Chapter 14

Sex Differences in Children's Play

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Step on to any playground anywhere on the planet and you will see boys and girls playing in different worlds. They differ in what they are doing, with whom they are doing it, and how they are doing it. These differences emerge early in life, and are among the largest of non-reproductive physical or psychological sex differences. Sex differences in play have led many scholars to suggest that boys and girls grow up and live in separate cultures (Maccoby, 1998). The differences have considerable significance for mental health, social relationships, and cognition across the life span.

What are these differences? How do they come about? What do they mean for the world outside of play? What can they tell us about sex differences in other characteristics? These questions are the focus of this chapter.

THE NATURE AND MAGNITUDE OF SEX DIFFERENCES IN CHILDREN'S PLAY

Boys and girls differ in several aspects of play including, interest and play with specific toys and activities, the sex of their play partners, and the styles they use when playing with toys and with friends. Males and females of other species differ in aspects of their play as well.

Toys and Activities: What Do Boys and Girls Do?

Studies across cultures document that girls more than boys are interested in and engage with dolls and doll

accessories, arts and crafts, kitchen toys, fashion, and make-up, whereas boys more than girls are interested in and engage with transportation toys, electronics, blocks (especially complex building sets), and sports (Ruble et al., 2006). These differences earn toys the sex-typed labels of "boys' toys" and "girls' toys."

Sex differences in toy play are well-documented by 2 years of age for some toys, such as girls' preferences for dolls and boys' preferences for toy trucks and tools (Fagot et al., 1986; Campbell & Shirley, 2002). Nevertheless, questions remain about the exact age at which the differences emerge and for which toys (Ruble et al., 2006). The range and scope of sex-differentiated toy and activity play increases in early childhood (Maccoby, 1998). In preschool, girls prefer to play with dolls and kitchen sets, and to have fantasy play that involves relationships, household roles, and romance, whereas boys prefer to play with cars, trucks, and blocks, and to have fantasy play that involves superheroes, danger, and aggression. Boys also play video games increasingly more than girls from 2 to 7 years, and girls begin to spend more time in chores than do boys at age 3 to 4 (Huston et al., 1999).

The magnitude of sex differences in toy and activity preferences among preschool children is illustrated in a study in which children were observed daily for 3 months, and their activities, affective displays, and play partners were recorded (Martin, Fabes, & Hanish, 2006, unpublished data). Table 14.1 shows the significant and sizable differences in

Table 14.1. Sex Differences in Preschoolers' Time Spent Playing with Toys and Activities: Mean Proportion of Total Interactions[a]

	Boys (N = 32)	*Girls (N = 23)*	*Size of Sex Difference, d*
Boy-Preferred Toys/Activities			
Balls	.018 (.015)	.009 (.010)	.66**
Bikes	.021 (.017)	.010 (.011)	.74**
Blocks	.078 (.045)	.032 (.023)	1.05***
Play figure male	.009 (.009)	.001 (.002)	1.01***
Pretend play male	.022 (.020)	.004 (.005)	1.01***
Trucks	.018 (.017)	.005 (.004)	.92***
Total Boy-Preferred Toys/Activities	.166 (.055)	.059 (.031)	1.51***
Girl-Preferred Toys/Activities			
Board Games	.020 (.013)	.029 (.023)	−.54*
Crayons	.049 (.047)	.083 (.048)	−.68*
Play figure female	.001 (.002)	.013 (.012)	−1.24***
Kitchen play	.009 (.011)	.016 (.013)	−.53*
Pretend play female	.002 (.004)	.020 (.005)	−1.31***
Puzzles	.009 (.007)	.016 (.013)	−.62*
Total Girl-Preferred Toys/Activities	.090 (.048)	.176 (.055)	−1.30***
Neutral Toys/Activities			
Books	.068 (.024)	.070 (.033)	−.09
Clay	.018 (.013)	.022 (.014)	−.34
Computers	.014 (.022)	.012 (.019)	.11
Digging	.021 (.015)	.021 (.016)	.01
Fantasy play neutral	.010 (.007)	.014 (.010)	−.42
Music	.034 (.020)	.039 (.019)	−.30
Pretend neutral play	.028 (.016)	.029 (.013)	−.10
Phone	.002 (.003)	.002 (.003)	−.10
Toy animals	.012 (.014)	.011 (.011)	.30
TV	.001 (.001)	.001 (.002)	−.14
Total Neutral Toys/Activities	.209 (.049)	.221 (.050)	−.24

[a]Number of sampled intervals including each activity divided by the total number of observations per child
Sex differences significant by *t*-tests, $^{*}P < .05$, $^{**}P < .01$, $^{***}P < .001$.

the proportion of interactions in which boys and girls played with specific toys and activities. Sex differences are described in standard deviation units, *d* (mean of boys minus mean of girls divided by average standard deviation, Cohen, 1988). For total play with girls' and boys' toys and activities, the sex differences were very large, –1.3 and 1.5. Expressed in another way, child sex accounted for about one-third of the variation in toy and activity play.

Large and varied sex differences continue into middle and late childhood and adolescence, encompassing interests and hobbies, household chores, and sports involvement, as measured by self-reported preferences and time use (Etaugh & Liss, 1992; McHale et al., 2004a). The sex differences in activities continue and expand in scope as children move through adolescence: compared to boys, girls spend more time in relationship-oriented activities, personal care, and household chores, and less time in sports and male-typical activities (e.g., building things) (McHale et al., 2004b; Ruble et al., 2006).

