

MAKATON VOCABULARY DEVELOPMENT PROJECT
Research Information Service
1984, Volume 2, Issue 4

COMMUNICATION BEFORE LANGUAGE

Compiled and Written by Nicola Grove, MSc. LCST, and
Margaret Walker, MSc, LCST

Edited by Margaret Walker, MSc, LCST

Published by
Makaton Vocabulary Development Project, 31 Firwood
Drive, Camberley Surrey
© 1984 Margaret Walker for MVDP

**THE DEVELOPMENTAL SEQUENCE OF CERTAIN
PRE-VERBAL COMMUNICATIVE BEHAVIOURS**

THE DEVELOPMENTAL SEQUENCE OF CERTAIN PRE-VERBAL COMMUNICATIVE BEHAVIOURS

INTRODUCTION

This chart is designed to accompany the previous two issues of the Research Information Service. It presents an approximate chronology for the development of the three principal channels of communication - visual, gestural and vocal from birth to 15 months, and also provides essential milestones (norms) for associated cognitive and physical development to give some perspective to this pre-verbal communicative behaviour.

It is not intended to function as a clinical checklist. It indicates the earliest ages at which behaviours have been observed, rather than norms for a homogeneous group of children. Furthermore, whereas some areas - gaze and speech sound production for example - have been covered in some depth by a number of researchers, others - such as giving and taking, rely on fewer observations with smaller numbers of children. Gaps on the chart may imply that a behaviour has not yet developed, is undergoing a phase of consolidation, or that the relevant information is not as yet available.

In practice, many children will not evidence behaviour as early as shown on the chart. Communicative reaching, for example, develops any time from 9 months on, but may not be used much before 12-14 months. Often an isolated instance of behaviour such as a point or vocal signal, occurs early on, but then seems to go underground to emerge later as a more established element in the child's repertoire. Nor will all children follow the same sequence of behaviour. One little boy (J) pointed consistently (for self) from the age of 11 months, but did not reach to signal till 13 months. They will also differ in their preference for modes of communication. Halliday's son Nigel opted early for vocal signals, whereas Carter's David used gesture and voice simultaneously.

The chart can be used as a map for the milestones under discussion in Issues 2 and 3, allowing the reader to check at any point where a behaviour has come from, and how it will develop; and also the relationship at any point in time between the three channels of communication. The notes provided after the chart expand where necessary on research background.

POINTING

The ability to point seems to be a crucial factor in the development of verbal naming, and is closely associated with the development of 'attentional' words such as 'look', 'there'. Mothers seem to use pointing routines as contexts for teaching names (Ninio & Bruner 1978). They respond increasingly with labels, to their children's point, and the frequency with which they do so affects vocabulary growth (Masur 1980). The four children in Masur's study used more words with points than with other gestures, and Bates et al 1979, in their correlational study of communication, language and cognition, found that pointing was the best single predictor of referential language.

Theories Relating to the Origin of Pointing

Despite the evident significance of pointing to early language development, it is unclear how it originates; it seems to emerge spontaneously as a complete piece of behaviour, rather than from gradual shaping by mothers (Masur 1980). At present there are two conflicting theories as to the origins of pointing.

(a) Pointing comes from reaching (Lock 1980; Murphy & Messer 1977)

According to this theory, pointing arises from an open handed extended reach, at about 9 months. The mother interprets failed reaches as indications of desire, and as a result, reaching becomes vestigial and stylised, aimed at obtaining an object through the mother's mediation. Once pointing has developed to request, it is quickly used to indicate objects of shared attention.

There are two difficulties with their theory. One is that pointing does not seem to replace open handed reaching, which continues to be used as a signal to request well after the time that pointing is established. A second is that no explanation is offered for why or how the open hand converts to fist + extended index finger. It does, however, seem clear that reaching precedes pointing developmentally.

(b) Pointing comes from the use of index finger to examine
(Bates et al 1979; Foster 1979; Werner & Kaplan 1963; Masur 1980; Murphy 1978; Lempers et al 1977)

According to these authors, infants first use their index finger to examine objects at close range, at some time from about 10 months on (proximal pointing). They then extend the gesture as a function of their increasing ability to distance self from the environment, (distal pointing). Martlew (1982) observed imitative proximal from about 10 months, spontaneous proximal pointing at 12 months and distal pointing at 14 months. Pointing arises here within the context of shared social activity. It is at first self related and is then used to secure the attention of

others. Before about 13 months it is used primarily in response to novel events and to pictures. The first function of pointing appears to be indicative, and it is not used to request until after it becomes communicative at around 12-14 months (Bruner et al 1982). Pointing is at first non-communicative (pointing for self), and is then used to secure the attention of others.

