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AUTHOR	Gershaw, N. Jane; Schwarz, J. Conrad
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ABSTRACT

The study was designed to investigate the exploration and attachment behavior of young children in a strange situation in the presence of: (1) an individual to whom the child was attached (the mother); (2) an inanimate object with which the child was highly familiar (favorite toy); and (3) a novel inanimate object (an unfamiliar toy). The effect of age was also investigated. Thirty-six male children from nursery schools in the Syracuse, New York area were subjects. They ranged in age from 15-42 months. The experimental session consisted of four parts: (1) instructional (mother and child shown room and toys); (2) baseline (mother and child alone in room for four minutes); (3) intermission (child coaxed or taken out of the room) and (4) test (child returns to room and finds either his mother, the familiar toy, or the unfamiliar toy. Data was compiled during baseline and test phase in two categories of dependent variables: (1) exploratory behaviors; and (2) attachment behaviors. Hypotheses and subsequent discussion of results are extensively presented. [Not available in hard copy due to marginal legibility of original document.] (TL)

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N. Jane Gershaw

and

J. Conrad Schwarz

Syracuse University

Psychology Department

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Attachment has been defined by a number of investigators (see Schaffer & Emerson, 1964; Cairns, 1966a) as the tendency of the young animal to seek out and remain with other members of its own species. Some writers (Ainsworth, 1969; Bowlby, 1958; King, 1966) appear to focus on the attachment to a specific individual, usually the mother, rather than attachment to the species in general. Bowlby (1958) conceives of the attachment developing out of the interaction between environmental stimuli, such as those provided by the mother, and the infants innate disposition to respond in a characteristic fashion to those stimuli. The opportunity to execute responses such as clinging, sucking, smiling, and following serves to reinforce the attachment to the mother. Other theorists (Cairns, 1966a; Scott, 1963, 1967) have placed more emphasis on mere exposure as the basis for the formation of an attachment. Consequently, both Cairns and Scott discuss the formation of attachments to inanimate as well as animate objects.

Much of the research on attachments in humans has been concerned with the emotional and behavior consequences of the presence and absence of attached objects. In most studies the object of attachment has been the mother. In the pioneer study by Arsenian (1943), infants (age 11-30 months) were placed in a strange situation with and without their mothers. It was found that separation from the mother resulted in an increase in emotional behaviors, such as crying, and a decrease in adaptive or coping behaviors, such as environmental exploration. More recent researchers have elaborated Arsenian's approach to make a detailed analysis of the pattern of infant behavior in the presence and absence of the mother. Ainsworth and Wittig (1969) found that the mother tended to serve as a base of exploratory operations for the human infant (age 13 months) exposed to a strange environment.

In a series of studies with a somewhat broader scope, Rheingold (1969) examined whether decreases in exploratory behaviors were a function of mother absence, per se, or whether exploratory behavior could be supported by the presence of any person, or by toys, in a strange room. Rheingold found that a high level of exploratory behavior in ten-month-old infants was maintained only in the presence of the mother. She concluded that the mother's presence had the effect of neutralizing the fearfulness of the strange environment, thus facilitating exploratory behavior. Ainsworth and Bell (1969) also found greater exploration when the mother was present in an unfamiliar envi-

ronment. Morgan and Ricciuti (1969) found that being on the mother's lap, as opposed to six feet away, significantly reduced the distress of the child at the approach of an unfamiliar adult in 10- and 12-month-old children.

Other investigators have examined the effects of the presence or absence of familiar persons in children ranging up to five years of age and in young adults (Cox and Campbell, 1968; Kissel, 1965; Schwarz, 1968; Schwarz, 1969). For the most part the findings of these studies support the conclusion that familiar persons, whether mothers or peers, have a comforting or distress-inhibiting influence on individuals in unfamiliar or stressful situations.

In addition to examining increases and decreases in a variety of exploratory behaviors, Ainsworth and Bell (1969) defined a category of attachment behavior called searching, which referred to those behaviors that involved looking for the absent mother. They maintain that a balance exists in infants between exploratory behavior and attachment behavior: the former has the consequence of decreasing the infant's proximity to the mother; the later, consisting of crying and searching, serves to increase the infant's proximity to the mother. The dynamic balance between these two classes of behavior gives an elastic quality to the infant-mother bond.

A body of literature which deals with the behaviors which are said to reflect attachment is the theory and research on arousal, curiosity, and response to novelty. Berlyne (1966, 1967) has focused on the arousing aspects of novelty. He postulates a linear relationship between the degree of novelty of a stimulus complex and the magnitude of arousal which it evokes in the subject. The organism's level of arousal, according to Berlyne (1967) has emotional consequences which result in approach or avoidance of novel aspects of the psychological field. Moderate levels of arousal are said by Berlyne to be rewarding, whereas very high levels of arousal are aversive. Berlyne points to the frequently observed vascillation between curiosity (approach) and fear (avoidance) as support for the hypothesis that novelty can be both rewarding and aversive. Such vacillation in young children, using the mother as a base from which the exploration of novel stimuli may proceed, has been ubiquitously reported.

