	1 (3)	4 (12)	5 (3)
Bubbles	10 (11)	0 (8)	1 (5)	6 (15)	1 (9)	3 (9)
Social games	3 (6)	2 (3)	2 (0)	6 (5)	1 (6)	1 (1)
Balloons	4 (10)	1 (5)	2 (4)	9 (11)	1 (5)	0 (4)
Jar	6 (9)	1 (6)	2 (5)	0 (14)	0 (2)	1 (2)
Slime**	2 (0)	1 (7)	0 (0)	3 (7)	4 (9)	2 (5)
Ball	3 (3)	2 (10)	0 (3)	0 (3)	5 (7)	2 (1)
Wave	0	1	1	3	0	1
Disliked food	0	4	0	5	3	2

*Figures in parentheses are total number of the 15 subjects in the Wetherby and Rodriguez (1992) study who responded with Requests, Comments or both (neither were produced in response to the last two communicative functions by their subjects.
**A commercially available wet, cold substance that was used instead of jello, as suggested by Wetherby and Rodriguez (1992).

functions. On the other hand, *'disliked food'* did result in Comments from subjects in Assessment 1, and both Requests and Comments in Assessment 2. Wetherby and Rodriguez (1992) found *'jar'* resulted in both functions across prelinguistic and the one-word stage; in the present study it failed to result in Requests or Responses from all but one subject at Assessment 2. Wetherby and Rodriguez (1992) reported some consistency across the following commu-

nicative temptations in being most effective in sampling both Requests and Comments: 'balloon', 'bubbles', 'jar', 'wind-up toy', 'books', 'blocks in box' and, to a lesser extent, 'jello'. These communicative temptations also resulted in the most Requests and/or Comments across both assessments in the present study. In addition, we found 'desired food' sampled Requests from most children at both assessment times and social games also led to Requests from a number of subjects at Assessment 2.

DISCUSSION

The results of the present study support those of Wetherby and Rodriguez (1992), which it partly replicated. As was found in their study, the structured condition, which utilised a series of communicative temptations, sampled more intentional communicative acts than did unstructured interactive play with an adult. In addition, more Requests and Comments were sampled in the structured than unstructured contexts at both assessment times. In the present study, more Requests than Comments were sampled in the structured condition at both assessments, whereas more Comments than Requests were sampled in the unstructured condition, but only at Assessment 1. Wetherby and Rodriguez (1992) found only a slight advantage for Requests over Comments in the structured condition (but only at a prelinguistic stage), and a similar advantage for Comments in the unstructured condition was found in our study (only at an early linguistic stage). The combined results across the two studies do not support a possible developmental advantage for Requests over Comments, as suggested by the argument of Camaioni (1993) that Comments require a higher level of representation. It is possible that the subjects in both studies were beyond a level of development in which a difference between these functions might be evident.

Unlike Wetherby and Rodriguez (1992), we did not obtain an interaction between condition and time. The apparent reason for the failure to replicate this finding was that the interaction obtained by Wetherby and Rodriguez (1992) was accounted for by the inclusion of a third assessment when their subjects were at a multi-word stage of language development. In our study, the subjects were functioning at an early linguistic stage (as evidenced in the range of reported vocabulary) at Assessment 1 and at an expanded single-word stage at Assessment 2 (as indicated by the increase in use of spoken and signed words). It is possible that, had our subjects been sampled at a later stage when multi-words were emerging, differences between the two conditions would have been significantly greater than at the other assessment times.

In comparing the usefulness of the criteria measure of Coggins et al. (1987) (i.e. a minimum of three ICAs) and total frequency of Requests and Comments, Wetherby and Rodriguez (1992) found the latter to be a more sensitive measure of the communication skills of children. In our study, the pattern of results by use of the criteria measure was similar to that obtained by Wetherby and Rodriguez (1992), who found that at the prelinguistic stage a number of subjects failed to achieve the criteria in the unstructured condition, in particular for Requests (approximately 47%), but most subjects achieved criteria in the structured condition at both prelinguistic and linguistic stages. In our study, there were a few subjects who failed to meet the criteria for both Requests and Com-

ments in the unstructured condition at both assessment times, whereas in the structured condition, most achieved the criteria at Assessment 1 and all achieved it at Assessment 2. Wetherby and Rodriguez (1992) suggested that children functioning at the 15–18-month level could be expected to achieve this criteria, thereby making it a useful screening measure. The subjects in our study were functioning at or beyond this level in terms of both developmental and receptive ages. Therefore, a number of them would have failed such a screening at Assessment 1, particularly if only an unstructured condition were used.

