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ABSTRACT

The present study compared the presence of sibling versus non-sibling partners in relation to the exploratory behaviors of toddlers in a novel environment. It was predicted that young children would use siblings as a secure base from which to explore the environment even in the absence of an adult attachment figure, whereas the presence of a non-sibling was expected to be less facilitative of such activity. Data from 20 children with a mean age of 2.8 years were analyzed according to physical exploration (locomotor and play activities) and social interaction with the older partner. All subjects who were eliminated from the study due to distress in the unfamiliar environment were with non-siblings at the time. When toddlers were paired with their own siblings, they explored more areas of the room, played with more toys, and ventured greater distances from their partners than when they were paired with an unrelated child. (Author)

Siblings as Facilitators of Exploratory Play in Young Children

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Abstract

The present study compared the presence of sibling versus non-sibling partners in relation to the exploratory behaviors of toddlers in a novel environment. It was predicted that young children would use siblings as a secure base from which to explore the environement even in the absence of an adult attachment figure, whereas the presence of a non-sibling was expected to be less facilitative of such activity.

Data from 20 children ($\bar{x}$ age = 2.8 years) were analyzed according to physical exploration (locomotor and play activities) and social interaction with the older partner. All Subjects who were discontinued due to distress in the unfamiliar environment were with non-siblings at the time. In addition, when paired with their own siblings, toddlers in this study explored more different areas of the room, played with more different toys, and ventured greater distances from their partners than when paired with an unrelated child.

Siblings as Facilitators of Exploratory Play

in Young Children

In 1979, Dunn and Kendrick proposed several new directions to guide future investigations of early sibling relationships; one of these was to examine "the interaction between young siblings to see how far the interaction between them mirrors the interaction between parent and child, provides the 'social functions'... the developing child needs, and overlaps the patterns of exchange we see between the child and other family members " (p. 144).

Thus the purpose of the present study was to observe whether or not young children behave as if they are using a sibling as a secure base from which to explore a new environment, and whether this differs from their behavior in the same environment with an unrelated child. This parallels earlier efforts in the literature which have examined children's exploratory behavior in the presence of the mother or father versus a strange adult.

Attachment theory, as formulated by researchers such as Bowlby (1958, 1969); Ainsworth and Bell (1970); and Lamb (1982), proposes that once the human infant has formed a secure attachment, the presence of the attachment figure will serve as a secure base from which the infant then copes with unknown and unfamiliar events, and explores the environment with active interest.

While much of the earlier research in this area was concerned with the mother as the primary caregiver or

attachment figure, more recent efforts have expanded our understanding of early social-emotional development by including fathers, and by demonstrating unequivocally that infants become attached to both parents (Cohen & Campos, 1974; Lamb, 1975, 1976; Kotelchuck, 1976). As Lamb (1982) states, "the most important factor determining to whom infants will attach appears to be time: infants form attachments to those people who have been available to them extensively and consistently during the first 6-8 preattachment months" (p. 197). If this is indeed the case, then multiple caregivers, extended family members, and children as well as adults could all function as attachment figures, though perhaps with some differences in style when compared to the behaviors of the mother or father.

It seems reasonable to assume that older siblings might also facilitate exploratory behaviors in young children, in much the same way as has been demonstrated for fathers and other non-maternal figures. Samuels (1980) has investigated the presence of older siblings, in addition to the mother, in relation to infant locomotor exploration in an outdoor play area. Results indicated that "when older siblings were present, infants went further from their mothers, traversed a larger area of the yard, left their mothers more quickly, and stayed away longer" (Samuels, 1980, p. 607). Relatively little has been done, however, to examine this effect with toddlers and siblings (in Western cultures, that is) in the absence of any adult caregiver or attachment figure.

Lamb (1978) found that although infants may prefer parents over siblings when the choice is available, siblings nevertheless facilitate toy encounters in a way that parents seldom do. As Lamb comments, "it may be incorrect to assume because there is little direct interaction between infants and siblings that siblings play an insignificant role in the infant's development" (Lamb, 1978, p. 57). Thus we would assert that siblings may both supplement and complement the parent-infant dyad, bringing to it their own unique social and cognitive characteristics which may also have important influences on the developing younger sibling.

The purpose of the present study was to investigate the effects of a sibling's presence (without an adult attachment figure) on the exploratory behaviors of young children in a novel environment. Since there is already substantial documentation of the behavior of infants and toddlers with and without the primary caregiver, this effort compared the presence of an older sibling with that of a previously unfamiliar older child. It was anticipated that young children with siblings present would use them as a secure base from which to explore the environment, whereas the presence of an unfamiliar child was expected to be less effective in facilitating such activity.

