

Measures of Parent-Infant Interaction: An Overview

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Increasingly, programs for handicapped infants and toddlers are including in their intervention activities objectives related to the quality of parent-child interaction. As a consequence, it has become necessary for programs to assess the impact of these intervention efforts on parent behaviors. This article considers tools available for assessing parent-child interaction for program planning and evaluation. Lastly, recommendations are offered to guide the selection of a measure of parent-child interactions.

This paper will consider approaches to the assessment of parent-child interaction and the utility of several available tools for the design and evaluation of parent-mediated intervention. Two principles of the rationale for intervening in the structure and tone of parent-child interaction will be examined. The first is the relationship of parental style to child development outcome, and the second is the pragmatic rationale of designing evaluation strategies so that the targets of intervention can be assessed directly. Types of parental style/interaction systems will be described, and advantages and disadvantages of various types will be addressed. Several currently available measures will be examined in some detail. Finally, guidelines will be offered for selection of a system for use in program evaluation.

Rationale of Parent-Mediated Intervention

An emphasis upon parent involvement has become an almost universal characteristic of early intervention programs for handicapped infants. While the specific nature of parent involvement varies across program models, a large percentage of programs specify a role for parents and make the facilitation of parent-infant interaction a central goal of their intervention. For example, in their review of programs for biologically handicapped infants, Simeonsson, Cooper, and Scheiner (1982) found that 70% of the 27 programs specified a role for parents in the intervention. This emphasis upon parent involvement has been based at least in part upon a recognition that, for infants and toddlers, the typical context for learning is their home and, to a great extent, through interaction with family members.

Relationship of Parent-Child Interaction to Child Development

Literature on Nonhandicapped Infants. Much of the instruction given to parents is based upon literature that relates particular environmental characteristics to more favorable child development outcomes. Wachs (1976) found a correlation between the home environments of disadvantaged infants and their sensorimotor abilities. In this work, home characteristics such as the presence of daily routines proved to be related to favorable developmental outcomes. Underlying current research on parent-infant interaction is the idea that parents' behavior with their children affects the growth of the children (Ainsworth & Bell, 1973; Clarke-Stewart, 1973; Hunt, 1961). Maternal style, particularly the dimensions of warmth and affection, contingent responsiveness, sensitivity to children's state and interests, and encouragement of achievement have all been related to positive child outcomes. Alternately, maternal restrictiveness, punishment, and intrusiveness are negatively correlated with children's performance on tests of cognitive abilities. Very young children develop most rapidly when parents respond to them frequently and provide experiences that are appropriate to their developmental level (Hunt, 1961; Stern, 1974). For example, research on nonhandicapped children indicates that a match between a parent's speech and the child's language abilities encourages language development (Nelson, 1973). Parents adapt to their children's understanding by simplifying their speech. In particular, parents adjust

the length of their sentences to approach their child's own speaking style (Cross, 1977; Nelson, 1973; Phillips, 1973; Rondal, 1977). Parents encourage their children's speech by accepting their attempts and by avoiding rejection or punishment of attempts at communication (Moerk, 1975). These findings support a growing body of evidence that children whose parents encourage rather than direct their efforts develop more successfully.

Interaction with Handicapped Infants. Information about how a handicap affects interaction between infant and parents is accumulating. Parents of both nonhandicapped and handicapped infants have been found to adapt their patterns of interaction to their children's behaviors. In general, parents of handicapped infants must cope with less feedback from their infants than do parents of nonhandicapped infants (Walker, 1982). Jones (1977) studied several sets of parents and their Down syndrome babies. He found that these infants initiated fewer interactions and were less likely to give their parents a chance to participate than did nonhandicapped infants. In a later study, he also reported that Down syndrome infants made eye contact with their parents less often than did normal babies (Jones, 1978). Parents of infants with Down syndrome direct their infants more than do parents of nonhandicapped infants (Jones, 1977). Rondal (1977) did demonstrate, however, that parents of children with Down syndrome adjust their sentence length and complexity to their children's developmental age, not their chronological age.

Overall, parents of handicapped infants interact less often with their infants than do parents of normal infants. However, how well parents make constructive adaptations may depend on the nature and severity of the child's disability. Fraiberg (1975) reported that blind infants are less responsive and less vocal than sighted infants. She also found that blind infants developed attachment behaviors which, although delayed in time of occurrence, were otherwise normal. Specifically, these behaviors were recognition of parents and anxiety around strangers. Deaf-blind infants are also less responsive than normal infants. In one study, deaf-blind infants were found to be less active and to have many fewer positive experiences with their parents than their nonhandicapped peers. Parents of deaf-blind children have a greater tendency to repeat their actions than do parents of nonhandicapped infants. Moreover, parents of deaf-blind children try harder to elicit a response from their infants (Walker, 1982), perhaps because their infants respond less often and less positively.

