

Measurement of the Early Rearing Environment: Caregiver-Child Interaction

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INTRODUCTION

This chapter identifies measures that can be used to capture status and change in the quality and quantity of early caregiver-child interactions. Because maternal drug abuse often necessitates the use of alternative caregivers for the child, through either legal or informal arrangements, the measures discussed herein are suitable for the biological mother, father, or grandparent; professional foster parent; or any other designated primary caregiver. The discussion considers the significance of such measures in evaluating the efficacy of maternal intervention programs and in understanding the sequelae of prenatal drug exposure for children. The chapter also reviews the conceptual dimensions of caregiving, assessment procedures used in the home and laboratory, and level of analysis, whether by behavioral counts or rating scales. Comments on the strengths and pitfalls of specific measures also are included.

Caregiving interaction between adult and child is manifested in a variety of different contexts and can be measured using a variety of data collection strategies; however, this chapter is not exhaustive. Deliberately excluded are discussions of measures of parental beliefs and attitudes as well as parental self-reports of caregiving behavior, which were obtained through questionnaires or interviews. Rather, the chapter focuses specifically on observed transactions as appraised by objective researchers. Selected measures are highlighted because they have been used in longitudinal, normative studies or in investigations of children of drug-abusing mothers or of other at-risk groups, for example, preterm infants, children from low socioeconomic status (SES) families, and children of depressed mothers.

EVALUATING INTERVENTION

The study of caregiver-child interaction has three goals: to (1) describe how the caregiving is done, (2) understand the etiology of individual differences among caregivers, and (3) determine the consequences of caregiving for the developing child (Belsky 1984). Each goal is significant in evaluating intervention with drug-abusing mothers.

Although little systematic, empirical study has been done of deficits in caregiver ability associated with drug abuse, clinical studies (Escamilla-Mondanaro 1977; Rosenbaum 1979) and research with other populations with psychopathology (e.g., maternal depression) (Cohn et al. 1986, pp. 31-46; Field et al. 1985; Lyons-Ruth et al. 1986, pp. 61-82; Tronick and Field 1986) suggest that maladaptive parenting is likely in several domains. Therefore, to decide what will be addressed by an intervention, it is essential to identify the domains and to understand the internal vulnerabilities and external stresses that influence individual differences within those domains. Lack of clarity in defining what will be changed by intervention is one of the serious impediments to determining effectiveness of intervention.

Recent research indicates that mediating factors that affect individual differences in caregiving reside in the caregiver's personal history in the family of origin, personal psychological resources, contextual sources of stress and support (Belsky 1984), and attitudes and beliefs about children (Sameroff and Fiese 1990, pp. 119-149). Thus, a broad range of foci for intervention is possible, with feasibility and implementation differing among studies.

A comprehensive evaluation of the effectiveness of an intervention whose goal is to generate scientific as well as clinical information should target each of the three goals stated in the beginning of this section. That is, the evaluation should assess changes in dimensions of caregiving, changes in the presumed mediating factors, and changes in the hypothesized sequelae for the developing child.

DEVELOPMENTAL CONSEQUENCES OF PRENATAL DRUG EXPOSURE

Although prenatal drug exposure is associated with a higher occurrence of preterm births, intrauterine growth retardation (Frank et al. 1988; Hadeed and Siegel 1989; Hawley and Disney 1992; Zuckerman et al. 1989), and alterations in neonatal neurobehaviors such as crying (Lester et al. 1991), much controversy still exists as to whether prenatal drug exposure is a causal agent in adverse cognitive, emotional, and social development.

Two issues are in contention. One is long-term outcome, and the other is the exact nature of the causal agent. First, findings conflict as to the later development of children who were exposed in utero to illicit drugs. Some studies report a significant increase in the percentage of such children who function poorly in cognitive abilities (Chasnoff et al. 1992; Lifschitz et al. 1985), whereas the same studies and others report no differences in mean

scores between the target and comparison groups (Neuspiel and Hamel 1991).

Second, some investigators question whether prenatal drug exposure is the main causal agent or whether co-occurring factors during the prenatal period, such as poor maternal nutrition and lack of prenatal care, and interrelated factors occurring during the postnatal period, such as poverty, maternal depression, unstable home environments, and emotional and physical neglect, are the true causes (Hawley and Disney 1992; Lifschitz et al. 1985; Myers et al. 1992; Zuckerman and Frank 1992).

