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ABSTRACT

This study was designed to investigate whether depressed mothers would show a predominantly negative affect or fail to provide a positive frame of experience for their babies. Two field studies of depressed mothers and their infants were conducted. A subgroup of 13 subjects and their babies from a larger project conducted in Cambridge (Massachusetts) were videotaped at home during structured and spontaneous face-to-face interactions with their 6- to 7-month-old infants. Depression was assessed by means of the Center for Epidemiologic Studies Depression-Scale (CES-D) at the time of family intake, at 4 to 7 months, and again 9 to 18 months later. Behavior was described with behavioral descriptors on a 1-s time scale and with rating scales. Findings indicated that the depressed mothers differed markedly. Only 2 of 13 mothers showed extreme disengagement. Half showed high proportions of intrusive and, at times, angry behavior. Maternal behavior was generally consistent between structured and spontaneous interactions. For the infants, behavior was primarily withdrawn; protest corresponded to maternal disengagement; and looking away corresponded to maternal intrusiveness. Generally, infants were distressed and either sought engagement without success or avoided contact. Both preliminary and follow-up investigations are reported. It is concluded that further research is needed to address questions raised by the findings and to explore the predictive relation between individual differences in the behavior of depressed mothers and the quality of infants' attachment. (RH)

Individual Differences Among Depressed Mothers and Their Infants During Face-to-Face Interactions

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Individual Differences Among Depressed Mothers and Their Infants During Face-to-Face Interactions

Emotional withdrawal, sadness, anger, and irritability are common manifestations of affective disorder (American Psychiatric Association, 1980). One or more of these negative affects is likely to predominate in the expression of a depressed mother. In addition, whether because of psychomotor retardation, preoccupation with depressed thoughts, negative mood, or irritability and anger, a depressed mother is likely to respond to her baby in ways that are inappropriate, insensitive, or ill-timed. Inappropriate affect and inapt responsiveness are two likely ways that maternal depression may compromise infants' development.

To test this idea, we need to demonstrate: that young infants are sensitive to the predominant quality of their mother's affective expression; that ill-timed or inappropriate responses are disorganizing to the infant and that the depressed mother's affect and responsiveness are distorted in one or both of these ways.

Today, I will review two sets of studies. The first are observational and experimental studies of normal, mother-infant, face-to-face interaction. These studies strongly suggest that infants as young as three months are highly sensitive to both the

quality and the organization of their mother's affective expressions. The second set of studies extends this work to depressed mothers and their babies. These latter studies suggest that depressed mothers are primarily negative in affect and that the quality and organization of their expressive behavior have a strong influence on their babies. But, as we'll see, there are striking individual differences among depressed mothers.

To learn whether babies have specific responses to both the quality of their mother's affect and its relationship to their own, Ed Tronick and I (Cohn & Tronick, 1987) studied face-to-face interactions between mothers and their babies at three, six, and nine months of age using a cross-sectional design. Mothers were asked to play with their infants as they normally would.

Figures 1 and 2 About Here

At each age, mothers used positive affective expressions about half the time (see Figure 1). They almost never looked away from their infants (i.e., Look Away). Depending on the age (see Figure 2), between 12 and 25% of the infant's expressions were positive (Play). Babies also had high proportions of Look Away and of neutral affect with attention toward the mother (Attend) or an object (Object). Object was especially common at 6 months

Within mother-infant pairs, affective behaviors of each

partner were correlated. In all but 2 dyads, the mother's and infant's behaviors were interdependent. In particular, babies were almost never in play when their mothers were not (Table 1).

Tables 1 and 2 About Here

When we looked at how babies became positive, we found further support for our hypotheses about the quality and organization of the mother's behavior. Babies at each age were far more likely to become positive after the mother (Table 2). At three and six months, the probability was almost zero that they would become positive when their mother was not. Not until 9 months did babies begin to initiate joint positive engagement. The normal pattern is for the mother's positive expressions to provide a frame within which the infants cycle between neutral and positive expression. These findings suggest that the mother's positive affective expressions are essential to the quality and organization of the infant's behavior.

To test this idea in a more rigorous way, we asked how infants would respond were their mother to act depressed (Cohn & Tronick, 1983). We did a study in which we instructed mothers to simulate depression while interacting with their babies. Infants responded dramatically to this perturbation.

Figure 3 Here

Here we see (Figure 3) the difference in the infant's behavior between the simulated depressed and a normal control-

condition. The size of the circles represents the proportion of time spent in each state. The arrows represent the probability of transitions among states. The thickness of the arrows represents the size of the corresponding transition probability.

Note that in the depressed condition, the proportion of Play is far less than in a normal, control condition. Extreme reductions in the mother's positive affect result in extreme reductions in that of the baby. When infants in the depressed condition became positive it was only briefly (Brief Positive).

When mothers simulate depression, the organization as well as the distribution of the infant's behavior is affected. Not only are the infants less positive and more negative, they organize their behavior in a totally different way. They no longer cycle between attend and play. Instead, they cycle between negative affective states and look away.

From this project, we saw that infants are highly sensitive to the affective quality of their mother's behavior. But in the developmental study, we saw that it was both the quality of the mother's affect and its relation to the infant's that mattered. If the mother still becomes positive but is unresponsive or inappropriately responsive to changes in her baby's behavior, how will the baby respond? Specifically, must the mother provide a positive frame, by remaining in play, for her baby to cycle between neutral and positive expression?

To study this question, Marquita Elmore and I (Cohn & Elmore, in preparation) asked mothers of 3-month-old babies to become sober-faced for 5 seconds whenever their infant became positive. One of us observed the interaction, and we signaled the mother to become briefly sober-faced whenever her infant became positive. (Consistent with our previous findings, mothers were always in play when their baby became positive).

This perturbation of the usual relation between mother's and infant's affect provided a test of how closely the infant monitored changes in the mother's behavior. We reasoned that if the infant were really sensitive to the mother's signals, we should find an increased frequency of transitions from attend or play to look away and a concomitant decreased incidence of cycling between them.

This prediction was confirmed (Table 3). When mothers became briefly sober-faced contingent on their infant's positive expression, infants became less likely to cycle between positive and neutral expressions and more likely to turn away from their mother.

