

ADS SCALE
THE MASSIE-CAMPBELL SCALE OF MOTHER INFANT ATTACHMENT INDICATORS DURING STRESS
 For use During the Pediatric Examination and Other Stressful Childcare Situations

Instructions
Reverse Side

Infant's Behavior During Stress Event

	(1)	(2)	(3)	(4)	(5)	X
GAZING	Always looks away from mother's face.	Rarely searches out mother's face. Fleeting looks at mother's face.	Occasionally looks at mother's face.	Frequently long & short gazing at mother's face.	Rivets gaze on mother's face for long periods.	Behavior not observed.
VOCALIZING	Quiet. Never vocalizing.	Rarely vocalizing or whimpering.	Occasionally vocalizing or mild crying.	Frequently vocalizing or intense crying.	Uncontrollable, intense crying much of the time.	Behavior not observed.
TOUCHING (a)	Never touches or reaches toward mother.	Rarely touches mother.	Occasionally touches mother.	Frequently reaches toward & touches mother.	When close always touching mother.	Behavior not observed.
(b)	Always pulls away from mother's touch.	Frequently pulls away from her touch.	Occasionally pulls away from her touch.	Rarely pulls away from her touch.	Never pulls away from her touch.	Behavior not observed.
HOLDING	Violently resists holding; always arches away from mother.	Does not relax in mother's arms. Frequently pulls away.	Rest's in mother's arms and against her shoulder. Occasionally pulls away.	Body molds to mother's. Rarely pulls away.	Actively turns & arches body toward mother's. Clings strongly. Never pulls away.	Behavior not observed.
AFFECT	Always intensely anguished and fearful.	Frequently irritable fearful or apathetic.	Intermittent moderate anxiety and/or pleasure or unclear.	Rare tension; largely smiling.	Always smiling.	Behavior not observed.
PROXIMITY	Never follows mother bodily or with eyes; goes to far corner or out of room.	Rarely follows mother bodily or with eyes; often at far corner of room from mother.	Intermittently follows mother bodily or with eyes.	Frequently follows mother bodily or with eyes.	Always follows mother bodily or with eyes.	Behavior not observed.

Mother's Response to Infant's Stress

	(1)	(2)	(3)	(4)	(5)	X
GAZING	Always looks away from child's face.	Rarely looks at child's face. Fleeting looks at child's face.	Occasionally looks at child's face.	Frequently long & short gazing at child's face.	Rivets gaze on child's face for long periods.	Behavior not observed.
VOCALIZING	Quiet. Never vocalizing.	Rare words, cooing or murmuring.	Occasionally vocalizing to child.	Frequently speaks, murmurs, coos.	Intense vocalizations throughout.	Behavior not observed.
TOUCHING (a)	Never touches or reaches toward child.	Rarely touches child.	Occasionally touches child.	Frequently reaches toward & touches child.	When close always touching child.	Behavior not observed.
(b)	Always pulls away from his touch.	Frequently pulls away from his touch.	Occasionally pulls away from his touch.	Rarely pulls away from his touch.	Never pulls away from his touch.	Behavior not observed.
HOLDING	Pushes upset child away, or holds away from body.	Holds child stiffly & awkwardly. Not relaxed.	Supports child relaxedly against her chest or shoulder briefly.	Body molds to child & maintains contact until child quiets.	Body inclines toward child followed by prolonged holding with molding.	Behavior not observed.
AFFECT	Always intensely anguished & fearful.	Frequently irritable fearful & apathetic.	Intermittent moderate anxiety, and/or pleasure; or unclear.	Rare tension; largely smiling.	Always smiling.	Behavior not observed.
PROXIMITY	Leaves room.	Frequently out of reach of child; or at far corner of room from child.	Intermittently standing or seated within arm's reach of child.	Frequently in physical contact with child.	Always in physical contact with child.	Behavior not observed.

Growth and development: normal abnormal Explain: _____

Social behavior appears: normal abnormal Describe: _____

Unusual circumstances today: No Yes Describe: _____

Infant Sex: Boy Girl Birthdate: _____ Infant's Name: _____

Ethnic Group: Cauc. Black Asian Hispanic Other _____ Economic Group: \$0-10,000 \$11-20,000 \$21-30,000 \$31,000+

Observation Date: _____ ID or Chart Number: _____ Observer: _____

Firstborn: No Yes Mother's Age: _____ Marital Status: Single Married Other Lives: Alone With Partner Other Explain: _____

ADS SCALE INSTRUCTIONS

Introduction

The Attachment During Stress Scale is for use with infants from birth to 18 months to detect aberrant mother-infant responsiveness in mild to moderately stressful situations. The scale quantifies the reciprocal process of mother-infant attachment while the infant is under the stress of an ordinary physical examination. The scale can also be used in other situations which produce tension in mother and baby. When stressed, infants normatively seek out their mothers; mothers normatively seek out and comfort their infants when they perceive them to be in danger or in distress. Such interactions fall within the general category of attachment behaviors. The scale includes six basic attachment modalities: gazing, vocalizing, touching, holding, affect and proximity. These modalities are subdivided into components and correspond to mother and infant responses clinically seen in stressful situations which arouse tension and anxiety in mother and/or infant. The responses in each modality are graded from 1 to 5 to indicate the increasing intensity of mother-infant involvement that may occur during a stress episode. Generally, behavior at the low end of the scale (1) indicates abnormal isolation or avoidance of attachment, and responses at the high end (5) indicate abnormally anxious behavior or clinging. The top of the single-page scale quantifies the infant's behavior with its mother, and the bottom half quantifies the mother's behavior with her infant during the stressful situation.

Applications

The ADS Scale is for use during the pediatric examination as well as other situations where a relatively standardized stress occurs for parents and babies. For example, mental health or childcare workers can use the scale to assess mother-infant attachment at the moment of reunion following the stress of a brief separation between mother and child. Likewise at the end of a baby's bath, mild tension and recovery often occur as the child is lifted from the water, dried and clothed. In whatever setting it is used, the scale may serve some or all of the following functions:

- 1) To organize and record the clinician's assessment of the adequacy of maternal-infant dyadic responsiveness.
- 2) To document the need for developmental and psychological care to prevent the crystallization of pathological modes of social interaction.
- 3) To document the efficacy of early intervention efforts by registering improvement in the clinical indicators of attachment when used longitudinally during the first 18 months of life with deviant mother-infant pairs.
- 4) To teach by heightening the clinician's and parent's awareness of components of mother-infant interaction central to psychological development.

Instructions for Administration and Scoring

In the pediatric clinic, the clinician conducting the examination or an independent observer can administer the ADS Scale. Generally, the mother should not be alerted to the details of the observation so that she does not modify her usual style; and for the same reason the examiner may choose to let the mother decide whether to hold the baby or place the baby on the examining table.

