76-24,953

ZIBUNG-HUFFMAN, Patricia Irene, 1948-
THE EFFECT OF SEX DIFFERENCES AND BRIEF PEER DEPRIVATION OR SATIATION ON SOCIAL BEHAVIORS IN INFANTS.

University of North Carolina at Greensboro, Ph.D., 1976
Psychology, experimental

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Xerox University Microfilms, Ann Arbor, Michigan 48106

THE EFFECT OF SEX DIFFERENCES AND BRIEF PEER DEPRIVATION OR SATIATION ON SOCIAL BEHAVIORS IN INFANTS

by

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A Dissertation Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
1976

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ZIBUNG, PATRICIA IRENE. The Effects of Sex Differences and Brief Peer Deprivation or Satiation on Social Behaviors in Infants. (1976) Directed by: Dr. Marilyn T. Erickson. Pp. 75.

Research in the area of peer social behaviors of children has been approached primarily through observational and correlational studies. Knowledge with respect to the variables controlling the acquisition and maintenance of social behavior in very young children has only recently begun to be examined. Research has suggested that brief periods of social deprivation and satiation can alter the effectiveness of social reinforcers, but these procedures have not been examined as variables controlling peer social behavior. A survey of the literature has also indicated a lack of consistent findings with respect to sex differences and peer social behavior.

The purpose of this study was to examine the effects of brief social deprivation or satiation and sex differences on peer social behaviors. Sixty first-born infants, between 12 and 18 months of age, were paired on the basis of sex, and pairs were randomly assigned to one of three pretest conditions. In the first condition, two children and their mothers spent 20 minutes in one room (satiation condition). In the second condition, the two mother-infant pairs spent a 20-minute period in separate room (deprivation condition). In the third condition, each of two mother-infant pairs spent 20 minutes with "helper" peer and mother pairs who had already participated in the experiment (two-peer condition). Following

the 20-minute pretest conditions, the experimental pairs of children and mothers spent 15 minutes together in the experimental room. During this period, proximity, looking, touching, vocalizing, crying, and smiling behaviors with respect to the peer, the child's mother, and the peer's mother were recorded. Interactions with the observer and the experimenter (proximity, looking, and touching) were also recorded. It was hypothesized that: (1) children deprived of peer contact would engage in more social behaviors with the peer than would children who were with a peer during the pretest session; (2) children who had the opportunity to be in contact with one peer before the observation period and another, novel peer, during the observation period should display more peer social behaviors than satiated subjects but less than deprived subjects; and (3) females should display more social behaviors toward peers than males.

The results of the study indicated that deprived subjects looked at their peers and vocalized significantly more than Satiated subjects or subjects exposed to two peers. No differences among groups for the other four social behaviors were obtained. The results also indicated that subjects in the two-peer condition spent significantly more time looking at their mother and the peer's mother and touching their mother than did subjects in the other two groups. No differences between the deprivation and satiation groups were found for the other social behaviors related to the mother or the peer's mother. Finally, the results indicated that

females looked at the peer and peer's mother significantly more often than did males.

This study gave some support to both the deprivation-satiation hypothesis and the sex differences hypothesis. The behavior of the two-peer subjects was discussed in terms of two alternative explanations. The first was that exposure to two peers and their mothers may have been anxiety-arousing, and anxiety was manifested in the experimental session by these subjects spending more time looking at their own mothers and the peers' mothers. This explanation was supported by a trend toward a greater frequency of crying behavior for the two-peer group in comparison with the Deprivation and satiation groups. The second explanation was that the two-peer group was attracted to the observation mother as a "complex" stimulus (rather than the peer, a "simple" stimulus). The latter explanation, however, did not account as well for the total findings of the study.

ACKNOWLEDGMENTS

I am most grateful to Dr. Marilyn Erickson and the other members of my committee for months of patient assistance, careful analysis and advice in the preparation of this paper.

My thanks also go to Dr. Bill Powers, whose help with seemingly insurmountable statistical problems was most appreciated, and Mrs. Judy Lipinski and Mrs. Elizabeth Hunt, my typists, who were satisfied with nothing less than perfect.

Finally, I am indebted to Chuck Huffman, my observer, who was ready at a moment's notice to run subjects and who gave up many fine spring week-ends to the cause of science.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Page

Figure

CHAPTER I

INTRODUCTION

Historically, several ways of conceptualizing children's social behaviors have been advanced. They have ranged from descriptions of specific observed behaviors to labels reflecting constellations of social behaviors to trait explanations. Munn's (1955) definition is representative of recent descriptions. He stated that a child interacts socially when his own behavior is influenced and, in turn, influences the behavior of others.

Several researchers, using the descriptive approach, (including Gesell & Thompson, 1969; Buhler, 1930) have collected normative data on discrete behaviors at specific ages. Gesell and Thompson (1969), for example, tabulated social behaviors such as "smiles at mother" and "vocalizes one sound" of 107 infants from the 4th to the 56th week; they reported a progression of behaviors, from simple to complex, elicited by both inanimate and animate objects.

Other workers have attempted to label their observations and to form categories of behaviors. Maudry and Nekula (1949) described the development of prosocial behaviors in children 6-24 months of age, starting from "smiles" and "impersonal interactions" at ages 6-8 months to "social contact" and "friendliness toward partner" at 19-24 months.

Parten's (1946) labeling process included implications about future behavior or purpose. Although she observed behaviors such as proximity of children when playing, touching, talking to peers, and types of games played, her conclusions were described in terms such as "parallel play," when children utilize common toys but do not engage in a common goal, and "cooperative play" with group goals and plans for carrying out these goals.

In children over 18 months, the labeling process often reflects an attempt to describe behaviors as they would compare with adult behaviors. A partial list of these labels would include social facilitation (Leuba, 1933; Greenberg, 1932), imitation (Miller & Dollard, 1941; McDavid, 1959), social conflict and aggression (Jersild & Markey, 1935; Anderson, 1939; Muste & Sharpe, 1947), the development of group behavior and organized activities (Lehman & Wittig, 1931; Lewin, 1939), social maturity (Bridges, 1931), competition (Hirota, 1951; Wolfle & Wolfle, 1939) and obedience and compliance (Berne, 1930).

Research in the area of children's social behavior has likewise reflected variation in method and choice of variables. The earliest studies focused on social behavior as a function of chronological age (Bühler, 1930; Gesell & Thompson, 1969). Later studies (Goldberg & Lewis, 1969; Messer & Lewis, 1972; McCall, 1974) attempted to classify children according to other variables (for example, sex) in addition to age and described social behaviors as a function

of both variables. Goldberg and Lewis (1969) found, in observing infant play behavior, that girls were more dependent, showed less exploratory behavior, and reflected a "quieter style" in their play. Boys were independent, showed more exploratory behavior, played with toys requiring gross motor activity, were more vigorous and tended to run and bang in their play.

Recent approaches have included experimental studies, in which the effects of brief manipulations of independent variables on social behavior have been observed. Haskett (1974), for example, has explored some of the variables which lead to the occurrence of social interaction between children, 3-5 years old, and adult or child confederates. He observed the effects of variables such as novelty of toy, activity or confederate, the number and type of verbalizations, and academic ability of the children (those with IQ scores in the "average" range versus retarded subjects).

Each of these research approaches has its own strengths and weaknesses; each provides certain types of information--observational, correlational, or causal--about the way children behave in relation to other people. Observational data have provided descriptions and norms for the occurrence of peer social behavior in a variety of settings (Bühler, 1930; Gesell & Thompson, 1969). However, such data do not provide knowledge regarding the processes involved in the development of behavior. Correlational data have been useful in providing some hypotheses regarding cause-effect relationships

(Goldberg & Lewis, 1969) but, unfortunately, many authors have assumed cause-effect relationships when, in fact, a third variable may have been responsible for changes in the two variables being examined. While experimental studies have provided the most information about cause-effect relationships, they have been restricted in scope by necessary ethical concerns. For this reason, most of the experimental studies with children have been confined to short-term, laboratory manipulations. Several investigations (Rheingold, 1969; Cox & Campbell, 1968; Rheingold & Eckerman, 1969), for example, have reported differences in social behavior with such simple manipulations as presence or absence of mother or availability of mother for visual and/or tactile stimulation.