Table 3 About Here

Depressed mother-infant pairs. To investigate whether depressed mothers would show a predominantly negative affect or fail to provide a positive frame for their babies, we've conducted two field studies of depressed mothers and their

infants. In the first (Cohn, Matias, Tronick, Lyons-Ruth, & Connell, 1986), we studied a subgroup of 13 depressed mothers and their infants from a large, intervention project conducted in Cambridge with Karlen Lyons-Ruth and Dave Connell.

Depression was assessed at the time of family intake, at 4-7 months, and again nine to eighteen months later, with the Center for Epidemiologic Studies Depression-Scale (CES-D) (Radloff, 1977). The CES-D is widely used as a screening instrument in epidemiologic studies (e.g., Myers & Weissman, 1980). The mean CES-D score for our sample was well within the range for outpatient depressed patients. These scores were remarkably stable over the following nine to 18 months, with a test-retest correlation of over .7.

The mothers had high levels of chronic depression, as assessed by the CES-D, but they also had high rates of other factors identified by epidemiologic studies as risk factors for childhood behavior disorder and psychopathology (Robins, 1974; Rutter, Yule, Quinton, et al., 1974). All were of low SES, approximately half were single parents, and about one third had a previous psychiatric hospitalization or had been reported for child abuse or neglect.

Project staff who were known to the families videotaped them when the babies were 6 to 7 months. For the structured interactions, we used a face-to-face paradigm, behavioral

descriptors, and a 1-s scoring interval similar to what we've used in our laboratory studies with two exceptions. First, the original scoring system included codes for rough handling and expressions of anger by the mother, but since we had never observed such behavior we omitted these codes in the laboratory studies with nondepressed mothers. However, since irritable, angry, or confused mothers might behave this way, we included rough handling and anger among our codes.

Two, for data analysis we combined look away, object, and attend for the mother and referred to this composite as disengage. This pooling was warranted because we observed high rates of mother look away and of disinterest, i.e., looking at the baby but leaning back and away with little facial expression. One additional code, elicit, was used in the laboratory studies but had been pooled with attend. We retained this code here since it did not fit with disengagement.

For the spontaneous interaction, we videotaped the baby and anyone with whom she interacted over a period of 40 minutes. During this time, mothers were told to behave as they normally would. We described mother's and infant's behavior by ratings, which we scored every four minutes. By observing both kinds of interaction and describing them with related techniques, we were able to assess whether patterns of behavior were stable across situations.

During the face-to-face interactions, the mothers were highly variable in terms of both positive affect and also of negative affect and intrusiveness (Figure 4). At the extreme of disengagement, a small group showed a pattern similar to some clinical descriptions of depressed mothers (Weissman & Paykel, 1974) and what we had modeled in the simulated depression study.

Figure 4 About Here

These mothers were disengaged for over 75% of the time. They slouched back in their chairs, often turned away, and spoke in an expressionless voice. They were responsive only to active infant distress.

A second group also had low rates of positive expression but showed much eliciting behavior. These mothers appeared to want interaction with their infants but were unable to expand their affective range.

The largest group, denoted M-intrusive, also had low proportions of positive expression but had high proportions of angry or intrusive behaviors such as rough poking or prodding or forcibly turning the infant's head toward them.

A small group showed high rates of positive expression, comparable to nondepressed mothers. With the exception of the M-positive group, these patterns were strikingly unlike those in studies of nondepressed mothers conducted by ourselves, and others (e.g., Kaye & Fogel, 1980). But they also show a wider

range of individual differences than has previously been appreciated. Indeed the largest group was not disengaged, but highly engaged, albeit rough and intrusive.

The babies' behavior was far less variable. Overall, they were seldom positive in affect and were highly withdrawn (Figure 5).

Figures 5 and 6 About Here

Whereas the means for play for not at-risk infants, presented above, ranged from 15 to over 25%, only one infant of a depressed mother had a proportion within this range (Figure 6).

These are the corresponding infant profiles (Figure 7) for each of the four subgroups of mothers. Babies of disengaged mothers had the highest proportions of protest. The most distressing behavior for infants may be the pattern of maternal disengagement.

Infants of intrusive mothers had the highest proportions of look away. This high proportion of look away is consistent with Hirshfeld and Beebe's finding that increases in maternal intensity while infants are disengaged (i.e., looking away from the mother) increase the duration of infants' disengagement. (See also Kaye & Fogel, 1980).

Only in the m-positive group did the frequency of shared positive engagement occur at greater than chance levels. Only in this subgroup did mothers match their infant's bouts of play and

provide a positive frame. However, not even in this group did we find evidence of the infant's cycling between attend and play. Overall, these interactions differed dramatically from normal interactions in two ways: these mothers, with the exception of the m-positive group, failed to provide a positive frame for their infant and the infants responded with increased proportions of disengagement and a lack of cycling between attend and play.

Maternal affective expression during the spontaneous interactions was consistent with that observed during the structured interactions. One exception was that the intrusive mothers were more likely to spend time out of the room, away from their infants. They may cope with their hostility by avoiding their infants whenever possible. Infants' positive expression was also correlated between the two situations, although, again, the actual proportions were small.

These results are consistent with those from our laboratory studies of not-at-risk dyads. Infants respond to the affective quality of their mother's behavior in a way that is specific to that affect. In particular, the infant's cycles of neutral to positive affect occur only within the mother's periods of positive expression. When the mother is unable to provide such a frame, and do so consistently, the infant's affective expression is limited to neutral to negative displays. Indeed, one likely interpretation for the failure to find positive infant cycling

among the few infants of m-positive mothers may be that their behavior was atypical. In the simulated depression study we had found that the pattern of negative cycling carried over and persisted when their mothers again behaved normally.

Depressed mothers in this study were not uniformly withdrawn and sad or lacking in affective expression. The largest proportion was rough, insensitive, and intrusive, and, on occasion angry. These individual differences among mothers had striking effects on their babies: They were distressed and unsuccessfully sought engagement or they avoided contact. These responses are suggestive of insecure classifications in the Ainsworth strange-situation. Further research is needed to explore the predictive relation betwee. individual differences in the behavior of depressed mothers and the quality of infants' attachment.

Our research to date strongly suggests that infants are sensitive to the kinds of distortions of affective expression and responsiveness that seem to characterize depressed mothers. Depressed mothers fail to provide a positive frame within which their infants can cycle between neutral and positive expression. The mothers are predominantly disengaged and withdrawn or highly engaged but intrusive.

