The Pre-School Activities Inventory [PSAI]

A psychometric scale for the assessment of gender role behaviour in young children.

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Children's development of gender role behaviour

From an early age, boys and girls can be easily distinguished according to their sex. While this is partly due to their appearance and the way in which their parents dress them and cut their hair, it is also because of the things that children do. Boys and girls like to play with different toys, prefer different games, and engage in different activities. Long before they reach school age it is possible to tell with a reasonable degree of accuracy whether a child is a boy or a girl simply on the basis of his or her behavior. This does not mean that all boys engage in male activities, or that all girls engage in female activities, all of the time. There is a great deal of overlap between the sexes with some girls being more "boyish" than the average boy and some boys behaving in a way that is more typical of a "girlish" girl. Although there is considerable variation in the behavior of children within each sex, it is generally more acceptable for girls to behave like boys than it is for boys to behave like girls. This may explain why the term "tomboy" used to describe masculine girls is often used endearingly whereas "sissy" is a much more derogatory term when applied to feminine boys.

Preschool (3-4 Years)

Gender identity

By the time of their third birthday, children have generally developed a rudimentary sense of gender identity (Slaby & Frey, 1975). When asked "Are you a boy or a girl?" they will give the right answer. They can also correctly identify other people as male or female. But children of this age use physical appearance to make their judgments. A person with long hair who is wearing a skirt will be deemed female, and a short-haired person with a necktie will be seen as male, purely because of their external appearance. If these same people change their clothes and hairstyle to look like the other sex, children will report that their gender has changed as well.

At around 3 to 4 years of age, children develop gender stability, that is, they begin to recognize that gender does not change over time (Slaby & Frey, 1975). They realize that if they are a girl or a boy now then they used to be a girl baby or a boy baby, and that they will grow up to be a woman or a man. However, they still believe that children can change gender by changing their behavior; if a boy wears a dress, he can become a girl, and if a girl plays with guns, she can become a boy.

Toy preference

One of the most striking differences between boys and girls is their preference for different types of toys. This can be detected in 1 year olds (Snow, Jacklin, & Maccoby, 1983), and by 3 years of age, girls are much more likely than boys to play with dolls, dolls' houses, tea sets and other domestic toys whereas boys are most often to be found with toy guns, swords, cars, trains, and trucks (De Lucia, 1963; O'Brien & Huston, 1985; Sutton-Smith & Rosenberg, 1971).

Playmate preference

From as early as 3 years old, girls prefer other girls as playmates and boys prefer to play with boys (Maccoby & Jacklin, 1987). This phenomenon, known as "gender segregation," is not specific to particular nationalities or cultures. It can be seen in children's playgrounds around the world. Children's preference for same-sex playmates is a universal aspect of growing up (Whiting & Edwards, 1988). Gender segregation is most likely to occur when children are left to their own devices, especially when they are with others of a similar age, which suggests that it is children, not adults, who are driving this process. In an observational study of children in a daycare setting, LaFreniere, Strayor, and Gauthier (1984) found that the tendency for girls to play together became apparent at age 2. For boys, the preference for male playmates occurred slightly later but was clearly established at 3 years of age. Howes (1988) reported similar findings. Like LaFreniere et al. (1984), she observed children in daycare, and showed that 3 year olds were more likely to form new friendships with children of the same sex.

Play style

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 behaviors intended to damage relationships such as exclusion from a circle of friends (Crick, Casas, & Mosher, 1997; McNeilly-Choque, Hart, Robinson, Nelson, & Olsen, 1996). Boys also like to play outdoors in large groups while girls are more often to be found in twos or threes indoors. Differences in the way in which boys and girls resolve conflict are also apparent from age 3. Whereas girls incline toward reaching a compromise, it is more common for boys to use physical force (Sheldon, 1990). In addition, pretend play 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.

