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ORIGINAL PAPER

Continuity in Sex-Typed Behavior from Preschool to Adolescence: A Longitudinal Population Study of Boys and Girls Aged 3–13 Years

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Abstract Sex-typed behavior was assessed at age 3 using the Pre-School Activities Inventory, and at age 13 using the Multidimensional Gender Identity Scale, in 54 masculine boys, 57 masculine girls, 75 feminine boys, 65 feminine girls, 61 control boys, and 65 control girls. At age 13, girls who had been masculine at age 3 felt less similar to other girls, were less content being a girl, and had greater self-efficacy for male-typed activities than control girls, and girls who had been feminine at age 3 had greater self-efficacy for female-typed activities. Boys who had been feminine at age 3 felt less similar to other boys and had lower self-efficacy for male-typed activities than control boys at age 13, and boys who had been masculine at age 3 felt more competent in agentic roles. Thus, sex-typed behavior at age 3 predicted sex-typed behavior at age 13. It was concluded that the degree of sex-typed behavior shown by preschool children is a good indicator of their degree of sex-typed behavior following the transition to adolescence.

Keywords Sex-typed behavior · Gender development · Preschool · Adolescence · ALSPAC

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Introduction

One of the most striking behavioral differences between boys and girls is their preference for different toys. Sex-typed toy preferences have been demonstrated in children as young as 1 year old (Alexander, Wilcox, & Woods, 2009; Campell, Shirley, Heywood, & Crook, 2000; Jadva, Hines, & Golombok, 2010; Serbin, Poulin-Dubois, Colbourne, Sen, & Eichstedt 2001; Snow, Jacklin, & Maccoby, 1983) and, by their third birthday, girls are much more likely than boys to play with dolls, dolls' houses, tea sets, and other domestic toys whereas boys most often play with toy guns, swords, cars, trains, and trucks (Hines, 2010a; O'Brien & Huston, 1985; Pasterski et al., 2005; Ruble, Martin, & Berenbaum, 2006; Servin, Bohlin, & Berlin, 1999; Sutton-Smith & Rosenberg, 1971). By this age, girls also prefer girls as playmates and boys prefer to play with boys (Howes, 1988; LaFreniere, Strayor, & Gauthier, 1984; Maccoby & Jacklin, 1987; Pellegrini, Long, Roseth, Bohn, & van Ryzin, 2007). Differences in the play styles of boys and girls can also be seen from 3 years of age (Maccoby, 1998; Maccoby & Jacklin, 1987; Pitcher & Shultz, 1983). Boys tend to play in a more active, rough-and-tumble, and sometimes physically aggressive fashion than girls, who tend to talk more to each other and be more nurturant than boys. When girls are aggressive, this is more likely to take the form of verbal hostility or exclusion from a circle of friends (Crick, Casas, & Mosher, 1997; McNeilly-Choque, Hart, Robinson, Nelson, & Olsen, 1996). Moreover, boys like to play in large groups outdoors while girls are more often to be found in twos or threes indoors. Pretend play also differentiates the sexes with boys acting out heroic roles involving fighting and adventure, and girls preferring to be family characters or dressing up in feminine clothes.

The sex difference in toy preference that is apparent among preschool children continues to characterize the early school years. Martin, Wood, and Little (1990) demonstrated a greater

preference among boys for cars, airplanes, and tool sets and a greater preference among girls for tea sets, dolls, and hairdressing sets at age 5. Gender segregation is another important feature of the early school years, involving not only the preference for same-sex playmates but also the avoidance of playmates of the other sex. It was found that the amount of time 6-year-olds spent playing with same-sex peers was more than 10 times greater than that spent with peers of the other sex (Maccoby & Jacklin, 1987). A similar preference for same-sex peers was demonstrated by Serbin, Powlishta, and Gulko (1993). As children enter school, the play styles of boys and girls continue to diverge, with achieving dominance being of greater importance to boys (Maccoby, 1998). The way in which girls and boys communicate is also different. Girls often talk to each other to form and strengthen relationships whereas boys tend to use language to give information, assert themselves, and command attention (Lever, 1976; Maccoby & Jacklin, 1987). Boys of this age like to play in large groups with other boys whereas girls usually prefer the company of one or two female friends. The nature of these relationships also differs between the sexes. Whereas girls' friendships are characterized by emotional and physical closeness, the friendships of boys are founded on shared activities and interests (Maccoby, 1998).

