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Emotional Availability: A Reciprocal Reward System for Infants and Parents with Implications for Prevention of Psychosocial Disorders

"Be there!" Although my teachers gave voice to this in medical school, and I listened, it was not until this phrase echoed in my psychiatric training that I understood it for what it is—the cardinal principle of therapy. I have since learned that this principle goes beyond psychiatrists and physicians; it engages all health care professionals. From the patient's side, a sense of the helper's ongoing availability is fundamental for progress—the basic stuff for building trust and a measure of equanimity in the midst of problems, perturbations, and illness. From the helper's side, a sense of the patient's accomplishment in the midst of therapeutic availability, without necessary therapeutic "intervention," is also fundamental for progress—the stuff which builds confidence in the seasoned therapist. Again and again we find that a patient is apt to discover options in an atmosphere of ongoing diagnosis where the helper is an available listener, where there is another human being who is interested in understanding what is meaningful and complex.

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Over the years I have learned still more about availability—that it is more effective if it is of a certain sort, if it includes an empathic sensitivity which allows for resonance with a variety of feelings; feelings that orient us in any given encounter to what is both uniquely individual and commonly human. This kind of availability, emotional availability, goes beyond a therapeutic principle; it is a developmental principle. The emotional availability of another serves to facilitate development by fostering security, exploration, and learning. In cognitive terms, it has the effect of encouraging movement through an expanding world of self and environment. Further, it can be thought of as operating through a reward system which, although biologically based, is realizable only in a social setting.

This essay will consider the beginnings of emotional availability in the infant-parent relationship and, in particular, it will consider those rewards that make development possible. Being there during pain and discomfort is certainly a part of emotional availability, but our psychology has tended to neglect rewards. But now, considering the widespread prevalence of child neglect and abuse, I think we would do well to ask about the rewards in parenting. There must be some. Parenting is time-consuming, demanding, and often requires the laying aside of other endeavors. Yet it is obviously essential for survival of our species.

Evolutionary biology has emphasized survival to reproductive age and the corresponding biological importance of pleasure in sexuality with its reciprocal social rewards for sexual activity. It is a fact that in our post-Freudian world, pleasures in this realm are now acknowledged as vitally important in their own right. But what about after conception? The altricial human must be cared for. Surely there must be a biology of pleasure in parenting to correspond to a biology of pleasure in sexuality. I propose that, if we look, we might identify such forms of pleasure; we might then understand their "vicissitudes"—distortions, deflections, and inhibitions. After all, developmental processes of parenting, like developmental processes of sexuality, may encounter conflict as well as satisfaction.

SOURCES OF REWARDS

My thesis is that there is a biologically-based reward system for infants and parents. Rewards exist for interaction whether we consider the infant, the parent, or their developing relationship. Learning theories have emphasized that rewards are features that shape be-

havior. For years, such theories described how mothers "shaped" babies, but we are now beginning to appreciate how much babies "shape" mothers—and other adults as well.¹⁻³ When researchers look at interactions between parent and young baby, the lion's share of shaping is being done by the baby. This makes sense: the parent is capable of accommodating and responding to the baby's activities, while the baby has a limited capacity to accommodate to the parent's activity. Then, as the baby develops, the situation changes. By the end of the first year, interactions between baby and parent are more nearly symmetrical, with openings and accommodations more equally distributed between partners.⁴⁻⁶ Our longitudinal research⁷ and that of others² leads to thinking about three "phases" of social interaction during the first postnatal year. Since these phases begin with and depend upon what the infant's unfolding biology brings to a reciprocal reward system, they will guide our discussion. The phases are (1) the newborn period (which we define as extending through the first two postnatal months); (2) the awakening of sociability (2-7 months); and (3) the onset of focused attachment (8 months through the end of the first year).

Rewards from Infants

THE NEWBORN PERIOD

There is something about the appearance of the very young infant that is intrinsically appealing. The head is disproportionately large, by adult standards, and contains particular characteristic features: a protruding, large forehead; large eyes set below the midline of the head; and round, protruding cheeks. In addition, the baby has thick, short extremities, a rounded body, and soft and elastic body surfaces. These are features which Lorenz⁸ has referred to as "babyness."

This stimulus configuration of attractiveness has received experimental support in human studies.^{9,10} Of particular interest is a study by Chandler wherein attractive baby features were more compelling for adolescent girls who had passed through puberty than for age-matched adolescent girls who had not gone through puberty and adolescent boys. These results, along with the species-wide nature of the phenomenon itself, suggest that "babyness" may correspond to a physiologically-related incentive system in adults for nurturing the young baby.

The newborn's "thrashing of arms and legs"² has also been identified as an important stimulus for eliciting caring. Certainly a newborn's response capacity for being soothed from a thrashing-crying

state to a quiescent one is experienced as rewarding; a parent is told in this way that she or he is needed and appreciated.

The cuddliness of a newborn is also an important source of reward. Parents feel good about a baby who snuggles, who conforms to a posture of being held, and who can responsively alter his state, not just by being smoothed (i.e., going from arousal to quiescence), but by becoming alert and looking into another's face when being held. A major longitudinal study¹² found that cuddliness was one of the few aspects of individual differences among infants that proved stable over time, suggesting that this sort of reward may have consistent biological variation important for parenting.

Other aspects of the young infant give appeal. John Benjamin used to speak of the aesthetic aspects of what he referred to as "kinesthetic unity" between mother and infant, that sense of harmonious molding of infant to mother which was often captured by the great painters. Rene Spitz emphasized the pleasing qualities of the breast-feeding infant who blissfully looks up into his mother's face. Winnicott,¹³ Erikson,¹⁴ and Solnit and Provence¹⁵ have indicated that the newborn's appearance of helplessness is rewarding in another sense: it gives parents a sense of fulfillment by the developmental fact of the infant's becoming less helpless with time.