Interventions with Parents. Recognition that children who are at risk for or who display handicapping conditions behave differently and affect their parents differently than do nonhandicapped infants has prompted interventions designed to change the pattern of parent-child interactions to more closely approximate that of nonhandicapped infant and parent dyads. At this point, data indicate that parents and infants can be helped to improve the quality of their interactions (e.g., Bromwich, 1978; Fraiberg, 1975; McCollum & Stayton, 1985; Rosenberg & Robinson, 1985).

Parents of blind children, for example, have learned to be more effective in recognizing their infants' signals to communicate (Fraiberg, 1975). The mother of a 2-year-old boy with cerebral palsy was encouraged to bring her face closer to him and to repeat the sounds he made (Walker, 1982). His subsequent increases in vocalizations were associated with this intervention. Findings such as these support the utility of efforts directed at modifying parent interactional style.

Assessment Systems

At this point, efforts to evaluate procedures geared to enhancing parents' interactional skills have not been precise. Rather, the assumption has been frequently made that changes in parent skills will be reflected in measurable changes in child development. While such changes are certainly the ultimate criteria for judging the effectiveness of parent-mediated interventions, assessments of child behavior do not provide information about the programs' impacts on parenting, nor do they prescribe strategies needed to refine intervention procedures. Thus what is needed are measures of parents' interactional skills with respect to their handicapped infants.

Several direct and indirect measures have been used to assess the quality of the interactions and the environment that parents provide their young children. In this paper we will consider several measures that assess interactions and that have been developed sufficiently to have been described in the professional literature. For interventionists, selecting an appropriate and sensitive measurement strategy can be quite difficult. To be useful, observational measures of parent-infant interaction should (1) permit reliable assessment of dyads containing young children whose patterns of behavior may be ambiguous due to a handicap that limits the child's ability to interact; (2) offer a system that is efficient and that can be easily incorporated into an intervention

program; and (3) identify strategies that foster effective interactions between parents and their young handicapped children.

Approaches to Behavioral Observations

Systems for classifying behavioral observations vary in the size of the units of behavior recorded. Molar units are broad classes of behaviors such as responsiveness or directiveness. Molar categories give the least information about specific behavioral exchanges and the highest level of summarization of observed behavior. Molecular categories are more narrowly defined, recording specific behavioral events such as smiles, hugs, or vocalizations, and offering little condensation of information. The most common systems for recording behaviors use global rating scales to evaluate behavior after a period of observation. Some use precoded molecular categories to record the occurrence of behaviors during a period of observation, and others use checklists to record the presence or absence of behaviors either during or after a period of observation.

Molar Rating Systems. Molar ratings condense classes of behaviors that are presumed to reflect aspects of parent-child interaction (such as maternal sensitivity or child interest). Thus a rating of a particular individual's sensitivity is an estimate of displays of sensitivity. The ratings eliminate many sources of variance such as peculiarities of the setting or idiosyncratic acts of individuals. They allow observers to make judgments based on a number of behavioral acts involving both parent and child. At their best, rating scales highlight the essential meaning of complex events.

As with all measurement systems, errors can occur with rating systems. Errors in rating scales may stem from lack of clarity in definitions of behaviors evaluated and from the persons doing the ratings. For example, characteristics to be rated may not be well defined, or may not be understood consistently across raters. In general, well-defined rating scale points and thorough training can minimize these types of problems.

Molecular Coding Systems. As noted, systems using molecular categories to record behaviors generally offer more detailed records than do molar ratings. As with rating scales, errors in coding molecular behaviors arise due to problems in definition of behaviors and due to

observer errors. Interobserver reliability, however, is usually higher with molecular coding because these behaviors are more easily defined and are less open to varying interpretation than global ratings (Hollenbeck, 1978). In addition, molecular categories preserve much of the variance that is eliminated in global ratings—which is an important advantage when the analysis of a problem requires the study of small units of behavior or small shifts in rates of behaviors. Alternatively, data derived from molecular categories may be difficult to interpret because it can be hard to extract a common meaning from a set of narrowly defined behaviors. To cope with this problem Gottman (1978) suggested a number of statistical procedures, including factor analysis, for reducing sets of behavioral categories into smaller, more readily interpreted clusters. Another drawback to the coding of molecular behaviors is the frequently laborious nature of the process. If many molecular behaviors are to be coded, it is usually necessary to have a permanent record such as a videotape. The process of making a videotape may itself influence the nature of the interaction. Moreover, the logistics and costs of such a system may be prohibitive, particularly for home-based intervention programs. For example, the recording of molecular behaviors into categories can require substantial amounts of rating time, making the use of such a system impractical for clinical purposes.