There is considerable interest in children whose play and activity interests are not typical for their sex because of associations with sexual orientation, cognitive abilities, and emotional adjustment (as discussed later in the chapter). Cross-sex play decreases in middle childhood and is more common in girls than in boys. About one-quarter of boys and one-third of girls engage in multiple cross-sex behaviors at least occasionally (Sandberg et al., 1993). Studies of tomboys suggest within-group variability: some exhibit extreme cross-sex play, whereas other play with both girls' and boys' toys (Zucker & Bradley, 1995; Bailey et al., 2002).

A key question concerns the dimensions underlying sex differences in children's toy and activity preferences, which probably reflect the actions and qualities afforded by toys. Boys' and girls' toys differ on several dimensions, with boys' toys higher in symbolic play, sociability, competition, aggressiveness, dangerousness, and constructiveness, and girls' toys higher in domestic skills, nurturance, and attractiveness (Blakemore & Centers, 2005). We know little about the ways in which these or other dimensions contribute to sex differences in toy play.

Juvenile monkeys also show sex-differentiated preferences for human sex-typed toys (Alexander & Hines, 2002; Hassett et al., 2004). In fact, the sex-based preferences of rhesus monkeys for wheeled vs. plush toys are similar to the sex-based preferences of human children for boys' versus girls' toys (Hassett et al., 2004). This suggests that children's toy choices partly reflect inherent sex-differentiated preferences for characteristics that underlie the toys.

Play Partners: With Whom Do Boys and Girls Play?

The term *sex segregation* is used to characterize children's tendencies to interact preferentially with peers of the same sex. It begins at a young age (Serbin et al., 1994), with girls segregating earlier than boys. For example, in one observational study, girls preferred same-sex peers by 27 months, but boys did not show preferences for another year (LaFreniere et al., 1984). By 3 to 4 years of age, both boys and girls spend the majority of their social interactions with members of the same sex (Maccoby & Jacklin, 1987; Fabes et al., 1997). This preference is seen across method (e.g., observation, self-report) (Bukowski et al., 1993; Fabes, 1994), countries (Omark et al., 1975) and species (Barbu, 2006), including primates (Bernstein et al., 1993), rats (Meaney & Stewart, 1981), cats (Caro, 1981) and ungulates (Bonenfant et al., 2004).

Not only do young children strongly prefer peers of their own sex, they also spend relatively little time with only peers of the other sex. Over half of all young children's peer interactions involve play with same-sex peers, about 30% involves play with both a boy and a girl, and less than 10% involves play exclusively with other-sex peers (Fabes, 1994).

Preference for same-sex play partners escalates over childhood. In one illustrative study, the ratio of play with same versus other-sex peers was 3 to 1 in preschoolers, but 11 to 1 in 6 ½-year-olds (Maccoby & Jacklin, 1987). Throughout childhood, boys and girls prefer same-sex friends and have more positive interactions with them than with other-sex friends (Vandell et al., 2006). Play with other-sex friends decreases through childhood (Smith et al., 2001). For example, by middle childhood, only about 15% of children have other-sex friends (Kovacs et al., 1996).

Children's preferences for same-sex play partners are dramatic. For many characteristics, a person's sex accounts for a relatively small percent of the variation. But, sex of a play partner is predicted almost completely by sex of the target child, accounting for 70%–80% of the variance, equivalent to a difference (*d*) of 3 to 4 standard deviations (Martin & Fabes, 2001). This is illustrated in Figure 14.1 with observational data

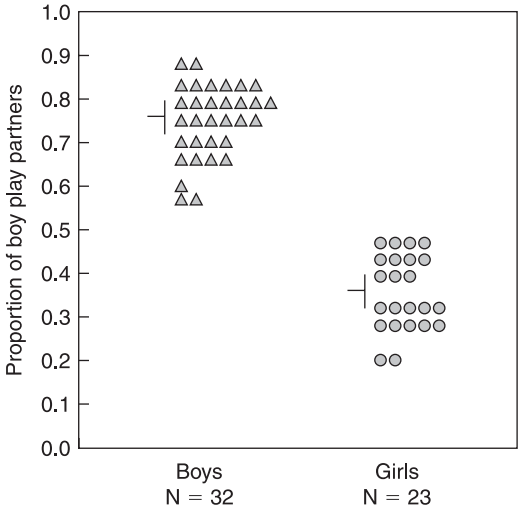

Figure 14.1. Distribution of proportion of boy play partners by sex of child. △=1 boy; ○ = 1 girl. Horizontal line = means; vertical line = standard deviations.

from preschool and kindergarten children. Boys and girls do not overlap in the proportion of their play with boy partners. The boy with the lowest level of play with boy playmates still played with boys more than the girl with the highest level of play with boys; similar but reverse patterns were found for play with girls (Martin et al., 2006, unpublished data).

Interestingly, same-sex play partner preferences are child-driven rather than adult-driven. The strongest sex segregation occurs in settings where children make their own choices. Same-sex peer play is strongest when activities are unstructured and adults are not immediately present or involved in children's play (Thorne, 2001). Play with other-sex peers is more likely to occur when adults are in the vicinity, especially for girls playing with boys (Fabes et al., 2003b). Moreover, these preferences are not easily changed by adults. For example, when preschool teachers reinforced play with other-sex peers, such play increased while the contingency was in effect, but play quickly became segregated when reinforcement was discontinued (Serbin et al., 1977).