THE AWAKENING OF SOCIABILITY

One has to remember, as Robson¹⁶ has emphasized, that the newborn period can often be trying. Appeal in the midst of crying and demandingness can sometimes be aversive. But, as Robson has put it: "In dealing with the human species, nature has been wise..." (1967, p. 15). Robson was referring to the developmental onset of increased eye-to-eye contact and social smiling. As will be seen below, there is much more in the developmental cluster that I refer to as "the awakening of sociability".

Around two months, what the infant brings to a social interaction takes a giant step forward. Parents often state that their baby is now more human and less of a doll-like creature to be cared for. A baby at this age brings pleasures in immediate face-to-face rewards, in rewards emanating from wakefulness and state development, and in rewards from a greatly enhanced learning capacity.

In an immediate sense, when one approaches a baby at two months there is a world of difference. A triad of developmental advances are apt to give pleasure and strong incentive for continuing to be with the baby; they tell us the baby is in a good mood and wants more of us. These rewarding features include (1) enhanced eye-to-eye contact, (2) social smiling, and (3) social vocalizing.

Enhanced eye-to-eye contact around two months has not only been described in the naturalistic setting,^{7,17} but has also been documented experimentally. In an elegant program of perceptual studies, Haith and his colleagues^{18,19} have shown that significant differential looking at the face has its developmental onset at seven weeks of age, when there is a prominent scanning of the eye region. The social smile, which so delights parents, also appears around two months. Although smiling has developmental antecedents, there is a shift from endogenous smiling (related to rhythmically-occurring states and not generally experienced as rewarding by parents) to exogenous smiling, which flows in response to outside stimulation and becomes most prominent in social encounters.²⁰ Social vocalization, with cooing in response to the face of another, begins within one to two weeks after the flowering of the social smile and adds further joy to one's encounter with the baby. Altogether, parents find an irresistible delight in their beaming, cooing baby, who looks at them engagingly and shows what can only be interpreted as pleasurable excitement as baby's face lights up and there is a bicycling activity of arms and legs. Some parents now think of their baby as "playful"; there is a sense of back-and-forth smiling, vocalizing and looking; a kind of affirming, fun-filled encounter now seems a gratifying addition to caregiving.

An important background for these immediate social rewards is found in the development of infant wakefulness and state. A decrease in nonhunger fussiness occurs around two to three months of age.^{7,21-24} Further, an increase in the amount of wakefulness occurs over the first two months.^{7,25} The distribution of wakefulness also changes, with more of wakefulness during the day and less at night. What has been called "settling," with sleeping through the night and more available nonfussy wakefulness in daytime, must be rewarding for parents. But even more important for parental pleasure is the fact that wakefulness seems used "in a new way,"²³ with increased exploratory activity, whether with toys, mobiles or faces.

There thus seems to be an intricate orchestration involved in unfolding of infant rewards at this age. The interplay of smiling, cooing, and engaging-looking against a background of more nonfussy wakefulness and exploratory activity—all seem to act in concert to enhance the baby's social appeal. This interplay can be appreciated further by considering learning. Enhanced learning has been shown in its three experimental realms of operant conditioning, classical conditioning, and habituation. In one form or another, all of these are easily demonstrable after two months of age, but more difficult to demonstrate before then.^{see reviews 26,27} After two months the infant can learn in a variety of ways, can accommodate and change its behavior

in a social situation, and can adjust to what is familiar, thereby completing learned activities so that exploration of the new is possible. It is therefore not surprising that there is a surge of exploratory activity with new learning capacities. Piaget,²⁸ in his scheme of cognitive development, notes that the infant becomes increasingly involved in activities that are "designed to make interesting spectacles last." In the natural course of events, a delighted mother and father are often part of these "interesting spectacles." Aside from the inherent attractiveness of wanting to be involved in such activities, there is additional incentive for interaction when a parent sees that a baby's behavior is changing as a result of her or his input.

THE ONSET OF FOCUSED ATTACHMENT

We believe these phases of interaction are based on maturationaly-timed developmental shifts in the infant's central nervous system organization. Elsewhere⁷ we have referred to these shifts as "biobehavioral" and have also described their manifestations in state development, EEG changes, and autonomic nervous system reactivity. In addition to the shift that occurs at two months, another shift in wakefulness and sleep state organization takes place between seven and nine months. At this age there is also a change which has further emotional significance to parents. Up to this time, although their baby may have smiled or reacted more pleasantly to them as compared with strangers, showing off baby to a variety of people was easy and substitute caregiving was relatively uncomplicated. Now things are different. The baby may cry when mother or father leaves, and there is likely to be a display of fearfulness when a stranger approaches.^{7,29} Although substitute caregiving is more difficult, parents feel needed and special. The developmental message from their baby is compelling: no one else will do. The mechanism of this commonplace observation has been elaborated in an ingenious operant learning experiment by Fouts and Atlas.³⁰ They showed that infants of six and nine months experience mother's face as rewarding; in contrast, a stranger's face is experienced as neutral at six months and has negative reinforcing value at nine months.

This is also a time when the infant sits up and begins to crawl. There is more mobility. In the realm of cognition the infant shows a beginning understanding of means-end relationships and of intentionality in the sense of anticipating an event independent of action. (This marks the onset of Piaget's stage IV of sensorimotor development.) Out of sight is not out of mind; the infant can remove a cloth covering a hidden object that he has seen disappear under it. Related to this advance in cognitive capacity is an advance in emotional

capacity. Whereas before emotions were primarily social signals, anticipating and guiding behavior from others, now they are internal psychological signals as well. Now emotions anticipate and guide instrumental behaviors of the infant. From our point of view, an infant can now demonstrate fearfulness expressions in advance of avoidance, pleasure expressions in advance of approach.

There is now play in addition to playfulness. Simple games begin, with peek-a-boo social games and give-and-take games with balls or favorite toys. Freud³¹ and Spitz³² have discussed how these games seem to have a theme of withdrawal and return and may bear some fundamental relationship to the comings and goings of caregivers, as well as to the infant's beginning sense of mastery in coping with such experiences.