Consistent with Berlyne (1967), Welker (1961) suggests in a theoretical review of exploratory behavior that a large majority of external stimuli may be novel to a young animal. Consequently, initial reactions to these stimuli will be aversive. Stimuli which are characterized by only a slight degree of novelty will be explored. Gradually, as the scope of an animal's experience increases, the increasing number of extremely familiar stimuli act as a frame

of reference from which the infant may proceed in the exploration of slightly novel stimuli. King (1966) draws similar conclusions. Cox and Campbell's (1968) finding that older children were less emotionally disrupted when left alone in a strange room than were younger children is consistent with Welker's (1961) notion that certain stimulus configurations which are extremely novel to a younger animal may be less novel to an older animal.

The two literatures, attachment and arousal, converge on the point that the proximity of familiar or attached objects serves to support exploratory behavior. Whether the fucus in on the "pleasant feeling" (King, 1966) elicited by certain objects, or on the reward and aversion systems (Berlyne, 1966, 1967), the research and theory support the general idea that animals have a tendency to be attracted to moderate degrees of novelty, i.e. to show curiosity, when comfortable or in familiar surroundings. When they are distressed or highly aroused, as by extreme novelty, they avoid further novelty and instead approach the comfortable and the familiar. Familiar stimuli reduce the level of distress and arousal and eventually promote the reemergence of exploration. Thus the theoretical formulation by Berlyne (1967) is compatible with Ainsworth and Bell's (1969) conception of a balance between exploration and attachment behaviors.

Further indication that familiarity, rather than maternal attachment or expectation of protection, is the important factor in the inhibition of distress in a novel situation is provided by studies in which an inanimate object served to inhibit distress or elicit attachment behavior. In the Harlow and Zimmerman (1959) study with monkeys, the presence of an inanimate cloth surrogate mother reduced fear and promoted investigation of a novel and fearsome object. Cairns showed that lambs reared in the presence of a television set became attached to and sought the proximity of a television set in a free-choice situation. Also, in a very well controlled experiment with rats, Sheldon (1969) demonstrated that the same inanimate object could be first aversive and later attractive to the animal, depending upon the extent of his exposure to it. None-the-less, no experimental evidence has yet been offered which demonstrates that familiar objects function as distress inhibitors in human infants. However, much anecdotal material exists atesting to the distress-inhibiting function of a human infant's "security blanket" or favorite "Teddy".

The present study was designed to investigate the exploration and attachment behavior of young children in a strange situation in the presence of: (a) an individual to whom the child was attached (the mother), (b) an inanimate

object with which the child was highly familiar (a favorite toy), and (c) a novel inanimate object (an unfamiliar toy). Also under investigation was the effect of the age of the subject on exploratory and attachment behavior in the strange situation. The experimental design was similar to that of Cox and Campbell (1968); however, it incorporated an additional treatment dimension and some important procedural differences. The Cox and Campbell study examined the effects of age and maternal absence on the behavior of children 13-15 and 23-27 months of age in an unfamiliar situation. In their study, following the mother's departure after the child had had four minutes of exposure to the experimental room, significant decreases (from baseline) in speech, movement, and play were observed in both age groups. However, direct statistical comparisons of the experimental and control groups were not reported. Mothers and children in the control groups remained in the experimental situation continuously; while in the experimental group, following the baseline period, mothers departed in full view of the infant. If a child's reaction to being alone and his response to the process of separating from the mother are, in fact, different or independent, the lack of separation of the two effects in the Cox and Campbell study makes the interpretation of their results somewhat ambiguous. In the present study, infants in all conditions were separated from the mother after the baseline period by removing infants from the experimental situation which still contained the mother. Following a short intermission, those in the two mother absent conditions were returned to the experimental situation minus the mother. Thus, children in both the mother-present and the mother-absent groups underwent separation from the mother. Furthermore, a period of time was provided for disipation of the reaction to the act of separation before observation in the differential treatment (test) phase was begun.

Generally, it was hypothesized that less distress would occur in older children than in younger children. It was also hypothesized that the least distress would occur in the Mother Present condition, an intermediate amount in the Familiar Toy condition, and the most distress in the Novel Toy condition. More specifically, it was predicted that:

I. Younger subjects would exhibit less exploratory behavior during the baseline phase than older subjects.

II. Relative to baseline levels, younger subjects would exhibit greater distress during the test phase than older sbujects.

III. Subjects whose mothers were present during the test phase would exhibit less distress than subjects whose mothers were absent

IV. Subjects in the Familiar Toy condition would exhibit less distress during the test phase than subjects in the Novel Toy condition.

V. There would be a positive relationship between measures of exploratory behavior, and a positive relationship between measures of attachment behavior. Measures of exploratory and attachment behaviors would be negatively related.

METHOD

Experimental Design

The study employed a 3 x 2 factorial design in which the levels of the first factor consisted of exposure in a strange environment under one of three treatment conditions: in the presence of the mother, a familiar toy, or a novel toy. The second factor consisted of two age groups, two-year-olds and three-year-olds.

The experimental session consisted of four phases: an instructional phase, the baseline phase, an intermission, and the test phase. In all treatment conditions, the mother was present during the baseline phase, and the baseline ratings of exploratory and attachment behaviors were made from a videotape recording of this phase. Ratings of the same behaviors were also made on the videotape record of the test phase which followed the intermission. It was during the test phase that the experimental treatm variation occurred.

Subjects

The subjects were 36 male children divided into two age groupings, each consisting of 18 children. The younger group ranged in age from 15 to 29 months, with a mean age of 23 months. The older group ranged from 31 to 42 months, with a mean age of 38 months. Subjects within each age group were randomly assigned to the three experimental treatment conditions.