Early School (5-7 Years)

Gender identity

It is not until the early school years that children attain gender constancy, the final stage of gender identity development (Slaby & Frey, 1975), and understand that gender is a fundamental aspect of a person's identity. They now realize that gender is constant across time and across all situations, and that however much someone wants to be the other sex, behaves like the other sex, and wears other-sex clothes, this simply cannot happen. The attainment of gender constancy is closely related to the conservation stage of cognitive development (Piaget, 1968). When Marcus and Overton (1978) administered both a conservation task and a gender constancy task to early school age children they found that children who could successfully complete the conservation task were more likely to pass the gender constancy task as well. There has been some controversy over the age at which children reach gender constancy, with different studies producing different findings depending on the assessment methods used (Emmerich, Goldman, Kirsh & Sharabany, 1977; Martin & Halverson, 1981; Zucker et al., 1999). Many children, it seems, do not reach the stage of gender constancy until the end of the early school years. It used to be thought that it was necessary for children to develop a full understanding of the gender concept before they would consistently engage in sex-typed behavior (Kohlberg, 1966) but the differences in toy, playmate, and activity preference shown by children as young as 3 years old clearly demonstrate that this is not the case.

Toy preference

The sex difference in toy preference that is apparent among preschool children continues to characterize the early school years. In a study of 3- 5 year olds, Martin, Wood, and Little (1990)

demonstrated a greater preference among boys for a car, an airplane, and a tool set and a greater preference among girls for a tea set, a doll, and a hairdressing set. Children in this study were also more likely to report that they preferred unfamiliar neutral items such as a pizza cutter and a hole puncher if presented to them as something that children of their sex really like.

Playmate preference

Gender segregation is an important feature of the early school years. Eleanor Maccoby and Carol Jacklin examined the playmate preferences of 100 children at 4.5 years old and again at 6.5 years (Maccoby & Jacklin, 1987). When first observed, the children were spending nearly three times as much time playing with same-sex peers than other-sex peers. By the second observation, only 2 years later, the amount of time spent playing with same-sex peers was more than 10 times greater than that spent with peers of the other sex. A similar increase in the preference for same-sex peers was demonstrated by Serbin, Powlishra, and Gulko (1993) when they compared children in kindergarten with children in the early school years. The process of gender segregation involves not only the preference for same sex playmates but also the avoidance of playmates of the other sex as well.

Play style

As children move from preschool to the early school years, the play styles of boys and girls continue to diverge. Achieving dominance appears to be of particular importance to boys. In order to have status, boys need to be seen as "tough" (Maccoby, 1998). The way in which girls and boys communicate is also different. Girls talk to each other to form and strengthen relationships. Boys 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 of other boys whereas girls 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).

Middle School (8-11 Years)

Toy preference

A study of letters to Santa Claus by elementary school children revealed a marked difference in the toys requested by boys and girls (Robinson & Morris, 1986). More than one quarter of the girls wanted a doll compared with less than 1 % of the boys whereas almost half of the boys but less than 10% of the girls asked for some kind of vehicle. It seems that right until the end of elementary school boys and girls have a strong preference for sex-typed toys.

Playmate preference

The preference for same-sex peers is strongest among middle school children. In reviewing the literature on relationships within the school environment, Maccoby (1998) reported that children's best friends are almost always the same sex as themselves. Furthermore, when observed during free time - in the playground, at lunch, or in the corridors - boys and girls are most likely to be found interacting with others of their own sex. Maccoby (1998) illustrates this with a description of behavior in the lunchroom: "In school lunchrooms, the children usually have a shared understanding that certain tables are 'girls' tables' and other tables are for boys. Very few instances are seen in which a child sits down next to a child of the other sex after emerging from the cafeteria line." A recent study of 8-11 year olds was particularly revealing. When Gray and Feldman (1997) investigated peer group interaction at a school where boys and girls of all ages had the opportunity to mix, more than half of the children spent no time at all with children of the other sex. And from their examination of the peer preferences of children of different ages, Serbin et al. (1993) reported that 95% of elementary school children preferred

same-sex peers. This is not just a Western phenomenon. The research of Whiting and Edwards (1988) shows that in India, Africa, South East Asia, and Central America, children of this age spend three quarters of their play time with peers of their own sex.

Play styles

In the elementary school years, much of boys' free time is spent in large groups of other boys playing competitive games. When Crombie and Desjardins (1993) observed boys and girls at play, they found that boys in large groups were involved in competition with other boys 50% of the time whereas this was true for girls in their smaller groups only l% of the time. 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) examined the content of girls' and boys' conversations in a laboratory setting. The girls had long, intimate conversations. Boys, in contrast, found little to say and resorted to talking about finding something to do.