Rewards from Parents

How do parents reward infants? We begin with the obvious. Species-wide, there is high readiness for parental tuning-in to infants' needs. Satisfying such needs is rewarding for infants and heretofore has seemed a sufficient basis for our looking at the emotional availability system. In technical jargon, this has been referred to as the "drive-reduction," "unidirectional" parent-to-infant point of view. We now appreciate more. Parents do satisfy needs related to hunger, thirst, warmth, and "contact comfort," but they also encourage exploration, and reward the infant in that manner. Parents make opportunities for "interesting spectacles"²⁸ and for the child to produce effects on the environment in a way we have come to see as intrinsically rewarding for the infant.³³⁻³⁵ Overall, parents set an expectation that "good things will happen," and this rewarding climate leads to a sense of "basic trust" in the infant.^{36,37}

Especially during the period of what we have designated as the "awakening of sociability," parents begin to arrange the environment so as to enhance learning. They facilitate contingencies between the infant's actions and useful results. That the infant finds this rewarding has been discussed in a compelling manner by Watson,³⁸ who demonstrated the relationship of infant smiling to such contingency experiences. In addition, during this time parents reward infants (communicating their love) by talking, smiling, and laughing. They engage in rhythms of eye-to-eye contact, reaching, holding, touching, postural adjustments, facial and hand gestures and they are involved in comings and goings—all of which offer a tuning-in to infant rhythms that must be gratifying.³⁹

There are other species-wide adult behaviors that occur in interaction with infants at this age; since they hold infant attention we might presume they are experienced as rewarding. These include: "baby talk," particular facial expressions, and looking behavior. Baby talk involves falsetto speech, extreme variations in pitch with sing-song intonations, and long vowel durations; there are many words like "oh," "ooh," and "ahh."^{4,40} Particular facial expressions include the frequent use of "mock surprise" and a slowing of tempo with exaggerated eyebrow and mouth movements. Looking is prolonged (as compared with other social encounters) and long adult-to-baby looks of 15-30 seconds are not uncommon.

Rewards from Reciprocity

We now know there is a back-and-forth quality in development between parents and infants. Development does not proceed in a simple linear fashion, and we increasingly see rewarding behaviors as a result of sequences of interaction. Reciprocity may be rewarding, first, from specific interactions and, second, from inherent features in reciprocal functioning itself.

FROM SPECIFIC INTERACTIONS

One can look at specific interactions from the infant's side and the parent's side. From the former, we can easily appreciate that the infant, having been given to in parental interactions, is more apt to give. Having experienced rewards, an infant is more apt to be rewarding. Further, after experiencing that good things happen predictably (i.e., having developed a sense of basic trust), an infant is more predictable, less fussy, and more exploratory.

From the parent's side, there are similar aspects to what is rewarding. A parent who has been rewarded by her infant is more likely to feel better about herself as a person and as a fulfilled parent and is more likely to continue giving in a rewarding manner. But with parent, there is more complexity. As we know, a parent has also been parented; there is a longer intergenerational, interactive history. A parent who can draw upon good parenting experiences from the past, re-experiences that parenting and is more apt to feel rewarded and be rewarding to her infant. From a psychodynamic point of view, we appreciate that through processes of re-experiencing and identification, a mother, for example, in giving to her infant, is also giving to herself. Optimally, rewards flow back and forth, both because of identification with the baby who is being pleased, and because of a

reexperiencing with activation of a rewarding store of memories of being parented. We also appreciate that parenthood is a developmental phase in its own right.^{41,42} To the extent that this is true, infant interaction is rewarding in still another sense. It is self-fulfilling at an appropriate phase of the life-cycle and it will involve a re-integration of earlier experiences.

INHERENT REWARDS FROM RECIPROCAL FUNCTIONING

As Sameroff⁴³ has pointed out, there are inherent rewards in exercising reciprocal functioning—intrinsic pleasures in experiencing back-and-forth rhythms and contingencies in social interaction. It is not hard to imagine this in terms of back-and-forth smiling or back-and-forth vocalizing between parent and infant. The point is a more fundamental one, however, rewards may be less obvious to an observer.

To conclude this section on rewards, I offer an example of reciprocity under extraordinary circumstances. This is from a research case report,⁴⁴ one in which an infant was born with Down's syndrome and had multiple associated congenital anomalies. The mother was at first shocked and then grief-stricken. She then experienced what was fulfilling to her in a situation of reciprocity which only she and her infant could appreciate.

After the birth of her child, Mrs. D. was told of the diagnosis of Down's syndrome, duodenal atresia, kidney failure, and heart problems. She was told it was likely that her son would not survive. Initially she had thoughts that perhaps, since he was retarded, it would be better if he did not survive. Her view changed dramatically, however, when she first held her son at eight hours. She fell in love with him, knew he needed her and could survive if she could convince him of her loving presence. Leo remained in intensive care for the next seven weeks, had major surgery, and remained critical. He could have nothing by mouth for six weeks. Throughout this time his position was fixed: he was on his back with hands and legs in restraints, so he could not pull the many tubes and wires that were held precariously in place. When our research team visited, we were shocked by the sight. Aside from physical survival, we wondered about psychological survival with this degree of restriction, presumed stress, and pain.

But even more moving than the unsettling sight of Leo was what Mrs. D. did. The nurses had expressed concern that Leo could not get to sleep, that he was awake fretting much of the time. Mrs. D. found that she could insert her arms under Leo's back, avoid disturbing the tubes and wires around his face, and gently pat his buttocks while holding him. She did this for hours and Leo regularly gratified her by going to sleep. Looking back, Mrs. D. later commented that the nursing staff did not have time to do what she did and, after

all, they did not love Leo as only she, his mother, could. She felt he was responsive to her; he needed her love and she felt loved.

Leo survived and developed. At a home visit toward the end of the first year, Mrs. D. demonstrated a special way that Leo "knew her." She held him in a somewhat awkward way, with her arms under his back and with his side against her body, she gently patted his buttocks and Leo looked at her and smiled, obviously content. Mrs. D. was clear about the special significance of this posture, seeing an unbroken continuity to the difficult days in the hospital. She said: "I think the patting on the behind is important because I did a lot of that in the hospital. Whenever I held him, I rubbed his back and patted his behind. That was about all I could do . . . now he is remembering back to when that was the only place."