Despite the fact that the subjects in the present study did not produce more ICAs across time, they did use more sophisticated forms, as demonstrated by the reduction in gestures and vocalisations with concomitant increases in speech and sign. This changing distribution was evident not only for Requests and Comments but also for Responses. The pattern for spoken words was interesting, since, at the second assessment, more speech was produced in the unstructured than the structured condition for both Requests/Comments and Responses. This finding may best be interpreted in the light of differences in the number of Responses displayed across the conditions: they were produced more frequently in the unstructured condition, when Requests and Comments were produced less frequently. This pattern supports the suggestion of Wetherby and Rodriguez (1992) that 'if a parent uses a more controlling interaction style, a parent–child interaction may not provide ample opportunities for the child to initiate communication' (p. 137). Although this may be the case, the results of our study suggest that the parents' direct requests for information to which the subjects responded actually elicited more speech during the second assessment. This effect was not evident for sign, perhaps reflecting the parents' preference for speech and their success in eliciting it. The literature on parent–child interaction with children with disabilities has tended to view parent directiveness as detrimental to communicative development (Marfo, 1992). However, recently, this issue has been re-examined with the argument made that early directiveness actually provides a scaffolding for children at very early stages of development (Marfo, 1992). According to Marfo (1992), such directiveness reduces as children progress linguistically. A reduction in directiveness across time (given that the frequency of responses is taken as being indicative of parental directiveness) was not evident in the present study. The reason may have been the failure to sample the children at a more linguistically advanced stage. Alternatively, it is possible that these parents were maintaining control of interactions as a result of participating in an early intervention programme which encouraged them to take the role of instructing their children.

Most communicative acts produced by the subjects in the present study contained gestures, with the frequency being greatest at the first assessment. This pattern was also found by Wetherby et al. (1988) and Wetherby and Prizant (1989) for children with Down syndrome. It has been suggested that this early dependence on gestures may be the reason why sign language has been found to be learned more efficiently by these children than has speech (Wisniewski, Miezejeski & Hill, 1988). If this were the case, it would be expected that the subjects in our study would have displayed more use of sign than speech. The fact that the reverse pattern was obtained may reflect the nature of the early

intervention programme in which the children were participating and parental preferences. Within the early intervention programme, it was apparent that sign was used with the children, but speech was the preferred modality. Previous case studies (e.g. Kouri, 1988; 1989) have indicated that intervention which provides consistent sign models results in increases initially in sign and then in speech. It is possible that had the early intervention programme from which the subjects were recruited focused more on sign, it would have occurred with greater frequency during the sampling condition. Research examining the impact of sign in intervention is needed to determine if such an emphasis results in linguistic gains whilst maintaining the development of speech.

The results of the present study demonstrate how use of structured procedures, in particular communicative temptations, is an effective and efficient means of sampling the early communication skills of children with delayed development, thereby supporting the study of Wetherby and Rodriguez (1992). Particular communicative temptations were found to be more effective than others when sampling Requests and Comments across children. Our study supported the recommendation of Wetherby and Rodriguez (1992) that such procedures should, minimally, include the temptations of 'balloon', 'bubbles', 'jar', 'wind-up toy', 'books' and 'blocks in box'; we would also include 'desired food'. The remaining items often failed to result in any communicative behaviours by the children; however, a suggestion to omit them from the procedures could be unwarranted because of potential individual differences across children.

In addition to the structured context, the use of the unstructured context, with the parent acting as the interactant, provided additional and complementary information. The structured context appeared to be optimal for sampling the subjects' communicative acts, whereas the unstructured condition, in which the subjects played a more responsive role, may have been more effective in sampling their speech. Taken together, this information, obtained in only 30 min of sampling, provided a profile of what Wetherby and Prizant (1989) described as horizontal (the variety of communicative acts) and vertical (the sophistication of means) dimensions of communication.