Illustrations of Systems for Assessing Parent-Child Interaction

Molar Rating Scales. Two scales through which interaction between mothers and their handicapped infants is rated have appeared in the literature recently; the Maternal Behavior Rating Scale (Mahoney, Finger, & Powell, 1985) and the Teaching Skills Inventory (Rosenberg, Robinson, & Beckman, 1984; Rosenberg & Robinson, 1985). The Maternal Behavior Rating Scale consists of 18 maternal behavior items and 4 child behavior items rated on 5-point scales. This scale assesses three areas: Child Oriented/Maternal Pleasure, Quantity of Stimulation, and Control. In the one study reporting its use, interrater reliability obtained using Pearson correlation ranged from .76 immediately after training to .81 on a random sample of 15 dyads.

The Teaching Skills Inventory—Version 2 (TSI) consists of 15 items that are rated on 7-point scales. This scale assesses Structure of the Interaction, Maternal Responsivity, Maternal Instructional Skills, and Child Interest. Using a percentage of agreement procedure, the authors

reported an average interrater reliability of .86 for the 15 rating items. Internal consistency was evaluated using coefficient alpha, which was computed for the 13 rating items that assess Maternal Responsivity and Maternal Instructional Skills. This analysis, based upon ratings of videotapes of 23 parent-infant dyads, yielded a coefficient alpha of .96. When the content of the scale formed the basis for parent instruction, the TSI demonstrated sensitivity to changes in parent's skill level as assessed with the TSI. Also, improvements in parent performance on the TSI have been demonstrated to be related to increases in children's interests in tasks their parents present (Rosenberg & Robinson, 1985).

Molecular Coding Systems. Many examples of molecular coding systems have been reported. Only a few examples can be offered here. McCollum and Stayton (1985) summarized work on assessment and intervention with parents and infants using the Social Interaction Assessment/Intervention (SIAI) model. In this model no formal measures are used during assessment; rather, this is a clinical process that makes use of both observations of parent-infant dyads and expressions of parents' concerns. The goal of the assessment phase of the SIAI is to select a child behavior for which an increase is desired, and then select parent behaviors that appear to affect the occurrence of the targeted child behavior. During intervention the occurrence of the targeted behaviors is formally recorded by coding videotapes of parent-infant interactions made during baseline and treatment play sessions. Inter-observer reliability was calculated by a percentage of agreement method. The authors reported average reliability of .97 for maternal behaviors and .93 for infant behaviors.

Kelly (1982) used an observational coding system to assess infant and caregiver behavior using videotapes of 10-minute teaching sessions. Behavior was categorized as initiating, responding, and controlling. These behaviors were then rated as positive or negative, vocal or nonvocal. Both duration and frequency of the behaviors were recorded. The Pearson correlation was used to calculate interobserver agreement, which for each category ranged from .93 to 1.0 during training of observers.

Kogan (1980) and her colleagues (Kogan & Gordon, 1975) developed the Interpersonal Behavior Constructs System. This system permits the recording of the occurrence of 22 behaviors at 40-second intervals from videotaped parent-child play sessions. These behaviors are grouped under five headings: positive and negative affect, nonacceptance, control, and submissiveness. The authors offered limited

information on interrater reliability, which is measured as "agreement with consensus." Where disagreements arise between two raters, a third rater reviews the event in question, and the final rating is based on the agreement by two of the three observers. An average agreement with consensus of 85% is reported. It is difficult to know if this is an acceptable level of agreement without knowing how often disagreements arise.

Checklists. Checklists filled out after one or more periods of observations have also found a useful niche in the evaluation of parent-child interaction. The HOME Inventory for Infants and Toddlers (Caldwell & Bradley, 1984), for ages birth to 36 months, assesses aspects of the quality of care young children receive in their own homes. This measure makes use of both interview and observation methods to obtain information. After visiting a parent and child at home, interviewers record the presence or absence of the behaviors specified within the HOME scale. The HOME Inventory is composed of 45 items that are organized into 6 subscales: Responsivity, Acceptance, Organization, Play Materials, Parental Involvement, and Variety in Stimulation. The inventory focuses on several areas including aspects of parent-child interaction. Items in the HOME are grouped on the basis of factor analysis. Caldwell and Bradley (1984) reported internal consistency as assessed by the Kuder-Richardson 20 formula as .80. Interrater reliability reported in much work with the HOME is calculated by the percentage of agreement method and is generally reported at above .90 for the total scale (e.g., Barnard, Bee, & Hammond, 1984).