EMOTIONAL AVAILABILITY—A BASIC PSYCHOSOCIAL REQUIREMENT FOR DEVELOPMENT

The Adaptive Nature of Emotions

Emotions are adaptive. We assume along with Darwin⁴⁵ and many others⁴⁶⁻⁵² that human emotional states represent complex systems of organized functioning that are useful to the individual and that have been advantageous to the species. An evolutionary history is traceable, especially through primates, wherein emotions seem to have emerged for promoting social interaction in group-living animals. As Hamburg⁵³ has put it, the formation of social bonds is apt to be experienced as pleasurable and their disruption as unpleasurable. From another perspective, facial expressiveness may have evolved in primates concomitant with the enhancement of daytime vision which allowed for social signaling.⁵² The nocturnal prosimian, communicating mostly through sound, smell, and touch, had little in the way of facial expressive musculature. When the ecological niche shifted to daytime life, vision and facial expression of emotion had more prominence. The close ties between emotion and the capacity for social living has been given experimental validation in macaques by Myers,⁵⁴ who has shown that emotional and social behaviors are controlled by the same neocortical areas in the forebrain.

The human, as Platt⁵⁵ has stated, is the most complex entity evolution has brought forth in the universe. Emotions not only reflect that organized complexity, but are adaptive in an individual sense, telling us about the centered aspect of our being.⁵⁶ Not only do they signal others of our interest or disinterest, pain or pleasure, annoyance, fear or surprise, but they tip us off about how we are doing in

general. In the words of a current popular book, "feelings" are "our vital signs."⁵⁷ Emotional states are ongoing and dynamic rather than intermittent and, as clinicians now appreciate, all meaningful social relationships are affective.^{37,58}

Nowhere is the adaptive nature of emotions more apparent than in human infancy. Emotional expressions are the language of the baby, providing messages for survival as well as loving and social bonding. Crying, for example, gives a message of "come change something," a message that is species-wide and peremptory, while smiling gives a species-wide message something like "keep it up, I like it."

Although the baby can't use words to tell us how he feels, we believe that with repeated interactive sequences, mother and infant normally establish modes of reciprocal activity which leave both with a preponderance of pleasurable and positively-toned expectations, rather than negatively-toned ones.

The Concept of Emotional Availability

The view of affects as continuous adaptive features in the lives of infant and parent leads us again to the concept of emotional availability.

From the infant's side, expressing a range of emotions is important for engaging the mother (and father). This includes not only positively-toned emotions of interest, happiness, and surprise, but also negatively-toned ones such as distress, anger, sadness, and disgust. The infant's emotional signaling allows the caregiver to appraise both the current state of contentment and corresponding need for intervention. Less often emphasized, however, is that the infant's emotional expressions in themselves satisfy an important need for the caregiver. For adaptive functioning, it is important that the infant be emotionally available and responsive to the mother, signaling where he is at, how she is doing, and communicating the fact that she is needed and appreciated. Optimally, the infant's expressiveness allows for interchanges that are varied, interesting, dynamic, and, on the whole, rewarding. In a sense, emotional signals confirm that mother is loved and that development is taking place.

From the parent's side, both clinical experience and research have shown us that more than availability is important for fostering development; emotional availability is required. In a recent review of child development research prepared as a background for public policy, Clarke-Stewart³ emphasized that quality of care was deemed espe-

cially important for development. Quality of care was seen to involve playful, responsive, and affectionate parenting with consistent behavior over time. A flexible, rewarding parent is available, responsive to the emotional "language" of the baby, and offers a rich variety of individualized activity in an overall context of parental enjoyment.

A feature of emotional availability that has interested us most recently is the possibility that parenting in early infancy may involve a certain propensity for "reading in" one's own emotions according to situations. Thus, mothers may sometimes attribute infant emotions on the basis of a notion like, "if I were in that situation I would feel angry . . . I would feel afraid . . . I would feel sad . . ." Different cues may be used for emotion judgments at different ages; situational features may be more important in early infancy and infant response features more important later. In a recent cross-sectional survey of 623 mothers in the Denver area, we asked about infant emotions. Mothers were surveyed with infants at each monthly age from birth through 18 months. We were surprised to find a relatively high amount of emotional attribution in early infancy with more than one-half of mothers in the newborn period seeing interest, joy, surprise, anger, and distress in their infants, and nearly one-half seeing fear.

At first, this result threw us. From our other research, we knew that mothers appeared to have little infant response specificity for such judgments, either in consistent facial expressions or in infant instrumental behaviors. We then realized it would make adaptive sense for mothers to respond emotionally and affectionately to their newborn infants even in the absence of a range of clear cues for a variety of emotions. Acting in this way, perhaps using the mechanism of projective identification, a new parent could begin tuning-in to baby feelings. Presumably, corrections take place with development as infant responses become increasingly specific, related to sequences of interaction, and act as confirmations of maternal interpretations.

The Rewarding Dimension of Emotions

Before considering conditions which interfere with emotional availability, I would like to review some basic research we are now pursuing in our laboratory. This research came about because of the need for understanding the infant's emotional life in terms of messages that are typically available to parents. It is noteworthy that experimental research on emotion has mainly been with adults expressing emotion to other adults and has involved two approaches, those

involving the dimensions of emotional expression and those involving discrete emotional expressions. Our research on emotional expressions of infants-to-adults has taken both approaches.