Predictions were made according to two basic categories of the younger child's behavior: 1) exploration of the physical environment, and; 2) social interaction with the older child. It was expected that all behaviors involving

active initiation on the part of the toddler (such as movement around the room, playing with different toys, seeking assistance from the older child) would occur more frequently in the presence of the older sibling. By contrast, it was predicted that passive behaviors which might signal the toddler's need to become familiar with the new surroundings or the other child (such as visual exploration, or gazing from a fixed position) would be more prevalent in the unfamiliar child condition.

Methods

Subjects

Twenty-eight target children (mean age 2.9 years) were each paired once with an older sibling and once with an unfamiliar older child for two five-minute observations in a pre-arranged playroom setting which was also unfamiliar to the children. This age group (2 to 3 years) was chosen in order to observe toddlers who would hopefully be beyond the stage of more extreme stranger anxiety, and who would also be mobile and independent enough for parents to agree to leave them alone with an unfamiliar child. The average age of the older siblings was 6.6 years, with an average age difference between subject and sibling being 3.7 years. Nine of these pairs were same-sex and 11 were opposite-sex siblings; in the non-sibling pairs, same-sex and opposite-sex pairs were equally distributed.

Two older children, a boy and a girl, served as the unrelated children throughout the study for the non-sibling

condition. These children functioned essentially as passive participants during each observation; that is, they were not expected to initiate interactions with or to instruct the toddler subjects, and were not the focus of any observations.

Physical Environment

The research area was comprised of three adjoining rooms: a waiting room for parents and older children; an observation booth, not visible to participants in the adjacent rooms; and a playroom measuring approximately 6 X 7 meters. The playroom was decorated with posters and children's drawings, and equipped with toys such as a rocking horse, stuffed animal, ball, and telephone for the younger children. A chair and table for the older child were located in one corner, with books, paper, and drawing materials available for their use. The older child sat facing away from the target subject, since he/she was not expected to initiate interaction with the younger child. Beginning one meter from this corner, brightly colored tape on the floor marked off the radii of 3 partial circles, each approximately one meter apart. In addition, each semi-circle was further divided into three grids, so that the room included a total of seven possible areas for exploration by the younger child.

Prior to each observation, toys were arranged according to a standardized scheme so that the grids always contained the same equipment for each pair of children. Toys were set out on the floor, and one box containing a variety of small toys, books, and animals was accessible in the farthest

corner of the room opposite the older child.

Procedures

The order of observations was balanced randomly, with half of the subjects being with their own siblings first and half of them being observed with an unfamiliar child first. The following instructions were given to the children when they were first shown the playroom:

(To younger subject): "Now I'm going to let you use these toys in our playroom. Some other children your age have already been playing with them, and now it's your turn."

(To older child): "This table and chair are set up for you with books, magic markers, etc. For about five minutes you need to sit right here and just let (S's name) play with whatever he/she wants to. At the end of five minutes, I'll come back with another child to take your place. When they're all finished, then you can come back and play too. If (S's name) cries, I'll be right in to help. Do you understand? Any questions?"

(Again to younger subject): "Now you can play with anything in this room while I go next door."

(To both children): "I'll be back in just a few minutes."

At the end of one observation session, the second partner received comparable instructions and entered the playroom to replace the first child.

Three trained observers alternated with coding behaviors, escorting parents and children to and from the

various rooms, and coding simultaneously to check reliability. An audio-tape signal was used to confine each observation unit to 10-seconds, with 10-second pauses between each for recording behaviors on a pre-defined coding sheet. Information obtained for each target child included their geographical location within the room; duration, frequency, and nature of their locomotion, play, and exploratory activity; and latency to first occurrence of distress behavior such as crying. (Observations were terminated if a child continued to cry for longer than 15 seconds.)

After initial training for inter-observer coding agreement, reliability checks were obtained for approximately 1/4th of the actual observations. By comparing the number of agreements on occurrences of target child behavior, to the total number of agreements plus disagreements on such occurrences, an overall reliability rate of 96% was obtained, with a range of 82 to 100% agreement across 16 behaviors.

Results

Dependent measures were analyzed in two separate categories: 1) "Exploration Variables" (locomotor, exploratory, and play behaviors); and 2) "Social Interaction Variables" (seeking assistance from, looking at, or talking to the older partner). Non-normal distributions in some instances made log tranformations necessary; where such transformations still did not correct the distribution, variables had to be dropped from multivariate analyses of variance. The latter occurred for three variables altogether,

as can be seen in Tables 1 and 3.