Again, these authors fail to account adequately for the development of pointing; in this case how and why the arm becomes extended. However, this theory provides a somewhat better 'fit' than the first with observed behaviour, and also explains why Bates et al found an association between referential language and non-communicative pointing, as well as communicative pointing. They hypothesise that some factor of external reference is common to all three.

Pointing and looking

Infants are at first unable to combine pointing and looking at mother, since this involves co-ordinating two divergent signals, gesture and visual regard, and often two different visual fields. This ability develops between 12-14 months, and Bates et al describe an interesting transitional behaviour observed in one of their children at 12-13 months. The child looked out of the window and pointed, swung round, still with hand extended and looked at her mother, then swung back to the window. Gradually she became capable of integrating the behaviours into one scheme. The children in this study were not able to point and look at another person until they were also able to initiate giving and showing objects.

Pointing and vocalising (Bates et al 1979; Lock 1980)

As with pointing and looking, pointing and vocalising seem to be distinct activities which have to become integrated. At 9 months children cannot cry and point simultaneously. The child described by Lock (1980) could at 9 months cry to attract attention, and then point. By 11 months, she could co-ordinate these behaviours in a sequence, and at 12-14 months she learnt to combine the behaviours in a single act. In Masur's sample of four children, however, one child displayed all three behaviours within the same month (at 14 months), whereas for the other three children pointing alone preceded pointing and looking, pointing and vocalising.

Pointing, naming and requesting

By 20 months or so, pointing is well established as a communicative act. During the second year, as children's language develops, many researchers postulate that pointing is gradually dropped as habitual activity, to be replaced by the name of the object of attention (Carter 1978; Lock 1980; Greenfield & Smith 1976; Clark 1978). Masur (1981), suggests that this process may be shaped by the mother, who increasingly responds more to points accompanied by words than to points alone. Her response is usually to imitate the child's word, which in turn is usually an object label, and this reinforces the likelihood of labels being used with points on subsequent occasions. Naming is also a more efficient way of directing attention in

situations where your arms are full of toys, or your mother is not looking in your direction (Carter 1978).

Lock suggests that points remain relatively more established in request schemas because whereas object names replace the point when the child is indicating, the names replace the whining cry accompanying the point in a request.

The origins and age of acquisition of pointing seem to remain somewhat vague. The wide variation regarding the ages at which it is first observed reflects individual differences between children and the possible differing criteria of researchers. It may also reflect the situational characteristics of pointing behaviour, for example, Murphy (1978) found a very high incidence of pointing and looking behaviour in picture book routines, where the mother specifically elicits the behaviour. Until there is a study to determine the origins of pointing with a larger sample of children, it is difficult to conclude whether or not pointing is fundamentally used to request or to indicate. It may even be that different children will develop pointing in different contexts.

Once established, there is reasonable agreement on the sequence of development for pointing, and a chronology such as shown on the chart is proposed.

EXPRESSIVE AND SOCIAL GESTURES

There is relatively little information on the development of gestures expressing feelings in babies and young children; rather more on the emergence of social gestures.

By the age of two years, Sheridan considers that the following gestures are well established:

Two Handed

- Come here (beckoning, arms outstretched)
- Go away (pushing away, face averted)
- Please (arms raised)
- Don't want to (fists banged up and down)
- Who cares (shrug, arms extended)
- Can't see (hands over eyes in refusal to watch or listen)

One Handed - dominant hand

- Look (point)
- Listen (point upwards near face)
- Silence (sh! gesture)
- Greeting wave (may be used for stop for hand held steady, or invitation with palm turned inward)
- Bye-bye wave

One Handed - non dominant hand

Oh dear (spread fingers to mouth)

Sheridan (1977).

SYMBOLIC PLAY GESTURES

The gestures used in symbolic play may be divided into enactive gestures: movements representing actions on or with objects and depictive gestures, which represent an aspect of the object itself (Barten 1979). Enactive gestures seem to develop first. Age levels are very approximate (from McCune Nicolich 1981; Volterra et al 1979).