First, for the dimensional approach. Rewards, resting on the balance of pleasure over displeasure are centrally important in emotions, both as intra-individual states and inter-individual social expressions. In studies of adult-to-adult emotional expression, *hedonic tone* (pleasure-unpleasure) has consistently been found as the central aspect of emotion.^{48,49} From a social point of view, this dimension seems to modulate the ebb and flow of rewarding interactions. From an individual point of view, this dimension appears important in motivating instrumental behaviors used in approaching or avoiding. *Activation* consistently emerges as the second main dimension of adult emotional life. This may have to do with both the salience of an emotional signal and the urgency of a message, either to others or oneself. A third dimension in adult-to-adult emotional expressions studies occupies less variance in experimental studies and often seems difficult to label; it is sometimes called "acceptance-rejection," sometimes "control," and sometimes "expressed feeling versus inner feeling." (These three-dimensional descriptions go back to the thinking of Spencer,⁵⁰ Wundt,⁶⁰ and Freud⁶¹; and persist through experimental investigations of Woodworth and Schlosberg,⁶² Osgood,⁶³ Frijda and Philippszoon,⁶⁴ Frijda,⁶⁵ Gladstone,⁶⁶ and Abelson and Sermat.⁶⁷

In our dimensional studies of infant-to-adult emotional expression, we have used a multidimensional scaling approach for infant facial expressions of emotion.⁶⁸⁻⁷⁰ Women who are experienced with children are asked to sort infant pictures into one or more piles, putting those that seem to belong together in the same pile. This allows us to generate a similarity matrix that quantifies the extent to which pairs of pictures are sorted into the same pile; it also allows us to represent these similarities in a spatial configuration using multidimensional scaling. These analyses, reported in detail elsewhere,⁷¹ gave quite different results before and after three months. At two months, scaling solutions are two-dimensional, with dimensions best characterized as "hedonic tone" and "state." At three months (after the period of "awakening of sociability") three-dimensional scaling solutions predominate and these are characteristic of multiple studies we have done at four and twelve months. In the three-dimensional solution, *hedonic tone* carries the most variance, *activation* appears as the second dimension of prominence, and an *internally-oriented/externally-oriented* dimension is third. We feel that it is a reflection of the adaptive significance of emotional expressions and their biological

organization that, beginning at three months and afterwards, these results are not only internally consistent but the pattern of results shows consistency with adult emotional expression studies.

Discrete Emotions

Great excitement was given to the field of emotion research in the early 1970s by the findings of crosscultural "species-wide" agreement about specific facial expressions of emotion.^{43,49} Using still photographs of adults who posed peak expressions, agreement was found among adults in nonwestern, as well as western cultures and in nonliterate, as well as literate cultures. This universality of agreement suggested a biological basis for emotional expression and recognition, especially for the emotions of joy, surprise, anger, fear, sadness, disgust, and probably for interest. It also suggested the value of looking for the origins of patterned emotional expressions in infancy.

Our infancy work has also found agreement about specific facial expressions of emotion; but, unlike the adult studies, our studies have not used actor-posed peak expressions. Instead, we used infant facial expressions that have been photographically sampled in the home environment under a variety of circumstances. We then made use of these infant photographs to obtain free response judgments about what emotions are seen. These judgments are later categorized, using a technique modified from Izard.⁴⁸ Our judges are women experienced with children who are asked to look at the pictures of facial expressions and tell us "the strongest . . . feeling the baby is expressing," if any. Words are categorized automatically according to an accumulated dictionary of words for nine emotional categories plus a tenth of "no emotion." Up to now, we have done studies for infant pictures sampled at three-and-a-half and twelve months of age, with multiple replication studies done at each age, and with 25 judges used in each study.

At three-and-a-half months, our sampling of infant facial expressions yielded agreement about the following emotions: interest (33% of photos), joy (41% of photos), distress (9% of photos), sleepy (6% of photos), and anger and fear (1% of photos each). Nine percent of the pictures were blends; most of these were for interest combined with joy. At twelve months of age, results were similar, except that four percent of pictures were judged as surprise, one percent as sleepy and one percent each for anger, fear and disgust; 15 percent were categorized as blends. Details of these studies are presented elsewhere.^{37,71}

It should be pointed out that our infant photos involved low

intensity, mid intensity, and high intensity emotional expressions and that correlations between replication studies were high (ranging from 0.84 to 0.96) for the four major emotion categories. This indicates to us that women who have experience with children have high agreement about these categories of emotion, as well as agreement about the extent of the clarity of emotional signaling.

We are now engaged in a collaborative study with Izard in which he has selected still pictures representing peak emotional expressions from his infant studies; we have exchanged sets of pictures sampled under his conditions and ours and we are estimating the extent of agreement between free response categorizing experiments done in each setting. Preliminary results indicate that agreement levels are high across studies. With the Izard infant pictures major categories of agreement now include fear, anger, and surprise, in addition to joy, interest, distress, and sleepy.

This raises an issue about sampling. Izard sampled for peak emotional expressions; we sampled for more "naturalistic" expressions in the home, but under somewhat arbitrary conditions. But are still photographs meaningful units? We know that emotional life is necessarily embedded in temporal patterns of activity. To explore this concern we did a study comparing still photographs with movies and we were reassured. More than three quarters of our photographs that had met criteria for stability were judged to be in the same category during movie and slide presentations, and disagreements were readily explained by the addition of new information occurring during the movie segments which had preceded the still photographs.⁷¹

Another question about sampling concerned the representativeness of our sample of group pictures with respect to the infant's usual "behavioral day." This question was partially resolved by doing a time-lapse video recording for a continuous 12-hour period from 8:00 a.m. to 8:00 p.m. for an infant of three-and-a-half months of age. Following the recording, we arbitrarily sampled still photographs at fixed time intervals. Since we established that the recording day was not only typical for this particular infant, but also typical for normative data previously collected from 25 longitudinally-studied infants, we have reason to believe our results provided us with some approximation as to our sampling bias in the three-and-a-half-month-old infant group of pictures. Comparison with this previously collected group data indicated that we had indeed overrepresented joy and underrepresented sleep, but that these two emotion categories, along with distress and interest, were the most prominent categories in both the 12-hour infant data and our group data; we also found that emotion blends were prominent in both methods of sampling.⁷²

Our program has taken us in still further directions. A cross-validation study between our two methods (free responses for categorizing and similarity sorting for dimensional scaling) found a strong tendency for pictures similarly labeled in the free response paradigm to be close together in our multidimensional space.⁷¹ Studies are also being done comparing the infant's response system in relation to judgments of discrete emotions. In one experimental study of fear, surprise, and happiness, there was an encouraging relationship between the number of predicted facial expression components for a discrete emotion and the global judgment of that emotion from videotapes of 10-12-month-old infants.⁷³ That study, and another involving anger in seven-month-old infants, also found evidence for specificity in the relationship between situations designed to elicit particular emotions and the facial components predicted for those same emotions.⁷⁴ We are now studying the action consequences which follow upon the perception of discrete emotional expressions, both for mothers and for infants, as well as individual differences in parental abilities to "read" infant emotional signals and the effects of experience on such abilities. Our search to describe the emotions of infancy may seem a sweeping one; yet, the territory only begins to be charted.