During adolescence, sex-based peer preferences begin to change. Young adolescents congregate in small cliques of same-sex peers and have same-sex friends (Bukowski et al., 1999). Although same-sex preferences are still obvious among mid-adolescents (15–16 years), heterosexual dating and other-sex relationships emerge (Sippola, 1999). Even so, girls (but not boys) report feeling more comfortable with same- than with other-sex peers (Lundy et al., 1998). Longitudinal data across grades 9 to 11 show that children's same-sex peer networks remain about the same but their other-sex peer networks increase in size (Richards et al., 1998).

Play Styles: How Do Boys and Girls Play?

Boys' and girls' play styles are characterized by different behaviors and patterns of social interaction, beyond their toys and partners (reviewed in Leaper, 1994). Boys' play tends to be unstructured, more peer- than adult-directed, and guided by the peer group, with boys generating their own rules and standards for appropriate behavior (Carpenter et al., 1986; Smith & Inder, 1993). It is no surprise, therefore, that boys' play tends to be rougher and more active than girls' play, more often involving physical contact, fighting, and taunting (Maccoby, 1998). Indeed, boys are more likely than girls to engage in rough-and-tumble play, involving physical activities characterized as playful and joyous, and to participate in large motor activities (e.g., running, jumping, Fabes et al., 2003b). Boys tend to play more than do girls in large groups characterized by competition and the establishment and maintenance of dominance hierarchies (Maccoby & Jacklin, 1987). Thus, boys' play is characterized as active, dominance-oriented, and physically-assertive.

In contrast, girls' play is structured and adult-oriented. Girls' play groups more than boys' are likely to be near teachers (Fabes et al., 2003b; Martin & Fabes, 2001) and girls' interactions tend to be adult-oriented and adult-structured (Smith & Inder, 1993). Girls tend to interact in dyads, rather than large groups (Fabes et al., 2003a), which is important because dyadic play is more likely than large-group play to elicit behaviors that are sensitive to peers' needs (Maccoby, 1998). Girls are more likely than boys to emphasize cooperation and verbal interaction among play partners and to use enabling forms of communication that promote group harmony. In contrast to boys, girls display dominance and leadership using verbal means, such as negotiation (Maccoby, 1990). Furthermore, girls often play quietly in activities that require verbal interaction (e.g., playing house). Thus, girls' play is characterized as quiet, verbal, and governed by adult-based rules designed to maintain social harmony.

These sex differences in play styles emerge early in childhood and are apparent by the time children enter preschool. Just as the preschool years mark increasing segregation of boys and girls, they also mark increasing differentiation in boys' and girls' play behaviors (Maccoby & Jacklin, 1987; Maccoby, 1998). Moreover, the divergence in boys' and girls' play styles is influenced by the amount of time that children spend in same-sex play. Longitudinal data show that the more time that preschool children spent in same-sex peer play during the fall, the more sex-differentiated their patterns of behavior became the following spring, even after controlling for children's initial individual differences to engage in sex-typical ways. Thus, as boys play with other boys and girls play with other girls, they are repeatedly exposed to the play styles and interaction patterns that characterize their own sex, thereby strengthening the sex-specific patterns (Martin & Fabes, 2001).

Sex-differentiated play style also characterizes other species. From rats to primates, play fighting or rough-and-tumble play is much more common in males than in females, peaking in frequency in the juvenile period (reviewed in Beatty, 1992; Wallen, 2005).

THE SIGNIFICANCE OF SEX DIFFERENCES IN PLAY

Sex differences in children's play and activity interests are associated with sex differences in other behaviors concurrently and in the future. Some of these links reflect the direct effects of play on other behavior, whereas others may reflect the operation of a common yet unidentified third factor. We focus here on links between childhood play and other psychological characteristics, but it seems likely that play also has consequences for physical health.

Consequences of Sex-Typed Toy and Activity Preferences

Sex differences in children's toy and activity preferences have received much attention for their association with sexual orientation and cognitive abilities. The causal nature of the play-ability associations has been assumed in discussions of interventions to enhance girls' spatial ability through modification of their toy play.

Sexual Orientation

Individuals with homosexual orientation in adulthood are more likely than those with heterosexual orientation to have shown sex-atypical childhood toy and playmate choices, with this effect larger for males than for females (Bailey & Zucker, 1995). Most evidence is based on retrospective reports, but one prospective study showed that boys who were extremely "feminine" in childhood (e.g., dressing in feminine clothing, preferring dolls to trucks, playing with girls, and even preferring to be girls) were very likely to become homosexual adults (Green, 1987).

Cognitive Abilities

A popular explanation for sex differences in cognitive abilities involves sex differences in childhood toy play. In particular, high spatial abilities of boys and men compared to girls and women are often considered to result directly from boys' experiences with toys that encourage manipulation and exploration of the environment, so that sex differences in spatial abilities would be eliminated if girls were encouraged to play more with boys' toys.