To use the scale, observe the interaction between mother and infant WHILE the infant is being physically examined (the stress episode) and IMMEDIATELY AFTERWARD (the reunion and recovery episode). Together, they comprise a **STRESS/RECOVERY SEQUENCE**. In many pediatric examinations the final phase is the inspection of the head, eyes, ears, nose and throat. This usually takes about 3 minutes and is often the most difficult for mother and infant. The period immediately following this (about 3 minutes) is the time when mother and infant reunite and tension subsides. Similarly, in non-pediatric settings there is a corresponding rise and fall of tension around a stressful event. Assessment is made by focusing on the period of most heightened stress (for example, the final 3 minutes of the physical examination) and the period of tension decline (the first 3 minutes of the recovery phase). IMMEDIATELY AFTER OBSERVING THE STRESS/RECOVERY SEQUENCE, circle the behavior description that best fits the mother's and infant's response in each attachment modality during the sequence. Sometimes it is unclear exactly which description to circle. In this case the rater should select the one that is closest, and may chose to add a qualifying note in the margin. If a particular attachment modality, such as holding, has not occurred circle "not observed" so that an entry is made in every category.

Operational Definitions

Holding: the mutually reciprocated posturing of the infant and mother while the infant is supported in the arms of the mother.

Gazing: the eye-to-face contact within a dyad and the maintenance of this contact.

Vocalizing: the making of vocal sounds for the benefit of the partner in the mother-infant dyad. The infant's crying is considered a vocal signal of dismay during stress which alerts the mother to its tension.

Touching (a): the making of skin-to-skin contact initiated by either the mother or the infant for play or attention, not physical support.

Touching (b): the withdrawal from skin-to-skin contact initiated by either the mother or the infant.

Affect: the facial expression signaling emotional states. A neutral expression is not unusual or abnormal for an individual under stress.

Proximity: the state of being near, close to, or beside another. In the context of the ADS Scale it refers to the infant maintaining either physical or visual contact with the mother, and to the mother maintaining physical contact or being immediately accessible to her infant.

Rarely: the behavior occurs once in a while, or seldom; it doesn't happen often during the observation period.

Occasionally: the behavior occurs from time to time, now and then during the observation period.

Frequently: the behavior happens often but not all the time during the observation period.

Interpretation of Scoring

Normal behaviors will usually rate at 3 and 4. When an infant or a mother rates at 1 or 2 it suggests that the infant or mother may be avoiding contact or not responding to the other's display of tension or attempts at attachment. When there are scores of 5 it should raise concern that there is an over-anxious intense interaction or an unusually strong reaction to stress. Further, in dyads where one member rates at 1 or 2 and the other at 5, there is a dissynchrony which may have pathological significance. To derive a single or "correct" score is not the proper use of the scale. The most productive way to interpret the ratings is to use the attachment indicators as a guide to the adequacy of interaction in a given mother-infant pair. Studies indicate that deviant attachment is associated with subsequent psychomotor developmental delays, pathological intrapsychic management of tension and aggression, and the inability to postpone gratification—all with their attendant behavioral disturbances. When behaviors of 1, 2, or 5 occur in 2 successive observations, there should be a diagnostic workup since, once established, unhealthy patterns of mother-infant interaction show little change without therapeutic intervention. The exception occurs with some very young or premature infants who show a normal dampened responsiveness. They may rate 2 for gazing, vocalizing, touching (a), and proximity in the first weeks of life.

Variables

An infant's ability to tolerate tension or respond to comforting may be affected by illness or hunger. Likewise, a mother's capacities may be affected by concurrent disturbances in her life. History taking should elicit this; and the ADS Scale can then assist in assessing the capacity of the mother and infant to compensate for the additional stress, or their vulnerability to decompensation and the traumatic behaviors that follow. Additionally, a disturbing examining situation can intensify the stress of customary events. If there are unusual circumstances when the rating takes place, explain briefly in the space provided at the bottom of the scale.

Typically, fathers accompany infants less frequently than mothers, but the ADS Scale can be effectively used to assess father-infant interaction. When infants are older than 18 months, their behaviors become so increasingly complex that the ADS Scale is less useful.

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Abstract

THE MASSIE-CAMPBELL SCALE OF MOTHER-INFANT ATTACHMENT
INDICATORS DURING STRESS (A-D-S SCALE)

Henry N. Massie, M.D. and B. Kay Campbell, Ph.D.

The A-D-S Scale is a one-page guide to standardized observation of mother-infant interaction. Specifically designed for rapid use by pediatric and mental health practitioners, the scale facilitates early detection of aberrant patterns of parent-infant responsiveness. The scale succinctly describes mother-infant bonding through its key parameters: gazing, affective sharing, vocalizing, touching, infant clinging, maternal holding, and physical proximity. Grading these components for the intensity of the attraction or avoidance between a mother and baby, the A-D-S Scale indicates the adequacy of the mother's and baby's response; and draws attention to several of the syndromes of psychiatric disturbance that occur in the first two years of life. This documentation can assist practitioners in making therapeutic interventions early in a child's life to prevent the establishment of pathological family behaviors and disturbed child development.

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**THE MASSIE-CAMPBELL SCALE OF MOTHER-INFANT ATTACHMENT
INDICATORS DURING STRESS (A-D-S SCALE)**

Henry N. Massie, M.D. and B. Kay Campbell, Ph.D.

Introduction

The Massie-Campbell Scale of Mother-Infant Attachment Indicators During Stress--also referred to as the Attachment During Stress Scale or A-D-S Scale--is a one-page guide to standardized observation of components of mother-infant interaction. Specifically designed for rapid use by pediatric and mental health practitioners, the scale facilitates early detection of aberrant patterns of parent-infant responsiveness. Specialized equipment or procedures are not required.

The scale succinctly describes key parameters of mother-infant bonding--gazing, affective sharing, vocalizing, touching, infant clinging, maternal holding, and physical proximity. Grading these components for the intensity of the attraction/avoidance between mother and baby, the scale indicates the adequacy of the mother's and baby's response. Such documentation can help practitioners therapeutically intervene with families showing signs of disturbance in

order to prevent the establishment of pathological mother-child behavior and subsequent emotional developmental disorder in the child.

The Attachment During Stress Scale can be used in any setting where a mother and baby are together; however a mild stress situation such as a well-baby physical examination, a mother and child reunion after a separation, or even the ending of a baby's bath or diapering heightens the mother's and child's interactions making their behaviors more apparent for the observer. Therefore a pediatric clinic or a child-care program is an ideal place to apply the scale. The A-D-S Scale is for use with babies from birth until eighteen months of age.

The scale can also assess father-infant behavior. However fathers accompany infants less frequently than mothers to the settings in which the scale best serves its purpose of preventive identification and clinical guidance. For this reason the scale has been standardized with mothers and infants.

Background

The Application of Contemporary Clinical Practice and Theory

The A-D-S Scale categories derive from contemporary clinical practice to identify current difficulties in mother-infant relationships. Clinical knowledge itself is based on research and psychotherapists' and pediatricians' theoretical and therapeutic working models of mother-infant interaction.

Underpinning these models is understanding of human attachment which has been drawn from multicultural studies (Ainsworth, 1967; Bowlby, 1969). Attachment is the process through which infants establish and maintain a sense of security which becomes their foundation for subsequent separation from their mothers and exploration of their environment. As a psychological tie, attachment grows from the bonding of infant and mother through mutual gazing, vocalizing, touching, holding, facial expression, and physical closeness during feeding and other interactions. The A-D-S Scale keys on these six elements as its basic behavioral parameters.

Normally when an infant is in distress, danger, or experiencing physiologic tension such as hunger and cold, it seeks relief by signaling through crying and turning to the mother. The parent, alerted and concerned, responds to calm the infant. This mutual parent-infant response is accomplished primarily through the six above-mentioned attachment behaviors.