Problems in the Area of Peer Social Behavior in Young Children

Because young children (arbitrarily defined as 18 months old and under) have limited response repertoires, especially their lack of meaningful speech, researchers must define and record their dependent variables carefully to avoid labeling basic behaviors as being motivated by intentions or some cognitive processes. It is perhaps for this reason that there is so little information available concerning the development of simple peer-directed responses such as "looking" or "touching" into complex behaviors labeled "cooperative play" or "a fist fight." Maudry and Nekula (1949), for example, found that "impersonal interactions" occurred

between pairs of their subjects starting at ages 6-8 months. Because specific behaviors were not recorded, however, they could not be identified as components of more complex behaviors, such as "social contact," at a later time. It cannot even be determined which component behaviors were occurring in the presence of the peers.

A second problem was encountered in the selection of behaviors. For the present study, it seemed most parsimonious to select behaviors from among those that are known to occur throughout the developmental phase. Such behaviors would include "looking," "crying," "touching," "standing or sitting next to," "smiling," and "vocalizing." Other behaviors, such as "hitting" and "kissing," could have been included but were judged to occur too infrequently for the purpose of the study. Given that behaviors are directed toward other persons or objects, it was determined that the recording of the behaviors would reflect whether they were directed toward either the mother, the peer or a toy.

One of the principal goals of the present study was to determine whether the presence of a peer during the pre-experimental session could be experimentally manipulated and thereby alter the subsequent amount of social behavior.

The Deprivation-Satiation Manipulation

Research with older children suggests that deprivation of social stimulation increases the effectiveness of social reinforcers, such as praise, presented by adults. The

original study in this series was conducted by Gewirtz and Baer (1958). They deprived nursery school children of social stimuli for 20 minutes immediately before their participation in a marble game in which the reinforcer consisted of verbal approval from the experimenter. Their results indicated that socially deprived children increased rates of responding more for adult social approval than did children taken directly from their classrooms or children who were provided with social reinforcers during the 20-minute pretest session.

Stevenson and Odom (1962) offered an alternative interpretation of these results, suggesting that the isolated subjects may have been deprived of all stimulation. If so, they argued, the effectiveness of social stimuli as reinforcers could perhaps be reduced when other types of stimuli are made available during the deprivation period. To test this hypothesis, in addition to the isolation and control groups, they included a toy condition in which subjects were allowed to play in a room filled with interesting toys for 15 minutes. Their results indicated that the presence of stimuli during the isolation period did not result in a significant decrease in the effectiveness of social reinforcers over that obtained when no toys were present. Erickson's (1962) "deprivation" manipulation, designed to provide all but social interaction cues, included giving fourth-grade children puzzles to work while the experimenter sat in the same room but did not talk. She found an increased effectiveness for social reinforcement for the deprivation group.

In criticizing the interpretation of Gewirtz and Baer's (1958) results, Walters and his colleagues provided yet another interpretation, accompanied by some supporting data. Walters and Karal (1960) stated that the isolation procedure may have aroused "anxiety" in the children and that this was the reason for the increase in performance over the satiation subjects. Walters and Ray (1960) manipulated both degree of social contact and "anxiety" level. Anxiety was induced by having a strange experimenter place the subject in a strange environment; these researchers found that the anxiety variable was far more effective than the isolation-interaction variable in facilitating conditioning. Walters and Parke (1964) replicated the design of the previous study, adding a physiological index of emotional arousal and two types of reinforcement, social and material. They found a significant main effect for arousal level, while all other main effects and interactions were nonsignificant. Thus, children under high arousal showed higher levels of performance than did low arousal children, whether or not they had also been deprived of social stimulation. The authors interpreted their findings as lending support to the anxiety-arousal hypothesis. They further hypothesized that faster learning was <u>not</u> related to reinforcer effectiveness but reflected improved perceptual organization and cue utilization that accompanies moderate emotional arousal (as suggested by Easterbrook, 1959 and Kausler & Trapp, 1960). Following this line of reasoning,

Erickson's (1962) findings of significant differences in performance as a function of availability of social interaction cues were reinterpreted by Walters and Parke to show that her "social deprivation" condition was really a "withdrawal of social reinforcement" condition. This withdrawal of reinforcement was viewed as the creation of threat which may have produced emotional arousal and thereby more effective learning.

More recently, Babad (1972, 1973) has taken up Gewirtz and Baer's (1958) original work and has replicated their findings. His social deprivation condition was similar to Erickson's (1962) in that the experimenter remained in the room with the subject for 10 minutes. He reinforced the subject twice during this period by saying "Good," (a behavior which might decrease threat and therefore emotional arousal, according to Walters and Parke's 1964 interpretation). Babad's interpretation of his findings followed an information-processing model. Thus, the critical subject behavior which followed the period of deprivation or satiation occurred cognitively and was reflected in subsequent behavior during the test condition. Subjects in the satiation condition were not able to discriminate which behaviors elicited praise because it occurred so frequently; therefore, praise had little effect on behavioral change. Subjects in the deprivation condition, however, had the opportunity to test the contingencies and could change their behavior accordingly.

The weight of the evidence presented above seems to indicate that depriving a child of the opportunity to interact with another person for a short period of time results in rates of responding on a learning task that are higher than if the child has some social contact before the testing session. This hypothesis has never been tested with young children. Taking into account a limited behavioral repertoire, it could be hypothesized that young children would respond to other people, children and adults, with a higher frequency if they were absent from the environment for a period of time than if they were continually present. Greenberg et al. (1973) provide indirect support for this hypothesis. They found that 8-month-old infants responded positively (looking, smiling, touching) toward strange elementary school children and adults.

Because young children do have limited response repertoires and because they have been exposed to relatively few stimuli in their lives, it could be argued that children between the ages of 12 and 18 months would respond to any stimulus, animate or inanimate, if it were novel (operationally defined as a stimulus the child has never experienced), and that social reinforcement has no special significance as a motivator. There is some research available which indicates that infants (12 months and under) will respond, either by fussing or performing some behavior, to gain access to novel inanimate stimuli. Ross, Rheingold and Eckerman (1972) found that infants, after being held by their mothers

for a short period of time, would leave their mothers and consistently enter the more novel of two rooms to play with the more novel of two toys. Rheingold and Samuels (1969) discovered that infants who were deprived of toys for a brief period of time fussed and manipulated their mothers more than infants who had toys available. The authors hypothesized that fussing may be considered to be a human child's response to "the aversive properties of diminished sensory stimulation." A study reported by Lipsitt (1965) indicated that 4-month-old infants will suck a pacifier vigorously to keep visual stimuli in focus.

Considering all of the data presented to this point, a case can be made for the hypothesis that young children would respond socially to a novel peer significantly more than young children for whom the peer was not novel. The stimulus novelty and the deprivation-satiation hypotheses lead to similar predictions about the behaviors of infants who have been deprived of peer contact for a short period of time; however, if the stimulus novelty hypothesis is valid, the subjects exposed to two different peers should respond to the second peer at approximately the same rates as the satiation subjects, peers being a class of objects. If the deprivation-satiation hypothesis is valid, subjects should respond to the second peer as a special stimulus (a novel child), at rates similar to the deprivation subjects. The purpose of the present study was to test the viability of these hypotheses. In addition to the deprivation and satiation

conditions, a third condition was devised. In this condition, subjects spent the preobservation period with a peer, as did the satiation subjects; however, during the observation (experimental) period, they were paired with a different peer.

Sex Differences

Traditionally, developmental research has considered sex a fruitful variable for finding and interpreting differences in behavior. Considering social behaviors specifically, a wide range of dependent and independent variables have been examined in both the laboratory and the natural environment. Lewis (1969) found sex differences in infants' (under 12 months) responses to facial stimuli. Whereas duration of looking was greater in boys, girls vocalized, smiled more, and showed greater differential expression to these stimuli. Goldberg and Lewis (1969) found, in observing infant play behavior, that girls were more dependent and showed less exploratory behaviors, while boys were more independent and showed more exploratory behaviors. Messer and Lewis (1972) replicated this study with lower SES infants of the same ages and found that sex differences were noted primarily in infant-mother attachment behavior, with girls showing more attachment behaviors than boys. There was also a trend toward greater vocalization in girls. McCall (1974), on the other hand, found no sex differences with respect to

vigorous manipulations and noninteraction with toys during the experimental sessions or the number of looks given a parent while not in contact with a toy.