Earlier, I argued that to link maternal depression with adverse developemental outcomes, we had to demonstrate at least

three hypotheses: that babies are sensitive to the quality of their mother's affective expression; that they are sensitive to the relation between their mother's affective expression and thier own; and that the behavior of depressed mothers is typically distorted in one or both of these ways. We now have strong evidence in support of the first two hypotheses. Using both observational and experimental paradigms and disparate samples, we find a strong association between the quality and organization of the mother's behavior and that of her baby. If a mother consistently fails to provide a positive frame, we can be relatively certain of the kinds of interactions that will follow. We also have reason to believe that specific types of negative affect, such as sadness or irritability, will have specific influence on infants' behavior.

We must be cautious, however, in making generalizations about the interactive behavior of depressed mothers. In our depressed group, we found several patterns of maternal behavior. One of these was comparable to that of nondepressed mothers. Because ours was not a representative sample, the relative proportions of depressed women showing one of our four patterns remains unknown.

We also cannot say with certainty that the maternal behavior we studied was specific to depression. We assessed depression with the CES-D, which was the best screening instrument available

at the time. However, clinical interviews based on Research Diagnostic Criteria (Spitzer, Endicott, & Robins, 1978) would provide more conclusive diagnosis than any screening instrument. It is possible that some of our depressed mothers were classified incorrectly. Another reservation is that maternal depression was correlated with other risk factors, such as low SES. To determine the prevalence of each of our subgroups requires an epidemiologic design.

A relatively homogeneous group of depressed women can be selected from those experiencing a postpartum depression. Postpartum depression is estimated to occur 12 to 20 times per 100 births and is a relatively common developmental event. Are postpartum depressed women likely to behave in the ways we've described for chronically depressed mothers? Is postpartum depression a risk factor for infant development? Does a family history of affective disorder increase the likelihood of disengagement or intrusiveness? To answer such questions, Sue Campbell and I are studying postpartum-depressed and nondepressed mothers and their babies over the first year. By sampling systematically from a well defined obstetric population and using well validated Research Diagnostic Criteria, we will be able to make valid inferences about individual differences among postpartum-depressed mother-infant pairs. This sample will also let us compare chronically depressed and episodically depressed

mothers and their babies. Do women respond similarly to a discrete episode of depression versus a depression that is chronic? How does each influence the course of infant development? We hope to provide answers to these and other questions at future meetings.

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Table 1. Mean proportions of time that both partners were in Play relative to the mean proportions of time that babies were in Play and mothers were not.

Dyadic State	Infants' Age		
	3 Mos.	6 Mos.	9 Mos.
Both in Play	15	12	25
Baby in Play but Mother Not	02	03	03

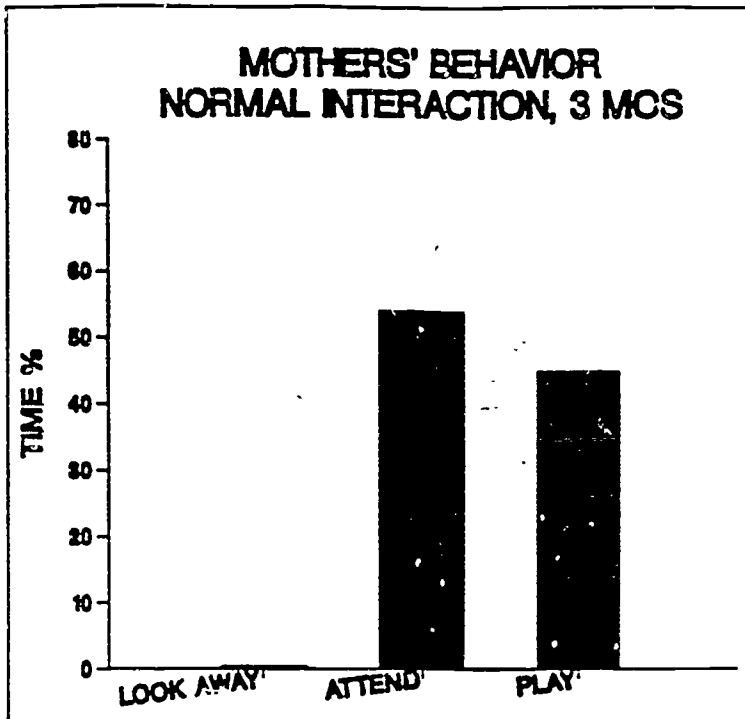
Table 2. Conditional probabilities (in percent) of dyadic state transitions to baby in play.

FROM:	TO: Baby in Play		
	3 Mos.	6 Mos.	9 Mos.
Baby Attend and Mother Neutral	03	03	11
Baby Attend and Mother Play	33	33	22

Table 3. Conditional probabilities of infant transitions to look away as a function of normal, control- or experimental condition.

Condition	Transition Probability	
	Attend to Away	Play to Away
Normal, Control	21	08
Experimental	38	28