Additionally, instances of mild to moderate stress--the condition in which the scale ratings take place--have special significance for the young child's development. By experiencing brief non-traumatic distress and frustrations followed by relief, the child gains the security and capacity to a) develop ego structures to modify internal tension and postpone gratification, b) differentiate self from other, and c) individuate from the mother while maintaining stable relationships with loved ones who both realistically satisfy and disappoint at times (Winnicott, 1958; Mahler, Pine, Bergman, 1975).

Another addition to understanding the mother-infant relationship which contributed to the construction of the A-D-S Scale is the relatively recent appreciation of the intense psychobiologic complexity of early life in which mothers and babies participate together. For example, infants in the first weeks of life can focus their eyes and follow a human face which they prefer over other objects (Spitz, 1965; Fantz and Miranda, 1975). They hear and attend to voices (Brazelton, 1973), move synchronously with the rhythm of a speaker's voice (Condon and Sander, 1974), and smile and frown in response to pleasing or distressing events (Brazelton, 1973). Later in the early weeks of life, infants make rudimentary imitations of parental expressions (Meltzoff, 1985). In general babies and mothers mutually

influence each other through gesture, touch, verbalization, play, and affective interchange (Beebe and Lachman, 1988; Stern, 1988; Cohn and Tronick, 1989).

Over months one can perceive how an infant's and parent's responses to each other coalesce into stable patterns (Massie, Bronstein, Afterman and Campbell, 1988). These grow from the early potentialities and experiences of the baby--the play of connections between constitutional/temperamental qualities, environmental and maternal stimuli, infant responses, and environmental and maternal co-responses.

In this matrix the mother is crucial. Her actions stem from a) her physiologic capacities, b) her character in its conscious and unconscious dimensions, c) her baby's ability to react to her (which both reciprocates and elicits maternal actions), and d) the mother's social and physical circumstances. The latter can enhance a parent's care for her child. But if the mother suffers extreme poverty, illness, hunger, violence, and the death of children and separation from their father, she can be profoundly traumatized in her ability to respond to her infant (Scheper-Hughes, 1992).

The infant's experiences in this forge of its natural endowment and interplay with its environment create three

further accomplishments of the first eighteen months of life. These are a) attention and engagement with the mother, b) the establishment of intentionality, two-way communication, and shared communication (Greenspan, 1990), and c) the child's core mental representation of itself and its parents (Stern, 1985). Interferences with mother or baby responsiveness during this time may critically hinder these achievements.

Ethologically oriented research into pervasive developmental disorders (Massie and Rosenthal, 1984) provides examples of impairment in the infant-mother relationship that are linked to psychopathology. In this investigation, films of the early life of subsequently diagnosed children often showed disturbed infant-mother interaction in the first months of life. Specific symptoms appeared toward the end of the first year and in the second year of life. Unfortunately the children's illnesses typically escaped recognition and treatment until long after symptoms emerged because child-care practitioners and parents were unaware of the disordered infant-parent interaction and the initial symptoms of illness, or were reluctant to acknowledge the distressing symptoms.

The pervasive developmental disorder study constructed a forerunner of the A-D-S Scale to compare the disordered infant-parent reciprocity in the research films with normal

mother-infant pairs. Subsequently the research instrument was adapted into the current practical one-page A-D-S Scale for assessment of mother-infant interaction, a clinical aid that had not previously been available.

Epidemiology: The Need for an Early Detection Instrument

Emotional and behavioral disturbance in children may well be the primary hidden morbidity of our day in pediatric practice. Surveys of children attending primary care clinics in the United States have found that pediatricians find a prevalence rate of emotional/behavioral problems in 5-6% of children compared to a prevalence rate of 11.8% when mental health professionals screen the same children (Costello et al, 1986, 1988). These incidences compare with community based studies which have found psychopathology such as soiling, enuresis, tics, hyperactivity, speech disorders, conduct disorders, and fearful and dependant qualities in 9-18% of children (MacFarlane et al, 1962). Data also suggests that pediatricians may have a low sensitivity to emotional/behavioral problems, diagnosing them in only 17% of the cases in which psychiatric evaluations indicated childhood psychopathology, so that morbidity remained hidden to the pediatrician in 83% of the children (Costello, 1988).

Childhood problems of anxiety, conduct, attention and their associated learning difficulties, and many characterologic conditions (depressive, paranoid, narcissistic, borderline, and somatizing) have a primary functional origin in disturbances in the familial environment and in the relationship between parent and child. To a significant extent these disturbances have their onset in a child's infancy where problems may be extreme at times (as in cases of physical abuse and neglect), or less evident at other times (as in cases of parental withdrawal from, or overstimulation of an infant).

Studies with the A-D-S Scale have found up to 20-25% of mother-infant pairs troubled in their interaction (see *statistical studies* below). Some of these dyads will benefit from naturally occurring ameliorative influences and correct their interplay. Nonetheless, a considerable percentage of troubled parent-infant pairs will persist in their disturbance and eventuate in childhood psychiatric conditions. Thus aberant parent-infant interaction becomes the means through which child-care practitioners may identify children at risk for psychopathology and make their first interventions and referrals for specialized treatment before disabilities become established and the prognosis difficult.

The Need for a Training Tool

Advancing knowledge of parent-infant behavior, child maltreatment, and precursors of severe childhood psychopathology requires its communication to medical and nursing students, pediatric house-staff, and other professionals in contact with parents and babies. In experience with psychiatric liaison consultation with pediatric services, pediatric staff are often highly sensitive to the quality of the relationship between a parent and infant. Frequently however even the most attuned practitioners lack the specific constructs with which to voice and categorize the behaviors they observe. When pediatric staff are unable to specify what disturbs them in a parent-infant relationship, they may neglect it and chose instead to focus their attention on concrete data such as laboratory studies. Addressing this tendency, the A-D-S Scale offers behavioral categories to help practitioners translate clinical hunches into discrete observations. If staff are able to make precise observations (e.g. "This parent does not touch her baby when he reaches toward her.") they can then follow up by eliciting more information from the family, attempting an educational intervention, and requesting a psychiatric or social work consultation if necessary.

Additionally, some medical students and practitioners are not aware of the nuances of the parent-infant relationship.

At times they have no knowledge of the actual components of the bonding process. To illustrate, if a care-giver asks a parent, "How are things going with the baby," and the parent replies, "Fine," an untutored practitioner may simply accept this and not notice, for example, gaze aversion or a depressed affective response in one or both members of the dyad. To redress this potential professional blind spot, the A-D-S Scale has been used as a teaching tool with medical students during their pediatric clerkship (Massie, 1990), with physicians in family practice residencies (Campbell, 1983), and in training sessions with other child-care professionals. The scale descriptions literally open the eyes of some students to a process of which they had been unaware, for others the Attachment During Stress Scale refines and sophisticates observational and clinical skills.

Function and Use of the Attachment During Stress Scale

Population

The A-D-S Scale is for use with mothers and infants from birth to 18 months of age. After this age the behavior of toddlers becomes increasingly complex so that variables described by the scale are more difficult to recognize, although they remain embedded in the maturing relationship of the mother with her child. When the principal attachment

figure is not the biological mother, it is also important to assess the adequacy of the bonding process between the infant and parent surrogates.