Review of the research literature reveals little information concerning sex differences in the development of peer relationships in young children. Thus, a second purpose of the present study was to determine whether males and females would respond differently to peers during the observation period. Considering the work of Lewis and his colleagues described above, it was hypothesized that, while there would be no uniform sex differences across behaviors (dependent variables) there would be an interaction between sex and response made; specifically, it was predicted that females would look and smile at the peer more than males, and it was further hypothesized that males, because of the reported tendency to be more independent and to engage in more exploratory behaviors than females, would spend more time away from the mother, perhaps close to the peer though not necessarily in interaction.

In considering the possibility of an interaction between sex differences and the deprivation-satiation manipulation, it was further hypothesized that deprived and two-peer females would exhibit more looking and smiling toward peer than any other groups and that deprived and two-peer males would exhibit more independent and exploratory behaviors. Satiated males and females were expected to exhibit the fewest number of social behaviors.

Statement of the Problem

A review of the literature suggests that inadequate attention has been given to the study of peer social behaviors in young children. Previous research (e.g., Rheingold, 1969) has manipulated the relationship between infants and their mothers but not between peers. The present study was devised to describe peer relationships in a brief social interaction between young children. Thus, the present study examines the effects of sex differences and brief social deprivation and two satiation conditions on the frequency of peer social behaviors. The following hypotheses are advanced:

1. Children deprived of peer social contact before the observation period should display more peer social behaviors than children who are allowed a period of time in proximity to a peer.
2. Children who have the opportunity to be in contact with one peer before the observation period and another, novel, peer during the observation period should display more peer social behaviors than satiated children but less than deprived children.
3. Females should display more looking and smiling behaviors toward their peers than males. Males should display more proximity behaviors than females.
4. Deprived and two-peer females should display more looking and smiling behaviors toward the peer than

other children. Deprived and two-peer males should exhibit more independent behaviors (proximity to peers than other children. Satiated males and females should exhibit the fewest number of social behaviors.

CHAPTER II

METHOD

Subjects

Subjects were 60 first-born children whose average age was 14.6 months (range: 11.2 months to 18.2 months). Half of the children were males, and half females. The only qualification for participating in the study was that both parents had completed high school. The average parent education level was 15.6 years (range: 12 years to 20 years).

Subjects were obtained from three sources: names supplied by teachers of childbirth preparedness classes, local church rosters, and friends of participating mothers who had children of the appropriate ages. Table 1 shows the breakdown of age by subject groups.

Observers

One 29-year-old male observer served throughout the experiment. He was not informed about subject assignment to experimental groups. The author was the second observer for purposes of calculating interobserver reliability.

Training. The observer was trained before and during the gathering of pilot data. He received a written description of all the behaviors to be observed and was required to be familiar with them before observation began. Training was continued until an overall rate of reliability of 85%

Table 1

Subject Age in Months by Experimental Group

	Males		Females	
	S_1	S_2	S_1	S_2
Deprived	14.25	13.00	14.25	11.75
	12.25	12.25	18.00	12.75
	17.00	14.75	13.25	13.00
	11.75	15.75	13.75	15.00
	11.75	16.25	14.50	16.00
Mean =	13.90		14.22	
Satiated	18.00	16.50	14.25	17.50
	18.50	16.25	14.50	12.00
	13.25	11.75	13.25	12.00
	15.75	15.50	15.50	13.00
	11.50	12.75	15.25	14.00
Mean =	14.97		14.12	
Two-Peer	13.75	15.00	13.50	17.25
	15.00	18.50	16.75	13.00
	13.50	16.25	13.75	11.75
	17.00	17.75	17.25	15.00
	14.00	14.25	14.75	16.00
Mean =	15.50		15.10	

for every behavior was reached. The training procedure required about 15 hours of observation time.

Reliability. Interobserver reliability was checked during 10 of the 30 sessions at approximately equal intervals during the data-collection phase.

Experimental Setting

Three rooms were used. Two were waiting rooms which contained identical toys and furniture. A third room, the experimental room, contained two chairs upon which the mothers sat, placed in opposite corners of the room; one novel toy ("Tiger Roly Poly," Playskool, Inc.) was placed in the center of the floor. (Mothers were questioned to insure that their child did not already have this toy.) The floor itself was carpeted and marked off in 30.48 cm x 30.48 cm (1' x 1') squares with masking tape.

The observer was seated on one side of the room approximately equidistant from the two mothers. The experimenter was seated in the doorway (about 3 feet from the observer) to prevent the subjects from crawling out of the room. Observers were not able to see each other's rating sheets.

Experimental Design and Independent Variables

The design of the study was a 2 x 3 factorial with both factors fixed. Sex of the infant constituted the first independent variable. The deprivation-satiation manipulation, the second independent variable, consisted of three experimental conditions prior to the observation session:

1. Deprivation--one-third of the pairs and their mothers were placed in separate rooms with toys for 20 minutes;
2. Satiation to peer--one-third of the pairs and their mothers were placed together in a single room and allowed to interact and/or play with the toys for 20 minutes; and
3. Satiation to novel peer (two-peer)--one-third of the pairs and their mothers were placed in separate rooms with "helper" peers and mothers for the 20-minute waiting period. "Helper" peers were selected from subjects who had already participated in the experiment and whose mothers agreed to return for another session.

Dependent Variables

The following behaviors were observed during a 15-minute session immediately following the pretest condition:

A. Proximity--if the subject is within the same 30.48 cm x 30.48 cm block or in any block adjacent to the toy or the person within the time interval, but is not touching:

   1. Proximity to peer
   2. Proximity to mother
   3. Proximity to peer's mother
   4. Proximity to toy

B. Looking--includes only those behaviors where the subject is clearly oriented toward toy or person and makes visual contact for at least 1 second:

1. Look at peer
2. Look at mother
3. Look at peer's mother
4. Look at toy

C. Touching--includes contacting the toy or person with any part of the body:

1. Touch peer
2. Touch mother
3. Touch peer's mother
4. Touch toy

D. Vocalizing--includes words, babbling, and any other non-distress vocal responses.

E. Crying and other vocal distress sounds.

F. Smiling--includes any response of the facial muscles where the corners of the mouth are drawn upward, and the flesh of the cheeks is displaced.

The following behaviors were observed for the last 24 pairs of subjects:

G. Interactions with the observer and the experimenter:

1. Touch
2. Look
3. Proximity

Procedure

Mothers of potential subjects were contacted by telephone. Appendix A presents the information given to the mothers. If the mothers agreed to participate, a time and a date were arranged. At that time, the subject and his/her same-sex pairmate were randomly assigned to an experimental group. The appointment times were usually set up for the next week.

Upon arriving at the experimental setting, mothers and their children were greeted by the experimenter and the observer. The observer retired to the experimental room, and the experimenter then took subjects and their mothers to the appropriate waiting rooms. Mothers were requested to be seated, to place their child on the floor in proximity to the toys, and to allow them to play. A number of children went back to their mothers at this point, and these mothers were instructed to allow the children to take their own time in adjusting to the setting. The experimenter then left the room and returned 20 minutes later. Subjects and their mothers in the satiation condition spent this 20-minute period together in one room. Subjects and their mothers in the deprivation condition spent this period in two separate rooms. Subjects and their mothers in the two-peer condition were instructed that the "helper" mothers and children had already participated in the experiment and were going to spend the first 20 minutes with them to help them become adjusted. Appendix B contains the instructions to the mothers.

At the end of the 20-minute period, the experimenter returned to the waiting rooms. If "helper" mothers and children were involved, they were thanked and left. Otherwise, the two mothers were instructed (see Appendix C) in the second phase of the experiment. Mothers and children were then taken to the experimental room and seated. A toy was placed on the floor in the center of the room; the children

were then placed at their mothers' feet and allowed to do what they wanted.

