

Sex differences in 1-, 3-, and 5-year-olds' toy-choice in a structured play-session

ANNA SERVIN, GUNILLA BOHLIN and LISA BERLIN

Department of Psychology, Uppsala University, Sweden

Servin, A., Bohlin, G. & Berlin, L. (1999). Sex differences in 1-, 3-, and 5-year-olds' toy-choice in a structured play-session. *Scandinavian Journal of Psychology*, 40, 43–48.

This cross-sectional study investigated toy-choice in 38 one-year-old, 33 three-year-old, and 35 five-year-old children, who could choose between 10 different toys (four feminine, four masculine, and two neutral) in a structured play-session. The children played alone for 7 minutes and together with their accompanying parent for another 7 minutes (play-status). The results showed that girls and boys chose different toys from as early as the age of one year (Mdn = 12 months). These sex differences were found at all three ages. In contradiction to earlier studies, our results showed that feminine toys became less interesting for both girls and boys with increasing age. The present study showed no consistent effects of play-status. This study contributes to the knowledge of how early behavioral sex differences can be observed, how these differences develop, and it also raises questions concerning what sex differences stem from.

Key words: Sex differences, play, toy choice, preschool children.

Anna Servin, Department of Psychology, Uppsala University, Box 1225, S-751 42 Uppsala, Sweden

Although there is an abundance of studies on sex differences, the debate is still hot concerning which differences are replicable and what the contribution from culture versus biology is. One area where sex differences have most convincingly been demonstrated concerns play behavior and, in particular, play with sex-stereotyped toys (Maccoby & Jacklin, 1974). Studies within this area have demonstrated that preschool girls and boys prefer toys that are stereotyped for their own sex and, thus, that girls and boys differ in the amount of time they play with these toys (Caldera *et al.*, 1989; Berenbaum & Hines, 1992; Hines & Kaufman, 1994; Robinson & Morris, 1986). Girls usually play more with dolls, tea and kitchen sets, and dressing-ups, while boys prefer construction and transportation toys (Hines & Kaufman, 1994).

The observed sex differences in play behavior have been explained both in terms of socialization and in terms of biology. The reinforcement principle has been invoked as a socialization agent to explain how sex differences develop. It has been shown that parents, siblings, peers, and teachers react more positively to sex-stereotyped behavior and to play with sex-stereotyped toys, than to cross-stereotyped behavior and to play with neutral or cross-stereotyped toys (Fagot, 1978; Fagot & Hagan, 1991; Fisher-Thompson, 1993; Lamb *et al.*, 1980; Langlois & Downs, 1980). From the biological viewpoint it has been argued that the fact that parents reinforce sex-stereotyped play behavior does not mean that sex differences are due to solely environmental influences; parental behavior may act to strengthen or modify biologically based sex differences. The biological view has been supported by research on play behavior in girls with Congenital Adrenal Hyperplasia (CAH), who prenatally have elevated levels of male hormones, andro-

gens. As compared to unaffected controls, CAH girls tend to show greater preference for construction- and transportation toys (Berenbaum & Hines, 1992; Berenbaum & Snyder, 1995; Berenbaum & Therrell, 1994; Collaer & Hines, 1995; Hines & Kaufman, 1994). However, advocates of the environmental position have questioned whether findings from a group of girls with a chronic disease can be generalized to normal populations.

Hypotheses about what gives rise to sex differences are difficult to test formally. However, by starting observations at an early age, when environmental effects presumably are less significant, and tracing the effects across the preschool years, the importance of the culture—the reinforcing environment—would be possible to examine. Although some previous studies have used this approach, existing data do not present a clear picture. O'Brien and Huston (1985a) conducted a cross-sectional study of children in three age groups with the average age of 17, 23, and 28 months. They reported that girls and boys showed different developmental toy-preference patterns across age; girls increased their play with feminine toys and decreased their play with masculine toys with age, while there were no significant trends across age in boys' play with the two types of toys. Analyses across the three age groups showed that girls and boys played most with the toys stereotyped for their own sex. From the trend data the authors concluded that boys' preferences for same-sex toys appeared earlier than did girls' preferences, and that girls younger than 20 months did not select feminine toys more often than they selected masculine toys. It should be noted that, since the age groups were not analyzed separately, it is not known to what extent there were sex differences in the youngest age group concerning time spent with different kinds of toys.