Symbolic play after 12-15 months develops along the following lines:-

Stage III develops around 12-15 months, continues in repertoire:-

Decentred symbolic games'Pole substitution'

Infant begins to play the role of 'other', putting doll, or adult into slot originally occupied by himself and recreates activity he sees others do - e.g. dusting, hoovering, cooking, 'feeds' or 'brushes' doll, or mother. Only one 'scheme' is played at a time.

'Object substitution'

Infant may use object that is perceptually similar to real object in pretence, e.g. matchbox as toy car, stick for gun. Infant first uses object that is less realistic than actual object in this way, then is progressively less governed by perceptual characteristics of object.

Stage IV 16-18 months onwards (not shown on chart):-

Combinational symbolic games'Sequencing pretend acts'

Infant begins to apply a sequence of actions to an object/person; or applies an action scheme with a sequence of participants. E.g. infant may feed doll, then put her to bed, or infant may 'drink' from cup, then give 'drink' to mother, then doll. The meanings of several schemes are thus integrated within one framework.

Stage V 18-26 months (usually around 24 months) (not shown on chart)

Internally directed -symbolic gamesPlanned pretend

Infant may search for absent objects to complete a game - suggesting prior mental planning.

Object substitution

Infant uses 'pretend' object that is dissimilar to real object in game - e.g. uses toy car as hairbrush indicating that internal symbolic scheme is dominant.

Both Volterra et al (1979) and McCune Nicolich (1981) find close parallels between development of first words and symbolic play. The same stages of 'decentration' appear to be followed in both. Infant first uses words or gesture as part of routine or game, then to anticipate or recall; then used words to designate actions carried out by others, and agents or objects of such actions, and at the same time reversed roles in play. Both language and symbolic play proceed from single units to combinations. This suggests strong links between cognitive organisation for symbolic play and for language.

SPEECH SOUND PRODUCTION

Ferguson (1977) suggests that vocal signals have particular phonetic characteristics, which are different from the first use of adult words. Other researchers suggest that the phonetic characteristics of this stage in fact carry over into meaningful speech. The form of these vocal signals varies considerably in production (Menyuk & Menn 1979; Crystal 1979). Ferguson describes them as "babble sounds used meaningfully".

Intonation Patterns of Vocal Signals and First Words

In the first vocal utterances, the prosody tends to be more stable than the phonetic form (Crystal 1979), e.g.

thank you can be heard variously
[θeɪkə] [deɪdɪ] [gɪgʊ] [gɒɪtə]

(Menyuk & Menn 1979), but the intonation is always the same. Adults tend to exaggerate prosodic contrasts in talking and playing with children, and there is evidence that these contrasts are the first which are perceived and produced by children (Crystal 1979).

Stable intonation allows adults to read meanings into the child's first vocal communications, and assign them to pragmatic categories such as request - greeting - rejection.

PIAGET STAGES OF SENSORI-MOTOR DEVELOPMENT

(Boyle, D.C. A Student's Guide to Piaget, Pergamon Press, Oxford, 1969)

(Beard, R.M. An Outline of Piaget's Developmental Psychology, RKP, London 1969)

I : 0-1 month

Random and Reflex actions

II : 1-4 months

Primary circular reactions

A circular reaction is one in which the completion of a pattern of behaviour is the stimulus for repeating it. 'Primary' means that the action is directed to the child's own body e.g. repetitive kicking movements. In this period, the child begins to show the rudiments of voluntary action. If he is taken off the breast, while still hungry, he will turn back to it though we cannot yet say he does this in order to regain the breast, it is more than a reflex response.

III : 4-8 months

Secondary circular reactions

Termed 'secondary' because they are directed to outside objects and events. Vision and grasp are co-ordinated, and behaviour generalises and acquires intentional characteristics, e.g. the child can stretch his hand to an object out of reach; behaviours he employs in relation to one toy are generalised to others, e.g. banging, shaking. Imitation develops.

IV : 8-12 months

Co-ordination of secondary schemata and application to new situations

This stage represents an advance in intentional behaviour. Whereas previously, the means and the end were both equally part of a single secondary reaction, the means now becomes subordinate to the end, and he begins to direct behaviour to a desired outcome e.g. pushing away obstacles between himself and a toy (means behaviour) in order to reach it (the end behaviour). He has expectations, which are evidence of him internalising his world - e.g. he will show disappointment, or inquiry if a cup which previously contained juice is now empty. He can find objects hidden within his view, but not follow a sequence of hiding an object behind several screens in turn.