Evidence supports a weak-to-moderate link between spatial ability and aspects of sex-typed activities (e.g., Newcombe et al., 1983), although there is some variability and inconsistency that likely reflects methodological and conceptual issues (Baenninger & Newcombe, 1989; Voyer et al., 2000). These associations are not evidence of causation: play with male-typical toys/activities might enhance spatial ability or instead reflect that ability (i.e., children with high spatial ability are attracted to toys that allow spatial activities). In fact, some longitudinal data suggest that the causal path is from abilities to activities rather than the reverse (Newcombe & Dubas, 1992). Therefore, it is important to note some direct evidence for the beneficial effect of experiences on spatial ability from experimental studies (reviewed by Baenninger & Newcombe, 1989).

Thus, sex differences in spatial abilities may partly reflect boys' and girls' differential engagement with toys and activities that facilitate the development of those abilities. Nevertheless, caution is necessary before concluding that girls' spatial abilities can be improved simply by encouraging them to play with boys' toys: there have been no studies showing the long-term cognitive effects of spatial training, there is

limited generalizability of training, and sex differences in spatial effects of practice are eliminated only when everyone scores well. Further, there may be a cost to encouraging girls to play more with boys' toys, because they typically play some with boys' toys, time use is finite, and there may be benefits to playing with girls' toys.

Consequences of Sex-Segregated Play

Playing with boys provides different opportunities and experiences than does playing with girls. Because children vary in the extent to which they show sex-segregated play, they also vary in the consequences of this play. As shown in Figure 14.2 (for the sample described earlier), the proportion of same-sex peer play in both sexes varies from .30 to .80 (Martin et al., 2006, unpublished data). And the more a child is exposed to same-sex peers, the more the child will be affected by these experiences, although these effects depends on the child's characteristics (Fabes et al., 1997; Fabes et al., 2003a).

For children low in self-control, play with same-sex peers enhanced social competence for girls but lowered social competence for boys, suggesting that playing with other boys enhances dysregulated tendencies for those who already have a difficult time regulating themselves, but playing with other girls enhances the ability to self-regulate for girls who have difficulty doing so. Relatedly, young children's self-control moderated the relation between same-sex play and academic readiness for kindergarten, with boys high in self-control and girls low in self-control benefiting most from same-sex play. These findings may reflect sex differences in peer groups' self-regulation (more in girls' groups than boys' groups), with differential effects on children who vary in levels of self-control. Importantly, these effects are not a function of general sociability (Fabes et al., 1997).

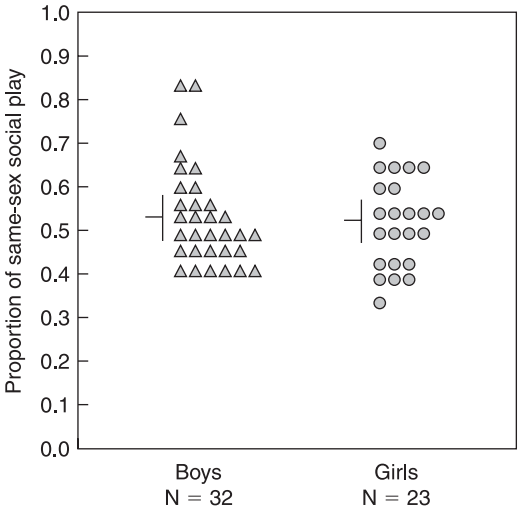

Figure 14.2. Distribution of proportion of same-sex social play by sex of child.

Thus, the experiences that result from segregated peer interactions likely contribute to development in both positive and negative ways, which extend beyond the individual differences that lead children to initially select themselves into same-sex peer play. Experiences gained within boys' and girls' peer groups foster different behavioral norms and interaction styles, which have the effect over time and exposure of promoting the development of different skills, attitudes, motives, interests, and behaviors.

Sex-differentiated early play experiences have consequences for later behavior in non-human species too. The absence of rough play in male monkeys is associated with adjustment problems (Wallen, 2005). The sex composition of monkeys' rearing groups affects aspects of adult sexual behavior; for example, males reared only with same-sex others display less mounting behavior than males reared in mixed-sex groups, but the reverse effect is observed in females (Wallen, 1996).

Thus, same-sex peer groups and their activities represent a powerful context for socialization. The research described above illustrates the potential of this work to explain development across species, with particular implications for aspects of human physical and mental health.

Summary: The Nature and Consequences of Sex Differentiated Play

Some sex differences in toy preferences are obvious by age 2 and become marked in the following few years. Preferences for same-sex peers appear by age 3, and become pronounced in middle childhood, with very little play with other-sex peers. For all aspects of play, there are early sex differences in a few domains, and the differences grow in size and scope through childhood and into adolescence. Sex-differentiated play patterns are dynamically interrelated: the more chil-

dren play with same-sex peers, the more sex-differentiated their toy choices and play styles become, and the more sex-differentiated their play styles and toy choices, the more likely they are to attract and maintain same-sex peer interactions.

The consequences of children's sex-typed play extend well beyond play itself. The largest effects appear to come from children's segregation into girls' and boys' groups, although there are some effects for toy play. The different socialization experiences of girls and boys may play a role in many of the sex differences discussed elsewhere in this book. It would be interesting to examine, for example, the ways in which early sex-differentiated play patterns affect the development of sex differences in response to stress, affiliation, and eating behaviors.

THE CAUSES OF SEX DIFFERENCES IN PLAY

Because sex differences in play represent one of the largest psychological sex differences, understanding their origins will likely help to understand the origins of sex differences in other characteristics. Theoretical explanations of sex differences in play parallel those invoked for most sex differences, involving influences of sex hormones and socialization. An important additional theoretical perspective on children's play—and gender-related psychological development in general—is provided by cognitive theories, which emphasize children's active construction of their world through their thoughts about and use of gender-related information. This perspective could also be usefully extended to other characteristics that show sex differences.