Another study (Blakemore *et al.*, 1979), in which children aged two, four, and six years were asked to choose which toy they liked best using pairs of pictures of feminine versus masculine toys, also found that girls in the youngest group did not show sex-stereotyped preferences. The data by Turner *et al.* (1993) may suggest more long-lasting differences in developmental patterns for boys and girls, because even at the age of 4 to 4.5 years girls were found to be less sex-stereotyped in their toy preferences than boys.

In sum, differences between girls' and boys' play behavior have been studied and demonstrated from about the age of two years. Boys seem to develop a preference for same-sex toys earlier than girls. Girls seem to increase their preference for same-sex toys as they grow older. Except for the study by Caldera *et al.* (1989), who observed sex differences at the age of 20 months, the very few studies that have included children below the age of two years have not analyzed the youngest children separately but have conducted analyses across age groups (O'Brien & Huston, 1985a; O'Brien & Huston, 1985b). Thus, the developmental issue is unsettled both with regard to how early these sex differences in play behavior can be observed and with regard to how sex-stereotyped toy preferences develop.

The present study

The purpose of the present cross-sectional study was to investigate sex differences with particular focus on very young children and on developmental trends. For this, we chose to study children's toy-choices at the age of one, three, and five. Toy choices were studied by assessing the time the children spent with feminine and masculine toys during a play-session, and as choice of a gift to bring home.

We also aimed to investigate parents' influence on their children's play behavior from a developmental perspective. Investigating parental influence, by comparing children's play when they played alone and together with their parent, made exploration of the reinforcement hypothesis possible.

METHOD

Participants

The sample consisted of thirty-eight 1-year-old (19 girls and 19 boys), thirty-three 3-year-old (18 girls and 13 boys), and thirty-five 5-year-old (21 girls and 14 boys) children (Mdn = 12 months, Range 12–14 months; Mdn = 36 months, Range 35–38 months; Mdn = 60 months, Range 59–62 months) living in Uppsala, Sweden (a university city and also the country's fourth largest city). They were randomly recruited from all children born during two specified months for every age-category. A further inclusion criterion was that the family was listed in the official telephone directory. Of the 193 families contacted, 104 (54%) agreed to participate and to visit the departmental laboratory. The main reason for refusal was shortage of time. A video-recording failure occurred when one of the 5-year-old girls visited the department, and as result, there are 20 girls in the analyses of the 5-year-olds' play behavior.

The families could choose, for practical reasons, whether the mother or the father would participate. Out of 104 parents, there were 80 mothers (43 daughters and 37 sons) and 24 fathers (15 daughters and 9 sons).

The mothers in the three groups were on the average 31, 34, and 34 years, and the fathers were 33, 36, and 38 years old. The parents' average educational level was high; twenty-two percent of the mothers and 39% of the fathers held a university degree, 46% and 21% respectively had some other more or less advanced post-high school education, 13% and 22% respectively had graduated from a 3-year theoretical high school, and 17% and 11% respectively from a 2-year program. Two percent of the mothers and 7% of the fathers had the compulsory 9 years of schooling as their only formal education.

The proportion of children having older sisters in the three age-groups, were for the girls: 32% 39%, and 35% and for the boys: 42%, 38%, and 21%. The proportion of children having older brothers were, for the girls: 37%, 39%, and 25%, and for the boys: 47%, 31%, and 36%.