Subjects were located through the cooperation of several nursery schools located in the vacinity of Syracuse University and through an advertisement placed in a local newspaper requesting volunteers for participation in a psychological experiment. The nature of the study was explained in a phone conversation with each mother before an appointment was made. A large majority of the subjects were the children of students or faculty at Syracuse University.

Experimental Situation

All experimental sessions were held in a room measuring 9 feet by 12 feet with a reflecting one-way vision glass along one of the 9 foot walls. The room was equipped with a chair for the mother and four toys located on a raised platform (4' x 4' x 1' high). The four toys in the experimental room were as follows:

(1) Three pastel colored sponge "Bouncy Blocks", each measuring 6" x 3" x 2" (distributed by Kenner Products, Cincinnati, Ohio).

(2) A mechanical gorilla, 7" tall, and covered with a dark gray plush fabric. When wound, the gorilla walked and emitted a whirring sound (distributed by Louis Marx Co., Inc., New York City).

(3) A red metal "Tom Thumb" cash register, 7" high. A clicking sound was made when the keys of the cash register were depressed. (distributor unknown.)

(4) A multi-colored "Time Tone Clock" with visible gears, 12" high. Turning of a knob on the face of the clock resulted in movement of hands coupled with a ticking sound (distributed by Child Guidance Toys).

Figure 1 illustrates the arrangement of equipment in the experimental room. An attempt was made to select toys for the experiment which subjects would not have in their homes. According to mothers' reports, all four toys were unfamiliar to 66% of the subjects tested. An additional unfamiliar toy was employed in the test phase of the Novel Toy condition. The novel toy was a blue plastic "Dr. Seuss" animal, 6" tall, with green fur decorations on the head and tail. Mothers were asked to bring the child's favorite toy or object, that is, one which he liked to play with, carry around, sleep with, and take on trips away from home. This object was called the familiar toy and was used during the test phase in the Familiar Toy condition. For a listing of the actual objects brought to the experiemntal sessions by the mothers, see Appendix A.

The television camera and microphone coupled with video and audiotape recording equipment permitted the continuous recording of all experimental sessions. The camera was equipped with wide angle lens, and was maintained in a fixed position high on one of the 12' walls of the experimental room. Rather than focusing directly on the room the camera pointed into a convex Detecto mirror which reflected the entire floor area. This system produced on the TV monitor an overhead view which covered the whole experimental room with a minimum of visual distortion.

Procedure

In the instructional phase, the mother and child were escorted into an office where the mother was asked to complete a questionnaire. The first author served as experimenter. During this time, the experimenter showed the child a jar of cnady, offered him some, and told him that he would have more later. The candy jar was used later as an inducement to facilitate the child's separation from the mother. Mother and child were then led into the observation room containing the television monitor. There details of the procedure were explained to the mother. Mother and child were then led into the experimental room and the baseline phase was begun.

During the baseline phase, which lasted four minutes, the mother and child remained alone together in the experimental room. Mothers were told to remain

seated in the chair provided, to allow the child to do anything he chose, and to refrain from manipulating any toys. No restriction was placed on the mother's verbal interaction with the child. Videotape recording was continuous during this phase.

To initiate the intermission, which lasted one minute, the experimenter re-entered the experimental room and induced the child to come get another piece of candy. The child was told that he would be coming right back. Mothers were instructed to encourage the child if he hesitated. In 10 cases, the child protested, and had to be carried out of the room by the experimenter. The intermission was occupied in going for the candy and returning.

The four-minute test phase of the experiment began when the experimenter returned to the experimental room. The four toys present during the baseline phase had been returned to their original position. Videotape recording was continued. The procedures for the three treatment conditions during this phase were as follows:

Mother Present. The test phase for this condition was the same as the baseline phase. The child returned to the room to find the mother seated in her chair as before. The instructions to the mother remained the same.

Familiar Toy. Upon returning to the experimental room, children in this condition found the mother gone, and on the chair in her place was the familiar toy which had been brought from home. The experimenter faced the child toward the chair and said: "(Name), Mommy will be right back. She left that for you to play with (pointing toward the toy on the chair). Mommy will be right back. You wait here for her, OK?" The experimenter then left the child alone in the room and closed the door.

Novel Toy. In this condition children also found the mother gone upon returning to the experimental room. On the chair in which she had been sitting was the novel (Dr. Seuss) toy. The experimenter's remarks and actions were the same as in the Familiar Toy condition described above.

The first author, a young adult female, served as the experimenter and was aware of the experimental hyotheses. When the treatment condition required the mother's absence, she was encouraged to observe her child through the one-way window.

Measures

All measurement of the dependent variables was made from the videotape recordings of activity in the experimental room. Audio playback was simultaneous with video playback. Sound and picture quality were both good.

Two categories of dependent variables were employed in the study. The first category, exploratory behaviors, included exploratory play behavior and locomotor exploration. The second category, attachment behaviors, included crying and searching. For each variable, a separate score was obtained for the baseline phase and the test phase.

Five undergraduate and three graduate students at Syracuse University served as raters. They were trained from runs of pilot subjects. Each variable was rated independently by two raters; each rater rated a single variable. Tapes were randomly ordered, and unmarked as to treatment condition of subjects. The interrater reliability coefficients (rho) for all variables were above .98 (df = 34, $p < .01$).