V : 12-18 months

Differentiation of action schemata and discovery of new means - tertiary circular reactions

The child now varies his actions, trying out new ways of interacting, rather than simply repeating familiar patterns of behaviour. He explores new objects, and investigates to see what can be done with them, drawing on previous learning to solve a new problem. They begin to take into account the physical properties of the objects they play with - e.g. he will turn a cube box in order to find a particular picture; he builds a tower taking care to place the bricks so they do not fall. He can follow a hiding sequence, and retrieve a toy from the last screen behind which it was hidden, but only if he actually watches the sequence (so called 'visible displacement').

VI : 18-24 months

Invention of new means through mental combinations

The child begins to use his internalised images of the world in order to solve problems, instead of relying directly on sensori-motor activity - e.g. in order to place a toy in a drawer which is partially closed, he can pull the drawer open without having to experiment with it or the toy, because he can call up the memory of having done so before.

Piaget describes an intermediary phase in this process with his daughter, who faced with the problem of extracting a chain from a matchbox with a narrow opening, looked at the slit, then opened her mouth wider and wider - then palled to enlarge the slit. Here the motor activity is a kind of symbol for "open", the child reflects, rather than acts directly. Symbolic play develops at this stage, along with the ability to imitate in the absence of a model - a child will reproduce a piece of behaviour he has observed after a delay. This stable mental representation allows him to find an object even when he has not observed its displacement - e.g. if a ball rolls under a chair, he goes round the other side to fetch it.

The ages Piaget gives are based on his own three children, and are highly approximate; it is the sequence which is important, rather than the chronology.

SCALES OF SENSORI-MOTOR DEVELOPMENT DEVELOPED BY UZGIRIS AND HUNT

(I.C. Uzgiris & J. McV. Hunt Assessment in Infancy, University of Illinois Press 1975)

Uzgiris and Hunt set out to develop an assessment based on Piaget's theories of infant development. They isolated six skill areas, and devised an ordinal scale of steps for each skill which corresponded with the projected sensori-motor sequence. They did not, however, attempt to match the steps precisely to Piaget's stages. This was because when they looked at the relationships between the assessment and the stages, they found that they were not uniform for each skill, progress in the various branches of intelligence being somewhat independent. Also they tested only a small number of children, and there was considerable individual variation. In general, however, Piaget's developmental progression was reflected in the assessment.

Despite these cautions by Uzgiris and Hunt, it is common practice for researchers to use the assessment results to "assign" children to one stage or another of sensori-motor development.

1. Visual Pursuit and the Permanence of Objects

This scale focuses on the development of the concept of the independence of objects, it begins with looking and visual tracking, and involves searching for partially hidden objects, then objects which are fully hidden, and then objects which are displaced in a sequence. By Stage 6 a child can follow a series of displacements even if he has not actually watched the object being moved from place to place.

2. Means for Obtaining Desired Environmental Events .Means-End Scale

This scale is concerned with what infants do in order to cause events or obtain objects which they want. They combine the use of one behaviour pattern as a means, with another as end or goal. The earliest example of this is when the baby moves his hands about in order to look at them (around 2 months). Later, he repeats actions in order to produce an interesting result. During stage IV from about 8 months on, he will move to retrieve a toy he wants to play with, and pull at a support, such as a blanket, to obtain a toy. By the end of Stage V he shows foresight in anticipating consequences, and can co-ordinate means and end behaviour - e.g. the example given of building a tower where care is taken to place bricks so that the tower will not fall.

3. Imitation

Vocal imitation begins around 3 months when the child vocalises on hearing an adult make his “own” sounds, such as cooing or blowing. Between 9 and 14 months he develops the ability to imitate novel sounds, and subsequently imitates simple words.

Gestural imitation begins around 4 months. Again he copies his “own” behaviours modelled by an adult e.g. waving, banging. Gradually he imitates novel body movements, such as clapping, peek-a-boo. By about 11 months he can imitate behaviours which he can see himself doing. Between 14-18 months he becomes able to imitate “invisible” behaviours such as facial expressions.