Material

Ten different toys, which in earlier studies have been regarded as feminine, masculine, or neutral (Alexander & Hines, 1994; Berenbaum & Snyder, 1995; Fisher-Thompson, 1993) were used in the study. Feminine toys included a soft female doll with blanket and feeding bottle, Barbie and Ken dolls, a plastic tea set in toy-size, and a toy-version of a beauty-set (two brushes, a comb, a mirror, a hair-slide, a bracelet, and a necklace). Masculine toys included a bus, a garage with four cars, a construction toy (Lincoln Logs), and two fighting-figures (X-men). Neutral toys included a View-master and playing cards with pictures of characters in a comic strip. The toys were arranged in a standard order on the floor in a semicircle in front of the child, with every other toy being feminine and masculine, respectively. The neutral toys were in the middle, in front of, the child. The toys lay in the following order (from left to right): the doll, the construction toy, the beauty-set, the fighting-figures, the playing cards, the View-master, the Barbie and Ken dolls, the bus, the tea-set, and finally the garage. The child was placed in the middle of the semi-circle so that the child initially was at the same distance from all toys. But as all children were mobile, the distance was probably not an important factor.

Procedure

Parents and children were told that the purpose of the study was to investigate what children between the age of one and five like to play with.

To investigate both the children's own choice of toys and the parents' behavior during the play-session, all children played alone for exactly 7 minutes (the parent sat just outside the semicircle) and together with the parent for another 7 minutes. The order of play-status (alone versus together with the parent) and the position of the parent (when the child played alone) were randomized. The parents were instructed to sit close to the toys (outside the semi-circle) even when they did not play with them because the 1-year-olds might otherwise leave the toys and go to the parent. The 2 × 7-minute-sessions were videotaped for later scoring.

The instructions for the parents for playing together with their child were that they should play together as they usually would, and when they sat outside the semi-circle that they should let the child play alone and not encourage or direct the child's play.

The children received a gift at the end of the visit. They were able to choose between a doll (feminine), a car (masculine), and a ball (neutral). The visit took approximately 45 minutes.

Table 1. Analysis of variance for sex-stereotyped toy-choice in 1-, 3-, and 5-year-old girls and boys, playing with and without their parent (play-status)

	1-year-olds		3-year-olds		5-year-olds	
	df	F	df	F	df	F
<i>Masculine toys</i>						
Sex (A)	1,36	5.32*	1,29	27.56***	1,32	5.70*
Play status (B)	1,36	5.20*	1,29	0.32	1,32	0.54
A × B	1,36	0.11	1,29	4.03	1,32	1.64
<i>Feminine toys</i>						
Sex (A)	1,36	2.89	1,29	9.74***	1,32	13.56***
Play status (B)	1,36	0.00	1,29	0.07	1,32	0.23
A × B	1,36	0.04	1,29	1.78	1,32	0.25
<i>Neutral toys</i>						
Sex (A)	1,36	0.23	1,29	0.58	1,32	0.23
Play status (B)	1,36	1.12	1,29	0.75	1,32	0.02
A × B	1,36	0.63	1,29	0.47	1,32	1.24

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Analyses

We scored the number of seconds the children played with each toy. Play was defined as being in direct contact with the toy. If the child played with several toys simultaneously, time was scored for each toy. The amount of play-time spent with each separate toy and with each of the three toy-categories (masculine toys, feminine toys, and neutral toys) was summed and analyzed. Half of the tapes were scored by two independent raters, giving a high inter-rater reliability ($r = 0.98-1.0$). Which gift the children chose to bring home was recorded by the experimenter.

We had planned to score which toys the parents initiated play with when they played "as they usually would", but as the parents to a large extent awaited their child's initiatives, very few parental initiatives were taken. Therefore, meaningful analyses of parental behavior could not be performed.

To investigate whether the accompanying parents' sex influenced the children's play, all major analyses were done controlling for parents' sex. As these analyses yielded similar results as the straight-forward ones, the results of the latter were chosen to be reported. Only one analysis resulted in a different conclusion, and is reported in its context.

RESULTS

A two-way analysis of variance with sex of child and play-status (repeated measure) as factors were performed for each age-group, with the amount of time the child played with each toy category as the dependent variable. The ANOVA results are presented in Table 1.

There were significant main effects of sex for the masculine as well as the feminine toy category in all analyses except for the 1-year-olds' play with the feminine toys. Where sex differences were found, the girls played more with the feminine toys, and the boys played more with the masculine toys. In no age-group did girls and boys differ significantly in the amount of time they played with the neutral toys.