Assessing Emotional Availability

A number of research programs in recent years have taught us about assessing infant-to-mother "attachment" during later infancy.^{75,76} and about assessing processes related to separation-individuation during this time.⁷⁷ But in thinking about emotional availability, we refer to more general features, perhaps even principles, of the infant-parent system.

A first principle to begin assessment is to take a "pleasure inventory." This would address the question: what are the pleasures which infant and parent are finding in their interactions? Parents and infants need to be happy. Taking a pleasure inventory would not only help us "diagnose" problems, it would also help us with our empathic stance when things are awry. Parents as well as infants can be deprived of rewards and the system is sufficiently intricate and interlocked that both will be involved, no matter how that deprivation got started. Overall, there should be a balance of trust, affection, interest, and pleasure in interactions. If there is not, there is likely to be a "turning off," exploration may be inhibited, and in extreme cases, sadness and depression may ensue.

A second principle of assessing emotional availability is to take

into account the *individuality* of participants. It is important to assess the mother's individual reward system, for example, in terms of her personality, her past experiences, her view of herself, her expectations, and what is likely to be experienced as pleasurable by her. Similarly, it is important to assess the infant's individuality as best as one can through repeated observations, testing, parental reports, and perceptions of infant temperament.⁷⁸

Third, the *clarity of emotional signaling* needs to be considered. To what extent is each partner able to express what interests, what pleasures, and what is being asked for? Fourth, assessment should include consideration of the *range of emotions* expressed and their appropriateness to particular situations. And fifth, the ability of each partner to sustain an *appropriate emotional tone* should be considered, one that fosters reciprocal investment and exchange.⁷⁹

Beyond this, one could assess the operation of *regulatory control* features in the interaction system. If one partner is less emotional does the other readjust with more initiatives and emotional expressiveness?⁸²

CONDITIONS WHICH INTERFERE WITH EMOTIONAL AVAILABILITY AND OPPORTUNITIES FOR INTERVENTION

I would now like to give some examples of the usefulness of this kind of approach for thinking about a variety of problematic conditions in infancy. Some conditions interfere with emotional availability and blunt our rewards—rewards we usually take for granted and may even feel "biologically entitled to." In the first group of examples, problems can be thought of as beginning with infants and, in the second group, with parents; but sooner or later all become problems in the interactional arena. Unfortunately, the likelihood is then for emotional unavailability on both sides. Interactions are not pleasing and corrections are indicated.

Consider the infant with Down's syndrome. We have found that when the "awakening of sociability" occurs in development, this phase is slightly delayed, but the quality is such that it draws attention to itself and is apt to be experienced by parents as disappointing.⁴⁴ The smile is dampened. Smiling seems to promise the excitement of social engagement but instead is fleeting. Typically as one approaches there is a bilateral upturning of the corners of the mouth, but the face doesn't "light up" and there is not the bicycling of arms and legs we

are used to in the normal infant. Further, eye-to-eye contact is not continued in the face-to-face encounter and eyes do not brighten. As researchers, we experienced a sense of being let down when we saw this in babies we had known since birth. We were empathic with parental disappointment and understood the air of sadness we found in families at this time. Dampened smiling reminded parents again of the expected normal child who was not born; there was a return of sadness and a need for grieving. There was also a corresponding need to find new aspects of what could be rewarding in their Down's baby. (The interested reader is referred to Emde et al.⁸⁰ for a photographic display comparing smiling in normal and Down's syndrome infants.) Evidence also suggests that the emotional expression system of the Down's infant is dampened beyond this. When expressions of "focal attachment" appear, they are more obviously delayed (during the middle or end of the second year) and, as with smiling, they are less intense.⁸⁰⁻⁸²

Let us consider other circumstances where the usual rewards of early infancy are unavailable: the parent whose newborn infant is less cuddly¹² or whose newborn doesn't satisfy by being soothed. Consider the infant whose early fussiness is extreme and does not decline between two and three months, who may be called "colicky," but who may be an extreme instance of a maturationally-related phenomenon.⁶ Consider the small-for-dates infant who may be hard to soothe, who may have considerable fussiness, a scraggly appearance, difficulty in maintaining his gaze, and a frowning appearance on his face. Parents with such infants may feel they are being "disapproved of" and may experience a sense of failure as Brazelton⁸³ has observed. Similar irritable states with poor soothability may characterize infants born with a previously undetected syndrome of hyperviscosity or relative polycythemia.⁸⁴ We might also consider infants born with physical handicaps (absence of limbs, facial malformations, bony malformations, etc.) that distort their appearance and make them less appealing at the outset. We ought to think of a pleasure inventory in these instances. From a therapeutic standpoint, I believe it helps to acknowledge a deficit in rewards. We can then understand the parental sadness. Parents can then feel freer to talk about this and there can be the beginnings of progress towards an appreciation of other rewarding aspects of their handicapped infants.