Figure 1


MOTHERS' BEHAVIOR
NORMAL INTERACTION, 3 MOS
TIME %
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70
60
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LOOK AWAY
ATTEND
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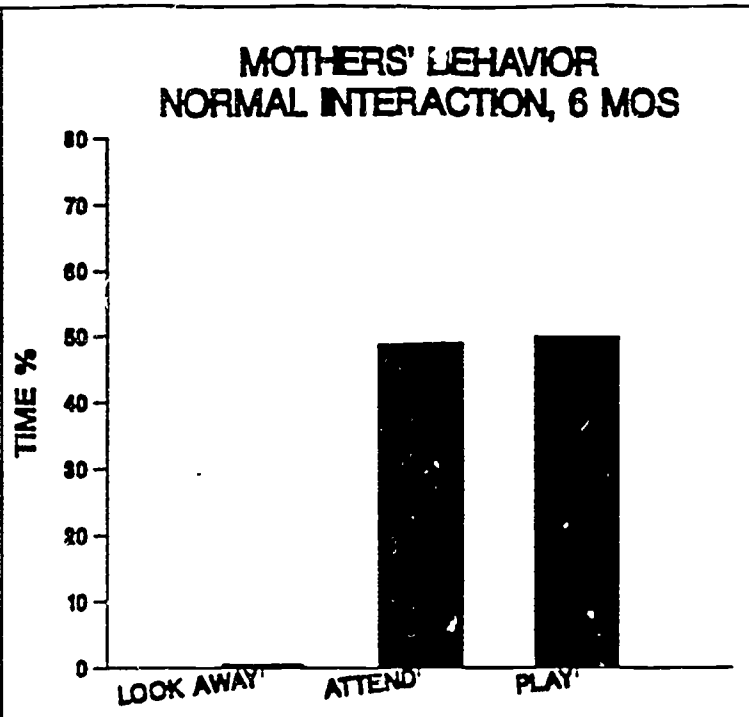
MOTHERS' BEHAVIOR
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TIME %
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LOOK AWAY
ATTEND
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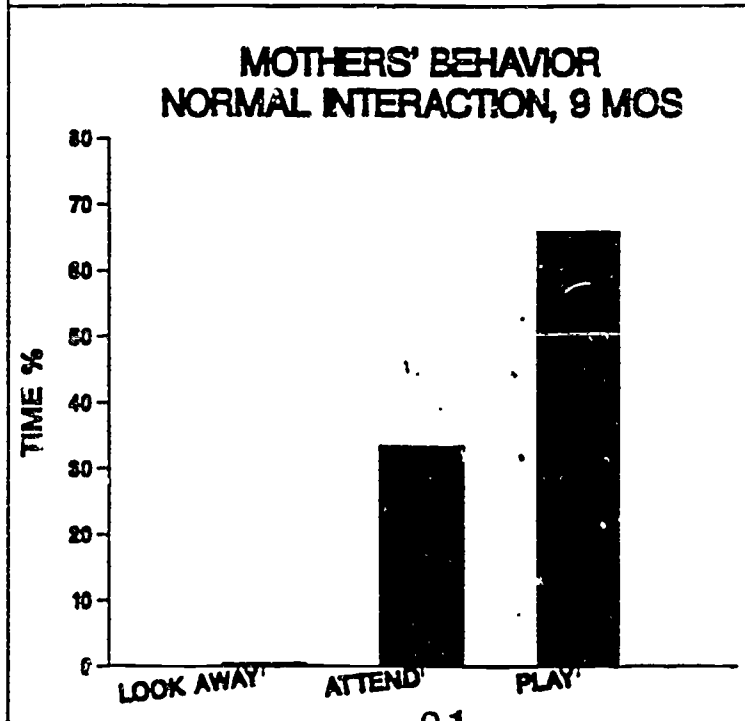
MOTHERS' BEHAVIOR
NORMAL INTERACTION, 9 MOS
TIME %
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LOOK AWAY
ATTEND
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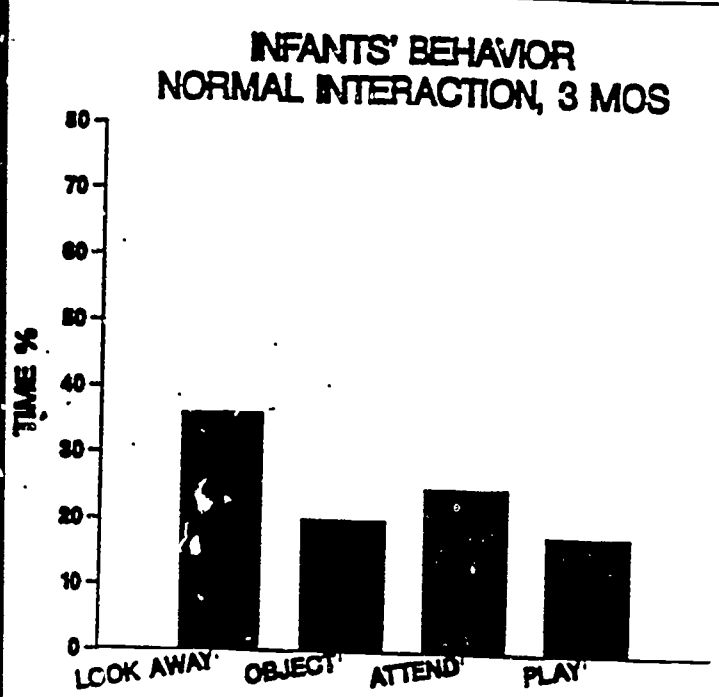
Figure 2