The issues have implications for both developmental theory and social policy. To date, however, the debate remains philosophical and mainly unaddressed by empirical research. Few studies have examined “the critical issue of the quality of the home environments of children of addicted mothers” (Hawley and Disney 1992).

The premise of this chapter is that no conclusions can be drawn in advance of research. Disentangling the influence of prenatal drug exposure from multiple postnatal influences can be done only through the systematic assessment of group and individual rearing conditions for children who were and were not exposed in utero to drugs and who are and are not being brought up in drug-abusing families. Although such an aim is ambitious, multiple individual studies can begin to contribute an informed answer.

DECISION ABOUT DOMAINS OF CAREGIVING

Assessing rearing conditions requires deciding which of the multiple roles that caregivers fulfill with infants and young children will be theoretically relevant and feasible for a specific study.

Caregivers provide protection (Ainsworth 1973, pp. 1-94; Bowlby 1969); provide comfort for distress (Ainsworth et al. 1978; Belsky and Isabella 1985; Del Carmen et al. 1993; Sroufe 1985); elicit and maintain positive social-affective exchanges, including smiling and vocalizing (Blehar et al. 1977; Campos et al. 1983, pp. 783-916); encourage environmental exploration and learning (Yarrow et al. 1975); and exercise control (Maccoby and Martin 1983, pp. 1-101). Caregivers also ensure physiological homeostasis through the concrete provisions of food, cleanliness, and warmth. Thus, the caregiver functions as nurturer, protector, comforter, playmate, teacher, and governor, among other roles.

Caregivers also provide the inanimate aspects of the environment: The number and kinds of toys, novelty or familiarity and variety of settings,

and degree of crowding also influence children's affective and cognitive development (Wachs and Gruen 1982).

Which domains should be measured? Most assessment procedures concentrate on one or more dimensions, but no procedure covers all. The choice of measures depends on which functions are of specific interest for a particular study. The selection might be guided by a focus on functions that are believed to be altered by drug abuse (e.g., affect management, protection). The selection also might be determined by considering functions that influence specific developmental outcomes of interest (e.g., facilitation or inhibition of environmental exploration as it affects a child's intelligence quotient [IQ]) or more general functions important to every child, such as those that underlie the quality of attachment between infant and caregiver (e.g., caregiver sensitivity).

There are wide individual differences within groups in how caregivers fulfill each role. Moreover, it is important to know similarities and differences among groups for children who were and were not prenatally drug exposed and who are and are not growing up in drug-abusing families. Similarities may exist in some domains of caregiving experience; differences may exist in others. Only when multiple domains are examined can there be a precise understanding of the relationship between drug abuse and caregiving.

FIELD-LABORATORY DECISION

Research contexts for the assessment of the rearing environment vary in the degree to which they approximate the child's naturalistic physical and social environment (Parke 1979, pp. 15-36). Multiple variations can be produced through alterations in either or both the physical and social domains. A variety of strategies are possible, and the choices are dictated by the experimental questions, the skill of the investigator, and the study's resources in terms of time and money.

The procedure that most approximates the natural environment is a field study in the home in which the caregiver and other members of the household, including siblings, are asked to go about their usual activities with the child just as if a stranger were not present. No experimental manipulation is introduced, and thoughtful consideration is given to diminish the influence of the observer (and, often, the video camera). The significant advantage of such a study is that it most closely reveals the animate and inanimate events within the natural environment that shape the development of the child. This procedure has been used to marked advantage to describe individual and group differences in rearing

environments in studies of children born preterm (e.g., Beckwith and Cohen 1984, pp. 235-271; Thoman et al. 1981). To date, few such studies have been published that used samples of drug-abusing mothers or infants who were prenatally exposed to illicit drugs. Much more work needs to be done.