Function of the Scale

The Attachment During Stress Scale identifies principal behaviors embedded in the interaction of a mother and infant, quantifies that interaction, and provides a means to follow the evolution of the mother's and baby's behavior into the second year of life. Use of the scale centers on periods when infant and mother are undergoing a mild to moderate stress. The stress heightens and clarifies the needs for, and responses of one member of the dyad to the other, thus making them more discernible and ratable. How the mother and baby manage stress also has important developmental and clinical significance.

The A-D-S Scale subdivides the six basic attachment modalities of gazing, vocalizing, touching, holding, affect, and proximity into component actions clinically seen in situations that arouse tension and anxiety in a mother and/or infant. These components distribute across the scale in a range of 1 to 5 with regard to the frequency and intensity of their display during the observation period. Generally, responses at the low end of the scale (1)

indicate isolation or avoidance of interaction; at the high end (5), they indicate a vigorous need and demand for interaction, and at times clinging. Either extreme may be abnormal during mildly stressful pediatric examinations or other comparable situations.

For ease of use the scale's format places normative infant and parent responses in the middle range at 3 and 4. That is, parent and infant occasionally look at one another, occasionally "talk" with one another, and both initiate and withdraw from touching each other during the stressful period. The infant rests comfortably against its molding parent; both share an alert attentive expression appropriate to and confirming of the other's affect; and most importantly, they remain within arm's reach of each other.

When applied, the scale may serve some or all of the following functions:

- *Record of the clinician's assessment of the adequacy of maternal-infant dyadic responsiveness.

- *Documentation of the need for psychological assistance to prevent the crystallization of pathologic modes of social interaction and intrapsychic pathology.

*Documentation of the efficacy of early intervention efforts by registering changes in the behavioral indicators of attachment when used over time.

*Teaching of clinicians by increasing their awareness of parameters of mother-infant behavior central to psychological development.

Format of the A-D-S Scale

The entire scale is contained on a standard 8 1/2 by 11-inch page. Instructions appear on the the reverse side of the form. The top portion of the scale quantifies the infant's behavior toward its parent; the lower portion quantifies the parent's actions; and at the bottom are spaces to record demographic and historical information.

Setting of the Observation and Rating

The A-D-S Scale has been largely developed for pediatric well-baby physical examinations, a mildly stressful experience for mother and child. This context provides child-care specialists with their only consistent opportunity to assess the quality of the mother-infant relationship, which is essential to preventive psychosocial care.

The scale may also assess parent-infant reciprocity in other settings where mild tension may arise such as at naturally occurring events like dressing, ending bathing, ending playing, feeding and bedtime. A typical naturally occurring stress is the moment of mother-infant separation or reunion at a daycare center, which a child-care worker may observe. The user may also create a standardized brief parent-infant separation and reunion experience for rating. With such a paradigm, the scale documents the social interactions occurring during the leave-taking and during the reunion between mother and baby. In any situation repeated application in the same setting enhances the usefulness of the scale.

Equipment and Space Required

The only equipment required is a pen or pencil to mark the observations. The pediatric examination room should be large enough to accommodate parent, baby and pediatrician. If the pediatrician is not making the scale observations, room for an observer is needed. There must be room for the parent to sit next to her infant or hold her baby. Each rating should be made on a fresh copy of the scale so that previous markings do not affect the rater's judgement.

Operational Definitions of the A-D-S Scale Attachment Behaviors

It is important that users of the scale share common definitions of each of the behaviors to be observed, as follows:

Gazing: The eye-to-face contact within a dyad and the maintenance of this contact.

Holding: The mutually reciprocated posturing of the infant and mother while the infant is supported in the arms of the mother.

Vocalizing: Sounds uttered for the benefit of the partner in the parent-infant dyad. The infant's crying is a signal of dismay during stress, which alerts the parent to its tension.

Touching (a): Skin-to-skin contact initiated by either parent or infant for play or affection, not for physical support.

Touching (b): The withdrawal from skin-to-skin contact initiated by either parent or infant. (Touching [a] and [b] do not refer to contact in the service of holding, clinging or body support. Rather they refer to playful grooming and

affectionate, communicative or other touching that may be expressed, for example, by fingers, hands, feet, toes or facial nuzzling.)

Affect: The facial expressions signaling emotional states. An unclear, slightly anxious, alert, attentive, neutral or bland expression is typical of an individual under stress and is appropriate.

Proximity: The state of being near, close to, or beside another. In the context of the A-D-S Scale, it refers to the infant's maintaining either physical or visual contact with the parent, and to the parent's maintaining physical contact or being immediately accessible to the infant.

Rarely: The behavior occurs once in a while; it doesn't happen often during the observation period.

Occasionally: The behavior occurs from time to time, now and then during the observation period.

Frequently: The behavior happens often but not all the time during the observation period.

Behavior Not Observed: This category is for those occasions when the observer is not able to observe the specific behaviors in question due to obstructed vision or when a

ILLUSTRATIVE DRAWINGS OF MOTHER-INFANT BEHAVIORS DESCRIBED BY THE A-D-S Scale

INFANT'S BEHAVIOR DURING STRESS EVENT

	(1)	(2)	(3)	(4)	(5)
<u>GAZING</u>					
<u>VOCALIZING</u>					
<u>TOUCHING (a)</u>					
(b)					
<u>HOLDING</u>					
<u>AFFECT</u>					
<u>PROXIMITY</u>					

MOTHER'S RESPONSE TO INFANT'S STRESS

	(1)	(2)	(3)	(4)	(5)
<u>GAZING</u>					
<u>VOCALIZING</u>					
<u>TOUCHING (a)</u>					
(b)					
<u>HOLDING</u>					
<u>AFFECT</u>					
<u>PROXIMITY</u>					

behavior does not take place (for example, if a mother does not hold her baby).

A page of drawings illustrates the infant-mother behaviors the A-D-S Scale describes.

Insert Illustrations Here

Instructions for Administration and Scoring

Either the clinician conducting the infant's physical examination or an observer can administer the A-D-S Scale. The clinician should, as in normal practice, assist the parent and infant to feel as relaxed and free to engage with each other as the situation permits. To facilitate this, the clinician may choose to begin the interview by reviewing the infant's history since the previous visit and by asking for the demographic information and social history that is requested at the bottom of the scale if it is not already available. The examiner should not alert the parent to the details of the A-D-S Scale observations so that the mother does not modify her usual style. For the same reason the examiner may choose to let the mother decide whether to hold or place the baby on the examining table since the mother's choice in this matter is potentially an indicator of how she

handles the modes of physical proximity and holding with her child.

To use the scale, observe the interaction between parent and infant while the infant is being physically examined (the *stress episode*) and immediately afterward (the *reunion and recovery period*). Together they comprise a *stress/recovery sequence*. In many pediatric examinations the final phase is the inspection of the head, eyes, ears, nose, and throat. This usually takes about three minutes and is often the most difficult for baby and parent. The period immediately following (about three minutes) is the time when parent and infant reunite and tension subsides. Similarly, in non-medical settings, there is a corresponding rise and fall of tension around a stressful event.

Assessment is made by focusing on the period of most heightened stress (the final three minutes of the physical examination) and the period of tension decline (the first three minutes of the recovery phase). Immediately after observing the stress/recovery sequence, circle the behavioral description that best fits the infant's and parent's response in each attachment modality during the entire stress/recovery sequence. Sometimes it is unclear which description to circle. If so, the rater should select the one that best fits the observation, and may choose to add a qualifying note in the margin. If a particular behavior,

such as holding, has not occurred during the observation, circle "not observed" so that an entry is made for each of the seven behaviors.