The assessment of gender role behaviour in young children

Although a number of measures of gender role behaviour have been developed for children aged 5 years and older (for a review see Beere, 1990), few are available for younger children, and those that do exist have a number of difficulties associated with them. A major problem is their focus on the child's reported preferences for pictured toys, games, or activities, rather than the child's actual involvement in sex-typed play. In addition, little or no information is given about the reliability or validity of these tests. They are also somewhat outdated, which may be important given the changes that have taken place in attitudes towards children's sex-typed play over recent years. It is now more acceptable for boys and girls to engage in a wide range of activities that are not traditionally associated with their gender. The particular toys, games, and activities that children like have also changed considerably over the years. A further drawback of existing tests is their failure to discriminate within the sexes, i.e. to differentiate between masculine and feminine boys and between masculine and feminine girls.

The Fauls-Smith Activity Preference Test (Fauls & Smith, 1956) requires children to choose between a masculine and a feminine activity in three sets of pictures according to the one that they prefer. The test produces a score along a single dimension of masculinity/femininity. No information is given about the reliability or validity of this short test. In the Toy Preference Test (De Lucia, 1963) children are presented with 24 pictures of pairs of toys and are asked to choose the one with which a pictured child of the same sex as the subject would like to play A single measure of masculinity/femininity is obtained according to the gender appropriateness of the child's toy choices. Although this test is presented by its authors as a measure of gender role identification, it does not ask for the child's own toy preferences and is thus more accurately described as a measure of knowledge of gender role stereotypes. Parallel-forms reliability was found to be .57, and test-retest reliability coefficients ranged from .67 to .72 when an experimenter of the opposite sex to the child administered the test, and from .13 to .21 with a same-sex experimenter. Construct validity was measured using a list of pairs of games adapted from the Checklist of Games and Play Activities (Rosenberg & Sutton-Smith, 1964). The correlation between these two measures was found to be .64 with an opposite-sex experimenter and -.13 with a same-sex experimenter. Although a version of this test in which children are asked to select the toys with which they themselves would most like to play has now been developed (Newman & Carney, 1981), no data are available for preschool children.

The most widely used measure is the Sex Role Learning Index (SERLI, Edlebrock & Sugawara, 1978). This has been designed to measure the child's knowledge of gender role stereotypes ("gender role discrimination"), the child's desire to adhere to gender role stereotypes ("gender role preference"), and the child's desire to adhere to his or her own ideas of what is gender role appropriate ("gender role confirmation"). Boys and girls are presented with 20 pictures of male or female individuals who are respectively engaged in a variety of masculine and feminine activities, and 20 pictures of masculine and feminine objects relating to these activities. The

children are asked to sort the objects according to their appropriateness for boys or girls and then to rank the activities in order of preference. In scoring for gender role preference, gender role stereotypes are used to define sex appropriateness, and in scoring for gender role confirmation, the child's own classification of the objects is used. With a same-sex experimenter, test-retest reliability coefficients ranged between .65 and .69 for gender role discrimination, between .84 and .90 for gender role preference, and between .51 and .69 for gender role confirmation. The reliability coefficients were consistently lower with an opposite-sex experimenter. The It Scale for Children (Brown, 1956) was administered together with the SERLI to obtain a measure of construct validity. Although some relationship was found between the tests for boys, this was not the case for girls.

The Pre-School Activities Inventory [PSAI]

The Pre-School Activities Inventory [PSAI] was developed as a reliable and valid psychometric questionnaire for the assessment of gender role behaviour in preschool children. Unlike existing tests, it has been designed to discriminate both within and between the sexes so that variation among as well as between boys and girls can be assessed. A further advantage is its focus on actual behaviour rather than on preferences; the questionnaire was designed to measure the child's frequency of play with respect to a variety of toys, games, and activities.

As preschool children tend to be unreliable reporters, the PSAI is completed by the child's mother or other caretaker. Following the trend in measures of gender role behaviour in older children, such as the Children's Personal Attributes Questionnaire (Hall & Halberstadt, 1980) and the Children's Sex-Role Self Concept Inventory (Kurdek & Siesky, 1980: Stericker & Kurdek, 1982), the PSAI also includes items relating to the child's temperamental characteristics. The PSAI is a research tool that can be applied to a wide range of studies of gender role behaviour in young boys and girls, for example, to investigate developmental changes in gender role behaviour or factors associated with variation in gender role behaviour in boys or girls. The PSAI allows meaningful comparisons between different groups of children and, by providing normative data, enables individual children to be assessed.