Disappointment from a deficit of reward, its potential dire consequences, as well as a strategy for helping parents in "tuning in" to other rewarding features of their infants is beautifully illustrated in the work of Fraiberg⁸⁵ with the congenitally blind. Not only is appearance different in the blind baby, but the basic rewarding and

communicating system of eye-to-eye contact is absent. A large proportion of these infants were known to become socially withdrawn children with stereotypic behaviors, retarded language development, and were often regarded as "autistic." Fraiberg noticed an interference in the mother-blind-infant relationship from the earliest postnatal months. There was a dampening of affective interchange, often a seeming avoidance of close interaction, and a deficit of interest, pleasure, and play by mothers. Fraiberg developed a research intervention program in which she helped parents understand cognitive development in their infants, their nonvisual communicative patterns, and how these infants were pleasing in a variety of ways. She could demonstrate developmental accomplishments and, as a result, affective interchange was restored, mothers enjoyed their babies more, and the so-called "autism" syndrome was eliminated.

Normal infants will have marked individual differences in the timing, intensity, and nature of rewards they offer to parents. Under most circumstances the challenge of finding which rewards are prominent in one's own baby is one of the great joys of life. But consider the particular challenge of those infants who are temperamentally irregular in their biological functioning, who are slow to adapt to change and may have a preponderance of negative emotional responses. Such infants have been characterized under the rubric of "the difficult child" by Thomas and Chess,⁸⁶ who found this group to make up about ten percent of their New York longitudinal study.

The interference with the emotional availability occasioned by grief provides a bridge to problems on the parental side. The infant born with a handicap (e.g., Down's syndrome) presents the parent with a discrepancy from the expected normal baby who was not born and for whom the parents need to grieve.⁸⁷ Energy is tied up in this grieving process, and emotional availability for other loved ones, and for the new handicapped infant, is diminished. Similarly, parental grieving for the death of a sibling or another family member also interferes with emotional availability. A particular problem has been observed with twins; when one twin dies in infancy, there is often enormous difficulty in parents being able to grieve for the lost twin sufficiently so that there can be full emotional investment in the survivor.⁸⁴ There are also more subtle aspects of grief. Parents often need to grieve for a brief period following the birth of a child of an unexpected sex.

Clinically, we know that the grief process, especially if prolonged, overlaps with depression. Severe depression can result in parental unavailability in the most profound emotional sense, and this can have a serious depriving effect on an infant's development. Indeed, a

young child's helplessness in the face of a parent's depression can lead to the child becoming depressed. We know from recent prospective studies that major parental depression conveys a high risk for problematic development.^{88,89} From a preventive standpoint, when there is loss it is hard to imagine anything more important than someone's being available to facilitate parental grief. If grieving does not take place, there will be continued suffering, emotional availability will be compromised, and infant incentives for development will be lessened.

We know that parental attitudes can interfere with emotional availability for infants. The Neonatal Perception Inventories⁹⁰⁻⁹² identify mothers who have less than optimal perceptions of their infants and have allowed for prediction of problematic outcome, as well as for developing a strategy of prevention. In a similar vein, Gray et al.⁹³ found that negative comments and behaviors on the part of mothers in the delivery room identified risk for later child abuse. But, as we think about risk, we need to know more. What are the sources of these negative parental attitudes? There must be infant effects on these attitudes; in fact, individual differences among infants may account for the greater prediction of the Neonatal Perception Inventory administered at one month as opposed to its being administered at one-to-two postnatal days. Mothers may be influenced for better or worse as they get to know their babies. Other sources of negative attitudes include "ghosts in the nursery," as Selma Fraiberg and her colleagues have put it.⁹⁴ Parents re-experience their own parenting and, in many situations of emotional unavailability, it is as if early problematic experiences of being parented are interfering with parental loving in the present. The most dramatic illustration of this phenomenon is found in the well known clinical fact that many child abusing parents were themselves abused by their own parents. But this is only the tip of the iceberg. Unresolved conflicts from the past, even though such conflicts are with shadowy figures from one's own childhood, haunt the present. Unfortunately, it is all too likely that emotional unavailability is transmitted across generations: what is not given, what is not rewarded, what is not learned as pleasurable but instead as unpleasurable, tends to endure.

Thus, more impinges on emotional availability than is immediately apparent. To illustrate the complexity of influences, as well as the reciprocal nature of emotional availability, let us consider recent research on effects of postpartum separation. The work of Klaus and Kennell and their co-workers^{95,96} have shown us that, under certain conditions in the modern hospital, postpartum separation of mother and infant can interfere with the later development of parental affective availability. It is as if separation limits new mothers in

opportunities for "tuning-in," being rewarded by, and falling in love with their babies. Not having been rewarded by seeing, touching, smelling, and cuddling their babies early-on, they are not as rewarding to them, and show fewer affectionate behaviors when observed at one month and sometimes later than that. But, there are important infant influences as well as parent influences on any outcome. Klaus and Kennell⁹⁶ and others in this field⁹⁷ have emphasized the importance of early contact and *en face* looking. Our research^{98,99} has highlighted that in the first two postpartum hours, the unmedicated infant is not only "wide awake," but is capable of visual pursuit and there is a typical inviting wide-eyed appearance that is often interpreted by parents as a display of "wonderment." To the extent that infants are medicated, or less than awake, one might not expect the same attractiveness. We also know that newborn infants, as well as mothers, are "tuning in." Sander et al.¹⁰⁰ have shown that switching caretakers at ten days can result in disruption of infant rhythms and in increased fussiness. Thus, enforced separations introduced by the technology of intensive care units or by rigid hospital routines, can interfere with the rewarding back-and-forth experiences on both sides. As Leiderman and Seashore¹⁰¹ have suggested, we would probably do well to consider such situations as involving risk of "interactional deprivation," not just parental deprivation or infant deprivation. Clearly, emotional availability is a reciprocal process.