There were no consistent effects of play-status (the children's play alone versus their play together with their

parent) to indicate that the parent influenced the children's play behavior in a sex-stereotyped way. The main effect of play-status for masculine toys was significant for the 1-year-olds ($F(1,36) = 5.20$, $p < 0.05$). When the 1-year-olds played with their parent ($M = 167.74$, $SD = 116.03$), both girls and boys played more with the masculine toys than they did when they played alone ($M = 129.00$, $SD = 101.15$). However, this effect disappeared when we controlled for parents' sex ($F(1,35) = 1.76$, ns).

Since there were no consistent sex-stereotyped effects of play-status, we used the "total play" time of 14 minutes in further analyses. Table 2 shows descriptive data for girls' and boys' total play with masculine and feminine toys together with effect sizes for the sex differences, which were moderate to large.

Each toy analyzed separately

We conducted one-tailed t -tests for each toy to investigate if there was any particular toy in the toy-categories that differentiated girls' and boys' toy-choice during the 14 minutes of play.

The 1-year-old girls played significantly more than the boys with the plastic tea set ($t(36) = 2.40$, $p < 0.01$). The boys played significantly more than the girls with the bus ($t(20) = -1.88$, $p < 0.05$), the construction toy ($t(26) = -2.83$, $p < 0.01$), and the garage ($t(25) = -1.81$, $p < 0.05$). The results for the X-men were in the opposite direction. The girls played more with the X-men than the boys did. A two-tailed t -test showed the effect to approach significance ($t(24) = 1.81$, $p = 0.07$).

The 3-year-old girls played significantly more than the boys with the Barbie and Ken dolls ($t(18) = 2.64$, $p < 0.01$) and with the beauty set ($t(23) = 4.23$, $p < 0.001$). The boys played significantly more than the girls with the bus ($t(22) = -2.16$, $p < 0.05$), the construction toy ($t(22) = -2.46$, $p < -0.01$), and the garage ($t(19) = -2.75$, $p < 0.01$).

Table 2. Effect sizes for the differences between girls' and boys' play time (seconds) with masculine and feminine toys

	Masculine toys	Feminine toys
<i>1-year-olds</i>	$d = -0.76$	$d = 0.54$
Girls	$M = 114.48$ $SD = 75.02$	$M = 275.08$ $SD = 98.20$
Boys	$M = 182.29$ $SD = 103.93$	$M = 220.82$ $SD = 103.27$
<i>3-year-olds</i>	$d = -1.92$	$d = 1.23$
Girls	$M = 139.75$ $SD = 77.45$	$M = 215.83$ $SD = 156.92$
Boys	$M = 279.88$ $SD = 67.09$	$M = 73.19$ $SD = 56.90$
<i>5-year-olds</i>	$d = -0.84$	$d = 1.36$
Girls	$M = 150.42$ $SD = 104.55$	$M = 139.1$ $SD = 110.83$
Boys	$M = 244.07$ $SD = 123.30$	$M = 23.75$ $SD = 44.08$

The 5-year-old girls played significantly more than the boys with the plastic tea set ($t(25) = 1.99$, $p < 0.05$), the Barbie and Ken dolls ($t(22) = 3.67$, $p < 0.001$), and the beauty set ($t(27) = 2.22$, $p < 0.05$). The boys played significantly more than the girls with the X-men ($t(14) = -2.78$, $p < 0.01$) and tended to play more with the garage ($t(25) = -1.55$, $p = 0.07$).

In sum, except for the 1-year-olds where the girls tended to play more with the X-men than the boys did, all differences were in the predicted direction.

The development of sex-stereotyped toy-choices

A three-way analysis of variance, with sex, age, and toy-category as factors, was carried out to assess developmental trends in stereotyped toy-choice. By looking at effects involving toy category, the results could be analyzed in terms of preferences (Table 3). The non-significant main effect of toy category showed that there was no across sex preference for either category. The highly significant interaction of sex with toy-category supported the analyses conducted separately for each of the two toy categories in showing that girls and boys differed in how much time they spent with masculine as compared to feminine toys. With respect to the developmental trends, the significant effect of toy-category by age reflected the fact that both girls and boys became less involved with feminine toys and more involved with masculine toys across age. Although this finding implies that girls' preferences for feminine toys decreased across age, while boys' preferences for masculine toys increased, the three-way interaction was not significant.