Other assessments in the home, while maintaining the familial context, may alter everyday routines by instructing the caregiver to carry out a particular activity such as feeding, diapering, playing, or teaching. Such a procedure has the advantage of standardizing the observational context for each subject and ensuring that important activities are observed equally for each subject. Whereas the activities are usually chosen to duplicate common routines, some caution is necessary because ecological validity may be altered by the artificiality introduced in the timing. Timing, whether sensitive or insensitive to the child's cues, and predictability or unpredictability of the routine may be as important to the child's experience as the quality of the activity. Moreover, the focus on predetermined interactions obscures observation of other events in the environment that are perhaps equally important.

Partial approximations of the social environment also can be conducted in the laboratory. Procedures can vary from (1) unstructured "free play," to (2) specific feeding or teaching interactions, to (3) situations in which the caregiver is instructed to behave in an unusual manner. The "face-to-face" procedure as well as the "strange situation" (described below) are examples of the third scenario.

Paradigms that simultaneously impose unfamiliar contexts and unusual caregiver behaviors have a goal different from approximating the natural social environment. Their aim is to perturb the ordinary routines in the belief that adapting to perturbations is more revealing of individual differences than reacting to familiarity. The principle, as demonstrated in more than a decade of research with the "strange situation" (Ainsworth et al. 1978), has generated a powerful tool. However, as pointed out by Ainsworth, only naturalistic observations in the home can demonstrate the ultimate validity of the laboratory procedure.

Thus, to more accurately determine the rearing environments associated with drug abuse, naturalistic studies in the home and experimental perturbations are required. Practical considerations also guide the choices. Home observations may involve safety issues for the staff as well as the families. Some neighborhoods may be too dangerous for a single staff member to enter or make observations because of increased gang activity and drug-dealing in the late afternoon and evening. Home observations

may fail because subjects who abuse drugs may forget appointments, may not be awake and ready, or may be preoccupied with activities of drug use.

Laboratory visits may be equally difficult. Transportation to the laboratory as well as child care for other children may have to be provided. The staff members may have to help ensure the subjects' readiness by waking the mothers, organizing their preparations, and ensuring the children's dressing and feeding. The laboratory staff members must provide diapers, formula, snacks, and meals. Furthermore, subjects may seek the researchers' attention for themselves or fail to soothe and help their children feel comfortable in the laboratory situation. The decision whether to use the home or laboratory depends on both theoretical and practical considerations, which in turn will affect the knowledge gained.

METRIC DECISION: BEHAVIORAL COUNTS, RATING SCALES, OR Q-SORTS

The choice of measures depends not only on decisions about the domains of caregiving to be investigated, the theoretical rationale and feasibility of the setting, and the structure of the procedure but also on the method of quantification. Observational techniques can be quantified by behavioral counts, rating scales, or Q-sorts (Block 1978).

The use of behavioral counts as the method of quantification can reveal how frequently specific behaviors or events occur, the frequency of affects accompanying the behaviors, and the sequence of events. The advantage of behavioral counts is that they produce a precise, albeit incomplete, record of what occurred during an observation. The disadvantage is that they are affected by transient conditions and may be less stable over time and situation than rating scales. Behavioral counts also require complex analysis procedures to meaningfully integrate specific, discrete behaviors.

In contrast, rating scales automatically summarize discrete behaviors over time as well as suppress or ignore deviations from a subject's central tendency (Barnard and Kelly 1990, pp. 278-302). Statistical analysis becomes simpler because the observer becomes a filtering and integrating tool (Block 1978). However, to the extent that observers synthesize events, ratings tend to be subject to differences among observers in how much weight they give to specific behaviors; thus, the bases of the ratings may remain idiosyncratic or unspecified to some degree.

Q-sorts (Block 1978) retain the focus on the observer as the means of synthesis. However, rather than being asked to measure aspects of a subject's behavior against a presumed or specified norm, the observer

measures an array of specified behaviors against each other for a particular subject. Q-sorts include many more enumerated behaviors than do rating scales, thus making the differences among subjects and groups more specifiable. Q-sorts also diminish some biases that trouble rating scales, including halo effects and differential preferences among observers for the middle or extremes of the scale. However, Q-sorts are complex to develop and difficult to score. Although no Q-sort measures are described in this chapter (the ones in common use have different aims), interested readers should consult Block and Block (1980, pp. 39-101) and Waters and Deane (1985).