Interpretation of Scoring

Normal behaviors usually fall at 3 and 4. Lower ratings suggest that the infant or parent may either be avoiding contact, or not responding to the other's display of tension or attempts at engagement. Scores of 5 should raise concern that there may be over-anxious and clinging attachment, or an unusually strong reaction to stress on the part of mother, child or both. In dyads where one member rates at 1 or 2 and the other at 5, there is dissynchronous interaction which may also have pathological significance. The most productive use of the ratings are as descriptive guides to the adequacy of parent-infant interaction. The A-D-S Scale is not designed to produce a single "correct" score.

Ratings at 1, 2, and/or 5 of two or more behaviors on successive visits suggest the need for a diagnostic evaluation of parents and infant that includes a social and psychiatric history. Once unhealthy patterns of social behavior are established, they may become integrated into the overall interactional styles of the partners, recur on repeated evaluations, and show little change without

therapeutic intervention. Serially observed aberrant interaction warns that the child may be at developmental risk.

There are exceptions to this outline of typical response. Some very young or premature infants may show social behaviors that are considerably subdued. They have a normal dampened responsiveness and may receive low ratings in gazing, touching (a), vocalizing, and proximity in the first weeks of life (Blair, 1987). Further clinical study of the case, however, would clarify the reason for the low ratings, and potentially guide supportive counseling for parents who may be frustrated if their baby does not reciprocate their involvement.

In addition, maternal affect ratings of 5, at any age, may have multiple explanations. They may bespeak a parent's need to deny unhappy feelings, to cling to an infant, or to be overly reassuring--all of which may pose a risk.

Persistent smiles (5) in the face of stress in the parent or baby are unusual since normally there is some signaling of tension. Absence of tension signaling may indicate that the parent or infant has difficulty expressing anxiety. This may grow from social circumstances such as poverty and traumatization that lead a parent to resignation, or from individual psychopathology. In either case it suggests an impediment to connectedness between partners in the dyad.

Absence of tension signaling may also reflect a child's early identification with a parent who has a particularly non-communicative affective style; and it may be a sign of an organically based interference with the early building blocks of language in the child.

Particular A-D-S scale ratings do not diagnose specific illnesses. Nonetheless, the scale may be of great assistance in facilitating recognition of several of the psychiatric syndromes of the first eighteen months of life. These are autism, infancy depression and the associated emotional deprivation syndrome (both also termed reactive attachment disorders), symbiotic psychosis of childhood (a variant of pervasive developmental disorder), and the psychosocial syndrome of abuse and neglect.

Abuse and Neglect. Parents who have a history of child maltreatment often have profound difficulty soothing even a mildly upset child. A-D-S Scale ratings can capture this difficulty alerting the pediatric practitioner to the risk a baby faces as well as to the specific components of the mother-infant interaction that are problematic. To illustrate, parents prone to neglect or abuse may retreat from mildly stressed children and receive very aberrant scale ratings in gazing, touching and proximity. Angry verbalizations and affect may also register on the A-D-S

Scale at the same time. Typically this behavior increases the child's tension which then exacerbates the parent's response. Sometimes the infant has gained sufficient control over his tension so that he is able to dampen his responses, quiet himself, and submit to the parent's threat.

In parent-infant dyads where maltreatment exists, there is rarely mutual pleasure in the interaction. Instead of pleasure, a parent with a history of abusing or neglecting a child is likely to be detached from her baby. The baby's distress or overtures to engage the parent evoke little if any response from the parent. Sometimes having given up attempts to engage the parent, the child may have learned to approach and smile at strangers to elicit the caretaking and affection it needs.

A parent's detachment from her baby will signal itself in a profile of low A-D-S Scale marks for gazing, vocalizing, touching, holding, and proximity. A detached parent's affect may rate in the middle range. By contrast sometimes parental disengagement may shift explosively into angry attempts to control, rather than soothe an upset child.

Alternatively, some parents who maltreat children may over-identify with their child. Prior to an episode of abuse, neglect or abandonment, over-identifying parents may appear extremely intensely involved with their baby, to the point

of scores of 5 on the A-D-S Scale. However when the baby fails to meet their expectations, the parent may experience the child's "misbehavior" as shameful evidence of their own inadequacy and retaliate against the child for making them feel bad.

Autism. When an autistic syndrome exists, routine use of the A-D-S Scale readily points to the pathology. The infant consistently rates as avoidant (1 or 2). The mother's behavior ranges from anxious or vigorous attempts to elicit responses from her child (4 and 5) to frustrated or resigned withdrawal from her child (1 and 2).

Infancy Depressions. Also identified as reactive attachment disorders, infancy depressions are associated with loss of the mothering figure in the first year of life. This may occur when a mother is physically absent or emotionally unavailable. Clinically depressed infants appear emotionally withdrawn and isolated; they may fail to grow physically or fail to develop loving ties with other people (Spitz and Wolf, 1946). On the A-D-S Scale they may show apathetic responses (1) and (2). However they do not necessarily rate at 1 for touching (b) or holding since this reflects an admixture of willful avoidance exhibited by some autistic children.

An emotional deprivations syndrome (Spitz and Wolff, 1946) exists which is similar to infancy depression and also has features of autism such as motor stereotypies and gaze aversion. On the A-D-S Scale the baby shows an apathetic response. In this syndrome, the mother is physically present but unable to nurture because of her own depression, self-involvement, or severe preoccupation with life difficulties. Her interaction parallels the depressed infant's in terms of low ratings and unresponsiveness.

Also closely related are infancy depressions which derive from a child's identification with a depressed mother and her depressed facial expression. The baby's responses reflect the mother's apathy with her child (Adelson and Fraiberg, 1977); and both mother and infant receive low scale scores.

Symbiotic Psychosis of Childhood. This syndrome (Mahler and Furer, 1968) is phenomenologically a variant of pervasive developmental disorder. It is suggested when the toddler reacts to separation from the mother (or the threat of it) with 1) severe behavioral regression, 2) display of aggression and anxiety, and 3) loss of most or all of the independent functioning it has achieved. Interactional components are easier to determine from the maternal side. A parent may have particular needs, arising from her own

life history, to rigidly control her infant. This desire for control may reflect a drive for dominance, hostility toward the child, or a need to ward off a sense of helplessness and depression. Sometimes when a parent is intensely insecure or guarding herself against expressing anger, she may manage a child with an overly anxious and close attachment. A mother may also have extreme needs to establish an unusually close union with her infant in order to feel herself nurtured and loved by the baby. In any event, the outcome for the child is severely impaired ego development associated with inadequate self-object differentiation. In some cases a significant organic neuromaturational problem may contribute to the child's impaired ego development. This makes the youngster's separation-individuation process perilous, which requires more optimal parental support and guidance for the child.

When major symbiotic psychopathology occurs, multiple child and parent scale ratings of 5 typically occur and indicate an overly intense involvement between mother and child. In situations where the parent has an angry need to control the baby and has difficulty nurturing, low parental ratings for touching (b), holding, and affect may also appear.