At the moment the children were placed on the floor, the first data interval began. Each observation interval was 10 seconds in length and was followed by 10 seconds for recording the behaviors. The observer watched one subject for 10 seconds and recorded for 10 seconds, and then observed and recorded the behavior of the other subject, alternating until the end of the session. Total session time was approximately 15 minutes (44 intervals). At the end of the session, the observer and the experimenter talked with the mothers for a few minutes. If the mothers commented on any behaviors, they were discussed. Cookies were available to the children at the end of the session. As the mothers were leaving, they were asked if they would like to participate as "helpers," and volunteers' names were recorded.

CHAPTER III

RESULTS

Reliability

The mean overall interobserver agreement score for the 10 reliability sessions was .96 (range: .90 to 1.00). Interobserver agreement was calculated as the number of agreements (presence of behavior) divided by the number of agreements plus disagreements. The mean interobserver agreement scores for individual dependent variables ranged from .90 to 1.00. Table 2 contains the means and ranges for the individual dependent variables. None of the subjects in this sample touched the experimenter while they were being observed.

Analysis I

Table 3 presents the means for all of the dependent variables except those related to the observer and the experimenter. Data, frequency of responding, from each member of the peer were combined to yield one score per pair for each variable. These scores were analyzed in a 2 x 3 multivariate analysis of variance (five pairs of subjects per cell). The results of this analysis indicated no significant differences for either independent variable or their interaction. Appendix D contains the summary statistical tables. Univariate analyses indicated significant main effects for the deprivation-satiation condition for 5 of the 15 variables.

Table 2

Mean Interobserver Agreement Scores and Ranges for the Dependent Variables

Variable	Mean Score	Range
Proximity to Peer	.97	.94-1.00
Proximity to Mother	.96	.93-1.00
Proximity to Peer's Mother	.99	.93-1.00
Proximity to Toy	.97	.94-1.00
Looking at Peer	.93	.85-1.00
Looking at Mother	.90	.80-1.00
Looking at Peer's Mother	.90	.66-1.00
Looking at Toy	.96	.87-1.00
Touching Peer	.97	.75-1.00
Touching Mother	.97	.89-1.00
Touching Peer's Mother	.94	.66-1.00
Touching Toy	.96	.90-1.00
Vocalizing	.95	.91-1.00
Crying	1.00	
Smiling	.95	.66-1.00
Proximity to the Observer	.99	.98-1.00
Proximity to the Experimenter	1.00	
Looking at the Observer	.92	.87- .97
Looking at the Experimenter	.94	.92-1.00
Touching the Observer	1.00	

Table 3

Means for Proximity, Looking, Touching, Vocalizing, Crying, and Smiling for Males, Females, Deprivation (Dep), Satiation (Sat), and Two-Peer (2-P) Conditions

Proximity to Peer

	Dep	Sat	2-P	$\bar{X}$
Males	1.43	1.03	1.44	1.30
Females	2.09	1.36	0.74	1.40
$\bar{X}$	1.76	1.20	1.09	

Proximity to Mother

	Dep	Sat	2-P	$\bar{X}$
Males	1.30	1.43	0.90	1.21
Females	1.43	1.58	1.03	1.35
$\bar{X}$	1.37	1.50	0.97	

Proximity to Peer's Mother

	Dep	Sat	2-P	$\bar{X}$
Males	0.34	0.45	0.30	0.36
Females	0.85	0.34	0.21	0.47
$\bar{X}$	0.59	0.40	0.26	

Proximity to Toy

	Dep	Sat	2-P	$\bar{X}$
Males	0.56	0.61	0.61	0.59
Females	0.82	0.92	0.47	0.74
$\bar{X}$	0.69	0.77	0.54	

Look at Peer

	Dep	Sat	2-P	$\bar{X}$
Males	2.80	2.36	2.47	2.54
Females	3.29	2.47	2.83	2.86
$\bar{X}$	3.05	2.41	2.65	

Table 3 (Continued)

Look at Mother

	Dep	Sat	2-P	$\bar{X}$
Males	1.22	1.23	1.81	1.42
Females	1.50	1.18	2.01	1.57
$\bar{X}$	1.36	1.21	1.91	

Look at Peer's Mother

	Dep	Sat	2-P	$\bar{X}$
Males	0.89	0.90	1.61	1.13
Females	1.58	1.16	1.67	1.47
$\bar{X}$	1.23	1.03	1.64	

Look at Toy

	Dep	Sat	2-P	$\bar{X}$
Males	1.89	1.38	1.51	1.59
Females	1.92	1.62	1.65	1.73
$\bar{X}$	1.91	1.50	1.58	

Touch Peer

	Dep	Sat	2-P	$\bar{X}$
Males	0.14	0.09	0.05	0.09
Females	0.30	0.10	0.07	0.16
$\bar{X}$	0.22	0.09	0.06	

Touch Mother

	Dep	Sat	2-P	$\bar{X}$
Males	0.96	1.49	2.51	1.65
Females	1.00	1.22	1.78	1.33
$\bar{X}$	0.98	1.35	2.14	

Touch Peer's Mother

	Dep	Sat	2-P	$\bar{X}$
Males	0.05	0.01	0.05	0.04
Females	0.07	0.07	0.00	0.04
$\bar{X}$	0.06	0.04	0.02	

Table 3 (Continued)

Touch Toy

	Dep	Sat	2-P	$\bar{X}$
Males	1.49	1.12	1.09	1.23
Females	1.49	1.05	1.10	1.21
$\bar{X}$	1.49	1.09	1.09	

Vocalizing

	Dep	Sat	2-P	$\bar{X}$
Males	2.61	2.09	2.54	2.41
Females	3.11	1.38	2.39	2.29
$\bar{X}$	2.86	1.73	2.47	

Crying

	Dep	Sat	2-P	$\bar{X}$
Males	0.18	0.09	0.20	0.15
Females	0.14	0.23	0.56	0.31
$\bar{X}$	0.16	0.16	0.38	

Smiling

	Dep	Sat	2-P	$\bar{X}$
Males	1.03	1.05	0.63	0.90
Females	0.34	0.47	1.25	0.69
$\bar{X}$	0.69	0.76	0.94	

Significant differences among groups were obtained for Looking at Peer, F (2, 24) = 6.31, $p < .01$. A Newman-Keuls test (Winer, 1971) indicated that subjects in the deprivation condition looked at their peers more often than did subjects in the satiation condition ($p < .01$), or subjects in the two-peer condition ($p < .05$).

Significant differences among groups were also obtained for Looking at Mother, F (2, 24) = 6.82, $p < .01$. A Newman-Keuls test indicated that the two-peer subjects looked at their mothers significantly more often than did the satiated subjects ($p < .01$), or the deprived subjects ($p < .01$).

Significant differences among groups were also obtained for Looking at Peer's Mother, F (2, 24) = 5.56, $p < .05$. A Newman-Keuls test indicated that subjects in the two-peer condition looked at the peer's mother significantly more often than did subjects in the satiation condition ($p < .01$), or subjects in the deprivation condition ($p < .05$).

Significant differences among groups were also obtained for Touching Mother, F (2, 24) = 7.72, $p < .01$. A Newman-Keuls test indicated that subjects in the two-peer condition touched their mothers significantly more often than did subjects in the deprivation condition ($p < .01$), or subjects in the satiation condition ($p < .05$).

Finally, significant differences among groups were obtained for Vocalizing, F (2, 24) = 3.86, $p < .01$. A Newman-Keuls test indicated that subjects in the deprivation condition

vocalized more frequently than did subjects in the satiation condition ($p < .05$), but not significantly more than subjects in the two-peer condition.

The variable Crying showed a trend toward significance for the deprivation-satiation condition, F (2, 24) = 2.99, $p < .10$. A Newman-Keuls test indicated that subjects in the two-peer condition cried significantly more frequently than subjects in both the deprivation and satiation conditions ($p < .05$).