Table 3. A three-way analysis of variance in play time for sex, age, and toy-category

	df	F	p
Toy-category	1,97	2.53	0.12
Toy-category *Sex	1,97	35.79	<0.001
Toy-category *Age	2,97	15.49	<0.001
Toy-category *Sex *Age	2,97	1.88	0.16

Choice of toy gift

Fisher's exact test was used to investigate sex differences in terms of the gift chosen (a doll, a car, or a ball).

The 1-year-old girls and boys did not differ significantly in what toy they chose. The ball was the most popular toy. Thirteen girls (68%) chose a ball, five girls (26%) chose a doll, and one girl (5%) chose a car. Fourteen boys (74%) chose a ball, three boys (16%) chose a doll, and two boys (11%) chose a car.

The 3-year-old girls and boys differed significantly in what toy they chose ($p < 0.01$). The ball was still the most popular toy for both girls and boys. However, girls chose the doll more often than the boys did, and the boys chose the car more often than the girls did. Nine girls (50%) chose a ball, seven girls (39%) chose a doll, and two girls (11%) chose a car. Eight boys (63%) chose a ball, no boy (0%) chose a doll, and five boys (38%) chose a car.

The 5-year-old girls and boys also differed significantly in what toy they chose ($p < 0.001$). At this age, the sex-stereotyped toys were most popular for each sex. Girls chose the doll most often, and the boys chose the car most often. Four girls (19%) chose a ball, fifteen girls (71%) chose a doll, and two girls (10%) chose a car. Two boys (14%) chose a ball, one boy (7%) chose a doll, and eleven boys (79%) chose a car.

DISCUSSION

Most earlier studies focusing on sex differences in toy-choice behavior have studied children at the age of two or older. In this cross-sectional study we showed that girls and boys, as young as one year of age, differ in what toys they choose to play with and that this difference also is found at the age of three and five. The effect-sizes for the obtained sex differences, which ranged from 0.54 to 1.92, indicate that the differences are to be judged as medium to more than large and that they are visible to the naked eye (Cohen, 1992; Hedges, 1982).

In contradiction to earlier studies, which have shown that girls tend to become more stereotyped in their play as they grow older, our results showed that feminine toys became less interesting for both girls and boys with increas-

ing age. However, except for the 1-year-olds play with the feminine toys, clear sex differences were observed at all ages; the girls still played more with feminine toys than the boys did, and the boys played more with masculine toys than the girls did.

Parents took so few initiatives when playing "as they usually would" with their children, that analyses of parental behavior became meaningless to perform. Play-status (children's play alone versus together with the parent) did not influence the children in a consistent, stereotyped way.

Sex differences in children's toy-choice at the age of one

It is noteworthy that the present sex differences were sizable already at the age of one year. How can these early sex differences be explained? From the viewpoint of socialization it would be argued that parents and other adults are perceptually biased to see behaviors and interests in the children that confirm their own view of sex-stereotyped behavior (Condry & Condry, 1976; Eccles *et al.*, 1990; Gervai *et al.*, 1995; Jacobs & Eccles, 1992), and that parents shape their children's behavior through encouragement of play with sex-stereotyped toys (Etaugh & Liss, 1992; Robinson & Morris, 1986). In the present study, when parental influence was studied by observing differences in the children's toy-choice depending on their play-status, we did find that the parents influenced the youngest children. The difference disappeared when we controlled for the parents' sex, which indicates that it was the fathers who affected the 1-year-olds' play. However, the influence was not in a sex-stereotyped way—the 1-year olds' played more with the masculine toys when they played with their parent (father) than when they played alone, irrespective of their own sex. Of course, it is not possible from the present study to reject the hypothesis that parents may, in real life situations, more directly reinforce their children in sex-stereotyped directions. However, the present study does not lend support to the idea of sex-stereotyped parental reinforcement as the basis of sex differences in toy-choice.