Studies using the HOME demonstrate a relationship between child cognitive development and the HOME scores (Wachs, 1976). One study also found that handicapped and at-risk infants who showed greater levels of pleasure in contact, who were more easily soothed, or who showed less distress were likely to reside in households receiving higher scores on the HOME (Affleck, Allen, McGrade, & McQueeney, 1982). Because the HOME was developed with at-risk and mildly handicapped populations, however, the HOME may not be a suitable measure to assess the quality of care severely physically handicapped children receive. For example, some of the items assess households based on the availability of toys that may be of little use to children with severe motor disorders. It should be pointed out that relatively little research with the HOME has included handicapped children.

Another checklist, the Parent Behavior Progression (PBP), Forms 1 and 2 (Bromwich, 1978), evaluates the quality of parenting provided to

infants. Form 1 of the PBP spans birth to 9 months, and Form 2 assesses parenting from 9 to 36 months. Form 1 is composed of 54 items that are organized into six levels. Form 2 contains 70 items that also fall into six levels. For each form the levels are (1) enjoyment of the infant, (2) sensitivity/responsivity, (3) mutuality in interaction, (4) developmental appropriateness, (5) initiation of new activities based on those presented previously, and (6) independent generation of new developmentally appropriate activities. The PBP is meant to be filled out by observers who are familiar with each family. No interobserver reliability data are available for the PBP, nor are there data indicating the relationship of individual items to the levels in which they are organized, nor to the sum of all items. The relationship of the PBP to the HOME has been examined with a group of handicapped and at-risk infants (Allen, Affleck, McQueeney, & McGrade, 1982). HOME total scores at age 9 months were found to be highly correlated with the total scores for the PBP at 4, 8, and 12 months. HOME total scores at 18 months were related to PBP totals at 12 and 18 months of age.

Selection of a "Parent" Measure

Several articles have called for program evaluation strategies that address all the goals of an intervention program, not just child developmental gains (Sheehan, 1982; Wang & Ellett, 1982; Zigler & Balla, 1982). As previously noted, the majority of infant intervention programs specify a role for parents in the intervention, but the impact upon the parent is not always measured directly, largely because few measures have been available. Now, however, a number of measures are available; several have been presented in this paper.

Selection of an appropriate measure for a specific program should be based upon several considerations. The first consideration in the selection of any measure is content validity. The content of the measure should be consistent with the type of parenting style the program wishes to foster. There are striking commonalities in the aspects of parenting style evaluated by the systems reviewed in this paper. Those aspects are sensitivity to the child's interest and affect, development of reciprocity and regular routines, and encouragement of active participation on the part of the child. This consistency in emphasis on sensitivity and reciprocity suggests both face and consensual validity of these measures. Despite the common features in content across these systems, there are unique features as well. The HOME, for example, looks at

aspects of the physical environment as well as interaction patterns. The Teaching Skills Inventory includes assessment of the parents' skill in adjusting the complexity of tasks to the child's developmental level.

Other characteristics of rating systems that need to be considered include the availability of information regarding interrater reliability. If interrater reliability is adequate, the next issue is the degree to which the system contains items that create an internally consistent scale; this is often demonstrated with a coefficient alpha of greater than .80. It is also important for a scale to be sensitive to changes in parent behaviors. Once the validity and reliability criteria are satisfied, the next issue of consideration is the practicality of use. Points to consider include (1) the ease with which observers can be trained to use a system reliably, (2) the utility of information provided by the measures for program planning and evaluation, (3) the expense in personnel time associated with the use of the measure, and (4) the appropriateness for use with parents of differing backgrounds and with children displaying a range of disabilities. It is quite likely that no one system will be ideal with respect to all these criteria.

Summary

The mutual influence of parents and children was a revolutionary concept when Bell's article on the direction of effects in studies of socialization appeared in 1968. It is presently recognized that infants, despite relatively limited behavioral repertoires, have a considerable influence on how their caretakers interact with them. This recognition underlies the present effort to consider not only what developmental content is appropriate for each infant, but how both infant and parent characteristics affect the presentation of that content.

At this point concern with the quality of parent-child interaction is common in intervention programs that emphasize parents' ability to read and respond to their children's communicative cues. Such an emphasis is appropriate as there is evidence that infants' handicaps can alter their interactive capacities in ways that impair their ability to contribute to enjoyable exchanges with their parents. Moreover, program evaluation needs to address the impact of interventions upon parents and children. It is our view that the range of skills displayed by parents in interaction with their handicapped infants and toddlers can be measured. Finally, these measures hold considerable promise both as program evaluation tools and as guides in working with individual parents.

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