Univariate analyses indicated significant main effects for the Sex variable for 2 of the 15 dependent variables. A significant difference between groups was obtained for Looking at Peer, F (1, 24) = 4.87, $p < .05$. Females looked at their peers significantly more frequently than did males.

A significant difference between groups was also obtained for Looking at Peer's Mother, F (1, 24) = 4.77, $p < .05$. Females looked at their peers' mother more often than did males.

The variable Crying showed a trend toward significance for the Sex condition, F (1, 24) = 3.47, $p < .10$. Females tended to cry more frequently than males.

The variable Smiling showed a trend toward a significant interaction, F (2, 24) = 3.26, $p < .10$. A Newman-Keuls test indicated that females in the two-peer condition smiled significantly more frequently than females in the deprivation condition ($p < .05$).

The variables involving interaction with the observer and the experimenter were analyzed in a separate 2 x 3 multivariate analysis of variance (three pairs of subjects per cell). This analysis was computed to determine whether the observer and the experimenter had differential effects on the experimental groups. Table 4 presents the means for these variables. The results of this analysis and all univariate analyses were nonsignificant.

Analysis II

The data in Table 3 were reanalyzed in a 2 x 3 x 3 x 4 analysis of variance (sex x deprivation-satiation x response x target). This was done for two reasons: (1) because of the large number of dependent variables, the degrees of freedom may have been too small for stable correlation matrices to form, and (2) because of the conceptual relationship between targets and response modes, it seemed reasonable to treat these as factors and explore the target x response mode interaction. Significant effects were observed for (1) the three way interaction, deprivation-satiation x response x target, F (12,144) = 2.14, $p < .05$, (2) the two way interactions, deprivation-satiation x response, F (4,72) = 4.84, $p < .01$, deprivation-satiation x target, F (6,72) = 3.51, $p < .01$, and response x target F (6,144) = 41.81, $p < .01$, and (3) the main effects of response, F (3,72) = 128.15, $p < .01$, and target F (3,72) = 42.89, $p < .01$.

Table 4

Means for Interactions With Observer and Experimenter

Proximity to Observer

	Dep	Sat	2-P	$\bar{X}$
Males	0.24	0.00	0.09	0.11
Females	0.33	0.12	0.18	0.21
$\bar{X}$	0.28	0.06	0.13	

Proximity to Experimenter

	Dep	Sat	2-P	$\bar{X}$
Males	0.30	0.03	0.03	0.12
Females	0.36	0.15	0.27	0.26
$\bar{X}$	0.33	0.09	0.15	

Looking at Observer

	Dep	Sat	2-P	$\bar{X}$
Males	0.60	0.54	1.39	0.84
Females	0.63	0.91	0.97	0.84
$\bar{X}$	0.62	0.72	1.18	

Looking at Experimenter

	Dep	Sat	2-P	$\bar{X}$
Males	0.66	0.48	1.33	0.82
Females	0.79	1.03	1.02	0.94
$\bar{X}$	0.72	0.75	1.18	

Touching Observer

	Dep	Sat	2-P	$\bar{X}$
Males	0.03	0.00	0.00	0.01
Females	0.06	0.00	0.03	0.03
$\bar{X}$	0.04	0.00	0.01	

Touching Experimenter

	Dep	Sat	2-P	$\bar{X}$
Males	0.06	0.00	0.00	0.02
Females	0.00	0.00	0.06	0.02
$\bar{X}$	0.03	0.00	0.03	

Exploration of the three way interaction via Newman Kuels ($p < .05$ in all cases) suggested differential patterns of proximity, looking, and touching as a function of target and deprivation-satiation. Figure 1 presents the mean frequency for each of the three responses as a function of target and deprivation-satiation condition. The two peer group emitted fewer proximity responses toward all four targets in comparison with the deprivation and satiation groups. The deprivation group showed a higher rate of proximity to peer and peer's mother than the satiation and two peer groups. The deprivation group also showed a higher rate of looking at peer, but the two peer group showed higher rates of looking at mother and peer's mother. However, the two peer group emitted a higher rate of touching mother than either the deprivation or satiation groups.

A Newman-Keuls test on the deprivation-satiation x response interaction indicated that subjects in the three experimental groups looked ($p < .01$) and entered into proximity ($p < .05$) significantly more than they touched, and that subjects looked significantly more than they entered into proximity ($p < .01$). This pattern of responding was uniform among the three experimental groups as opposed to being different for each group.

A Newman-Keuls test on the deprivation-satiation x target interaction indicated that subjects responded significantly more to mother, peer, and toy than to peer's mother ($p < .01$) and significantly more to mother than to toy ($p < .05$).

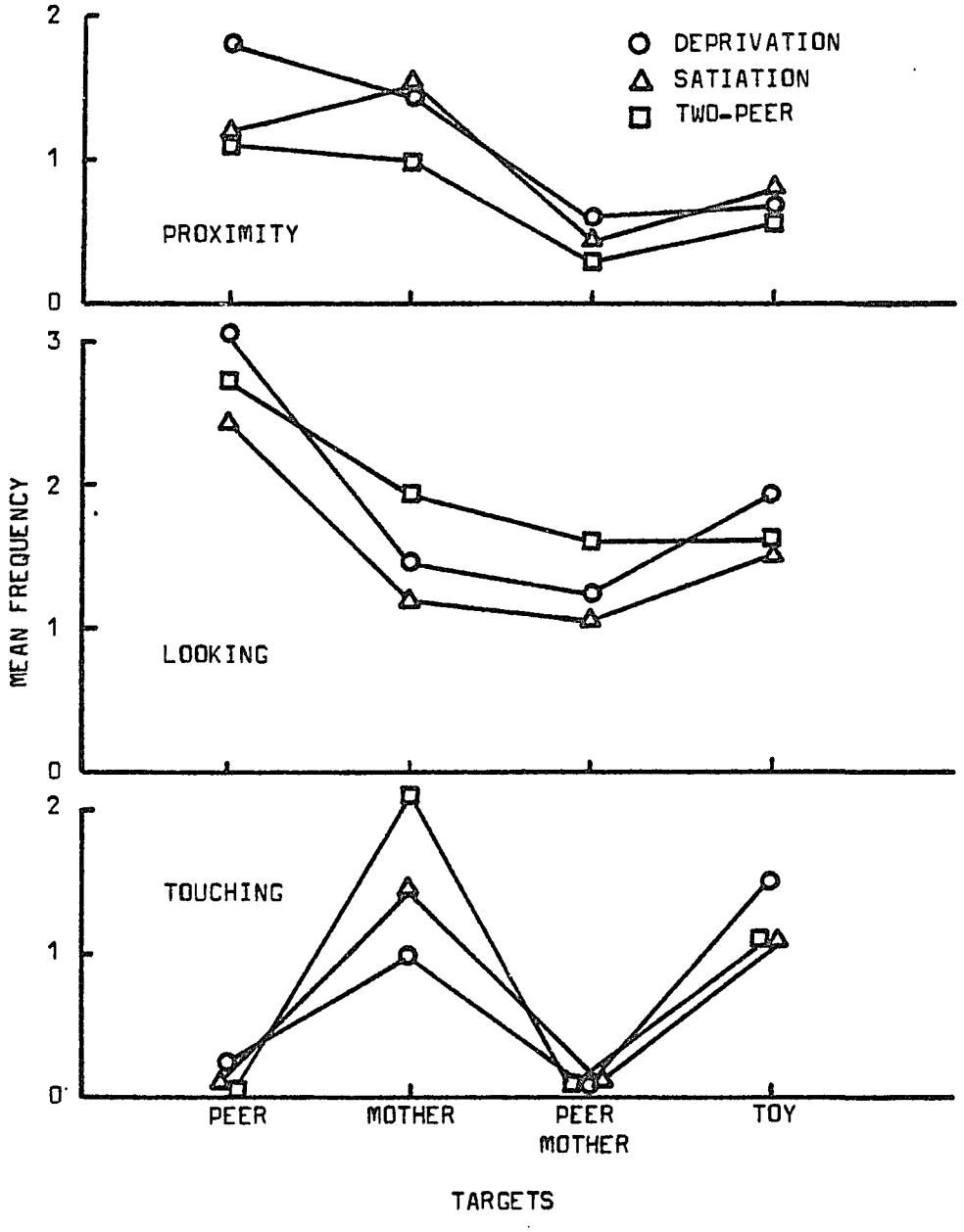

Figure 1. Mean frequency of the three responses (proximity, looking, and touching) for the four targets (peer, mother, peer mother, and toy) and three deprivation-satiation conditions.