Many dyads with significant symbiotic difficulty will show non-normative scale ratings such as those just described but most of these children will not go on to develop psychotic

level psychopathology. They will instead experience less severe problems associated with the separation-individuation process. This may appear as over-involvement between a mother and child; conversely there is sometimes a reactive disengagement of mother and child; and sometimes symbiotic disorders become transformed into psychophysiologic and psychosomatic symptoms.

Additional Variables and Examiner Training

The stress of the pediatric well baby examination is rarely intense. However concurrent family upset or traumatic social circumstances, and illness or hunger in the child may affect responsiveness and A-D-S Scale ratings. When this is the case the scale may assist in assessing the capacity of the parent and infant to compensate for additional stress, or in assessing their vulnerability to behavioral decompensation under stress and the actions dangerous to a child's well being that can follow. In general, well baby clinic and standard situation responses should be evaluated over time in order to recognize the pattern of interaction a particular parent-infant pair establish.

Instruction in the use of the A-D-S Scale should be given by pediatric practitioners and mental health professionals knowledgeable in normal and abnormal patterns of parent-

infant interaction and infant development. Supervised training and practice sessions in the administration of the scale increase the effectiveness of its use. Training should include opportunities to observe live or videotaped healthy parent-infant dyads interacting during standard stress situations. This gives students repeated opportunities to view the various behaviors upon which the scale focuses and allows them to compare their ratings with those of experienced observers.

Trainees should view attachment behaviors of varying intensity. The user's skill also increases with viewing videotaped examinations of parent-infant pairs at serious risk for emotional disturbance or maltreatment who show dissynchronous behaviors at the extremes of the scale. Comparisons should then follow between the parents and infants at risk and dyads receiving normal ratings to highlight the differences in the interaction between the groups. During the training process there should be time to interpret and discuss the clinical significance and developmental implications of scale ratings in actual case examples. Periodic retraining sessions with peer-group consultation minimize administrator distortions.

Statistical Studies

Concurrent and Predictive Validity

As described above the A-D-S Scale identifies current difficulties in parent-infant relationships. Data is developing to validate the scale's long-term predictive validity for future psychopathology. Prospective longitudinal research using the A-D-S Scale with twenty families (Massie, Bronstein, Afterman and Campbell, 1988) has shown that mother-child patterns do establish themselves in infancy and persist well into childhood. In this study mothers and infants with dyssynchronous interaction by A-D-S Scale indices showed trends seven to ten years later toward less happy affect, less spontaneity, less ability to concentrate on tasks, and sparser communication and reciprocity with their parents and with the investigators than the group of children whose scale profiles in infancy had been unremarkable.

Evidence for the long-term predictive validity of A-D-S Scale descriptors comes from the longitudinal research of Brody (1992). Her study has followed a hundred families from shortly after the birth of a child into adulthood. Hypothesizing the salience of many of the same parent-infant behaviors upon which the A-D-S Scale focuses, the study grouped the mothers and infants by the adequacy or inadequacy of components of baby-parent interaction during early feedings. At the followup at eighteen years of age,

the children who had compromised infancy interactions with their mothers were faring less well and had significantly more psychopathology than children from the non-compromised dyads.

Similarly, Murray (1991), with a focus on the first two years of life, documented interaction of forty-nine infants and their clinically depressed mothers at three month intervals. Examining the parameter of maternal verbalizations, the study found greater hostility toward, less awareness of, and less interactional reciprocity with the baby on the part of the depressed mothers than control parents. By eighteen months the infants of the depressed mothers were showing adverse cognitive and emotional development.

Interrater Reliability

When users of the scale receive careful training, there is good agreement among observers. Four reliability studies have been conducted using formulas developed by Willemsen (1977) for analyses of data generated by more than one pair of judges scoring mother-infant interaction with the A-D-S Scale. Consensual agreement across fourteen descriptive categories ranged from 0.34 to 0.80; agreement within one scale point ranged from 0.83 to 0.99.

parental consent was required before scale administration. No
parental refusals were discovered.

**Standardization--The Distribution of a Routine Pediatric
Clinic Population on the A-D-S Scale**

A standardizing sample provides the distribution of ratings on the A-D-S Scale of a population of infants and mothers receiving routine pediatric care. The sample was drawn from the Early Periodic Screening, Diagnosis and Treatment Program (EPSDT) (1969) jointly conducted by the State of Michigan Departments of Public Health and Mental Health. Infants were brought to the EPSDT program by their mothers for well-baby checkups and care; the group included both sick and well babies. Over a five-month period in 1977 in the Michigan EPSDT/A-D-S Scale Project (Massie and Campbell, 1983), public health nurses administered the A-D-S Scale to 228 mother-infant pairs.

Forty pairs were excluded from the final figures because of infant age and incomplete data, but general sample characteristics were based on the total sample. This group represented 1.5 percent of the infants eighteen months and younger in the five Michigan counties where the scale was used. Communities participating in the study ranged from a population of approximately 200,000 to rural towns with 30,000 inhabitants. Participation was voluntary, and

TABLE 1
Sample by Age and Sex

Age Periods	Male	Female	Total
	Infants	Infants	
1- 90 days	33	45	78
91-180 days	26	25	51
181-270 days	16	17	33
271-360 days	14	12	26
Total Sample	89	99	188

$\chi^2 = 1.48, df = 3, p \text{ n.s.}$

TABLE 2
Distribution of Scale Ratings in a Pediatric Population
Means and Standard Deviations by Sex and Age

Age in Days	Infants													
	Gazing		Vocalizing		Touch A		Touch B		Holding		Affect		Proximity	
	M ¹	S.D. ²	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.
<i>Boys</i>														
1- 90	3.39	.74	3.12	.76	3.37	.59	3.69	.63	3.64	.58	3.15	.63	3.30	.66
91-180	3.50	.76	3.19	.74	3.30	1.01	3.82	.57	3.64	.56	3.65	.74	3.46	.64
181-270	3.68	.79	3.35	1.00	3.73	.96	3.66	.61	3.64	.74	3.53	.99	3.43	.72
271-360	3.57	.85	3.33	1.04	3.80	.67	4.26	.79	3.69	.75	3.13	1.18	3.13	.63
<i>Girls</i>														
1- 90	3.17	.86	3.17	.71	3.02	.73	3.66	.47	3.66	.57	2.95	.63	3.07	.60
91-180	3.48	.65	3.40	.50	3.62	1.09	3.87	.74	3.64	.70	3.40	.76	3.40	.50
181-270	3.47	.62	3.58	.93	3.41	.71	4.05	.55	3.76	.66	3.41	1.06	3.58	.87
271-360	3.33	.98	3.41	.79	3.83	.71	3.75	1.05	3.58	.79	2.83	.57	3.66	.65
<i>Mothers of Boys</i>														
1- 90	3.64	.58	3.36	.67	3.57	.75	3.93	.51	3.41	.84	3.45	.50	3.50	.64
91-180	3.80	.57	3.04	.84	3.28	.93	3.95	.57	3.68	.69	3.56	.71	3.36	.86
181-270	3.73	.59	3.00	1.15	3.30	.85	3.75	.62	3.50	.63	3.56	.51	3.37	.61
271-360	3.86	.51	3.46	.83	3.80	.67	4.14	.66	3.53	.66	3.93	.45	3.80	.56
<i>Mothers of Girls</i>														
1- 90	3.56	.68	3.20	.78	3.46	.75	3.78	.62	3.65	.62	3.60	.57	3.52	.65
91-180	3.76	.51	3.44	.86	3.42	.94	3.95	.84	3.56	.91	3.57	.57	3.53	.64
181-270	3.70	.68	3.38	.69	3.70	.58	4.00	.51	3.41	.71	3.64	.49	3.58	.71
271-360	3.91	.51	3.08	.99	4.00	.60	4.08	.66	3.75	.62	3.58	.66	3.83	.83

¹M = mean rating assigned each age group for the variable
²S.D. = standard deviation of the mean

parental consent was secured before scale assessments. No parental refusals were reported.