Play. The exploratory play score consisted of the time (in sec.) that the child spent touching any toy in the experimental room, including the novel and familiar toys when present. A separate record of the touching time for the latter toys was also recorded.

Locomotion. Locomotor exploration was indexed by the number of steps taken by a subject. Steps taken in a stationary position as well as locomotor arm movements during the crawling were included.

Crying. This variable was indexed by the time (in sec.) that the child spent emitting sounds which were not clearly talking or babbling. Thus, crying included vocal behaviors ranging from quiet whimpering to loud screaming. No visual index of crying was employed.

Searching. This variable was made up of two behavioral components, the time (in sec.) that the child's attentional focus was either on the door to the experimental room or on the mother's chair. Attentional focus was considered to be in a given area when a child was both physically in that area, as marked off on the video monitor, and facing.

Results

First, tests of differences between age groups on the baseline data of exploratory behaviors are presented. These are followed by the analyses of covariance of the test phase of the exploratory variables. The analysis of variables related to attachment behavior follows. Test phase scores were examined using baseline phase scores as the covariate in an analysis of covariance design. This procedure, in some cases, adjusted for initial baseline differences between age groups. Differences in test phase scores resulting from the analysis of covariance, reveal the differential effects of the treatments, after adjustments for possible baseline differences between subgroups.

Measures of Exploratory Behavior

The means of locomotor exploration for the baseline and test phase are plotted by age and treatment in Figure 2. A two-way analysis of variance, summarized in Table 1, indicated that the difference between the two age groups in locomotor behavior during the baseline phase was significant ($p < .005$). An examination of the means indicated that this difference was in the opposite direction from prior prediction: older subjects exhibited less, rather than more, locomotion (as measured by number of foot steps) than did younger children.

Insert Figure 2 and Table 1 about here

The means of exploratory play for the baseline and test phases are plotted by age groups in the lower right of Figure 2. The analysis of variance of baseline exploratory play summarized in Table 1 indicated that the age effect was not significant. The hypothesis of less play by younger children than by older subjects during the baseline phase was not confirmed.

Insert Table 2 about here

A two-way covariance analysis of locomotion during the test phase, summarized in Table 2 did not reveal any significant differences between the two age groups or between treatment conditions on locomotion. Thus, the hypotheses that the two age groups would be differentially effected by the experimental treatment, and that threatment conditions would also differ in locomotor exploration, were not confirmed. The two-way analysis of covariance on play behavior during the test phase, also summarized in Table 2, indicated a significant treatment by age interaction ($p < .05$). An examination of the baseline and test phase cell means, illustrated graphically in Figure 2, indicated that younger subjects in the two mother absent conditions showed less play behavior during the test phase than did other treatment groups. The significant main effects for age ($p < .01$) and treatments ($p < .05$) must be interpreted in light of this significant interaction. A planned comparison of play during the test phase between the mother absent conditions and the Mother Present condition in the younger age group revealed a significant difference between the two ($F = 9.20$, $p < .01$). A similar planned comison in the older age group revealed no significant difference. Adjusted means, employing baseline phase measures as the covariate, were used in the planned comparisons. A significant difference ($F = 6.32$, $p < .025$) was also found between the Familiar Toy and the Novel Toy conditions in the younger age group, with adjusted cell means of 39.1 and 133.6 respectively.

Clear confirmation of the hypotheses concerning play was not provided by the data, in view of the singificant interactions. Support was provided for the hypothesis of less play in the two groups without the mother than in the Mother Present group, but only for the younger children. Differences in play were found between the Familiar Toy and Novel Toy conditions, but these differences were in a direction opposite to that predicted, with more play in the Novel Toy condition than in the Familiar Toy condition.

Measures of Attachment Behavior

The two-way covariance analysis of searching, summarized in Table 3, revealed no differences as a function of age or treatment. There was a tendency for older children to search less than younger children ($p < .10$). Planned comparisons between the Mother Present condition and the treatment conditions with mother absent within each age group revealed no significant differences or trends. Planned comparisons between Familiar Toy and Novel Toy conditions also revealed no differences. The hypotheses that subjects in the Mother Present condition would search less than subjects in the two mother absent conditions, and that subjects in the Novel Toy conditions would search more than subjects in the Familiar Toy conditions were not confirmed. The baseline and test phase cell means for seconds spent focusing attention on the mother's chair and the door, the two components of searching, are plotted in the upper half of Figure 2.

It seemed advisable to analyze attentional focus on the area of the mother's chair and attentional focus on the door area separately to get a clearer picture of the subjects' responses in the situation. The two-way analysis of covariance, summarized in Table 3, indicated that there was a significant main effect for treatment ($p < .01$) or the Familiar Toy condition ($p < .01$, Tukey (a) Test). This tendency was opposite to the predicted direction, and thus failed to confirm the prediction of greater attachment behavior in the mother absent groups.