Hormonal Theories of Sex Differences in Play

Studies in a variety of species clearly show how sex hormones present during sensitive developmental periods induce sex-differentiated sexual, social, and cognitive behaviors and their underlying neural substrates (reviewed in Becker et al., 2002; Ryan & Vandenbergh, 2002; Wallen, 2005). Hormones affect aspects of juvenile play; for example, rough play is reduced in male rats deprived of testosterone, and increased in female monkeys exposed to high prenatal androgen (Beatty, 1992; Wallen, 2005). A key question concerns the generalizability of these findings to human beings, particularly the extent to which prenatal sex hormones shape sex differences in childhood play.

It is, of course, not possible to manipulate hormones in people, but much has been learned from children whose prenatal hormones are atypical for their sex as a result of disorders of sex development, particularly congenital adrenal hyperplasia (CAH), a genetic disease in which the fetus is exposed to high levels of androgens beginning early in gestation. Females with CAH provide an excellent opportunity to examine the behavioral effects of prenatal androgens because they are reared as females but exposed to high levels of sex-atypical hormones during prenatal development; their postnatal development is generally sex-typical after they are diagnosed at birth, and treated medically to reduce androgen excess, and surgically to feminize their genitalia.

Studies of females with CAH indicate that early androgen exposure has a large effect on sex-differentiated toy play and activity interests, with findings replicated across labs, methods, and countries (reviewed in Meyer-Bahlburg, 2001; Berenbaum, 2004). Girls with CAH play much more with boys' toys than do their unaffected sisters or other controls, and interest in boy-typical activities continues into adolescence. Paralleling the increased preference for male-typical activities is reduced preference for female-typical activities.

Differences between CAH and unaffected girls in toy play and activities are large, with means for girls with CAH generally between those for typical boys and girls. A typical difference is illustrated in Table 14.2 with data from a longitudinal study of boys and

Table 14.2. Toy Chosen to Keep by Girls and Boys With and Without CAH

	Control Girls	*Girls with CAH*	*Control Boys*	*Boys with CAH*
% who chose a transportation toy at any session	4%	43%	74%	78%
Average toy choice (SD) (1: feminine; 5: masculine)	1.9 (1.0)	3.1 (1.4)	4.2 (1.1)	4.3 (1.1)

girls with CAH and their unaffected siblings (summarized in Berenbaum, 2004; Berenbaum & Bryk, 2007). When choosing a toy to keep, girls with CAH were more likely than their sisters without CAH to pick a transportation toy; $d = 1.0$.

Congenital adrenal hyperplasia is not a perfect experiment for testing the behavioral effects of prenatal androgens because it is a disease that causes virilized genitalia. Recent work testing alternative explanations of behavioral changes (e.g., parent responses to the girls' genitalia, postnatal androgen) show that masculinized toy and activity play in girls with CAH results directly from prenatal androgen. Play with boys' toys is related to the degree of prenatal androgen excess inferred from genetic defect and other indicators of disease severity (Berenbaum et al., 2000; Nordenström et al., 2002). There is little evidence that parents socialize girls with CAH in a masculine way. For example, the amount of time that girls with CAH played with boys' toys was not increased when parents were present (Nordenström et al., 2002), and parents were observed to encourage girls with CAH to play with girls' toys (Pasterski et al., 2005).

Evidence from other clinical conditions converges with that from CAH. Individuals with a Y-chromosome and male-typical prenatal androgen exposure reared as girls because they lack a penis show boy-typical childhood activity preferences (reviewed in Meyer-Bahlburg, 2005; Hughes et al., 2006).

Recent work has examined the generalizability of results obtained in clinical populations. Fetal hormones in typical samples have been measured indirectly from amniotic fluid, mother's blood, or markers such as sharing a uterus with an opposite-sex fetus (parallelling studies in non-human species showing behavioral and physical masculinization in females who gestate between two males vs. two females; Ryan & Vandenbergh, 2002) (for review of methods and findings see Cohen-Bendahan et al., 2005). Results from these studies are mixed. Play behavior in typical girls at age 3½ years has been found to relate to testosterone in their mother's serum during pregnancy (Hines et al., 2002), but because the placenta generally protects the fetus against masculinizing effects of androgens, the association most likely reflects genetic effects, that is, the transmission of genes that affect testosterone levels which, in turn, affect activity interests. Other studies have failed to find associations between child toy and activity preferences and prenatal androgen determined from amniocentesis (Grimshaw et al., 1995; Knickmeyer et al., 2005) or gestating with an opposite-sex co-twin (Elizabeth & Green, 1984; Henderson & Berenbaum, 1997; Rodgers et al., 1998). It is unclear whether these findings reflect a lack of association between testosterone and activity interests within the normal range or methodological issues (discussed in Cohen-Bendahan et al., 2005).