INFANTS' BEHAVIOR
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TIME %
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LOOK AWAY
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ATTEND
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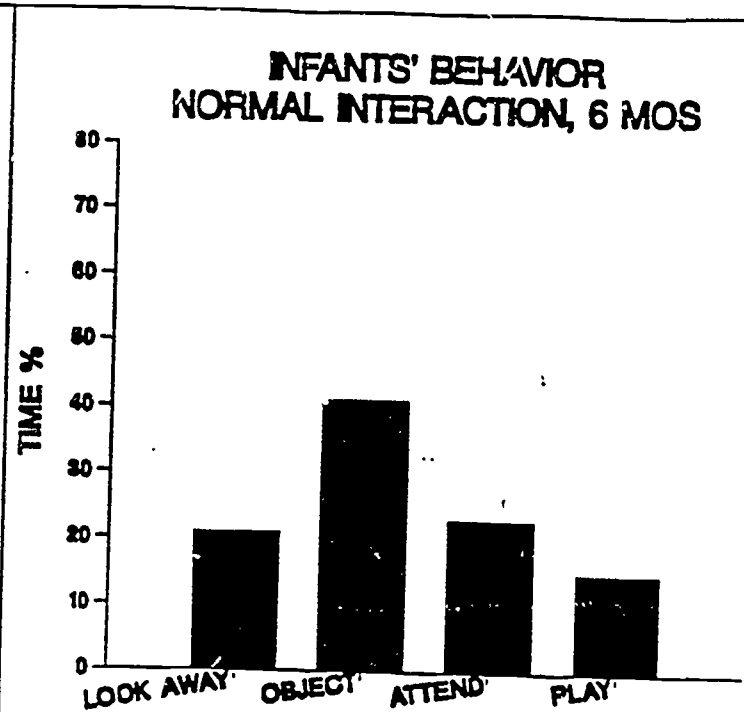
INFANTS' BEHAVIOR
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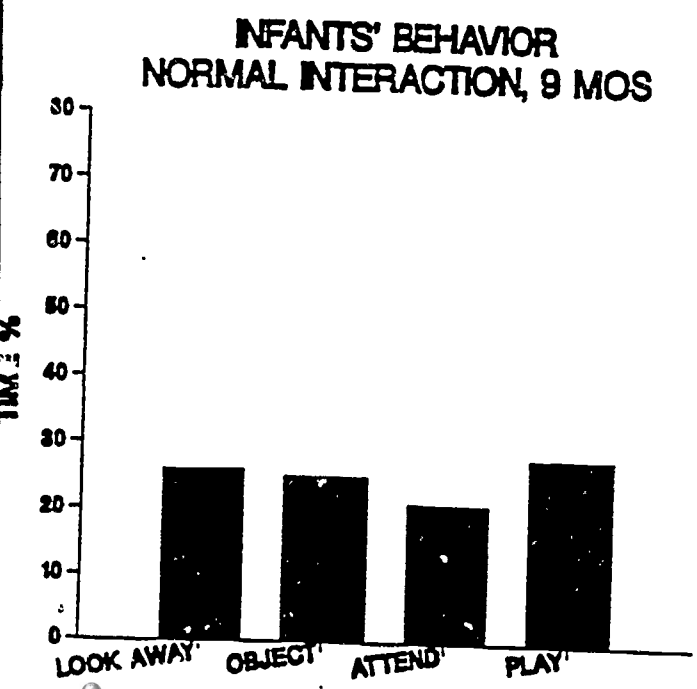
INFANTS' BEHAVIOR
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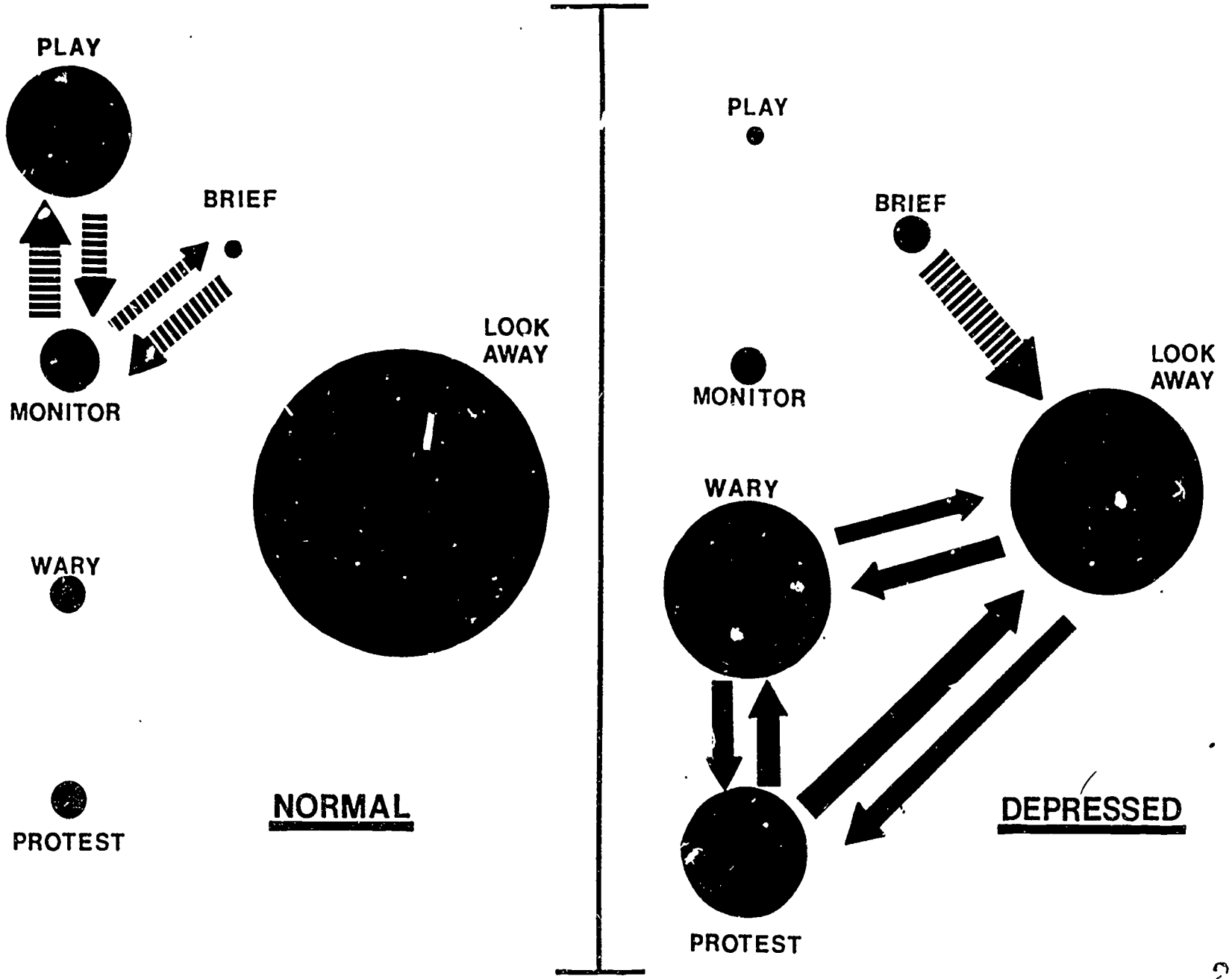
Figure 3


PLAY
BRIEF
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LOOK AWAY
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NORMAL
PLAY
BRIEF
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LOOK AWAY
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DEPRESSED