Insert Table 3 about here

Analysis of covariance on the second of the search behaviors, attentional focus on the door area during the test phase, revealed no significant differences as a function of age or treatment; however, the data did not adequately fit requirement of analysis of variance. It may be noted from Figure 2 that many subjects, especially in the older groups, spent no time focusing on the door area and hence had scores of zero. Because of this highly skewed distribution, subjects were divided into two categories: those who spent some time focusing on the door area during the test phase, and those who spent no time focusing on that

area during the test phase. Table 4 summarizes the obtained frequency distribution. The groups were logically combined because of the low expected cell frequencies: one chi-square was computed on the total sample divided into two age groups, and another on the same sample divided into Mother Present and mother absent treatment groups. The contingency tables presented in Table 4 are laid out according to the categorization just discribed. Between age groups, a significant difference was found in frequency of attentional focus on the door ($X^2 = 6.40$, $\underline{df} = 1$, $\underline{p} < .02$). Fewer older subjects focused on the door. Between mother absent and Mother Present treatment groups, though more subjects focus on the door in the mother absent conditions, the difference in proportions was not significant ($X^2 = 1.68$, $\underline{df} = 1$, $\underline{p} < .20$). Thus the analysis by frequency confirmed the hypothesis that older subjects exhibit less attachment behavior than younger subjects, when attachment is indexed by less attentional focus on the door area. The trend toward more attentional focus on the door area in mother absent treatment groups was in the predicted direction.

Insert Tables 4 & 5 about here

The last attachment variable was crying. No subjects cried during the baseline phase of the experiment, and only 8 (21.7%) cried during the test phase. Table 5 provides a frequency distribution of crying during the test phase. A Fisher's exact test indicated that the probability of the obtained distribution of crying occurring by chance was $\underline{p} = .03$. The lack of crying in the older age group and in the Mother Present condition provides support for the hypotheses that less attachment behavior would occur in the older age group and in the Mother Present condition. Within the younger mother absent groups, the Fisher's exact probability test indicated that there was a significant difference between the frequency of crying in the Familiar Toy and Novel Toy conditions ($\underline{p} < .05$). The direction of this difference was opposite to that predicted: more crying occurred in the Familiar Toy condition.

A phi-coefficient calculated on the data from the two cells in which the crying occurred, indicated that there was no significant correlation between whether a child cried during the test phase and whether he protested upon being separated from the mother during the break.

A chi-square test of independence was run on the proportion of children touching the toy (novel or familiar) in the Novel and Familiar Toy conditions. No significant difference was found ($X^2 = 2.0$, $\underline{df} = 3$, $\underline{p} < .25$)in the proportion of subjects who touched the toy in each condition.

Relationship between Dependent Measures

Individual correlations between dependent measures taken during the test phase, including attentional focus on the mother's chair and on the door area were calculated. It was predicted that attachment measures, searching and crying would be positively correlated; and that attachment and exploratory measures would be negatively related with each other. It should be noted that searching consisted of the sum of two other attachment behaviors, focus on the mother's chair and focus on the door. Thus, correlations between searching and these other variables must be interpreted accordingly.

Insert Table 6 about here

The correlations (Table 6) indicated that the two exploratory variables were negatively related, thus not confirming the predicted positive relationship. Locomotor exploration was found to be positively correlated with all measures of attachment, except for attentional focus on the area of the mother's chair. Thus, the direction of relationship between locomotor exploration to all other dependent measures was opposite to that predicted. In line with this was the finding that locomotor exploration was inversely correlated with age. Play, on the other hand, was found, as predicted, to be negatively correlated with all measures of attachment, except for attentional focus on the mother's chair. Play was positively correlated with age.

Of the attachment behaviors, attentional focus on the mother's chair was found to be correlated only with searching. Crying, searching, and attentional focus on the door area were positively correlated with each other, and negatively correlated with age and exploratory play, thus confirming the predicted positive relationships between these attachment variables and negative relationship between attachment and play.

Discussion

The results provide a partial replication of the findings of earlier investigations of attachment and exploratory behavior in young children in a strange situation. For the younger children (15-29 months) the absence of the mother was associated with a greater incidence of crying, one of the attachment behaviors under consideration, and with reduced exploratory play behavior. Thus, the dynamic balance or inverse relationship between attachment behavior and exploration noted by Ainsworth and Bell (1969) was partially confirmed. In the older

age group (31-42 months) the absence of the mother made no difference in either attachment or exploratory behaviors, relative to behavior in the Mother Present treatment condition. This attenuation of treatment effects with increasing age is congruent with the Cox and Campbell (1968) observations, however the attenuation was greater in this study. They reported significant emotional disruption in the older group as well as the younger. The age differences in reaction to the mother's absence observed here are consistent with Welker's (1961) theory that younger animals, due to their limited exposure to a variety of stimuli, find more stimuli novel, and approach these novel stimuli cautiously.

The consistency with Welker and Berlyne (1967) obtains only if one assumes that the distress of the child, in fact, reflects the impact of the novel physical environment and not purely a reaction to the recent disappearance of the mother. One could argue with equal cogency, as Bowlby (1958) or Ainsworth (1969) might, that the distress of the younger child stemmed solely from the loss of the mother and not from the novelty of the situation. From this perspective, that which changes with age is not the novelty of experimental rooms but the strength of the child's attachment to the mother. (One even need not assume that attachment strength decreases with age, if it is argued that age is simply correlated with the child's ability to interpret the experimenter's reassuring message that the mother would be back shortly.) A differential test of the novelty-arousal-reinforcement position requires experimental manipulation of the novelty of the experimental situation and assessment of its effects on the child's level of distress in the absence of the mother.