There has been little study of hormonal influences on other aspects of sex-differentiated play, such as play partners and play styles. Girls with CAH report that they are more likely than control girls to prefer boy playmates (Hines & Kaufman, 1994; Berenbaum & Snyder, 1995; Servin et al., 2003), but peer play has not been directly observed. Interestingly, differences between girls with and without CAH are smaller for playmate preference than for toy play, despite the fact that the sex differences are much larger for the former than the latter. This reflects findings that less than half of girls with CAH report preference for boy playmates but almost all prefer boys' toys. In light of evidence from typical children described above about limited play with other-sex peers and the impact of same-sex peer groups, it is important to observe girls with CAH playing with peers to see where they "fit" in the distribution of same- vs. other-sex peer play, and whether they are affected by peer groups in the same ways as typical girls. Girls with CAH were found not to be significantly different from their sisters in the only study of rough play, which involved observation of girls playing with a friend who they brought to the testing situation (Hines & Kaufman, 1994). It is unclear whether androgen has less effect on rough play in people than in other primates or whether female-typical levels of rough play in girls with CAH reflect reduced opportunity (rather than desire) to engage in rough play related to less time spent with boys.

Overall, then, there is good evidence that prenatal androgens influence some aspects of childhood play. Effects are larger for toy play and activity interests than for play styles and partners. There is clearer evidence that prenatal androgens produce differences between the sexes than variations within sex.

Socialization Theories of Sex Differences in Play

Broadly defined, socialization is the process by which individuals learn about and internalize social norms. Socialization is not merely imposed on individuals,

but reflects a complex transactional process and effects of many socializing agents, including parents, other adults, peers, and broad community influences, such as electronic media. Due to space limitations, we focus on two of the most immediate socializing agents in early childhood, parents and peers.

Parents as Socializing Agents of Sex-typed Play

In 1966, Mischel proposed that gender development could be explained by principles of social learning theory (Mischel, 1966). Children's gendered behavior was seen to be shaped by contingencies provided by parents and other socializing agents. Subsequent versions acknowledge the role of specific cognitive processes involved in learning about gender such as attention, memory, and motivation (Bandura, 1986). Parents are hypothesized to socialize children's sex–typed activities and behavior through three mechanisms: (a) direct reinforcement, (b) provision of different opportunities for boys and girls to engage in certain types of behavior, and (c) modeling.

With regard to direct reinforcement, parents are generally more involved with, and give more positive responses to, children when they are playing with toys typical for their sex than those that are typical for the other sex (Langlois & Downs, 1980; Roopnarine, 1986; Caldera et al., 1989; Fagot & Hagan, 1991). The magnitudes of these effects vary, however, by several factors, including child sex, parent sex, and parent attitudes. Both mothers and fathers with traditional attitudes towards family gender roles are more likely than those with egalitarian attitudes to encourage sex-typed play (Fagot, 1995). Parents reinforce sex-appropriate play more in sons than in daughters (Leaper, 2000), with fathers more likely than mothers to do so (Siegal, 1987). This may reflect the higher social status afforded males, so that fathers are more likely than mothers to emphasize gender roles, especially when interacting with sons.

But, parents do not work on a blank slate. Children have a significant amount of input into their own socialization through the way they behave. For example, preschool children instructed to initiate play with an unfamiliar adult elicited different behaviors depending on the adult's sex: children of both sexes were more likely to initiate ball play with a man than with a woman, but to ask for help more often from a woman than a man (Fagot, 1984). Thus, children are not just passive recipients of parental socialization, but active players in socializing themselves.

The second mechanism by which parents socialize children's sex-related play is by channeling girls and boys towards different activities. Even male and female infants have different environments: boys' rooms are significantly more likely than are girls' rooms to have toy vehicles, spatial toys, sports equipment, and toy animals, whereas girls' rooms are significantly more likely than are boys' rooms to have dolls and floral furnishings (Rheingold & Cook, 1975). Thus, it seems reasonable to suggest that children become exposed at an early age to sex-typed toys, develop familiarity and experience with these toys, and then maintain their preferences through parents' direct reinforcement. But, this proposal is difficult to confirm as there has been little longitudinal research on the trajectories of children's sex-typed toy preferences and how those are influenced by parental practices.

The third mechanism by which parental socialization affects children's sex-typed play activities is modeling (Bandura, 1986). When children observe a parent engaging in an activity, they are hypothesized to extract the rules of the activity, and generate new behaviors that conform to the same structures and rules (Perry & Bussey, 1979). Children are most likely to imitate sex-typed behavior from multiple models of the same-sex (Bussey & Perry, 1982) as compared to modeling a single person.

Parental socialization of gendered activities is more complex and nuanced than suggested by traditional learning theories. Evidence suggests that parents influence children's interests beyond the mechanisms described above, including provision of resources and support, and through their beliefs about the abilities of males and females in general, and of their own children (Eccles, 1993). Parents' beliefs relate to children's interests, ability self-concepts, and values about those interests (Eccles et al., 1990). Further, parents' beliefs about some activities (such as sports) appear to set the stage for later development in two ways. First, they shape children's early motivation for the activities, which may affect children's feelings of competence about those activities. Second, parents provide opportunities for children to engage in the activities and thus improve their competence (Fredricks & Eccles, 2005).

Further, socialization depends on family context (McHale et al., 2003), as illustrated by data on gender socialization within families. Children in European-

American families engaged most in sex-typed activities when they had an opposite-sex sibling and parents with traditional gender-role attitudes (McHale et al., 1999). Mexican-American parents who identified with Mexican culture provided stronger gender socialization to their children than did those who identified with Anglo culture, likely reflecting cultural differences in gender roles (McHale et al., 2005).