Figure 4

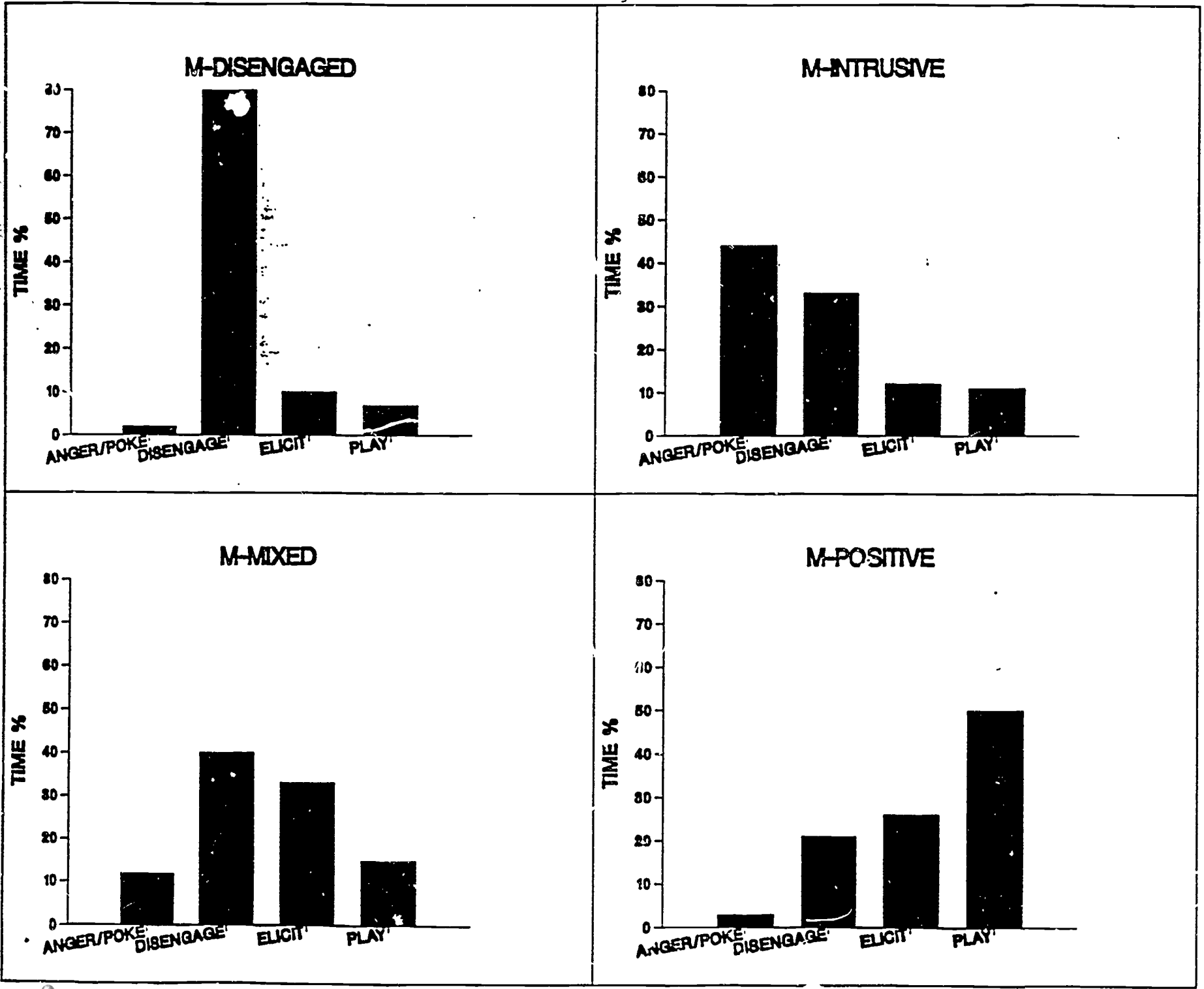
M-DISENGAGED
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Figure 5