The inclusion of a Familiar Toy condition may be though of as a manipulation of the novelty of the experimental situation in that an element of known familiarity was added to the psychological field. Considering the size of the experimental room, this manipulation could be considered somewhat weak. In any case, the results did not support the hypothesis, derived from arousal-reinforcement theory, that the presence of a familiar object would reduce the distress evoked in the absence of the mother. In fact, on some indices of distress, namely exploratory play and crying, younger children in the Familiar Toy condition exhibited more distress than children in the Novel Toy condition. Under the conditions of this experiment, the presence of a familiar toy appeared to have a facilitatory effect on the younger child's distress reaction. This result may be looked at in relation to an analogous finding by Schwarz (1968) that children encountering a fearsome stimulus in the mother's presence exhibited more distress than children in the presence of a stranger. Schwarz conjectured that the mother's presence simply facilitated the expression of fear. It may be that the

expression of a variety of emotions is under the control of situational cues, once the socialization process has begun. It is conceivable that the familiar toy provided an associative link with the home environment where distress reactions had been reinforced, and that it served to disinhibit this behavior. Alternatively, the familiar toy may have functioned as a stumulus cue supporting associations relating to the absent mother, associations which had aversive affective consequences. In other words, the cue may have interferred with what Spitz (1965) referred to as "repression of the mother image".

This latter speculation is supported by the absence of the expected attraction to the familiar toy on the part of children in the Familiar Toy condition. Children in this condition showed no greater preference for contact with the familiar toy than children in the Novel Toy condition showed for the novel toy. In addition, no difference was found between the Novel and Familiar Toy conditions in attention to the mother's chair where the novel and familiar toys had been placed. If the familiar toy could inhibit distress or had served as a secure base for exploratory operations, such differences would have been expected.

Contrary to these negative experimental findings in regard to the distress inhibiting effect of a favorite toy, are compeling clinical observations which clearly indicate the operation of such an effect. One possible solution to the dilemma may be found in individual differences. The number of children in this age group who derive measureable relief from the proximity of inanimate objects may be quite small. Their representation in this sample may have been inconsequential. Another possibility eluded to above is that the distress inhibition obtainable from a small inanimate object was insignificant relative to the capacity of the experimental situation to evoke distress in the younger children.

Several other results warrant discussion. Among these is the higher rate of locomotor exploration by younger children than older children during the baseline phase, which was contrary to prediction. It was assumed that in this unfamiliar situation, older children would be more comfortable. An alternative construction, consistent with the findings, is that both younger and older subjects were comfortable in the presence of the mother during the baseline, but the total situation was more novel for the younger child and, hence, elicited more locomotor exploration. A question remains as to why subjects, especially younger subjects, did not show a reduction in exploration in the mother absent conditions of the test phase? A possible clue may be found in the table of correlations among variables. With younger subjects (13 months) Ainsworth and Bell (1969) found an inverse relationship between exploration and crying. The positive relationship found between locomotion and crying in the test phase of the present study seems to indicate that the locomotion score reflected an

attachment behavior of searching rather than an exploratory behavior. Also the positive relationship between locomotion and searching points to the interpretation that, in this situation, locomotion reflected searching for the absent mother. The real problem with their score is that it may reflect searching (distress) in some subjects and exploration (no distress) in others.

The searching variable, adapted from the one used by Ainsworth and Bell (1969), proved to be less useful in discriminating between age groups and between treatment conditions than the two scores which were summed to produce the searching variable. Of these two scores, attentional focus on the door area seemed to be a good measure of attachment behavior, in that it was positively related to crying, and negatively related to play. Attentional focus on the mother's chair, the second behavior which went into the searching variable, did not prove to be related to any other variable in the study, except, of course, the composite searching score to which it contributed. In summary, of the dependent measures employed in the present design, the variables which provided the greatest utility in distinguishing between groups during the treatment or test phase of the experiment, were exploratory play, crying, and attentional focus on the door area. This last variable can be considered a form of searching.

The lack of relationship between protest upon being separated from the mother at the intermission and crying when left alone during the test phase, undersocres the importance of designing experiments to separate these two reactions as much as possible. The child who protests when his mother departs from view is not necessarily the same child who is distressed when he is alone in a strange place. This finding is evidence of a bias favoring the Mother present condition in designs in which children in the mother present condition are never separated from their mothers.

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Table 1

Summary of Analyses of Variance of Locomotion Scores and Play Scores During the Baseline Phase

Source	df	Locomotion		Play	
		MS	F	MS	F
Treatments (T)	2	2,422.3	1.04	4,976.9	3.25
Age (A)	1	27,155.1	11.59*	1,792.4	1.17
T x A	2	5,836.3	<1	327.1	<1
Error	30	2,340.4		1,531.3	

*$p < .005$

Table 2

Summary of Analyses of Covariance of Fast-Phase Scores of Locomotion and Play Using Baseline Scores as the Covariate

Source	df	Locomotion		Play	
		Adj. MS	F	Adj. MS	F
Treatments (T)	2	2,072.2	<1	14,363.5	5.09*
Age (A)	1	4,540.2	1.75	34,950.8	12.38**
T x A	2	320.3	<1	15,876.3	5.62*
Error	30	2,589.7		2,824.1	

*$p < .05$

**$p < .01$

Table 3

Summary of Analyses of Covariance on Test Phase Socres of Three Variables Related to Attachment, Using Baseline Scores as the Covariate