Method

Two sources of information were utilized for the development of the test specification. Firstly the literature on sex-typing in pre-school children was reviewed, and ways in which boys and girls have been shown empirically to differ from each other were identified, together with ways in which boys and girls respectively had been described as "girlish" or "boyish". Secondly, a short survey was administered to 27 mothers asking them to identify 10 aspects of their son's or daughter's behaviour that they felt was typical for their sex, and 10 ways in which they felt their behaviour was occasionally more characteristic of a child of the opposite sex. This was done to ensure that common belief systems for the attribution of cross sex behaviour within each sex were sampled as well as those which were traditionally thought to discriminate between sexes. The results of this preliminary study, together with the review of the literature, formed the basis of the test specification, which had three content categories: (i) toys (ii) activities, and (iii) personality characteristics of the child. From an initial item pool of 153 (57 toys, 47 games and 49 personality characteristics), 30 items per category were selected. Of these 30, 10 were traditionally masculine, 10 were traditionally feminine, and 10 were neutral. In the selection of these items, careful attention was paid to the balancing of desirable with possibly undesirable attributes of both masculine and feminine behaviour. This was done with the aim of balancing the final version of the PSAI with respect to the social desirability of the items. The 90 item initial version of the questionnaire was designed to be completed by a parent or caretaker who was in close contact with the child.

The pilot study was carried out on a sample of 32 boys and 43 girls from two nurseries and two play-groups in the London area. The mean age of the children was 43 months (s.d. 9.75 months), and did not differ between boys and girls. The mothers were asked to complete the

pilot questionnaire and were given the opportunity to comment on any of the questions. Some items were dropped from further analysis on the basis of these comments, for example, where the activity was very dependent on the weather or the time of year. Comparisons between boys and girls for each item showed that 40 of the 90 items successfully discriminated between the sexes. Some items were omitted because all of the respondents tended to endorse them in the same way.

Subsequent item analysis maximized the within-sex variance of the items while retaining only items that also discriminated between the sexes. In general, gender role items are of two types. Some items may show large overall differences between boys and girls, yet fail to differentiate the degree of sex-typing among children of the same sex. Other items may be considered characteristic of masculinity or of femininity in either boys or girls, yet the sexes do not differ on these items. An objective in the development of the PSAI was the maximization of variation in gender-typing within each sex to allow the final scale to be used to examine variation *within* the sexes, as well as differences *between* the sexes. To achieve this end, an initial scale was constructed from those items in the "toys" section which discriminated significantly between boys and girls. This initial scale was then correlated with each of the “activities” section items for boys and girls separately. The items from the "activities" section which correlated significantly with the initial scale from the “toys" section for both sexes were used to construct an intermediate “activities" scale. This procedure was repeated in reverse to produce an intermediate “toys” scale. The combined intermediate “toys” and “activities” scales were then correlated with each of the items in the “personality characteristics” section to produce an intermediate “personality characteristics” scale. This provided three intermediate scales that discriminated masculine from feminine gender role behaviour within as well as between sexes. These intermediate scales were then combined and reduced using factor analysis to produce a unidimensional scale.

The final scale has 24 items; 12 masculine and 12 feminine. The scale includes 7 toy items, 11 activity items and 6 personality items. The distribution of scores on the final version is bimodal for the sexes combined, but shows a large amount of within gender variation with significant overlap. The factor analysis of the final scale demonstrated that the items were generally parallel for the combined and separate boy and girl samples in the pilot study. The gender role scale came out clearly in all cases as an unrotated first factor. The second factor was easily identified as the result of acquiescence. The third factor was due to age.