In late childhood, sex-differences in toy preference remain apparent. A study of letters to Santa Claus revealed a marked difference in the toys requested by boys and girls (Robinson & Morris, 1986). More than one quarter of girls wanted a doll compared with less than 1% of boys whereas almost half of the boys but less than 10% of the girls asked for some kind of vehicle. The preference for same-sex peers is strongest at this age. In re-viewing the literature on relationships within the school environment, Maccoby (1998) reported that children's best friends were almost always the same sex as themselves. Further-more, when observed during free time, -boys and girls were most likely to be found interacting with others of their own sex (Gray & Feldman, 1997; Maccoby, 1998) and, from their examination of peer preferences, Serbin et al. (1993) reported that 95% of children preferred same-sex peers. Much of boys' free time is spent in large groups of other boys playing competitive games (Crombie & Desjardins, 1993) whereas girls spend most of their free time conversing with a female best friend, often sharing secrets or talking about mutual interests (Lever, 1976; Tannen, 1990).

Although there is a large body of research on sex-typed behavior in childhood, far fewer investigations have been conducted on sex-typed behavior in adolescence. An exception is a study of girls' sex-typed activities (McHale, Shanahan, Updegraff, Crouter, & Booth, 2004b) which included a group of early adolescent girls with a mean age of 11.7 years and a group of girls in middle adolescence with a mean age of 14.9 years. It was found that girls in middle adolescence were significantly more involved in feminine than masculine activities, and significantly more sex-typed with respect to their activities than early adolescent girls, indicating that sex-typed behavior increases in adolescence. When boys and girls with an average age of 10.86 years were followed up, sex-typed activities at the first assessment were found to predict individual differences in gender development two years later (McHale, Kim, Whiteman, & Crouter, 2004a).

Even less is known about the continuity of sex-typed behavior from early childhood to the adolescent years, i.e., whether ior at an early age continue to do so following the transition to adolescence. The current investigation was designed to examine this issue and became possible through collaboration with the Avon Longitudinal Study of Parents and Children (ALSPAC), a large, general population study in the United Kingdom that included a measure of sex-typed behavior, the Pre-School Activities Inventory (PSAI) (Golombok & Rust, 1993a, 1993b, 2009), when the children were 2.5, 3.5, 5, and 8 years old. In an earlier phase of this study involving 2,726 boys and 2,775 girls, it was found that those children who were the most sex-typed at age 2.5 remained so at age 8 (Golombok et al., 2008). In the present study, conducted at age 13, sub-samples of extremely masculine boys and girls, extremely feminine boys and girls, and comparison groups of randomly selected boys and girls, categorized according to their PSAI score at age 3.5 years, were administered the Multidimensional Gender Identity and Sexual Questioning Scale (Carver, Egan, & Perry, 2004; Egan & Perry, 2001), an age-appropriate measure of sex-typed behavior. The aim was to examine the continuity of sex-typed behavior from the preschool to the adolescent years, i.e., to establish whether "masculine" boys and "feminine" girls, and "feminine" boys and "masculine" girls, continued to show sex-typed and cross-sex-typed behavior, respectively, following the transition to adolescence.

Key theoretical explanations of the processes involved in children's acquisition of sex-typed behavior derive from biological, that is, early hormonal (Hines, 2004, 2010a), social learning (Bandura, 1977; Mischel, 1966, 1970), and cognitive developmental (Kohlberg, 1966; Martin, 1993) perspectives, with general agreement that sex-typed behavior results from an interplay among biological, psychological, social, and cognitive factors from early fetal development onward (Bussey & Bandura, 1999; Golombok & Fivush, 1994; Hines, 2004, 2010b; Ruble et al., 2006). These various perspectives predict continuity in sex-typed behavior from preschool to adolescence, with prenatal hormonal mechanisms forming the basis for postnatal social, psychological, and cognitive influences. As outlined by McHale et al. (2004a, 2004b), puberty is associated with heightened social pressure for sex-typed behavior producing an increase in sex-typing following the transition to adolescence. Thus it is hypothesized that boys and girls who at age 3 were extremely sex-typed will at age 13 show significantly higher levels of sex-typed behavior, and boys and girls who at age 3 were extremely opposite-sex-typed would at age 13 show significantly lower levels of sex-typed behavior, compared to randomly selected boys and girls.