Whether behavioral counts, rating scales, or Q-sorts are the measure chosen, their usefulness ultimately depends on the care and insight of the observer. To reach a high level of skill and to establish interobserver and test-retest reliability, observers must be trained for each study.

HOME ASSESSMENTS

There are several naturalistic observation procedures that differ in duration, time of day, behaviors encoded, and coding complexity (Beckwith and Cohen 1984, pp. 235-271; Bakeman and Brown 1977; Bornstein and Tamis-LaMonda 1989, pp. 49-62; Clarke-Stewart 1973; Del Carmen et al. 1993; Lewis and Coates 1980; Thoman et al. 1981; Yarrow et al. 1975). The procedures also differ in the use of preestablished behavior categories or narrative reports, time sampling (e.g., observer views occurrence or nonoccurrence of specified behaviors for 10 seconds and records during the next 20 seconds) or event sampling (occurrence of behaviors is recorded regardless of when they occur), and electronic recording devices, audiotape recordings, stenographer's books, or paper checklists.

Regardless of procedure, the following domains can be measured: involvement (i.e., amount of caregiver-child interaction); amount and quality of physical, verbal, and visual contact; amount of responsiveness of caregiver to child; degree of caregiver restrictiveness of exploration; degree of caregiver intrusiveness; kinds of control strategies; and caregiver affect. The child also can be assessed as to amount and kind of social bids, positive and negative affects, responsiveness to caregiver, amount of environmental exploration, and regularity of sleeping-awake states.

The procedures tend to be time consuming: Observations are precise and intense; statistical analyses often are laborious; and data reduction is challenging. Yet, naturalistic observations hold the promise of detailing objectively, minute by minute, caregiver-child behavioral sequences as

they differ in children who were and were not exposed in utero to illegal drugs and who are and are not being reared in drug-abusing households.

System for Rating Maternal-Care Behavior

This system consists of scales (Ainsworth et al. 1978) (available in microfiche form from the Educational Testing Service, Princeton, NJ 08540) that rate maternal behavior during the infant's first year. They were derived from careful examination of detailed narrative reports of repeated home observations of a normative sample and then were used to predict later quality of attachment and social behavior in that sample (Ainsworth et al. 1978) as well as in longitudinal studies of preterm infants (Goldberg et al. 1986), low-SES full-term infants (Egeland and Farber 1984; Sroufe 1983, pp. 41-84), and children exposed in utero to phencyclidine (PCP) and cocaine (Rodning et al. 1991).

These rating scales contain 26 nine-point subscales, with points 1, 3, 5, 7, and 9 anchored in detailed behavioral descriptions. The areas rated include general attitude of caregiver toward baby and the caregiver role, feeding, availability and interaction, physical contact, response to crying, social contact, facilitation of sensorimotor development, sensitivity-insensitivity to child signals, acceptance-rejection, cooperation-interference, and accessibility-ignoring. Many of the subscales tend to be highly intercorrelated, which allows the use of a few selected scales.

Home Observation for Measurement of the Environment

This inventory (Bradley and Caldwell 1984; Caldwell and Bradley 1978) is a combination observation and interview lasting about 1 to 2 hours. It is administered in a child's home when the child is present and awake, during which time the child's primary caregiver is interviewed. There are two versions of the Home Observation for Measurement of the Environment (HOME), one for use with families of infants from birth to 3 years of age and one for use with families of preschoolers from 3 to 6 years of age. The HOME is a rating scale that scores items in a binary (yes-no) manner. Because the items are well specified and concrete, the task is made easy for the rater, and rater bias is reduced.

The HOME measures some inanimate aspects of the environment as well as some facets of the caregiver-child relationship. The items are clustered into six subscales: emotional and verbal responsiveness of caregiver, avoidance of restriction and punishment, organization of the physical and temporal environment, provision of appropriate play materials, caregiver involvement with child, and opportunities for variety in daily stimulation.

Since its initial development, the HOME has become one of the most widely used measures in child development research for evaluating the quality of a child's early physical and social environment (Gottfried 1984). A wealth of information is available about internal consistency, test-retest reliability, and the influence on HOME scores of family demographics, including SES, ethnic group, birth order, and sex. In addition, multiple studies with diverse samples have effectively demonstrated predictive and concurrent associations between HOME scores and cognitive performance from infancy to school age.