The test also indicated that the deprivation group emitted significantly more responses than did the satiation group ($p < .01$).

A Newman-Keuls test on the response x target interaction indicated that subjects responded significantly more to mother, peer, and toy than to peer mother ($p < .01$), that subjects responded significantly more to mother than to peer ($p < .01$) and toy ($p < .05$). The test also indicated that subjects emitted significantly more looking responses and proximity responses ($p < .01$) than touch responses. Subjects also emitted significantly more looking responses than proximity responses ($p < .01$).

A Newman-Keuls test on the mean effect of responses indicated that subjects looked significantly more than they touched ($p < .01$) and looked significantly more than they entered into proximity ($p < .01$).

Significant differences were obtained for the main effect of targets (peer, mother, peer's mother, toy), $F(3.72) = 42.89$, $p < .01$). A Newman-Keuls test on the main effect of targets indicated that subjects responded to mother ($p < .01$) and peer ($p < .05$) significantly more than to peer mother.

CHAPTER IV

DISCUSSION

It was hypothesized that subjects in the deprivation condition would engage in more social behaviors, in general, than subjects in the satiation condition. This hypothesis was supported by the Newman-Keuls test of the deprivation-satiation condition by target interaction; subjects in the deprivation condition emitted more social responses than subjects in the satiation condition. More specifically, from the Newman-Keuls test of the third-order interaction, deprivation subjects emitted significantly more responses to peer than did satiation subjects, while responses to mother and peer's mother were not significantly different. Deprivation subjects also looked and entered into proximity more than did satiation subjects. In summary, then, children who spent the preobservation period only with mothers spent significantly more time during the observation period looking, entering into proximity, and responding to peer than did children who spent the preobservation period with a peer and his/her mother. When considering peer social behavior specifically, the data from the MANOVA, Analysis I, indicated that deprivation subjects looked at peer and vocalized significantly more than satiation subjects. The fact that not <u>all</u> the behavior defined as "social" followed the same pattern

suggested that these behaviors cannot be classified together. The fact that most of the means for the nonsignificant peer-related variables were very small (that is, the behaviors occurred very infrequently) may have contributed to the lack of findings for these variables.

The results of this study are compatible with other reported research, tending to uphold Gewirtz and Baer's (1958) original findings and Erickson's (1962) study, in which children deprived of social stimuli for a short period of time responded to a greater degree for social reinforcement than did children who were socially satiated. A behavioral account of the present results can be advanced. Placed in a strange room with a new person (peer), the satiation subject engages in some behaviors relative to that new person. Peer attention serves as reinforcement for social behaviors which are thereby increased. These social behaviors are assumed to be reinforced on a fairly continuous schedule. However, density of reinforcement eventually results in a decrease in responding. By the time satiation subjects enter the observation period, then, their rate of responding to peers has decreased relative to its peak value and continues to decrease during the observation period. Subjects in the deprivation condition also go through the initial portion of the same process, but their peak rate of responding occurs during the observation period when their behaviors are being recorded.

The studies which designed the deprivation condition to be a period of no stimulation (Stevenson & Odom, 1962) or an anxiety-arousing situation (Walters & Karal, 1960; Walters & Parke, 1964; Walters & Ray, 1960) are not directly comparable in their procedures to the present study. Deprivation subjects in the former studies were either left completely alone or were exposed to an anxiety-arousing adult, while subjects in the present study were continually in the presence of their mothers.

Although different in procedure from the work of Babad, who defined the deprivation-satiation manipulation as a cognitive process, the results of the present study may be conceptualized in a cognitive framework. Piaget (Phillips, 1969) described the cognitive changes in children between 12 and 18 months of age (the Sensorimotor Period, stage 5) as developing from a series of small experiments which the child performs "to find out what happens." He/she becomes increasingly adept at asking adults for help, finding new ways to get things done, and recognizing quickly means and ends. For example, after he has learned to find an object hidden by another object, he may play peek-a-boo, in a ritualized manner, merely because he likes to watch the face appear.

The importance of other children is most apparent in Piaget's discussion of imitation. By this stage of development, a child understands that a model's actions are not

continuations of his own. He can learn new behaviors just by watching another person.

In the present study, all children entered the experiment at about the same stage of development. Each subject's first exposure to a peer represented a period of learning about the peer. Subjects in the satiation condition would have gone through this process during the preobservation period when behaviors were not being recorded. By the time the 20-minute period was over, their attention may have been focused on other things besides the peer.

The hypothesis that males would emit more independent behaviors (time away from mother, proximity to peer) than females was not supported by the results of Analysis II and only mildly supported by the results of Analysis I.

The analysis of variables reflecting sex differences in Analysis I indicated that only one of the six, looking at peer, discriminated among groups. However, this one variable, in which females did show higher rates of responding, was the same variable that has significantly discriminated among the deprivation, satiation, and two-peer groups throughout Analysis I.

The results from Analysis II indicated that the target of the response, the type of response and the preobservation manipulation were more important than sex of subject in determining response patterns. The discrepancy between these findings and other data (i.e., Goldberg & Lewis, 1969) might be accounted for by the fact that subjects were younger and,

therefore, the rules of appropriate male and female social behavior were not yet being applied by mothers. Observation of the children's mode of dress indicated that almost all of the children were dressed similarly, thereby making it difficult to discriminate males and females on the basis of clothing. Approximately 75% of the mothers questioned on this point indicated that they were not concerned about stressing sex-appropriate behaviors or activities with their children at such an early age. It is also possible that the discrepancy between the present data and previous findings might be accounted for by the small number of subjects per group.

The hypothesis that subjects in the two-peer condition would display more peer social behaviors than satiation subjects, but fewer than deprivation subjects, was obtained for two of the six peer-related behaviors in Analysis I, looking and vocalizing. Since they are the same behaviors that distinguished deprivation from satiation subjects, it would appear that the deprivation-satiation manipulation is relevant to peer social behavior.

The results of Analysis II added no new information to that provided by Analysis I, but they did further emphasize the significance of the looking response and the peer as a target. Again, the Newman-Keuls test of the deprivation-satiation condition by response by target analysis indicated that looking at peer was the most frequent response and that

deprivation and two-peer subjects looked more than did satiation subjects.

Considering a behavioral explanation for these data, as for the deprivation and satiation data, two-peer subjects would have followed the same stimulus-response-reinforcement pattern as did the satiation subjects during the preobservation period (where density of reinforcement resulted in a decrease in responding to peer during the observation period). The introduction of a novel stimulus (the second peer) at the beginning of the observation period, however, resulted in a moderate increase in the rate of responding to the peer. Thus, subjects in the two-peer condition responded to the peer more frequently than did the satiation subjects but less frequently than did the deprivation subjects, who had not yet been introduced to a peer.

Considering a cognitive explanation of the two-peer data, subjects were allowed access to one child during the preobservation period, during which time certain aspects of the environment were assimilated, and a second child during the observation period, during which time they had to assimilate somewhat different aspects of the environment (because each peer is different) or test previously assimilated information. Thus, two-peer subjects would be expected to spend more time interacting with the observation peer than would the satiation subjects, but less time than the deprivation subjects, who would still be acquiring basic information.

Besides the significant social behavior related to peer, the present study also showed some interesting findings covering behavior related to mother. For three of the six social behaviors involving mother, subjects in the two-peer condition had the highest group means and were significantly different from the other two groups (which did not differ from each other). The two-peer subjects differed from the other groups on the looking at mother, looking at peer's mother, and touching mother variables. Several hypotheses can be advanced to account for these results. First of all, behaviors involving the child's mother or another mother, might indicate that the child is experiencing some anxiety. Perhaps the introduction of two strange children and mothers within a short period of time is aversive. The touch mother and crying data tend to support this anxiety hypothesis.