The infants tested ranged in age from birth to eighteen months, but because only a small number of infants were over twelve months, the normative tables were based on infants in their first year of life and their mothers. Girls and boys were placed in separate groups and the groups divided into four age periods: 1-90 days, 91-180 days, 181-270 days, and 271-360 days. First and later-born infants were included in the sample and were equally distributed across the research population (Table 1). Mothers in the sample were from fourteen to forty-one years of age, with an average age of twenty-five years. Approximately a third of the mothers were single parents. Ninety-one percent of the families had incomes below the poverty line and were receiving government subsidized care.

Insert Table 1 (Sample by Age and Sex)
and Table 2 (The Distribution of A-D-S Scale Ratings
in a Pediatric Population)

Infant age and sex did not statistically affect the ratings of the mother-infant pairs. Data generated by the 5-point

scale is negatively skewed and leptokurtic so that the shape of the distribution tends to be more peaked than a normal curve. This is a function of the scale's design which makes it clinically easy to use but statistically awkward. When one standard deviation was added or subtracted from the mean, the range in some cases extended to over 5.00 (touching [b], boys, age 181-270 days) and to just below 2.00 (vocalizing, mothers of boys, age 181-270 days). This suggests the need for caution in evaluating single ratings. Aberrant A-D-S Scale ratings should be repeated in subsequent visits and augmented by further study of the families.

Abnormal Ratings: Physically Ill Infants. Within the sample of 228 mother-infant pairs, 30 infants were physically sick when they received scale ratings. In this small number there is a difference in the behavior of physically sick male and female babies. Sixty-three percent of ill girls rated abnormally, the majority of their scale ratings falling at 1 and 2, indicating withdrawal from social interaction with their mothers. Only 31 percent of the sick boys rated abnormally. The majority of those ratings were 5, suggesting that the boys were more demanding of maternal involvement when they were not feeling well. Illnesses included respiratory and ear infections, feeding and weight gain problems, and cardiovascular and skin conditions.

Abnormal Ratings: Physically Well Infants. Fifty-eight of the 228 pairs of physically healthy babies and mothers received multiple scores of 1, 2, or 5 in a single examination. Thus approximately 25% of the mother-infant dyads rated abnormally. These findings are similar to figures from San Francisco General Hospital, California where 20% of 127 mother-infant pairs in the well-baby clinic received multiple ratings of 1, 2, or 5 on two or more visits (Campbell, 1977). These A-D-S scale surveys showing 20-25% of mother-infant pairs troubled in their interaction cast a broad screening net for children at developmental risk. Some of the families will improve their relationship without outside intervention, and many of the children will avoid consolidated emotional and behavioral problems (see *epidemiology* above).

Appendix: Clinical & Research Examples of A-D-S Scale

Applications

Three Clinical Cases

Case 1. A Medically Compromised Child. Named Billy, this child was born with pyloric stenosis and regurgitated his

feedings from birth. At one month surgery was successful, and during his hospital stay which, lasted until he was three months old, Billy's mother was highly involved in his care and feedings. Scale ratings a month after discharge during a pediatric clinic checkup registered Billy at 2 for gazing, vocalizing, affect, and proximity; he scored 1 for touching (a) and 3 for touching (b) and holding.

Descriptively, the baby rarely vocalized, he looked irritable and fearful, he never reached toward his mother to touch her, and he occasionally pulled away from her. The mother, on her part, rated consistently at 3 in all categories: she occasionally looked at her child's face, talked to him and touched him, and stayed within arm's reach throughout the examination. She occasionally pulled away from her son's touch but more often initiated touches and appeared relaxed as she held him against her. Her facial expression was attentive, neither smiling nor frowning excessively.

These scale ratings indicated that although Billy was not an avoidant child his social behaviors were less than those of a normal baby. His mother, although engaging with him, had not adjusted to his muted responses. The findings suggested that Billy's separations from his parents and the trauma of surgery--with its interference with the baby's full sensorimotor contact with his parents and environment--had impaired the child's normal responses to his mother. The

mother was loving of her son but uncertain how active to be with her passive baby. On the basis of these observations the pediatrician supported the mother's patience and tolerance but also suggested that she augment her activities with her baby. After some weeks, further scale assessments indicated a reciprocal movement in the direction of greater involvement on the part of both mother and infant, reflecting mutually appropriate responses during the modest stress of the pediatric visits.

Case 2. Impending Child Maltreatment. This case describes a baby, Michael, whose disturbed relationship with his mother had a psychological basis. Michael's unmarried mother first came to the well-baby clinic when her child was three months old. A nurse quickly noted how the mother left the infant unattended on the examining table even when there was no one else in the room. Scale ratings during the pediatric examination showed Michael at 1 in gazing, vocalizing, touching (a), and affect. He rated 2 in touching (b), holding, and proximity. The mother's behaviors were equally withdrawing and avoidant. She received ratings of 1 in vocalizing, holding, proximity, and ratings of 2 in touching (a and b), gazing, and affect. Michael always looked away from his mother's face, never vocalized his need for her, never reached toward or touched her, and appeared intensely anguished and fearful. He frequently pulled away from

touching his mother, did not relax when she held him, and rarely sought her out visually when she was apart from him. The mother rarely looked at her baby, never spoke to him, rarely touched him, and occasionally pulled away when he brushed against her. She held Michael stiffly and did not pick him up when he was distressed, occasionally leaving him to the pediatrician's care by going out of the room. Her affect was often unhappy and tense, if not fearful.

Initially concerned that Michael was pre-autistic, the clinicians mobilized a program of intervention that combined surrogate parenting in the mother's home for the child and psychotherapy for the mother. However as the therapeutic contact progressed, it became evident that Michael's mother was severely depressed and had experienced multiple traumatic losses and physical abuse during her own childhood. This raised the possibility that the mother herself might react violently toward her son. Her turning away during the pediatric examination was a warning that she might correspondingly avoid Michael at home during trying periods. Maltreatment, striking, or neglecting a child typically occur when a parent is feeling threatened, abandoned and overwhelmed. These were the day-to-day circumstances of the mother's actual and emotional life.

If Michael's mother became desperate, and the baby intensified her despair with additional demands such as

crying, she could readily lose control. The child in fact appeared unhappy and seemed to offer his mother little pleasure. This led those involved in the case to fear that the mother might not be able to tolerate the strain of caring for her young son and might rid herself of the burden; that she might isolate herself emotionally from Michael as well as care-givers; or might substitute a hallucinated or drug-induced alternative reality for her painful daily life. As time passed the greatest therapeutic dividends for the mother and baby grew from the mother's perception of her therapist's care. As Michael's mother increasingly felt mothered herself, she became less depleted emotionally and gave more of herself to her child. By the time Michael was sixteen months old, shifts on the A-D-S Scale documented the increasing involvement of mother and son with each other. The toddler's pleasure with people was expanding as was his exploration of his environment.