The HOME is reliable, valid, and easy to use and has the advantage of measuring physical as well as social dimensions of the caregiving environment. One caution: For some studies or samples, it may not be sufficiently sensitive to individual differences. The one published study that used the HOME to assess the early caregiving environments of infants who were prenatally exposed to drugs found equivalent scores for drug-abusing mothers, comparison mothers who did not abuse drugs, and professional foster parents, although the Ainsworth rating scales did differentiate (Rodning et al. 1991).

Purdue Home Stimulation Inventory

Wachs (1984, pp. 273-328) has been a strong exponent of a theory of environmental specificity, which contrasts with global models and postulates that different aspects of the environment influence different facets of later development. The effects are dependent on the age of the child and are mediated by the individual characteristics of the child. Thus, the use of multidimensional predictors and criteria, across distinct subgroups of children and across ages, becomes the recommended research design.

Derived from that model, the Purdue Home Stimulation Inventory (PHSI) is designed to assess specific animate and inanimate features of the environment. During the observations (approximately 45 minutes long), the observer dictates into a tape recorder all relevant child-environment, child-person interactions. Also, every 15 minutes the observer uses a precoded checklist to check off appropriate categories for ongoing aspects of the child's physical environment. Whereas the sections of the scale that assess the social features of the environment are complicated to observe and analyze, the section that assesses the physical aspects is much simpler and can be used independently. Items measured are availability and variety of stimulus material, responsiveness of the physical environment, noise-confusion, crowding, regularity of temporal and spatial scheduling, and physical restriction of exploration.

Because the inanimate aspects of the environment are an overlooked domain of influence in children's development and because few measures exist for such assessment, the PHSI could be particularly useful in researching the effects of maternal drug abuse on children, particularly because noise-confusion and regularity of temporal and spatial scheduling are probably altered by drug abuse.

ASSESSMENTS IN EITHER HOME OR LABORATORY

Nursing Child Assessment Satellite Training Teaching and Feeding Scales

The Nursing Child Assessment Satellite Training (NCAST) scales (Barnard 1979) assess the quality of the interaction between caregiver and child, ages 1 to 36 months, in the familiar situation of feeding and in a more novel situation in which the caregiver is asked to teach the child two tasks, one at the child's age level and one somewhat beyond the expected ability of the child. The feeding scale comprises 73 items that the observer judges did or did not occur during the feeding situation, and the teaching scale comprises 76 yes-no items that did or did not occur during the teaching tasks. The items for each scale are clustered and generate either a total score (a score for the caregiver and a score for the child) or scores for six subscales, four of which describe caregiver behavior (including sensitivity to child cues, responsiveness to child distress, fostering social-emotional growth, and fostering cognitive growth) and two of which describe child behavior (clarity of cues and responsiveness to caregiver) (Barnard and Kelly 1990, pp. 278-302). One additional score, contingent responsiveness, can be generated for the teaching scale.

These rating scales have been widely used in research with diverse groups of children, including preterms and full terms; longitudinal as well as normative data exist. The scales have the advantage of being highly structured; the behaviors to be noted are clearly specified; and judgments are simplified because they depend only on occurrence or nonoccurrence rather than matching against an implied norm. The use of the scales requires direct training by an NCAST-certified instructor.

Parent/Caregiver Involvement Scale

When this scale (Farran et al. 1986) is used, interactive play of at least 20 minutes is either videotaped in the laboratory or observed at home, and 11 domains of the caregiver's behavior with an infant or young child up to age 5 are assessed: physical involvement, verbal involvement, responsiveness, play, teaching, control, directives, relationship among

activities, positive emotions, negative emotions, and goal setting. Each domain is rated on 5-point scales as to amount, quality, and appropriateness. Amount notes quantity of the behavior; quality judges smoothness, pacing, and affect; and appropriateness rates the match of the caregiver's behavior to the developmental skill and interest levels of the child. Summary scores may be created for amount, quality, and appropriateness ratings collapsed across the 11 behaviors, or profiles of individual scores can be analyzed for each of the 11 domains of adult behavior for each of the three qualities.