Method

Participants

The sample was obtained from ALSPAC, a geographic population study of almost 14,000 mothers and their children beginning in pregnancy (Golding, Pembrey, Jones, & The ALSPAC Study Team, 2001). The study enrolled all pregnant women who were residents within Avon, a clearly defined area of southwest England, who had an expected delivery date between April 1, 1991 and December 31, 1992. It was estimated that approximately 90% of the eligible population took part. The study area has a population of 1 million comprising the city of Bristol, with a population of 0.5 million, moderate-sized towns, and rural areas. The demographic characteristics of families in the study are closely comparable to those of families in the United Kingdom as a whole with respect to the type of area in which they live, the educational level of the parents, housing, and mobility (Baker, Morris, & Taylor, 1997). The children in the study were similar to children in the rest of the country with respect to the prevalence of preterm delivery, low birth weight, physical and mental disability, physical illness, and psychological disorder.

Sex-typed behavior was assessed at age 3.5 years using the PSAI, a psychometrically constructed questionnaire specifically designed to differentiate "masculine" from "feminine" boys, and "masculine" from "feminine" girls, within a normal population sample, i.e., to differentiate within, as well as between, the sexes (Golombok & Rust, 1993a, 1993b, 2009). Using PSAI scores at age 3.5, six groups of children were selected: boys ($n = 128$) and girls ($n = 113$) with extremely masculine scores, boys ($n = 112$) and girls ($n = 118$) with extremely feminine scores, and boys ($n = 102$) and girls ($n = 106$) randomly selected from among the remaining children. PSAI scores at 3.5 years were used rather than PSAI scores at 2.5 years as sex-typed behavior is generally established by age 3 (Hines, 2004; Ruble et al., 2006).

The number of children followed up at age 13 years in the six groups was 54, 57, 75, 65, 61, and 65 respectively, representing 55% of the age 3 sample. This participation rate was almost identical to the 54% of adolescents from the entire ALSPAC sample still taking part at age 13. In addition, the average PSAI scores in the six groups did not differ for the cohort selected at age 3 years versus the sub-sample available for follow-up at age 13. The age 13 sample was representative of the geographic area of Avon, England and diverse in socioeconomic background. Based on paternal occupation, about 50% of the sample was professional/-managerial/technical and 50% skilled/partly skilled/unskilled. Mothers of 96% of the children described the child's ethnicity as White and 4% indicated Non-white (Black, Asian or Other).

At age 13, the children were administered the Multidimensional Gender Identity and Sexual Questioning Scale (Carver et al., 2004; Egan & Perry, 2001). This questionnaire was designed to assess adolescents' feelings of compatibility with their own gender and was specifically designed for this age group.

Measures

Pre-School Activities Inventory (PSAI)

The PSAI is a questionnaire measure for which a parent or the child's primary caregiver indicates their child's involvement in a variety of sex-typed behaviors (Golombok & Rust, 1993a, 1993b, 2009; Golombok et al., 2008). The questionnaire comprises 24 items, 12 masculine and 12 feminine, and is divided into three sections: *toys* (7 items), *activities* (11 items), and *characteristics* (6 items). Each section has its own stem. For *toys*, this is "Please answer the questions according to how often the child played with the following toys during the past month" and an example item is "Jewelry." For *activities*, the stem is "Please answer the questions according to how often the child engaged in the following activities during the past month" and an example item is "Climbing." For *characteristics*, the stem "Please answer the questions according to how often the child showed the following characteristics" is used, and an example item is "Interest in snakes, spiders or insects." Each item was rated on a 5-point scale ranging from "never" through "hardly ever," "sometimes" and "often" to "very often." The feminine items were reversed scored so that higher total scores represent more masculine-typical behavior and lower total scores represent more feminine-typical behavior. Thus, the higher the total score, the more masculine the behavior for both boys and girls.