Case 3. Accident Proneness in a Child Followed from Infancy to 7 Years. Nora's case illustrates how a pattern of mother-infant interaction registered by the A-D-S Scale persisted in the mother-child relationship and became embedded in the child's personality development and history of accidents.

After Nora's birth the mother suffered a marked post-partum depression. Declining psychiatric treatment, she recovered from the acute phase after two months. During this time the A-D-S Scale signs of her depression had been decreased touching of/and proximity to her baby. By contrast however, as the mother suppressed her depression, she became hypomanic. On the scale, she began to show unusually intense vocalizing and holding behavior with her baby. The mother had become fast-paced and rarely still with her child in the months following the acute depression. She was lively in a controlling way, and sometimes almost frantic or angry when the child did not respond to her. On her part, the little girl registered increased vocalizations on the A-D-S Scale in the first weeks, and later from 8-16 months she evidenced more movement toward her mother than typical toddlers.

The mother's psychological evaluation pointed to the roots of her depression in her estrangement from her own mother and in the death of a brother. Her principal psychological defenses were denial of unhappy feelings and action to avoid passivity.

By the second half of her first year Nora had begun to turn away from her mother while maintaining her unusually pronounced overall closeness. Simultaneously the mother--oscillating between self-preoccupation and absorption with her daughter--was often oblivious to her baby's states and

needs. For example, she occasionally left Nora precariously near the edge of the examining table during her well-baby checkups (reflected in the mother's low A-D-S Scale proximity rating). This portended danger for the little girl. The chaotic mother-infant interaction interfered with the child's developing ego capacity for self care and self-preservation (A. Freud, 1965). It also perturbed the child's negotiation of psychological individuation and separation from her mother toward the end of the first year and in the second year, lacing the process with unusually intense swings between dependency on her mother and autonomy seeking. In this emotional state Nora injured herself with minor burns at nine and fifteen months. At eighteen months, she had an Insecure-avoidant response on the Strange Situation test (Ainsworth, Blehar, Waters, and Wall, 1978). At five years, Nora pulled away from her mother while crossing a street and suffered a fractured leg when a car struck her.

At seven years, on the road to full recovery from her accident, she was a high-spirited and restless school girl. Her first grade teacher found her delightful and caring of other children at times. However this was not consistent, and Nora often over-reacted and was easily upset when the teacher had to set limits for her. Nora's psychological projective tests at this age showed unusual emotional avoidance, denial and counterphobic behavior to protect

herself against intense affects, a picture similar to the mother's. Nora's history up to age seven thus exemplifies developmental continuities which are complex and not simply linear. The mother's over-stimulation of her baby--itself the result of depression--re-emerged in the daughter's own impulsiveness and lability.

Three Research Applications

Maternal Attachment Behaviors with Adopted and Birth Infants. Focusing on adopted newborns' and their adoptive mothers' developing relationship, Chan (1986) applied the A-D-S Scale to 17 adoptive parent-infant dyads and a matched control group of birth mothers and their babies. The mean age of the babies was 11 weeks. The study found that adopted infants had lower scores for affect ($p < .07$), and ease of being held and molding ($p < .05$) than infants with their birth mothers. After the initial assessment a randomly selected subgroup of the adoptive families received a supportive intervention which taught the non-birth mothers to recognize the behavioral cues of their babies. Following this one-time educational intervention, A-D-S Scale ratings blind to the identities of the groups indicated that the adopted infants whose mothers had received the assistance were holding and responding to their mother's holding more optimally ($p < .04$) and touching their mothers more actively

($p < .05$) than the infants of mothers who had not receive the special assistance. The instructed mothers likewise touched more actively ($p < .08$) and vocalized more ($p < .03$) than their non-instructed counterparts.

The quantitative assessments suggest that adoption may adversely affect the sensitivity and responsiveness of mutual cueing in the process of bonding between parent and infant. In post-procedure interviews the adoptive mothers described feeling uncertain with their babies because of difficulty anticipating the arrival of the child, difficulty sharing the birth of the child with the birth parent, and fear of having to relinquish the baby later. Nonetheless, the investigation also demonstrated how even a one-time clinical intervention which teaches adoptive parents recognition of the infants' behavioral cues may benefit the relationship.

The Effect of Birth Trauma on Mother-Infant Attachment.

Henderson (1990) examined the impact upon mother-infant interaction of the emotional trauma of sudden high-risk perinatal interventions. The investigation compared normal deliveries with 25 primipara mothers and infants who required a high-risk team for conditions such as fetal distress necessitating Caesarian delivery, abnormal presentation, meconium aspiration, respiratory distress,

cerebral hematoma, and Apgar scores of less than 5--all emergencies which nonetheless did not require a prolonged hospital stay for the mother or infant. The methodology included assessments of videotapes of mother-infant interaction at the time of the babies' baths during three home visits when the infants were 10-17 days old. Blind A-D-S Scale ratings of the videotapes showed that parent-infant dyads receiving the high-risk procedures had significantly poorer mutual responsiveness ($p < .01$) than normally delivering dyads in terms of either apathetic profiles (low A-D-S scores) or dyssynchronous (simultaneous very low and high scores) profiles.

Findings were especially pronounced for infant gazing ($p < .01$), infant vocalizing ($p < .01$), and infant proximity ($p < .05$); and maternal proximity ($p < .05$) and vocalizing ($p < .05$). In interviews the parents described how the trauma of the sudden high-risk intervention had disturbed them because of the attendant sense of loss of control and security. This intense distress suggested that the mothers were suffering a post-traumatic stress reaction during the initial days and weeks with their babies. Rorschach responses of the traumatized mothers revealed emotional numbing, constriction, estrangement, and isolation. Parents' verbalization of feelings included a sense of failure, fear for the future, guilt over the difficult delivery, and uncertainty about their ability to care for

their baby. This psychological traumatization appeared to play a major role in the disordered reciprocity between parents and infants, findings of importance to obstetricians, neonatologists, and pediatric practitioners considering preventive intervention strategies.

Effects on the Infant-Mother Relationship of Family Daycare in Early Infancy. This study (Low, 1982) compared a group of 20 infants from intact families who attended family daycare from prior to five months of age (i.e. daycare in a neighborhood family home as distinguished from institutional daycare) to babies reared at home. Assessed with the Ainsworth Strange Situation at 12 months, the family daycare children overall were as likely to be Securely-attached to their mothers as the matched group of children reared in their own homes. However within the daycare group, infants who spent the most time in care (an average of 50 hours per week) were more likely ($p < .05$) to have Anxious-avoidant attachments to their mothers than children who spent less time in care (an average of 43 hours per week). Additionally, the A-D-S Scale assessed the mothers' responsiveness to their children during the reunion episode of the Strange Situation. The A-D-S ratings found that mothers of Securely-attached infants touched their babies more ($p < .02$) and initiated firm gentle holding more frequently ($p < .10$) than mothers of Anxious-avoidant babies.

In general the investigation suggests that good quality family daycare is a healthy alternative for babies whose parents work. As the hours the infant spends in care increase, however, the security of the baby's attachment to the mother becomes strained as does the mother's responsiveness to her child's distress during a separation-reunion episode.

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