The rating scales are "behaviorally anchored" with descriptions at three of the five points of each scale. However, the numerous items make scoring by memory, without videotape, difficult and subject to distortion. Also, there is no assessment of child characteristics or individual differences in the children's contribution to the interactions.

This scale has been used in research studies in the development of diverse groups of children, including those from low-SES families and those with handicaps (Farran et al. 1986; Farran et al. 1987, pp. 299-312). Reliability and validity data are available. A videotape and workbook provide an introduction to the scale and practice sessions in scoring.

Mother-Child Rating Scales

These scales (Crawley and Spiker 1983) were developed originally to detect individual differences in mother-child interactions with 2-year-olds with Down syndrome. Since then, selected scales have been used in the large, multisite Infant Health and Development Program to examine the efficacy of early intervention with preterm children (Spiker et al. 1993) as well as in a study of mothers who abused alcohol during pregnancy (O'Connor et al. 1993). The inclusion of child qualities in the scale proved to be particularly revealing in the latter study in that exposure to alcohol during the prenatal period was linked to increased irritability in the child, which in turn led to diminished maternal elaboration and stimulation.

The scales have been used only with videotaped interactions in either home or laboratory settings. The situations have included free play with standard sets of toys, cleanup, and problemsolving tasks from a paradigm previously used by Matas and colleagues (1978).

The scales consist of 10 child and 6 caregiver characteristics rated on 5-point scales. In addition, four other caregiver behaviors are rated dichotomously, and there is one rating of the dyadic quality of the interactions. Among the child qualities that can be measured are social initiative, social responsiveness, interest, object initiative, positive affect,

negative affect, and animation. Caregiver behaviors include directiveness, elaborativeness, sensitivity, stimulation, mood, pacing, developmental appropriateness, and intrusiveness. No specific training is required to use this measure.

LABORATORY ASSESSMENTS

Face to Face

This approach (Brazelton et al. 1974, pp. 49-76; Tronick 1989; Tronick and Weinberg 1990) assesses the vocal/affective communication system between infants 3 to 9 months of age and their caregivers. The procedure has been used effectively, with different scoring systems, to predict later cognitive ability (Roe et al. 1982), to determine the social capacities of preterms (Field 1980, pp. 113-132), and to understand the relationship between depressed mothers and their infants (Cohn et al. 1986, pp. 31-46; Field et al. 1985; Tronick and Field 1986).

As stated by Tronick (1989), the regulation of emotions, self and other; degree of interactive success; and affective and communicative reparation of interactive errors are major influences on the emotions the infant experiences, how well the infant accomplishes its goals, and the infant's developmental outcome.

The infant is placed in an infant seat, and the caregiver is seated facing the infant, within touching distance. No toys are allowed nor are functional activities such as feeding. Both adult and infant are videotaped simultaneously using two cameras. There are typically three episodes 2 to 3 minutes in length: The caregiver is instructed to talk or play with the baby; the interaction is perturbed by either having the caregiver leave and a stranger play with the baby or instructing the caregiver to maintain a "still face" and not to interact; then the caregiver resumes talking and playing with the baby.

The first face-to-face episode highlights the caregiver's and infant's interactive capacities and examines the ability of each to regulate and maintain a mutually satisfying interaction as well as their ability to repair interactive errors. The second episode is a mild stressor and permits the infant's capacity to regulate state and affect and to cope to be discriminated from the caregiver's competency. The third episode, the reunion, examines the infant's ability to use the caregiver as a resource for self-regulation and the caregiver's ability to soothe the infant and to reengage the infant in satisfying interaction.

Scoring the videotapes is done typically on a time-sampling or second-by-second basis. Several coding manuals exist: The most recent are the Maternal Regulatory Scoring System and Infant Regulatory Scoring System (Tronick and Weinberg 1990). The caregiver is scored as to proximity; degree of social, object, and visual engagement; vocalization; touch; and effect on infant state. The infant is scored as to social, object, and visual engagement; vocalization; gesture; self-comfort; distance (avoidance); inhibition; and distress.