But influences are still more complex. In experimental studies, enhancing early hospital contact between mothers and babies seems to have more of a demonstrable effect for mothers who are especially needy or socially disadvantaged. The original Cleveland study was done with poor, young, unmarried, and educationally disadvantaged women from the inner city.⁹⁵ A subsequent study⁹⁶ was done with an impoverished Guatemalan population, which like the Cleveland population, encountered little that was familiar in the modern hospital. These studies and others with disadvantaged groups have found effects. On the other hand, studies with advantaged populations¹⁰¹⁻¹⁰⁵ have not necessarily found additional affectionate behaviors following enhanced early contact. It would seem that early postpartum physical togetherness may facilitate emotional availability on the part of parents, especially among those who otherwise lack social and educational support systems; but that such early togetherness is not essential for later emotional availability. Many parents are loving and emotionally available to their infants in spite of no early contact (e.g., in the case of Caesarian section deliveries or, even more dramatically, in the case of adoptions). Campbell and Taylor¹⁰⁶ have an excellent discussion of these issues.

Recent research on perinatal separation also highlights the intimate involvement of the family system in emotional availability. Where young mothers do not have family support systems from available fathers of their infants, or from their own parents, things are likely to be difficult. Further, perinatal separation itself is a major stress on the family system. Concomitant with the separation occasioned by prematurity, the incidence of divorce is increased.^{107,108} Not only is there a stress on mother when she goes home without her prematurely-born infant, but there is a stress on father, and a stress on the marital relationship.¹⁰⁹

CONCLUSION: EMOTIONAL AVAILABILITY FOR RESEARCH AND PREVENTION

At the beginning of this chapter we considered emotional availability as a therapeutic principle. In concluding let us consider its role in research and prevention and draw a lesson from the literature on childhood depression. In his now classic papers of the 1940s on hospitalism and anaclitic depression¹¹⁰⁻¹¹² Spitz described his infancy research in institutions and related psychopathology to deficits in early parenting. But this stirred scientific controversy. In an evaluation of this work, published in 1955, Pinneau¹¹³ soundly criticized Spitz for inadequate description of environments, samples, and observation methods, as well as for the inappropriate use of a developmental testing instrument. There was little to substantiate Spitz's conclusions, according to Pinneau. In view of subsequent history, with other studies providing convincing evidence for many of Spitz's conclusions, we might ask: What did Pinneau miss? I believe it had to do with emotional availability. Spitz was empathic. In the midst of complexity, he allowed his feelings to guide his clinical pattern perception. He observed that individual infants, after separation, became weepy, immobile, had sad facial expressions, often with dazed looks, and that sometimes they engaged in repetitive and autoerotic activities. Spitz felt saddened. He was reminded of depression in adults and related their plight to the loss of a loved one. He made himself emotionally available so he could feel something communicated by the infants; he then made use of that feeling for a widened perception. A clinical syndrome emerged.

A similar debate about methodology where criticism did not take account of the developmental-empathic data of the researcher, fol-

lowed the dramatic experiment of Skeels¹¹⁴ wherein orphanage toddlers were raised by foster parents who were retarded institutionalized adults. These children were contrasted with others who received routine institutional care. Skeels's initial reports of recovery from depression and enhanced development in the children raised by the retarded met with strong methodological skepticism. But an exhaustive follow-up study, done after more than 20 years, revealed not only successful adoption but successful adult development in the experimental group. Tragically, the contrast group did not fare well.

It is somewhat ironic and sad that we have not absorbed the research lessons about empathy from Spitz and Skeels. One recent review,¹¹⁵ after considering a number of epidemiological studies, concluded that early childhood depression does not exist! It is stated that evidence is... "insufficient and insubstantial. Consequently, diagnosis of this presumed condition in children would appear to be premature and treatment unwarranted." The reader will not be surprised to learn that this review does not consider empathy, emotional availability, and the complexities of individuals changing over time.

I believe the foregoing example dramatically points up the hazards involved in our becoming abstract. The clinician-researcher and the clinician-epidemiologist, although dealing with numbers and with interactions of systems, cannot lose touch with what is personal, human, and affective. When speaking on this subject I usually show a selection from Spitz's 1947 movie "Grief: A Peril in Infancy."¹¹⁶ Even now, seeing this movie can be a wrenching and horrific experience. I never show it without there being ample opportunity for discussion.

Thinking about prevention, I would like to offer a few comments about emotional availability and risk research. We can identify populations at psychosocial risk, at genetic risk for schizophrenia and manic depressive illness, and at congenital risk for the hyperactivity-dysfunctional syndrome of childhood.¹¹⁷ We also know that children born with physical and mental handicaps are at psychosocial risk, and that any conditions that interfere with emotional availability may be studied with profit, for there is risk of adverse development. But there is an upbeat side which we have often taken for granted: this concerns what we can learn about *risk-reducing factors*. What makes things go right in risk populations? How do individuals and families successfully cope with blunted rewards, handicaps, and stress? Even in circumstances where there is the highest genetic loading for schizophrenia (i.e., an identical twin who is schizophrenic) there is slightly less than 50 percent outcome for schizophrenia. What are the individual coping

styles which buffer against stress and act as incentives for development? Opportunities abound for studying the development of emotional availability under these circumstances.

The health care professional's other great principle, ranking alongside emotional availability is *concern for individuality*. Our patients might tell it to us in the following voice: "Be there for me—I am different from anyone you've ever known before!" The principle is a humbling one, for there will always be privacy and a region of mystery no matter how well we come to understand another. The human organism is extraordinarily complex; the meaning of experience unique; and adaptive solutions to varied environments, multiple and creative. For this reason, in planning intervention, it is difficult to apply solutions in advance and in the abstract. But there is more about individuality and prediction. Therapeutic and other ameliorative processes mobilize transactions among individuals. When we intervene, we not only anticipate change in others, we ourselves change. We experience changing levels of empathy, changing diagnostic assessments, and changing goals as we work with individuals. It is no wonder that we soberly admit our ignorance: we cannot predict solidly in the individual case. How could we expect to?

Herein lies a paradox. In designing prevention programs we are necessarily concerned with the future; but psychosocial prevention begins by helping in the "now," so that individuals and families increase their current options for adaptive choice—so that they become less predictable. To the extent that we help individuals overcome risk and predictability, we feel pleasure. Knowledge of this sustains us. In the field of prevention, it is our reward for emotional availability.

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