Some of the research cited previously which has manipulated the "anxiety" variable, either directly or indirectly, has found similar results. Rheingold and her colleagues have considered "anxiety" as a possible motivator in some of their work with infants. Thus, the presence of the infants' mothers in the experimental room (Cox & Campbell, 1968; Rheingold, 1969), and freedom of movement of a child to return to his mother at any time (Rheingold & Eckerman, 1969) have been found to facilitate pro-social behavior and reduce overt signs of distress.

In a study procedurally similar to the present one, Ainsworth et al. (1967) observed the behavior of one-year-olds

through a series of 3-minute phases in which the child was either alone, with his mother, with a stranger, or with both the mother and the stranger. The amount of exploration and play behavior was greatest when the mother and child were together. When a stranger entered the room, however, the amount of exploration decreased significantly, and the child tended to look more at the stranger than the mother. When the mother was not present, the amount of crying increased.

A second interpretation of the mother-related two-peer data might be that they reflect a greater interest (reinforcement) value on the part of adults ("complex" stimuli) as opposed to peers (less complex). This interpretation would concentrate mainly on the looking at mother and looking at peer's mother data. For both of these variables, the ordering of the cell means was satiation < deprivation < two-peer. Subjects in the satiation condition have already spent 20 minutes with the strange mother by the time they enter the observation session so that her novelty has dissipated (i.e., looking responses are not reinforced). Subjects in the deprivation condition are attracted to the mother as a novel stimulus during the observation period and thus spend more time looking at her. Subjects in the two-peer condition have had the opportunity to look at one new mother for 20 minutes and then another new one during the observation period. If novelty in a stimulus is reinforcing, subjects may have been reinforced for looking at the mother during the preobservation period and thus, the probability that they would respond to

another novel mother during the observation period is higher than for subjects in the other conditions. This interpretation of the data is not as satisfying as the first one primarily because the touch-mother and crying data are difficult to conceptualize as indicators of infant interest in adults.

A number of ideas for further research may be derived from the results of this study. Several questions might be answered by a replication of the study with a larger number of subjects, notably the possibilities of sex differences and a greater distinction between deprivation, satiation, and two-peer results. With the present results, the effects of target and response were so strong that they appeared to overshadow other possible findings.

Babad's (1972, 1973) cognitive model has some interesting implications for future work. A possible manipulation patterned after Babad's hypotheses might be to observe the effect of pairing a deprivation and a satiation subject in the observation period, and record their behaviors separately. Babad (1972) found that subject knowledge obtained before the learning task about the frequency of emitted reinforcement from the experimenter did not transfer to another experimenter during the learning task. Thus, the deprivation subject would be expected to give and respond to peer cues at a high rate while the satiation subject would not. It would be interesting to see if one subject could alter the expected rate of responding of the other.

It would also be of interest to determine the relationships between defined social behaviors during infancy and behaviors obtained for older children. Thus, for example, the amount of looking-at-peer behavior and vocalizations at the 12-month level might be predictors of "sharing" behavior at 4 years. Investigators have not yet examined the broad repertoire of social behaviors of infants for their significance with respect to later social behaviors. The most that can be said is that patterns of social interaction tend to emerge as the child matures, but it is difficult to delineate patterns of less complex peer-related behaviors which may or may not be necessary precursors.

After descriptions of the continuity of social behaviors are available, experimental studies which manipulate early social behavior can be designed to determine the effect on later behaviors. For ethical reasons, such studies would require careful considerations. Applications of the experimental results could then be utilized in remediation and prevention programs with clinical and nonclinical populations, respectively.

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Appendix A

Phone Conversation with Mother, Requesting Participation in Experiment

"Hello. This is Pat Zibung from the Department of Psychology at UNC-G. The reason I'm calling is because I'm conducting a study now on the play behavior and social development of children between the ages of 12 and 18 months. _____gave me your name and told me that you might be interested in participating. Let me tell you a little bit about our work. The whole thing takes about ½ hour of your time, either during the week or on the weekend, depending on the baby's schedule and your free time. The first 15-20 minutes will be spent in a playroom with toys. This is an adjustment period for you and the baby. The second 15 minutes will be spent in another room especially prepared, with only one toy. We've put squares of tape on the floor to help keep track of the kids as they're moving around. Another mother and her child will be coming at the same time so that you will be able to see the two children together. So...would you like to participate? What time would be best for you? O.K.--let me check with my other mother and I'll call you back."

Final call: "Your time is all set. The address of the experimental house is 311 McIver St. (directions then given). Let me check the baby's birthdate once more....And is he/she an only child? O.K.--let me give you my number in case any problems develop. I'll call the day before your appointment to make sure you're still able to come. One last question--do you know of any other mothers with children between the ages of 12 and 18 months? O.K.--thank you for your time.

Appendix B

Preobservation Period Instruction to Mothers

Deprived Condition: "Hi. I'm Pat Zibung and this is Chuck Huffman. He is our data collector." (A short period of small talk followed.) "Let's go into this room....This is the playroom I told you about over the phone. The toys are for the baby to play with and have fun. Please make yourself at home. We want (child's name) to feel relaxed here, too. Let me ask you a few questions quickly: Are you at home with the baby? Where is your husband working? Has he had any special training for his job? [or] Has he completed any years of college? How about yourself? O.K.--I'll be back in about 20 minutes. Have fun." The experimenter listened outside the doors at 5-minute intervals to make sure that mother and child were relaxed and calm.

Satiated Condition: "Hi...(same as in deprived condition). Let's go in this room. (Mother's name) and (child's name), this is (other mother) and (other child)" (assuming one mother and child have already arrived). The second mother usually put her child on the floor automatically to play with the first child and sat down next to the second mother. "Let me ask you both a few questions quickly....O.K.--I'll be checking on you from time to time, to make sure everything is going well. We'll be ready to continue in about 20 minutes." The experimenter checked every 5 minutes as above.

Two-peer Condition: "Hi...(as above). Let's go into this room. _____and_____, this is _____ and_____. They've been here once before and they've agreed to come back to help you and (child) adjust to the new situation." The second mother usually put her child on the floor and sat down next to the other mother. "Let me ask you [new mother] a few quick questions....O.K.--I'll be back in about 20 minutes." The experimenter checked every 5 minutes as above.

Appendix C

Observation Period Instructions to Mothers

"We're ready to start the observation period now. What I'd like you to do is to hold your child on your lap after you're seated, until I tell you to release him/her. Chuck will put the new toy down on the floor, we'll get ready to observe and then, when I say 'Go,' place your child on the floor in front of you. After this time, you can hold them for support if they come to you, and you can pick them up if they cry for longer than a few seconds but don't smile or call to them or interact with them in any other way. We want to get the maximum amount of the children's interaction with each other. We will keep going for the full 15 minutes unless something unusual happens. Do you have any questions?"

Appendix D

Additional Tables

Table D1

Multivariate Analysis of Variance for Proximity, Looking, Touching

Vocalizing, Crying, Smiling

Source	Log (Generalized Variance)	Approximate F-Statistic	df	p
Deprivation-Satiation (DS)	17.33	2.02	30, 20	n.s.
Sex (S)	15.67	1.40	15, 10	n.s.
DS X S	16.64	1.23	30, 20	n.s.
Error	14.54			

Table D2

Univariate Analysis of Variance Summary for Proximity to Peer

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	2.58	2	1.29	1.66	n.s.
Sex (S)	0.06	1	0.06	0.08	n.s.
DS X S	2.49	2	1.24	1.61	n.s.
Error	18.60	24	0.77		

Table D3

Univariate Analysis of Variance Summary for Proximity to Mother

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	1.55	2	0.77	1.65	n.s.
Sex (S)	0.13	1	0.13	0.28	n.s.
DS X S	0.00	2	0.00	0.00	n.s.
Error	11.23	24	0.46		

Table D4

Univariate Analysis of Variance Summary for Proximity to Peer's Mother

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.57	2	0.28	1.78	n.s.
Sex (S)	0.08	1	0.08	0.49	n.s.
DS X S	0.62	2	0.31	1.93	n.s.
Error	3.85	24	0.16		