Of the original sample of 28 target children observed, 7 were discontinued due to distress during a play session; since all such cases occurred with the unrelated child rather than with a sibling, regardless of which condition had been first, this finding in itself supports the hypothesis of greater fear-wariness with a non-sibling. Data for one child were also disregarded when it became evident that the child and sibling had essentially changed roles during their entire observation session together (i.e., the older sibling ran around the room playing with toys, while the toddler sat quietly at the desk and looked at books.) The mean age for discontinued subjects was slightly lower ($\bar{x}$ = 2.49 years) than for the subjects who remained for both conditions ($\bar{x}$ = 2.8 years). After elimination of the previously mentioned subjects, data for 20 toddlers were subjected to further analyses.

In addition, 4 subjects who were with their siblings during the first 5 minutes became virtually immobilized when the unfamiliar child entered the room, and subsequently maintained a rigidly fixed location throughout the non-sibling condition. Again, this supports the prediction that toddlers would explore a novel environment more freely in the presence of a sibling than an unrelated child.

Exploration Variables

Condition effects. Mean scores of exploratory behavior by toddlers with siblings and with non-siblings are presented

in Table 1. In all variables except one (Visual Exploration of Room, i.e., without movement), scores are somewhat higher when subjects are paired with siblings than with an unfamiliar child; however, this difference is significant only in the case of Number of Grid Changes made by the toddler when the older sibling was in the room ($F = 4.98$, $df = 1,18$, $p < .05$). Nevertheless, since this variable is the most relevant indicator of locomotor activity in the observation scheme used, this finding lends support to the hypothesis that siblings may indeed facilitate this behavior on the part of toddlers more effectively than do non-siblings.

Insert Table 1 about here

Order effects and interactions. Exploratory behaviors by toddlers vary according to whether they are with the sibling or non-sibling during the first phase of observation. This result can be seen in Table 2. When scores of both pairs are combined, two significant differences emerge: mean scores for both Number of Grids Entered ($F = 7.43$, $df = 1,18$, $p < .05$) and Visual Exploration of Room ($F = 10.73$, $df = 1,18$, $p < .01$). These behaviors are significantly more frequent when toddlers are paired first with an unfamiliar child. Nevertheless, toddlers were more active (i.e. physically mobile, as indicated by Number of Grid Changes) with their siblings regardless of order of appearance of the older

child.

The general tendency seems to be for each group to explore more actively during the first five minutes in an unfamiliar playroom. However, another striking finding here is that toddlers in the sibling-first group show dramatically diminished exploratory behavior on several variables when their siblings leave the room and are replaced by an unfamiliar child.

Insert Table 2 about here

Social Behaviors

Table 3 presents descriptive data for social interaction behaviors, according to whether the toddlers were paired with a sibling or an unrelated child. Clearly the tendency, though not statistically significant, seems to be for the younger child to engage in more direct interaction with the partner (talking to or seeking asistance from him or her) when paired with a sibling. On the other hand, more time is spent simply observing the other child when he or she is not already familiar to the toddler. This is consistent with the finding that there is a greater tendency for the toddlers to look around the room without becoming actively engaged when paired with an unfamiliar child. Nevertheless, overall frequencies of these behaviors were low, and few children actually engaged in them to any meaningful degree. In two cases, distributions did not lend themselves to further

analyses, and in the one remaining social interaction variable (Looking at Older Child), results revealed no significant differences.

Insert Table 3 about here

Discussion

The purpose of this study was to contrast the exploratory behavior of toddlers in a novel playroom environment under two conditions: in the presence of an older sibling versus the presence of an older unfamiliar child. Of particular interest was whether the sibling would seemingly provide a base of security and familiarity which would then enable the younger child to become actively engaged in the new environment to a greater extent than when the younger child was with an unrelated older child.

The present study's findings that overt distress and immobilization by toddlers in a novel environment occurred only in the presence of an unfamiliar older child, supports the notion that siblings are effective in reducing apprehensiveness in such situations. Conversely, exploratory behavior, as seen particularly in moving around the room, was significantly more evident among toddlers in sibling pairs. The tendency toward more visual exploration of the surroundings among target children with non-siblings, though not statistically significant, also fits the expected pattern. This variable, an indicator of passive observation,

was coded only when it occurred in the absence of locomotor or other exploratory behaviors.