Source	df	Variable					
		Searching		Mother's Chair		Focus on Door	
		Adj. MS	F	Adj. MS	F	Adj. MS	F
Treatments (T)	2	4,115.9	1.04	13,741.8	8.34*	2,020.2	1.06
Age (A)	1	12,090.1	3.07	64.7	<1	4,140.5	2.18
T x A	2	1.731.4	<1	1,579.8	<1	1,936.1	1.02
Error	29	3,940.1		1,650.0		1,902.4	

*p<.01

Table 4

Contingence Tables of Attentional Focus on the Door Area during the Test Phase in Younger and Older Age Groups, and in Mother Absent and Mother Present Treatment Conditions

Focus on Door	Age Group		Total
	Younger	Older	
Yes	9	2	11
No	9	16	25
Total	18	18	36

Focus on Door	Treatment		Total
	Mother Absent	Mother Present	
Yes	9	2	11
No	15	10	25
Total	24	12	36

Table 5

Contingency Table of Crying during the Test Phase

Age Group	Treatment			Total
	Familiar Toy	Novel Toy	Mother Present	
Younger	6	2	0	8
Older	0	0	0	0
Total	6	2	0	8

Table 6

Individual Correlations between Dependent Variables and Subject Age (N=36)

Variable	2	3	4	5	6	Age in Months
1. Locomotor exploration measured in steps (test phase scores)	-.38*	.44**	.34*	.15	.29*	-.60**
2. Exploratory play measured in seconds (test phase scores)		-.78**	-.35**	.08	-.55**	.36*
3. Crying measured in seconds (test phase scores)	.38*	-.17		.68**		-.40**
4. Searching behavior measured in seconds (test phase scores)		.67**		.62**		-.40**
5. Attentional focus on mother's chair area measured in seconds (test phase scores)				-.16		-.09
6. Attentional focus on door area measured in seconds (test Phase scores)						-.44**