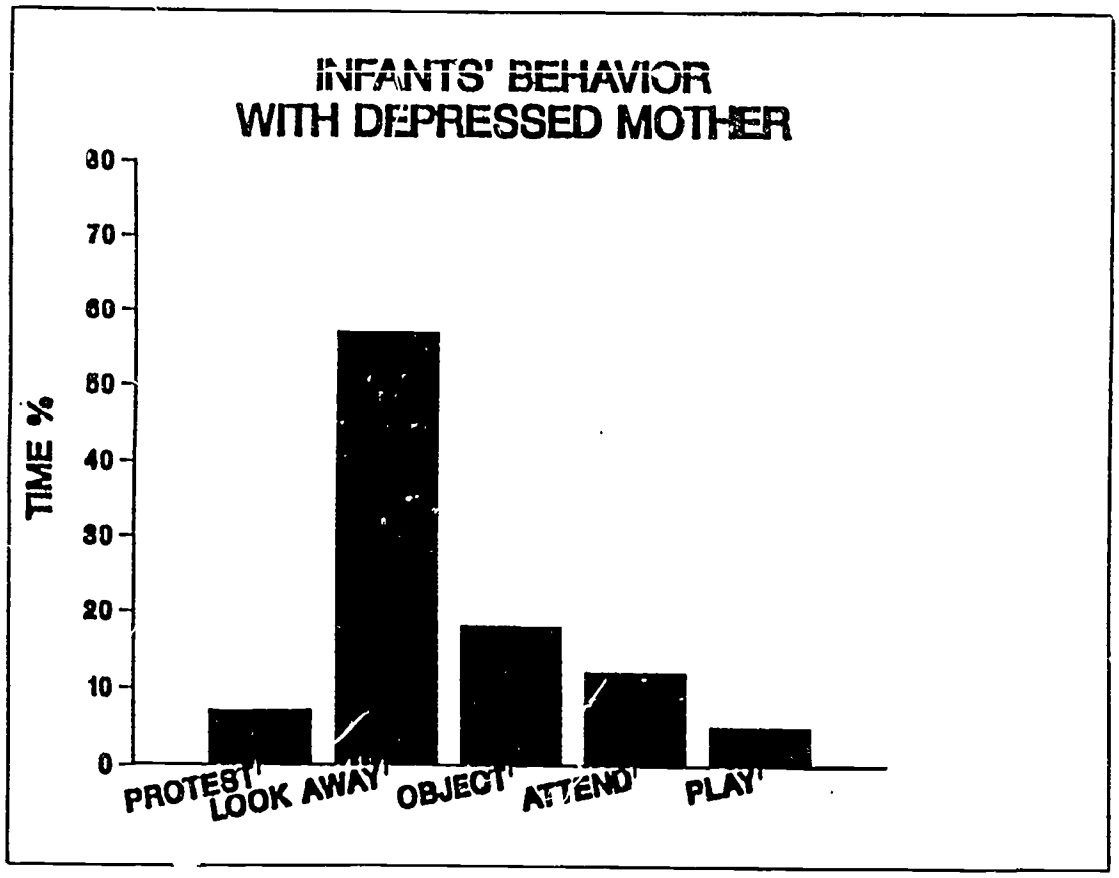
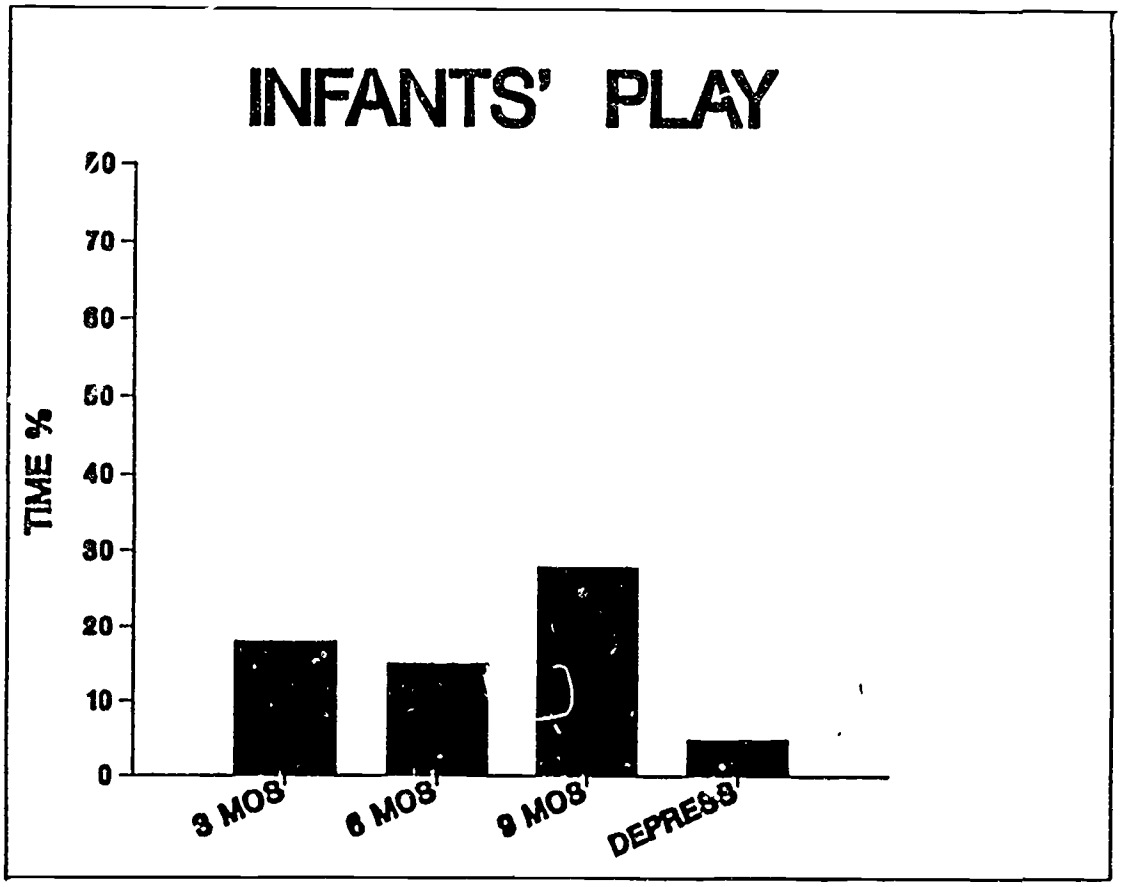
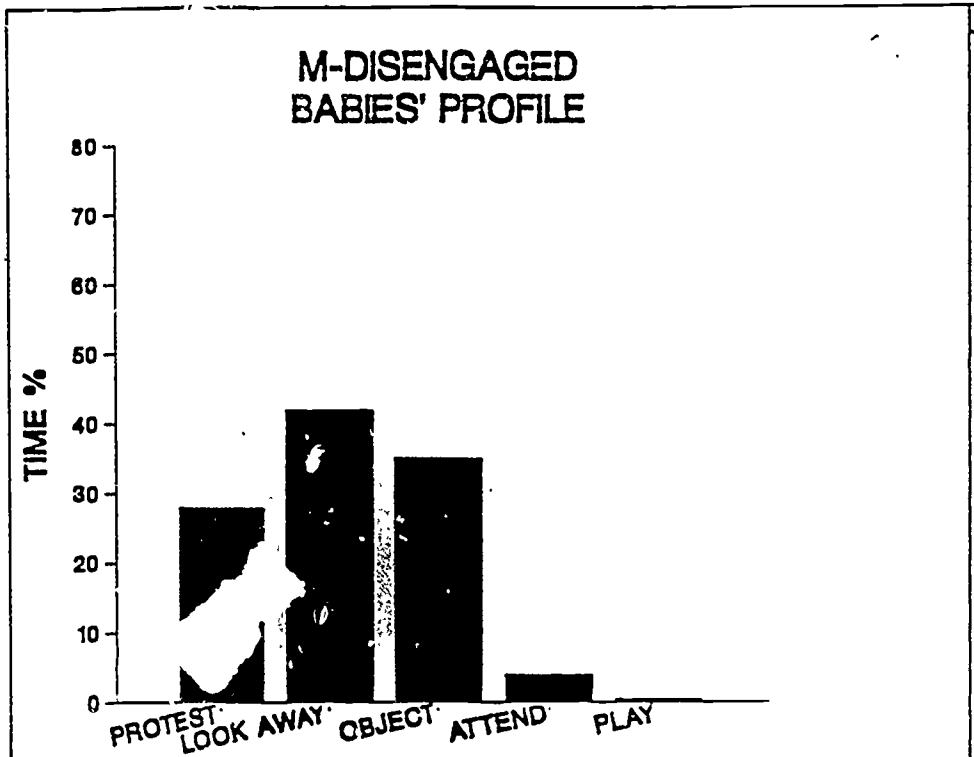