The measure has been standardized on more than 2000 children in the United Kingdom, the Netherlands, and the United States (Golombok & Rust, 1993a, 1993b). Mean standardized scores on the inventory did not differ for children from these three countries and for the entire group were 61.66 ($SD = 9.40$) for boys and 38.72 ($SD = 9.66$) for girls. The standardization target was a mean of 40 ($SD = 10$) for girls and a mean of 60 ($SD = 10$) for boys. Split-half reliability was .66 for boys and .80 for girls, and test–retest reliability over a 1 year period was .62 for boys and .66 for girls. The inventory has been validated by comparing parental ratings to teacher ratings for children attending five different day-care centers. For boys, the correlation between parent and teacher ratings was .37, and for girls the correlation was .48, showing the inventory to be a valid measure of gender role.

Multidimensional Gender Identity Scale

The Multidimensional Gender Identity Scale (Carver et al., 2004; Egan & Perry, 2001) was used to assess adolescents' sex-typed behavior. In the present investigation, the following

sub-scales were used: (1) Gender Typicality—the degree to which children feel that they are similar to others of their gender [6 items]; (2) Gender Contentedness—the degree to which children are happy with their assigned gender and rarely wish to engage in cross-gender activities [6 items]; (3) Agentic Traits—children's perceptions of self-efficacy for agentic traits such as leadership and risk-taking [8 items]; (4) Male-typed Activities—children's self-efficacy for male-typical activities, such as building model planes and cars [8 items]; (5) Communal Traits—children's perceptions of self-efficacy for communal traits such as showing emotion and being kind-hearted [8 items]; and (6) Female-typed activities—children's self-efficacy for female-typical activities, such as baby-sitting or looking after younger children [8 items]. For each item, children were presented with bipolar statements such as"Some girls like being a girl" BUT "Other girls don't like being a girl." The child first has to select the statement that best describes him or her, and then report whether the statement was "very true" or "sort of true" for him or her. Each item was scored on a 4-point scale, with a high score on a subscale representing a high degree of sex-typed behavior. The subscales have high internal consistency. Cronbach alpha coefficients were found to range from 0.60 to 0.92, with most greater than 0.70 (Carver et al., 2004). The sub-scales were also shown to have high test–retest reliability, with stability coefficients over a 6-month period ranging from 0.56 for Gender Typicality to 0.84 for Female-typed activities.

Results

The analyses were conducted for girls and boys separately using multivariate analyses of variance (MANOVAs). Where significant group differences were found, contrasts were carried out to determine whether masculine girls differed from randomly selected girls (average girls) and whether feminine girls differed from average girls. Similarly, contrasts were carried out to determine whether feminine boys differed from randomly selected boys (average boys) and whether masculine boys differed from average boys.

Girls

The girls' sub-scale scores from the Multidimensional Gender Identity Scale were entered into a MANOVA. Wilks' Lambda was significant, $F(14, 356) = 3.05$, $p < .0001$, reflecting significant group differences for Gender Typicality, $F(2, 184) = 8.24$, $p < .0001$, Gender Contentedness, $F(2, 184) = 7.68$, $p < .001$, Male-typed Activities, $F(2, 184) = 4.49$, $p < .05$, and Female-typed activities, $F(2, 184) = 7.11$, $p < .001$. Contrast analyses showed that masculine girls obtained significantly lower scores than average girls for Gender Typicality ($p < .05$; $d' = 0.41$) and Gender Contentedness ($p < .01$; $d' = 0.46$). Feminine girls obtained significantly higher scores than average girls for Female-typed activities ($p < .05$; $d' = 0.37$) (see Table 1).

Boys

The boys' sub-scale scores from the Multidimensional Gender Identity Scale were entered into a separate MANOVA. Wilks' Lambda was significant, $F(14, 362) = 2.65$, $p < .01$, reflecting significant group differences for Gender Typicality, $F(2, 187) = 4.27$, $p < .05$, Agentic Traits, $F(2, 187) = 7.67$, $p < .001$, and Male-typed Activities, $F(2, 187) = 8.02$, $p < .0001$. Contrast analyses showed that feminine boys obtained significantly lower scores than average boys for Gender Typicality ($p < .05$; $d' = 0.38$) and Male-typed activities ($p < .05$; $d' = 0.43$). Masculine boys obtained significantly higher scores than average boys for agentic traits ($p < .05$; $d' = 0.38$) (see Table 2).