4. Operational Causality

The term ‘operational’ here means practical, or effective, as opposed to conceptual causality, and refers to the child’s perception of cause and effect relationships. From around 3 months, the infant will generalise particular repetitive actions to circumstances other than those in which they originated - e.g. a baby who kicks his legs as part of a game to make an adult move a mobile up and down will kick when the activity has stopped, apparently as a way of making it start again. At first the infant behaves as though the source of causality lay within himself - then he begins to appreciate that it originates externally. During Stage IV he perceives that adults make things happen, and in order to make a musical box, say, work again, he will touch the adult’s hand, or the toy itself. Later he will hand the toy to the adult, perhaps with some kind of request signal, and later still will examine the toy for himself and try to make it work.

5. Object Relations in Space - Spatial Relations Scale

This refers to the infant’s appreciation and construction of where objects are in space and how they relate to one another. The earliest recognition is evidenced by a baby of about 2 months slowly looking from one object to another. By 4-5 months he can grasp objects successfully, and track rapidly moving objects. By 6-7 months he will lean to look appropriately for a dropped object. At about 9 months, he recognises objects which are reversed (e.g. a bottle presented wrong end up) and becomes able to construct relationships between two objects, using one as a container for another. By 15 months, he can build a tower. By Stage VI he can look for people and objects in their accustomed places - e.g. going to fetch shoes or coat.

6. Schemas for Relating to Objects - Schemes Scale

This scale represents a series of peaks in the tendencies for certain ways of interacting with toys, where one type of behaviour succeeds another.

At first toys are mouthed, then visually inspected, then used for hitting. In this Stage (roughly II) a familiar schema is applied regardless of the characteristics of the toy. The infant then begins to differentiate - shaking toys that make a noise as well as

hitting with them, later dropping and throwing toys. At around 6 months he examines objects for their different properties and begins to manipulate them selectively. By 8-9 months he is beginning to appreciate their social uses, and between 10 and 14 months he incorporates them actively in interpersonal interactions.

REFERENCE

- (1) Bates et al (1975)
- (2) Bates et al (1979)
- (3) Bower (1979)
- (4) Bruner (1977)
- (5) Bruner (1978)
- (6) Bruner (1981)
- (7) Carter (1978)
- (8) Clark (1978)
- (9) Condon (1977)
- (10)Crystal (1979)
- (11)Ferguson (1977)
- (12)Foster (1979)
- (13)Gray (1978)
- (14)Kaye (1979)
- (15)Kuhl (1980)
- (16)Lempers et al (1977)
- (17)Levinson & Poulsen (1980)
- (18)Lock (1980)
- (19)Martlew (1982)
- (20)Masur (1980)
- (21)Menyuk & Menn (1979)
- (22)Murphy & Messer (1977)
- (23)Murphy (1962)
- (24)Newson (1975)

- (25)Scaife & Bruner (1975)
- (26)Sheridan (1973)
- (27)Stark (1979)
- (28)Stern (1977)
- (29)Barten (1979)
- (30)Sugarman-Bell (1978)
- (31)Trevarthen (1979)
- (32)Trevarthen & Hubley (1978)
- (33)Volterra et al (1979)
- (34)McCune-Nicholich (1981-b)
- (35)Boyle (1969)
- (36)Beard (1969)

Refer to MVDP Research Information Service, Vol.11, Issue 3 for a detailed list of Bibliography.

So many people have contributed their ideas to these three issues of the Research Information Service, that it is impossible to mention them all by name. Among those we particularly wish to thank are:

Dr. Susan Gregory, Nottingham University, for her valuable advice and information; Dr. Margaret Martlew, Sheffield University, who kindly checked the developmental section; Dr. Susan Foster, University of California, Dr. Derek Putter, Kent University, Dr. Gordon Wells, Bristol University, who generously supplied copies of their work; Dr. Virginia Volterra, Rome Institute of Psychology, Miss Bencie Woll, Bristol University, and Mrs. Patricia Le Prevost, Oxfordshire Speech Therapy Service, for the time they kindly afforded for discussion.

Especial thanks are due to our printer, Mr. Foster, and to Ian Walker for the thought and time they put into production and layout. Our greatest debt is to our Secretary; Mrs. Pat House, for her cheerful acceptance of the numerous revisions we made.

Finally, thanks to Ghislaine, Sam, and Joseph Grove, who provided us with lively evidence for the theory we expounded.