In sum, evidence suggests that parents socialize children's sex-typed play and related interests through reinforcement, provision and channeling of opportunities, modeling, and attitudes. Although this process is bidirectional and transactional, socialization theories propose that effects are initially driven by parents' responses to the child's sex. But, socialization theories alone are insufficient to explain children's sex-typed play, given evidence for effects of prenatal androgens described above, and cognitive contributions discussed below. Further, parents are not the only socialization agents in children's lives: there is increasing evidence for the impact of other social forces (Ruble et al., 2006), especially peers.

Peers as Socializing Agents of Sex-typed Play

A challenge for understanding peer socialization comes from the fact that children are drawn to others who are like them. Children's selection of peers affects how they are, in turn, influenced by those peers (Jaccard et al., 2005). Friends are chosen for similarity in values, personality dynamics, interests, and attitudes, and these similarities reinforce or discourage behaviors. A child with an initial set of values and characteristics that predispose him or her toward a certain behavior might engage in that behavior regardless of his or her peers. If peers are selected for similar values and characteristics, it is difficult to determine the relative contribution of the child vs. the peer group (Berndt, 1996). When such selection effects are controlled, however, peers have still been shown to have an effect on sex-typed play (e.g., Martin & Fabes, 2001).

Most research on peer influence has focused on older children and adolescents, but recent studies confirm these effects in young children. For example, preschool children's exposure to peers who were high in externalizing behavior predicted externalizing problem behavior a semester later (Hanish et al., 2005). Similarly, preschoolers exposed to prosocial peers evidenced more positive social interactions later in the year and were more prosocial one year later than children not exposed to those peers (Fabes & Martin, 2005). In both studies, there were sex differences, with effects generally stronger for girls than for boys, suggesting that young girls and boys are differentially sensitive to peer influences. Boys' relative insensitivity to peer exposure effects may reflect the difficulty of altering boy-typical behaviors (e.g., aggression, low prosociality). Because active and competitive play styles characterize boys' groups and are normative for young boys (Fabes et al., 2003b), and boys are particularly sensitive to what constitutes sex-typical behavior, there may be little incentive for them to change behavior (Fagot & Leinbach, 1983). Girls, however, are sensitive to both normative and non-normative behaviors and activities, so may be more susceptible than boys to peer effects.

We still have a lot to learn about the specific processes through which peers socialize gender-related play. Certainly, modeling, reinforcement, extinction, and other forms of behaviorally contingent peer responses help shape and guide such behaviors (Fagot, 1985; Gifford-Smith et al., 2005), but it is likely that children contribute to their own socialization of play behavior and activities through their own biological predispositions and social cognitive processes (Martin et al., 1999; Ruble et al., 2006).

Cognitive Theories of Sex Differences in Play

The role of children's cognitive processes in the development of sex-typed play was first described by Kohlberg who emphasized children's active participation in their own socialization (Kohlberg, 1966). As children become aware of their sex, and their membership in a group of people of similar sex, gender-related information becomes more salient, and children become motivated to actively construct the meaning of gender categories and align their behavior with those categories. Kohlberg revolutionized the view of gender development by focusing on self-socialization, that is, how children seek out and learn about gender on their own.

Work over the past 40 years has elaborated Kohlberg's ideas and produced other cognitive approaches to gender development (Ruble et al., 2006). Gender Schema Theory (GST) represents the most influential of these cognitive approaches. Central to GST is the notion that children are active participants in their own

socialization because they are motivated to be like others of their own sex, with children forming cognitive constructions or networks of associations about the sexes that influence their behavior and thinking (Bem, 1981; Martin & Halverson, 1981). These *gender schemas* are presumed to direct children's attention, influence how information is interpreted, organized, and remembered, and guide behavior with objects and people. Specifically, children are expected to pay selective attention to and remember sex-typed information and to show biases towards members of their own group (for review, see Martin et al., 2002). Gender schemas are hypothesized to develop from an interaction of innate tendencies to categorize and the functional significance of gender.

How do gender schemas lead to self-socialization? As children develop a sense of their own sex, they are motivated to learn about their own sex and what members of their sex do, and then to apply this knowledge to their own behavior so that their behavior is *schema consistent*. Imagine a boy who is shown toys he has never seen before; he is told that a "scople" is a toy that lots of boys like and that a "fangle" is a favorite of girls, and is then left to play with the toys. A young boy will typically pick up, examine, and manipulate the scople, but ignore the fangle (Bradbard et al., 1986). The boy's attention, exploration, and interest has been directed by his schemas: "boys like scoples and girls like fangles, I am a boy, so I will probably like the scople and not the fangle." There is no external pressure to adhere to what he was told about these toys; the boy himself decides how to direct his attention and behavior.

Many studies confirm the power of gender schemas to influence behavior and thinking, including children's toy play (for review, see Martin & Dinella, 2002). Investigations of self-socialization involving toys cannot include real toys because children may have differential exposure to sex-typed toys and stereotypes about them. For that reason, studies have included novel toys that are given labels providing gender information. Consider two illustrative studies. In one (Bradbard & Endsley, 1983), children were shown six novel toys, two labeled as toys that boys like, two that girls like, and two that both sexes like, and each toy was named. Children were encouraged to play with and ask questions about the toys. Consistent with GST, children touched same-sex labeled toys most and other-sex labeled toys least, with both-sex labeled toys in between. In another study (Masters et al., 1979), children were observed playing with novel toys after demonstrations by male or female models and after toys were given gender labels. Play was affected by gender labels, but not by sex of models.