In conclusion, the present study supported the findings of Wetherby and Rodriguez (1992), demonstrating the effectiveness of the use of communicative temptations to sample intentional communicative acts. The unstructured situation with a parent provided additional information on the children's use of the spoken modality when in obligatory discourse situations. The involvement of parents in assessment is valuable not only because of the additional information on the child's skills obtained but also because it demonstrated to them how varying the context can affect the child's communicative behaviours. It was noted that many parents found it difficult not to prompt their child in response to the communicative temptations. However, when considering their child's responses afterwards, methods of modelling or encouraging more sophisticated language forms could be discussed. These communicative temptations could therefore lend themselves readily to creating naturalistic contexts in daily situations that would enable child-initiated interventions.

APPENDIX

Communicative Temptations*

Desired food: desired food is eaten in front of the child but not offered to him.

Wind-up toy: a wind-up toy is activated and when it deactivates is offered to the child.

Blocks in box: the child is given four blocks to drop into a box one at a time, then immediately given a small animal figure to drop into the box.

Books: the child is given a book and encouraged to look through it.

Bubbles: a jar of bubbles is opened and bubbles blown. The jar is then securely closed and given to the child.

Social games: a familiar and an unfamiliar game is initiated with the child until the child expresses pleasure, then the game is stopped.

Balloon: a balloon is blown up then slowly deflated. A deflated balloon is then handed to the child.

Disliked food: a disliked food item is offered to the child.

Jar: a desired food item is placed in a jar, which is then securely closed and handed to the child.

*Slime***: a commercial sticky, slimy substance is put into the child's hand.

Ball: a ball is rolled to the child. After the child has returned it three times, a different toy (e.g. a small truck) is rolled to the child.

Bye-bye: Objects presented in the first four situations are waved and 'bye-bye' is said to them as they are each removed. Nothing is done in the remaining situations.

*These communicative temptations are based on those described in Wetherby and Rodriguez (1992).

**This situation is referred to as 'Jello' by Wetherby and Rodriguez (1992).

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Acquisition of speech, pre- and post-cochlear implantation: longitudinal studies of a congenitally deaf infant

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ABSTRACTS

This paper details the process of speech acquisition by the first British, congenitally deaf infant (without additional handicaps) to be fitted with a multi-channel cochlear implant. The infant's phonologic and phonetic level development using, firstly, acoustic hearing aids and, secondly, a cochlear implant, is thoroughly detailed by use of video- and audio-recorded data, taken at weekly intervals and across a variety of contexts. The paper examines the benefit of early implantation for spoken language development and notes the utility of Ling's model of speech acquisition for the habilitation of young, congenitally deaf implant recipients.

L' article décrit en détail le processus d'acquisition du langage par le premier enfant britannique sourd congénital qui a reçu un implant cochléaire à canaux multiples. L'enfant ne souffrait d'aucun handicap supplémentaire. Des enregistrements sonores et sur vidéos faits chaque semaine et recouvrant tout un ensemble de contextes ont permis de décrire point par point son développement phonétique et phonologique, au début grâce à des appareils acoustiques et ensuite grâce à l'implant cochléaire. L'article analyse l'avantage qu'il y a à procéder très tôt à des implants pour assurer le développement de la parole, et il examine l'utilité du modèle de Ling de l'acquisition du langage pour l'habilitation de jeunes sourds congénitaux qui reçoivent des implants.

Dieser Aufsatz beschreibt den Spracherwerbsprozeß des ersten britischen, gehörlos geborenen Kindes (ohne weitere Behinderungen), das ein mehrkanaliges Cochlearimplantat bekommen hat. Die phonetische und phonologische Entwicklung des Kindes, zunächst mit akustischen Hörgeräten, dann mit Cochlearimplantat, wird anhand von Video- und Audioaufzeichnungen, die in Abständen von einer Woche in einer Vielzahl unterschiedlicher Kontexte gemacht wurden, eingehend dargelegt. Die Vorteile früher Implantation für die Sprechentwicklung und der Nutzen von Lings Spracherwerbsmodell für die Habilitation junger kongenital gehörloser Implantatsempfänger werden erörtert.

Key words: cochlear implant, congenital deafness, speech acquisition.

INTRODUCTION

It is widely believed that the use of multi-channel cochlear implants, combined with rehabilitative therapy, will significantly benefit the young deaf child's development of speech (Coerts, 1992; Gibbin, 1992; Lenhart, 1994, Young, 1994). However, whereas significant improvements in speech reception and perception skills have been documented, following implantation (Geers & Moog, 1991; Osberger et al., 1991; Waltzman, Cohen & Shapiro, 1992; Busby,