Table D5

Univariate Analysis of Variance Summary for Proximity to Toy

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.26	2	0.13	0.75	n.s.
Sex (S)	0.14	1	0.14	0.84	n.s.
DS X S	0.30	2	0.15	0.86	n.s.
Error	4.25	24	0.17		

Table D6

Univariate Analysis of Variance Summary for Looking at Peer and Newman-Keuls Test

ANOVA

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	1.99	2	0.99	6.30	.01
Sex (s)	0.77	1	0.77	4.86	.05
DS X S	0.18	2	0.09	0.59	n.s.
Error	3.80	24	0.15		

NEWMAN-KEULS

	Satiated 2.42	Two-Peer 2.66	Deprived 3.05	r	.01	.05	.10
2.42		.24	.63**	3	.59	.46	.32
2.66	--	--	.39*	2	.51	.38	.32

Table D7

Univariate Analysis of Variance Summary for Looking at Mother and Newman-Keuls Test

ANOVA

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	2.76	2	1.38	6.82	.01
Sex (S)	0.15	1	0.15	0.77	n.s.
DS X S	0.15	2	0.07	0.38	n.s.
Error	4.86	24	0.20		

NEWMAN-KEULS

	Satiated 1.21	Deprived 1.36	Two-Peer 1.92	r	.01	.05	.10
1.21	--	.15	.71**	3	.64	.49	.33
1.36	--	--	.56**	2	.55	.41	.33

Table D8

Univariate Analysis of Variance Summary for Looking at Peer's Mother and Newman-Keuls Test

ANOVA

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	1.93	2	0.96	5.55	.05
Sex (S)	0.83	1	0.83	4.76	.05
DS X S	0.52	2	0.26	1.51	n.s.
Error	4.17	24	0.17		

NEWMAN-KEULS

	Satiated 1.04	Deprived 1.24	Two-Peer 1.65	r	.01	.05	.10
1.04	--	.20	.61**	3	.59	.46	.32
1.24	--	--	.41*	2	.51	.38	.32

Table D9

Univariate Analysis of Variance Summary for Looking at Toy

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.93	2	0.46	1.36	n.s.
Sex (S)	0.14	1	0.14	0.42	n.s.
DS X S	0.05	2	0.02	0.07	n.s.
Error	8.22	24	0.34		

Table D10

Univariate Analysis of Variance Summary for Touching Peer

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.14	2	0.07	1.99	n.s.
Sex (S)	0.03	1	0.03	0.90	n.s.
DS X S	0.03	2	0.01	0.48	n.s.
Error	0.88	24	0.03		

Table D11

Univariate Analysis of Variance Summary for Touching Mother and Newman-Keuls Test

ANOVA

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	7.06	2	3.58	7.71	.01
Sex (S)	0.77	1	0.77	1.68	n.s.
DS X S	0.73	2	0.36	0.80	n.s.
Error	10.98	24	0.45		

NEWMAN-KEULS

	Deprived .98	Satiated 1.36	Two-Peer 2.15	r	.01	.05	.10
.98	--	.38	1.17**	3	.95	.74	.51
1.36	--	--	.79*	2	.83	.61	.51

Table D12

Univariate Analysis of Variance Summary for Touching Peer's Mother

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.00	2	0.00	0.46	n.s.
Sex (S)	0.00	1	0.00	0.03	n.s.
DS X S	0.01	2	0.00	1.07	n.s.
Error	0.16	24	0.00		

Table D13

Univariate Analysis of Variance Summary for Touching Toy

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	1.03	2	0.51	1.17	n.s.
Sex (S)	0.00	1	0.00	0.00	n.s.
DS X S	0.01	2	0.00	0.01	n.s.
Error	10.59	24	0.44		

Table D14

Univariate Analysis of Variance Summary for Vocalizing

and Newman-Keuls Test

ANOVA

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	6.60	2	3.30	3.86	.01
Sex (S)	0.10	1	0.10	0.12	n.s.
DS X S	1.82	2	0.91	1.06	n.s.
Error	20.51	24	0.85		

NEWMAN-KEULS

	Satiated 1.74	Two-Peer 2.47	Deprived 2.87	r	.01	.05	.10
1.74	--	.73[t]	1.13*	3	1.32	1.02	.70
2.47	--	--	.40	2	1.14	.84	.70

Table D15

Univariate Analysis of Variance Summary for Crying

and Newman-Keuls Test

ANOVA

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.31	2	0.15	2.99	.10
Sex (S)	0.18	1	0.18	3.47	.10
DS X S	0.20	2	0.10	1.89	n.s.
Error	1.28	24	0.05		

NEWMAN-KEULS

	Deprived .163	Satiated .163	Two-Peer .382	r	.01	.05	.10
.163	--	.000	.219*	3	.31	.24	
.163	--	--	.219*	2	.27	.20	

Table D16

Univariate Analysis of Variance Summary for Smiling

and Newman-Keuls Test

ANOVA

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.34	2	0.17	0.42	n.s.
Sex (S)	0.35	1	0.35	0.88	n.s.
DS X S	2.63	2	1.31	3.26	.10
Error	9.69	24	0.40		

NEWMAN-KEULS

	F-D[a] .35	F-S[b] .47	M-2[c] .64	M-D[d] 1.04	M-S[e] 1.05	F-2[f] 1.25	r	.05	.10
.35	--	.12	.29	.69[t]	.70[t]	.90*	6	.87	.48
.47	--	--	.17	.57	.58[t]	.78[t]	5	.83	.48
.64	--	--	--	.40	.41	.61[t]	4	.78	.48
1.04	--	--	--	--	.01	.21	3	.72	.48
1.05	--	--	--	--	--	.20	2	.58	.48

[a]F-D = Female-Deprived
[b]F-S = Female-Satiated
[c]M-2 = Male-Two-Peer
[d]M-D = Male-Deprived
[e]M-S = Male-Satiated
[f]F-2 = Female-Two-Peer

Table D17

Multivariate Analysis of Variance Summary for Interactions with Observer and Experimenter

Source	Log (Generalized Variance)	Approximate F-Statistic	df	p
Deprivation-Satiation (DS)	-8.38	1.07	12, 14	n.s.
Sex (S)	-9.26	0.62	6, 7	n.s.
DS X S	-8.36	0.81	12, 14	n.s.
Error	-9.69			

Table D18

Univariate Analysis of Variance Summary for

Proximity to Observer

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.16	2	0.08	2.78	n.s.
Sex (S)	0.04	1	0.04	1.54	n.s.
DS X S	0.00	2	0.00	0.01	n.s.
Error	0.35	12	0.02		

Table D19

Univariate Analysis of Variance Summary for

Proximity to Experimenter

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.19	2	0.09	2.62	n.s.
Sex (S)	0.08	1	0.08	2.47	n.s.
DS X S	0.02	2	0.01	0.33	n.s.
Error	0.43	12	0.03		

Table D20

Univariate Analysis of Variance Summary for

Looking at Observer

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	1.06	2	0.53	1.90	n.s.
Sex (S)	0.00	1	0.00	0.00	n.s.
DS X S	0.47	2	0.23	0.85	n.s.
Error	3.33	12	0.27		

Table D21

Univariate Analysis of Variance Summary for

Looking at Experimenter

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.76	2	0.38	2.33	n.s.
Sex (S)	0.06	1	0.06	0.40	n.s.
DS X S	0.54	2	0.27	1.66	n.s.
Error	1.97	12	0.16		

Table D22

Univariate Analysis of Variance Summary for Touching Observer

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.00	2	0.00	1.66	n.s.
Sex (S)	0.00	1	0.00	0.66	n.s.
DS X S	0.00	2	0.00	0.16	n.s.
Error	0.03	12	0.00		

Table D23

Univariate Analysis of Variance Summary for

Touching Experimenter

Source	SS	df	MS	F	p
Deprivation-Satiation (DS)	0.00	2	0.00	0.80	n.s.
Sex (S)	0.00	1	0.00	0.00	n.s.
DS X S	0.01	2	0.00	2.40	n.s.
Error	0.02	12	0.00		