Data reduction is complicated, and several approaches have been used, depending on the research questions asked. Analyses have involved all episodes or just the first or second. Multivariate analyses of variance have been used to compare groups on individual codes. Also, the degree of matched states between caregiver and infant has been assessed by deriving the proportion of the interaction that the caregiver and infant spent simultaneously in attending or social play with each other as well as the proportion of time that the caregiver and infant spent simultaneously in jointly attending to an object (Tronick 1989). The rate of change from matched to mismatched states and the rate of repair from mismatched to matched states also have been analyzed.

The procedure holds promise for insights into the early relationships of drug-abusing mothers and other caregivers with infants who have been exposed in utero to alcohol and other drugs. However, the procedure is difficult: Scoring the tapes is time consuming, and data reduction is challenging.

Strange Situation

This is a reliable and valid measure for assessing the quality of the caregiver-child attachment relationship when a child is between ages 12 and 48 months (Ainsworth et al. 1978). The classifications derived have shown associations with antecedent caregiving behavior in the home (Blehar et al. 1977; Goldberg et al. 1986; Grossmann et al. 1985, pp. 233-256), predictive validity to later affective and peer behavior (Matas et al. 1978; Sroufe 1983, pp. 41-84; 1985), and coherence with parental representations of their own relationships to their family of origin (Main and Hesse 1990, pp. 161-182).

The procedure must take place in an unfamiliar locale, such as a laboratory room, and consists of seven 3-minute phases given in invariant order. The sequences are (1) caregiver and child alone in a room with appropriate toys, (2) stranger enters and interacts first with caregiver and then with child, (3) caregiver departs leaving child with stranger, (4) caregiver and child reunite while stranger departs, (5) caregiver departs the second time

leaving child alone, (6) stranger returns, and (7) caregiver and child reunite a second time while stranger departs. The episodes when the child is separated from the caregiver are curtailed if the child is very distressed.

The procedure assesses the quality of the caregiver-child attachment relationship by intentionally introducing a graduated series of perturbations designed to activate the child's attachment system. Although all behavior of the child in the procedure is noted—in part by scoring each phase, as appropriate, as to proximity seeking, contact maintenance, avoidance, and resistance—it is the sequence of behavior during reunions that is particularly informative.

An integrated judgment is made for each child that classifies the organization of the child's attachment behavior as to subgroups within three major groups: (1) secure (B group), (2) insecure-avoidant (A group), or (3) insecure-resistant (C group). An additional classification then is made as to the degree of disorganization and disorientation (D group) (Main and Solomon 1986, pp. 95-124).

The hallmark of children in the B group is their active use of the caregiver as a secure base from which to explore the environment. When distressed, they seek and receive comfort from the caregiver, and when not distressed, they actively greet and initiate positive social exchanges with the caregiver. Insecure-avoidant children do not seek comfort and avoid proximal contact. Insecure-resistant children manifest angry resistant behavior that fluctuates with comfort-seeking, but they are neither soothed by physical contact nor calmed by the presence of the caregiver. Children classified as disorganized and disoriented show contradictory or changing attachment strategies, fear of the caregiver, dazed facial expressions, or stereotypic and anomalous postures and use of space. See Ainsworth and colleagues (1978) for further description of the procedure, instructions about setup of the room and toys, and scoring criteria and classifications.

The procedure is labor intensive (three staff members are needed to administer the paradigm) and also requires a trained person to determine a child's classification. Training requires a thorough knowledge of the theory of attachment plus direct training by experts in the field.

CONCLUSIONS

Review of the diverse measures cited in this chapter indicates that multiple, alternative measures exist through which to better understand the development of children prenatally exposed to drugs and by which to evaluate changes in caregiver behavior associated with early intervention.

No one measure is recommended above any other because measures differ in feasibility, degree of training required, ease of administration, complexity of analysis, sensitivity, concept, and purpose. Some assess the inanimate environment; many others survey the animate environment. Some assess only the caregiver; others assess the child's contribution as well as that of the caregiver. Some assess only behavior; others measure affect as well as behavior.

The author recommends the use of multiple measures to assess child characteristics as well as those of the caregiver, physical and social domains of experience, affect as well as behavior, the contingent nature of the interactions, and continuity over time. No matter what choices are made, interpretation of results must recognize what was not measured as well as what was.

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