The importance of order effects in any study involving varying social partners must not be overlooked, although such effects are not always easily explained. It is perhaps understandable that toddlers would spend more time looking around the room during their initial period of orientation (i.e., the first 5 minute session); however, the fact that this lasted significantly longer with unrelated partners would seem to indicate that with a sibling present, the same toddlers are able to proceed with other means of discovering their new environment more readily.

It would be informative for further investigative efforts in this area to examine toddlers' exploratory behaviors when paired with a child who has been explicitly instructed to care for, comfort, and assist the younger one in adjusting to the new surroundings. Stewart (1983), for example, found that over half of the older children observed in his study responded spontaneously to their infant siblings, using behaviors which were considered to be nurturant and reassuring in the absence of the parent. Since these behaviors were demonstrated without prompting or instruction, it is very likely that they could also be systematically manipulated to empirically examine their effects on the infant.

In conclusion, it may be that a greater sense of trust and of knowing what to expect when paired with a sibling can

help toddlers overcome their apprehensiveness in a new environment in which they do not know what to expect, or with a new caregiver with whom they are unfamiliar. The use of siblings in multi-age child care programs may therefore be helpful in facilitating the initial adaptation of toddlers to a new environment. That is, in preschool centers enrolling children from infancy up to kindergarten age, older brothers and sisters may be able to ease the transition of a younger child into group care.

Sibling research in recent years has moved away from the notion that rivalry and competition for parents' attention are the most pervasive aspects of relationships among children in the same family. Studies such as those reported by Abramovitch, Corter and Lando (1979), Dunn (1983), Dunn and Kendrick (1979, 1982), Meison, Fogel and Mistry (1986), and Pepler, Abramovitch and Corter (1981) have established an important precedent by also examining ways in which brothers and sisters exhibit prosocial behaviors, empathy, and cooperation with one another. The present study provides preliminary evidence that the presence of siblings can play a role in helping toddlers avoid or overcome apprehensiveness in a new environment, while at the same time facilitating their exploratory behavior.

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Behavior by Toddlers in Sibling and Non-Sibling Conditions

behavior	Sibling pairs $\bar{X}$	s.d.		Non-sibling pairs $\bar{X}$	s.d.
ifferent tered	4.90	1.17		4.10	2.10
rid	11.10	6.39	*	7.05	5.37
oration of	4.00 (1.49)[a]	2.49		5.40 (1.63)[a]	3.91
ntervals se [b]	11.30	4.35		11.00	4.53
ifferent d	3.25	1.48		2.80	1.74
intervals of use [b] away)	1.90	3.14		1.70	3.15

siblings

20

pairs of siblings and of non-siblings.

ormations applied to correct for non-normal distribution.

[b]Due to non-normal distributions not correctible by log transformations, these variables were omitted from statistical analyses.

1

22

Table 2

Exploratory Behavior by Toddlers: Effects of Condition and Order of Sibling or Non-Sibling Partner

Exploratory behavior	Siblings first			Non-Siblings first			Order effects	Order-by-condition interaction
	Siblings	Non-Siblings	Combined	Siblings	Non-Siblings	Combined		
Number of different grids entered	5.33	2.67	4.00	4.55	5.27	4.91	*	* *
Number of grid changes	13.22	4.44	8.83	9.36	9.18	9.27	n.s.	*
Visual exploration of room (log transformation)	1.36	1.19	1.27	1.59	2.00	1.79	* *	n.s.
Number of different toys used	3.89	2.00	2.94	2.73	3.45	3.09	n.s.	*

Note. N=20 pairs of siblings and of non-siblings. All numbers refer to means for each behavior.

* $p < .05$

** $p < .01$

Table 3

Social Interaction Behaviors by Toddlers in Sibling and Non-Sibling Conditions

Social interaction behavior	Sibling pairs $\bar{X}^c$	Sibling pairs s.d.	Non-sibling pairs $\bar{X}^c$	Non-sibling pairs s.d.
Seek assistance from partner[b]	2.10	2.97	.75	2.17
Look at partner[a]	4.35	1.98	5.35	3.91
Talk to partner[b]	2.55	2.91	2.20	4.43

Note. N=20 pairs of siblings and of non-siblings. No significant main effects or interactions were found.

[a]Log-transformation was applied to correct for non-normal distribution of this variable.

[b]Due to non-normal distributions not correctible by log-transformations, these variables were omitted from statistical analyses.

[c]Means represent the number of coding intervals during which this behavior occurred during observations.