Just as young children guide their behavior into schema consistent patterns, older children also try harder on games or tasks that they think are appropriate for their own sex. In one study (Montemayor, 1974), children where shown a novel game, and some children were told that this was a game for boys ("like basketball"), some were told it was a game for girls, and some were given no information. Both girls and boys performed better on the game and liked it more when it was labeled for their own sex rather than when it was labeled for the other sex. Similar results have been found using even subtle ability labels (e.g., "this is a test to see how good you would be at mechanics or operating machinery") (Hargreaves et al., 1985). Although much evidence demonstrates effects of gender labels on motivation, not all studies confirm these patterns: in some cases only boys are influenced by labels, and in one study, children did not accept experimental labels for the novel game so no labeling effects were found (for review, see Martin & Dinella, 2002). Ability labels are more effective with older children, whereas category labels are more effective with younger children (Miller & Ruble, 2006).

Gender schemas serve not only to affect children's interactions with toys (reducing interactions with toys that they believe are not "for them" and encouraging interactions with toys that are "for them"), but also to influence children's skill development by reducing information garnered about particular toys. Children pay less attention to and later remember less about how to interact with particular objects that were labeled for the other sex (Bradbard et al., 1986). Even incentives do not improve memory about other-sex toys, suggesting that children fail to attend and learn relevant information when it is first presented.

Gender schemas affect not just toys and activities, but children's choices about play partners. Children use gender schemas to infer whether they are likely to enjoy interacting with unfamiliar children. Children often prefer to play with children of their own sex rather than their own age. When children are given information about others' sex and interests, young children often use only sex of the child to make decisions about play partners, whereas older children and adults are likely to take interests into account (reviewed in Ruble et al., 2006).

Both adults and children assign stereotypic qualities to others based on their sex, and they use sex as a way to generalize new characteristics to others (Martin, 2000). For example, a child who is told about a girl who has "estro in her blood" is likely to infer that estro is a quality of other girls, and not of other boys (Gelman et al., 1986). Preschool children make assumptions about shared interests among members of the same group, even when there is no relevant information upon which to make these assumptions (Martin et al., 1995). In naturalistic studies of observed play behavior, children's beliefs about shared interests with same-sex peers correlate with their tendencies to play with same-sex peers (Martin et al., 2005).

The novel toy studies provide evidence that gender schemas influence children's exploration, attention, memory, and motivation toward objects and people. Whether they function this way in more typical circumstances is difficult to answer definitively. However, to the extent that they do, they will have both short- and long-term effects. Children who are motivated to adhere to gender schemas will avoid and forget information about toys and activities that they believe are not for their own sex. They will be less likely to play with other-sex peers because they will assume that these children do not share their interests. Over time, children who are susceptible to these influences are unlikely to develop a full range of skills and abilities because they will not have in-depth information or scripts to carry out other-sex activities. A cycle emerges: children avoid the activity because they think it is not appropriate for them, which leads to heightened avoidance as they then feel (and may actually be) less competent to engage in these activities (Martin & Dinella, 2002). This cycle can have serious consequences for performance in sex-related fields. For example, girls may drop out of high-level math and science classes because they think they are "not for me" (Nosek et al., 2002).

Summary: Causes of Sex Differences in Childhood Play

All three primary causal explanations for the development of sex-differentiated play have received some empirical support. Although early sex hormones, parent and peer socialization, and gender schemas have often been pitted against each other, these influences almost certainly act together, and the key question concerns how that happens.

There is good evidence from non-human primates for combined effects of hormones and social experience. Behavioral sex differences in monkeys result from hormonally influenced predispositions to engage in certain behaviors, but the ultimate expression is shaped by the social environment in which the animal develops (Wallen, 1996).

Children come into this world with certain predispositions that are manifested and exaggerated or suppressed by the environment in which they are reared, and those with sex-atypical predispositions provide a unique opportunity to examine causal influences on the development of sex-related play, as well as many of the other characteristics discussed in this book. Studies of girls with CAH, for example, might help us to understand more about the causes of sex-segregation and the nature of parent socialization. Do girls with CAH play with girls who share their identity, with boys who share their interests, or with children who share their play style or strategy for influencing others (which have not yet been studied in CAH)? Do parent attitudes affect the interests of girls with CAH as much as they do typical girls?

CONCLUSIONS

Sex differences in childhood play are important for many reasons: they are large, they lead to sex differences in other characteristics (including cognition and adjustment), and they reflect the joint effects of biological predispositions, the social world, and children's constructions of that world.

These differences also have indirect long-term consequences. Children's environments are changed as a result of their play, and this, in turn, affects later opportunities. This means that the lives of boys and girls are differently channeled, constrained, or expanded as a result of early differences. For these reasons, further study of sex differences in play patterns provides both a model for understanding sex differences in other characteristics and highlights the importance of assessing the long-term consequences of early sex differences. It might be worthwhile to consider, for example, the ways in which the different play styles of young boys and girls promote adult sex differences in affiliation or the ways in which sex differences in interaction styles and in cognitive schemas influence the perception and reporting of pain. Children's activities, their play partners, and the

playstyles they exhibit are remarkably important for the breadth and depth of influence they exert across the life span.

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