The other major explanation to sex differences, the biological approach, would not deny the influence of the social environment, but would assume that parental behavior acts to strengthen (and sometimes, to modify) biologically based sex differences, and that such differences also act to direct parental behavior. The biological view, which in this area is most strongly supported by research on play behavior in girls with Congenital Adrenal Hyperplasia (CAH), suggests that sex differences are due to the effect of androgens on early brain development.

The controversy between socialization and biology as determinants of sex differences in play behavior can be phrased as whether girls' and boys' play behavior should be seen as affected or directed by the socio-environment, and whether a biological contribution should be assumed or not. Two phenomena, the present data on sex differences at

the early age of 12 months and the previous findings concerning CAH-girls' cross-sex play behavior, make it problematic to explain these differences exclusively in terms of socialization. Sex differences in young children's play behavior could be explained by parents' early influence and infants' receptivity and capacity to behave in a sex-stereotyped way, in accordance with reinforcement, at an early age. Nevertheless, this argument becomes less convincing the earlier sex differences are observed, and especially when parental sex-stereotyped reinforcement is not demonstrated. Persuasive explanations to why CAH-girls play with masculine toys and in a male-like way, are even more difficult to find in the socio-environmental approach. Further studies in this area would profit from investigating even younger children, to pinpoint at which age behavioral sex differences appear, as well as to trace effects of parental reinforcement of sex-stereotypes longitudinally.

In this context the results obtained with regard to the X-men figures, in the present study, are particularly interesting. All toys, except for the X-men, were at all ages chosen most frequently (although not always significantly so) by children according to sex-stereotypes. A possible explanation for the 1-year-olds' cross-stereotyped play with the X-men figures could be that young girls and boys see them as dolls—in fact one girl put one of the X-men down in the bed together with the big soft doll. The older children may have come to realize the masculine aspect of this toy, thus making it more interesting to the boys. This is in line with the idea of a biological predisposition to certain behavior, which in this case then yields to environmental influences. (It should be noted that the analysis of sex differences concerning the 1-year-olds' play with the masculine toys would have been stronger if the X-men figures had been excluded, and the analysis concerning the 1-year-olds' play with feminine toys might have reached significance if the X-men figures had been regarded as feminine for this age-group.)

The development of children's toy-choice from the age of one to five

The purpose of this cross-sectional study was also to investigate how girls' and boys' toy-preferences develop. Our results showed that feminine toys became less interesting for both girls and boys the older the children got. In fact, if the data on the 5-year-olds are viewed from the perspective of preferences, it appears that boys show a clear preference for masculine toys, while girls do not play more with feminine than masculine toys. These results are in contradiction with earlier studies (Blakemore *et al.*, 1979; O'Brien & Huston, 1985; Robinson & Morris, 1986), which have shown that girls become more sex-stereotyped with age. They are, however, in accordance with more recent findings for older children presented by Etaugh and Liss (1992), who found that with increasing age, both girls and boys showed an increased interest in receiving masculine

toys as Christmas presents. A possible explanation for these contradictory findings is that the cultural norms—the reinforcing environment—have changed. Maybe girls today are reinforced for having less stereotypically feminine interests, this may be especially true for Sweden, which is a society known for its “equal-roles family model” and high maternal employment. Thus, it is not surprising that the older girls in this study, who have had a longer reinforcement-history, chose more masculine toys than the younger girls. The decrease in the girls’, and increase in the boys’, sex-stereotyped preferences, in the present study, may be seen as biologically based interests that are modified by a culture that reinforces and rewards masculine behavior and interests.

This cross-sectional study has shown large differences between girls and boys in their toy-choices. Our findings that girls and boys, as early as at the age of one year, differ in which toys they spend most time playing with, together with no findings of sex-stereotyped reinforcement from the parents, raise questions concerning what sex differences stem from. Together with previous studies, these results are in line with the biological view of the origin of sex differences in play behavior. However, one question is left unanswered by our findings, as well as by other studies supporting the biological view: How does biology make boys prefer cars?

We gratefully acknowledge Dr. Anna Nordenström, at the Department of Pediatrics, Karolinska Institutet, Huddinge University Hospital, for her valuable help in planning this study.

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Received 4 December 1997, accepted 2 July 1998