Figure 6




M-DISENGAGED
BABIES' PROFILE
TIME %
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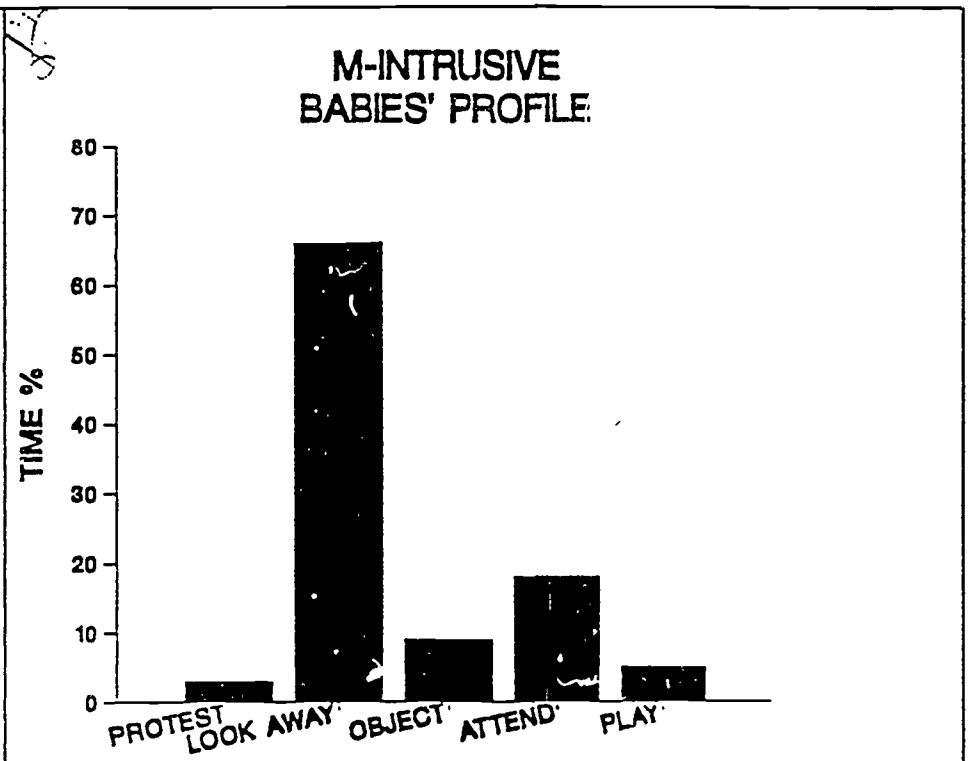
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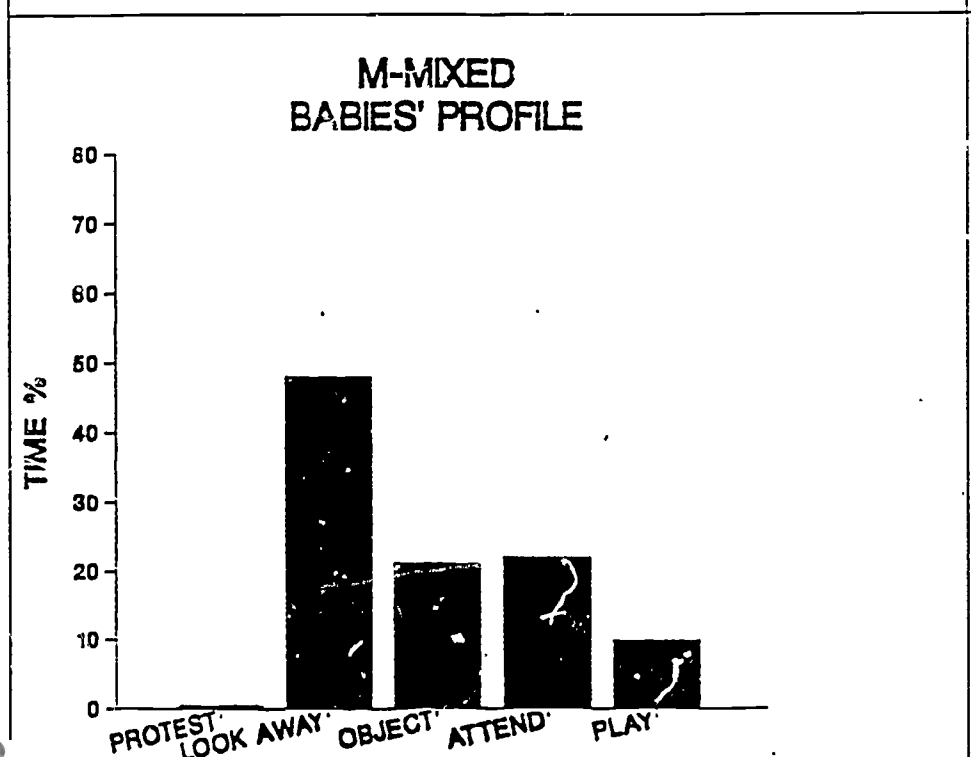
M-MIXED
BABIES' PROFILE
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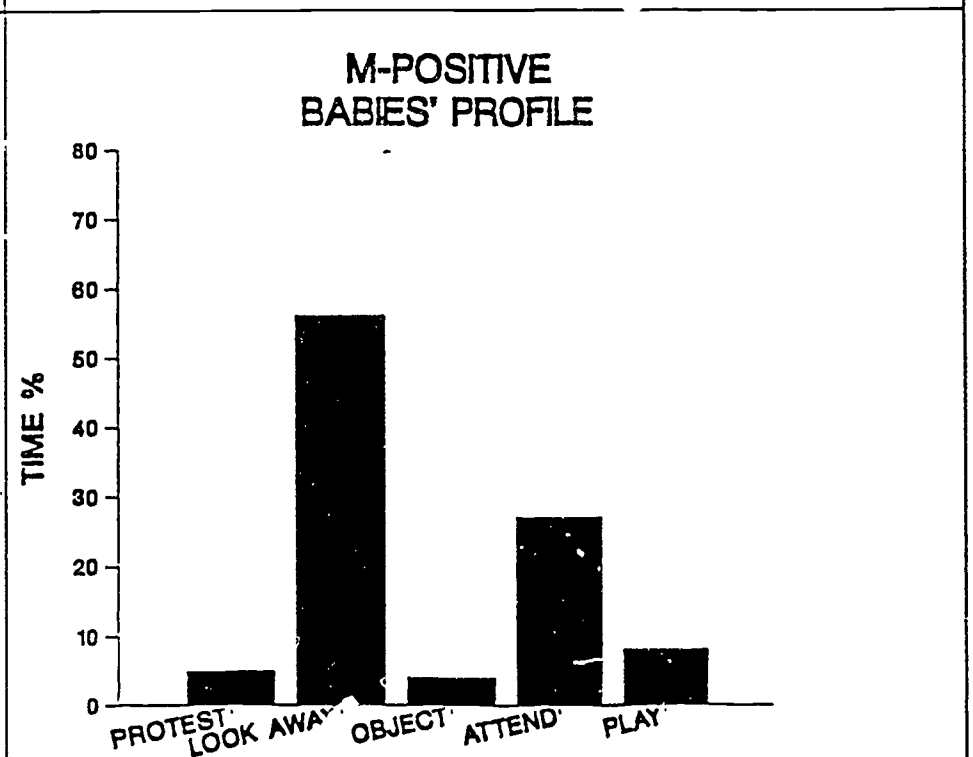
M-POSITIVE
BABIES' PROFILE
TIME %
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PROTEST
LOOK AWAY
OBJECT
ATTEND
PLAY

FIGURE 7