Table 1 Means and *SD* for the Multidimensional Gender Identity Scale scores at age 13 years in girls classified as strongly masculine, average, or strongly feminine according to their PSAI score at age 3.5 years

Variable	Masculine $N = 57$		Average $N = 65$		Feminine $N = 65$		F	p	Contrasts	
	M	*SD*	*M*	*SD*	*M*	*SD*			Masc vs. Medium	Fem vs. Medium
Gender typicality[a]	16.78	4.05	18.32	3.59	19.47	3.31	8.24	<.0001	<.05	ns
Gender contentedness[a]	15.38	3.28	16.90	3.21	17.60	3.00	7.68	<.001	<.01	ns
Agentic traits[b]	18.21	3.72	17.80	3.59	18.09	3.86	<1	ns	ns	ns
Male-typed activities[b]	21.78	3.83	20.06	3.81	19.95	3.58	4.49	<.05	<.05	ns
Communal traits[b]	25.73	2.66	26.53	3.09	26.86	3.62	1.99	ns	ns	ns
Female-typed activities[b]	22.50	4.07	23.63	3.91	25.10	3.49	7.11	<.001	ns	<.05

[a] Absolute range, 6–24

[b] Absolute range, 8–32

Table 2 Means and *SD* for the Multidimensional Gender Identity Scale scores at age 13 years in boys classified as strongly masculine, average, or strongly feminine according to their PSAI score at age 3.5 years

	Masculine $N=54$		Average $N=61$		Feminine $N=75$		F	p	Contrasts	
	M	*SD*	*M*	*SD*	*M*	*SD*			Masc vs. Medium	Fem vs. Medium
Gender typicality[a]	19.09	3.36	18.78	3.67	17.42	3.48	4.27	<.05	ns	<.05
Gender contentedness[a]	19.14	2.50	19.19	2.87	18.28	2.99	2.27	ns	ns	ns
Agentic traits[b]	19.33	2.65	18.19	2.73	17.32	3.14	7.67	<.001	<.05	ns
Male-typed activities[b]	25.18	3.10	24.40	3.34	23.01	2.97	8.02	<.0001	ns	<.05
Communal traits[b]	25.09	3.37	24.22	2.92	24.86	2.75	1.32	ns	ns	ns
Female-typed activities[b]	18.27	3.53	17.90	3.09	18.74	3.20	1.14	ns	ns	ns

[a] Absolute range, 6–24

[b] Absolute range, 8–32

Discussion

The findings showed continuity in sex-typed behavior from preschool to adolescence. For girls, significant group differences in Gender Typicality, Gender Contentedness, Male-typed Activities, and Female-typed Activities were found at age 13 according to their classification as masculine, average or feminine 10 years earlier. Contrast analyses showed that those who had been classified at age 3 as masculine at age 13 felt less similar to other girls, were less content being a girl, and had greater self-efficacy for male-typed activities, in comparison to randomly selected girls. Those who had been classified as feminine had greater self-efficacy for female-typed activities.

For boys, significant group differences at age 13 were found for Gender Typicality, Agentic Traits, and Male-typed Activities according to their classification at age 3 as masculine, average or feminine. Those classified at age 3 as feminine at age 13 felt less similar to other boys and had lower self-efficacy for male-typed activities, in comparison to randomly selected boys. Those classified at age 3 as masculine at age 13 felt more competent in agentic roles. It appears, therefore, that the degree to which children show sex-typed behavior at age 3 is indicative of their future level of sex-typed behavior at age 13.

Girls classified as extremely masculine at age 3 were found to differ on a greater number of subscales at age 13 than were boys who had been classified as extremely feminine at age 3. This finding is in line with the greater variation in sex-typed behavior shown by girls than boys (Blakemore, Berenbaum, & Liben, 2009), which is thought to result, in part, from the greater social pressure placed on boys than on girls to conform to gender stereotypes (Lytton & Romney, 1991; Maccoby, 2002). The effect sizes for the contrasts for both girls and boys ranged from 0.38–0.46 and thus approached the medium range.