*p<.05
**p<.01

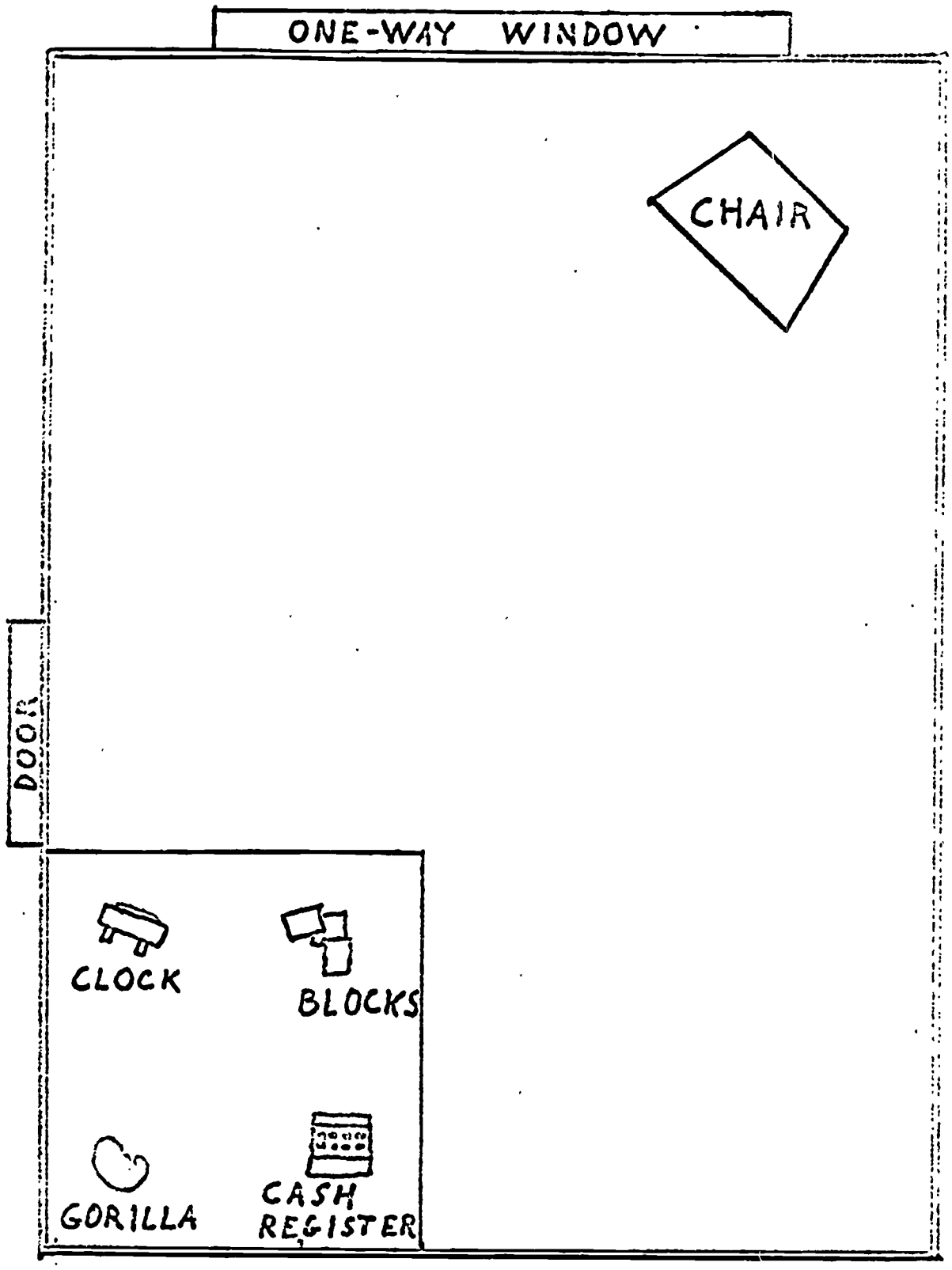
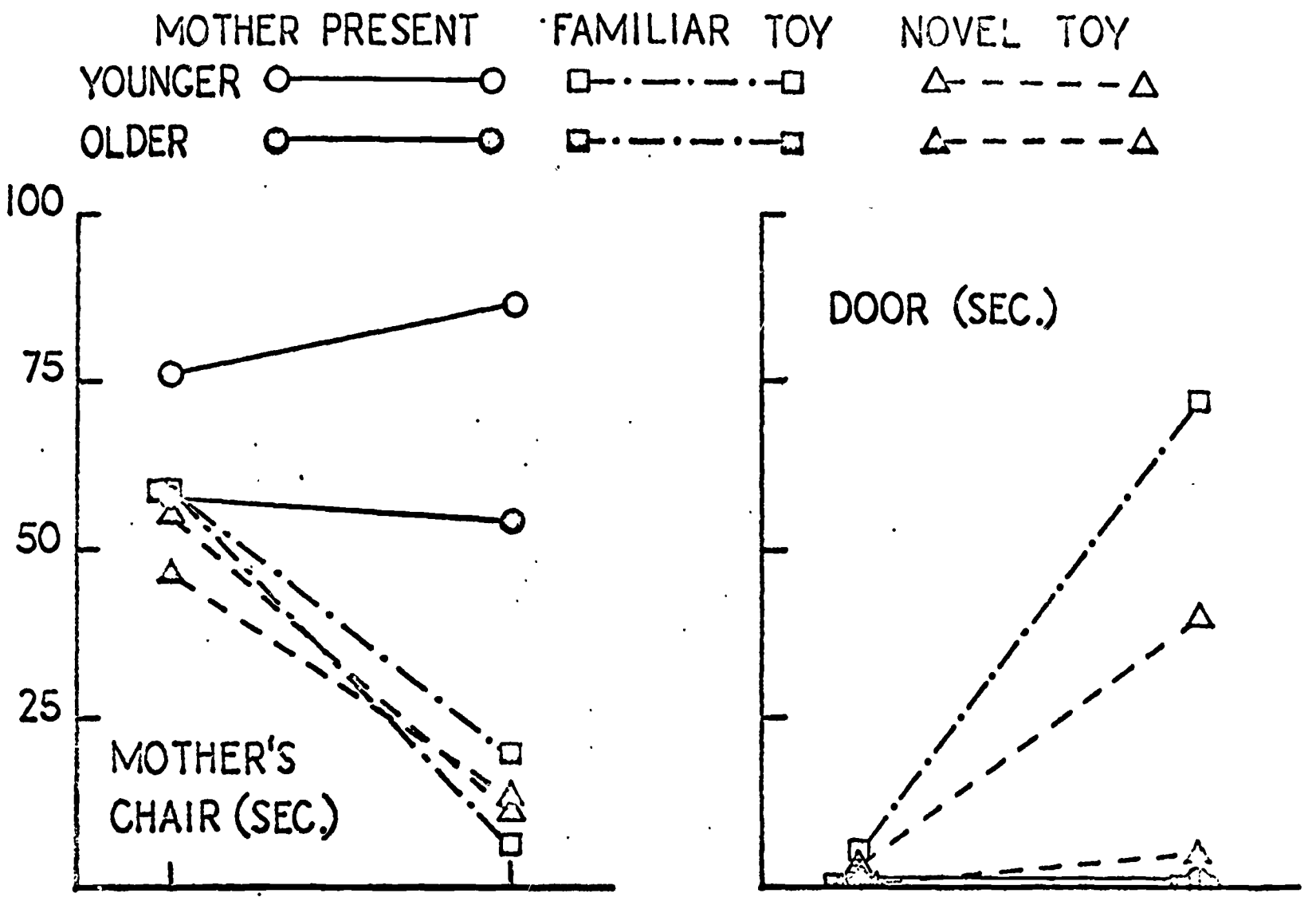


Fig. 1 Experimental room.

Figure: Title

Fig. Plots of baseline and test phase cell means of four variables. Locomotor exploration, exploratory play, attention focus on the mother's chair, and attention focus on the door.


MOTHER PRESENT
FAMILIAR TOY
NOVEL TOY
YOUNGER
OLDER
100
75
50
25
MOTHER'S CHAIR (SEC.)
DOOR (SEC.)
200
150
100
50
LOCOMOTION (STEPS)
PLAY (SEC.)
BASELINE
TEST
PHASE
BASELINE
TEST
PHASE

APPENDIX A

FAMILIAR TOYS BROUGHT BY MOTHERS TO EXPERIMENTAL SESSIONS

Description of toy or object	Number of mothers who brought this toy or object
Blanket	5
Tractor	3
Fire engine	3
Matchbox toys	3
Doll	2
Book	2
Tricycle	2
Truck	2
Blocks	1
Gun	1
Xylophone	1
Lawnmower	1
Record player	1
Stuffed Dog	1
Teddy bear	1
Stuffed donkey	1
Drawing pad and crayons	1
Milk wagon and bottles	1
Jigsaw puzzle	1
Spaceship	1
Car	1
	36 total