Although the study was not designed to test competing hypotheses regarding the processes involved in the continuity of sex-typed behavior from preschool to adolescence, the findings appear more compatible with explanations involving early hormonal and social influences than with a cognitive developmental approach, which would predict a decline in sex-typed behavior resulting from more flexible gender stereotyping as children grow older (McHale et al., 2004b; Ruble et al., 2006). However, it is important to differentiate between gender stereotyping and sex-typed behavior as, at adolescence, gender flexibility in gender stereotyping may operate independently of sex-typed behavior. This is consistent with evidence that, although there is an age-related decline in gender stereotypes, it is less clear that there is a similar decline in gender preferences (Ruble et al., 2006; Serbin et al., 2001). From a cognitive developmental perspective, children's gender schemas are involved in the acquisition of sex-typed behavior (Levy & Carter, 1989; Martin, Ruble, & Szkrybalo, 2002). Thus, variation in gender schematization at age 3 may be associated with sex-typed behavior at age 13.

Interestingly, where group differences were found, it was the children who showed atypical sex-typed behavior in the preschool years (masculine girls and feminine boys) rather than those who showed extremely sex-typed behavior (feminine girls and masculine boys) who were more likely to differ from the randomly selected children in adolescence. The masculine girls differed from the average girls on three sub-scales whereas the feminine girls differed from the average girls on one sub-scale, and the feminine boys differed from the masculine boys on two sub-scales compared with a difference on only one sub-scale between the masculine and average boys. Both masculine girls and feminine boys not only reported lower levels of sex-typed activities but also felt atypical for their gender. In addition, the masculine girls were less content being a girl. The earlier age of onset of puberty among girls than boys may explain the differences in Gender Contentedness for masculine girls but not feminine boys. These findings, based on a general population sample, are in line with longitudinal studies of clinical samples of children who show sex-atypical behavior (Bailey & Zucker, 1995).

Why are children who show extremely sex-atypical behavior as preschoolers more likely to remain less sex-typed as adolescents whereas children who are extremely sex-typed as preschoolers are less likely to differ at adolescence from girls who showed average sex-typed behavior at age 3? As far as social influences are concerned, it is conceivable that the children who remain opposite-sex-typed at age 13 are those who were not responsive to social pressure to conform to traditional sex-typed behavior. This raises the question of why they are not responsive.

One reason could be influences of hormones prior to birth. For instance, girls exposed to high levels of androgenic hormones, such as testosterone, before birth show increased male-typical behavior, including increased PSAI scores (Hines, 2010a). These findings have been reported following exposure to markedly elevated androgen, because of the genetic disorder, congenital adrenal hyperplasia (CAH) (Hines, Brook, & Conway, 2004), as well as in studies relating testosterone measured in maternal blood samples taken during in pregnancy (Hines et al., 2002) or in amniotic fluid (Auyeung et al., 2009) to PSAI scores in childhood. In addition, for girls with CAH, gender atypical behavior seems to persist despite parental encouragement of gender-typical behavior (Pasterski et al., 2005). Pasterski et al. found that girls with CAH received stronger parental encouragement to engage in female-typical play than did other girls, but that their sex-typical play correlated negatively with this parental encouragement. In contrast, among girls and boys without CAH, parental encouragement of sex-typical play correlated positively with engagement in sex-typical play. Thus, girls exposed to high levels of androgenic hormones prenatally may have a predisposition to gender atypical play and this predisposition may persist, despite parental efforts to encourage sex-typical play. Udry (2000) also provided evidence that healthy women exposed to relatively high concentrations of androgenic hormones during gestation differed from women exposed to lower levels in being unresponsive to maternal encouragement of gender-typical behavior, and proposed that early exposure to androgens limits the ability of the social environment to influence gendered behavior. Although similar studies are not available for boys exposed to reduced levels of androgenic hormones prenatally, it is possible that they also persist in gender-atypical play despite parental encouragement of gender-typical behavior.

Advantages of the present investigation include a large, representative sample and the inclusion of age-appropriate measures of sex-typed behavior designed to assess within-sex variation. It is the first study to follow children up from preschool to adolescence and to demonstrate that the degree of sex-typed behavior shown by children at age 3 is a good indicator of their degree of sex-typed behavior 10 years later following the transition to adolescence. This appears to be particularly true of sex-atypical children, especially girls.

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