Item analysis statistics were subsequently replicated on several other groups in the UK (data collected by the authors), the USA (data collected by Dr William Freidrich at the Mayo Clinic, Rochester, MN) and the Netherlands (data collected by Dr Cohen-Kettenis at the Academisch Ziekenhuis, Utrecht). The data for the various groups were comparable, and the item-total correlation statistics for the combined groups are shown in Table 1. All items make a contribution to the discrimination between the sexes, and also towards the variation in sex-typing within either one or both sexes. Some subsequent changes to the questionnaire were made to a few of the items to ensure its application across a wide range of English-speaking populations. In particular, the word "aeroplane" (as used in England) was changed to "airplane", and the word "doll's pram" (as used in England) was altered to "doll's carriage". Further analyses on other samples have confirmed that these changes have had no detrimental effect on the factor structure of the questionnaire.

Table 1. Item-Scale Correlation Coefficients (Corrected for Overlap) for all Subjects and for Boys and Girls Separately

Item	All (n=2,330)	Boys (n=1,260)	Girls (n=1,070)
A1	0.46	0.38	0.17
A2	0.53	0.19	0.29
A3	0.39	0.06	0.13
A4	0.66	0.32	0.33
A5	0.51	0.12	0.27
A6	0.41	0.37	0.14
A7	0.40	0.22	0.23
B1	0.35	0.21	0.06
B2	0.26	0.07	0.25
B3	0.51	0.18	0.32
B4	0.33	0.24	0.06
B5	0.27	0.29	0.03
B6	0.28	-0.04	0.31
B7	0.25	0.19	0.14
B8	0.23	0.21	0.16
B9	0.51	0.14	0.34
B10	0.38	0.09	0.19
B11	0.64	0.22	0.38
C1	0.17	0.08	0.26
C2	0.37	0.32	0.32
C3	0.19	0.15	0.20
C4	0.28	0.20	0.30
C5	0.44	0.15	0.37
C6	0.19	0.04	0.30

Standardization

The questionnaire was standardized across several samples, including (a) the pilot group; (b) the validation group considered above; (c) a sample of 939 boys and 704 girls (mean age = 35.79 months, SD = 14.88) in the UK obtained through the popular magazine Practical Parenting; (d) 178 boys (mean age = 44.51, SD = 11.33) and 170 girls (mean age = 43.34, SD = 11.32) from preschools in the Netherlands (the questionnaire having been administered in Dutch translation); and (e) 96 boys, mean age = 51.41 months (SD = 10.35) and 115 girls, mean age = 47.54 months (SD = 11.23) from preschools in Minnesota. These samples provided a breadth of representation across ages, preschools, nationality, and both urban and rural populations. Although, as would be expected in samples of this size, there were some significant differences between the groups, these did not reflect any large-scale variation in the nature of the samples. The standardisation was used to derive regression intercept and slope parameters such that the mean transformed PSAI score for boys would be 60 (s.d. = 10) and the mean transformed PSAI score for girls would be 40 (s.d. = 10). The values derived were 48.25 for intercept and 1.1 for slope.

Scoring

Each item has a score of 1 to 5, representing the response categories *never*, *hardly ever*, *sometimes*, *often* and *very often*, The PSAI is scored by first adding the "male" items, subtracting the "female" items, and then transforming to a pseudo-T scale by multiplication with 1.1 (to make the SD for boys and girls separately close to 10) and adding 48.25 (to render the

mean close to 50). This is achieved, on the basis of parameters derived from the standardisation samples, with the formula:

Score = 48.25 + 1.1 x (the sum of "male" items - sum of "female" items)

Male items: 1, 3, 5, 6, 11, 12, 14, 15, 17, 19, 20, 21.

Female items: 2, 4, 7, 8, 9, 10, 13, 16, 18, 22, 23, 24.

A higher score indicates more masculine behaviour, and a lower score, more feminine behaviour. The population mean score for data on 2,161 children is 51.10. Of these, 1,166 are boys, with a mean score of 61.66 (SD = 9.40); 926 are girls, with a mean score of 38.72 (SD = 9.66).

The means and standard deviations of the scores for the various groups, following application of the standardisation formula, are given in Table 2.

Table 2. Means and Standard Deviations of PSAI Scores for Boys and Girls in the Standardization groups.

	Boys			Girls		
Group	N	M	SD	N	M	SD
Pilot study	32	60.21	9.56	43	41.41	10.53
Validation study	45	61.06	8.66	57	43.91	11.06
Magazine study	918	60.36	10.16	748	40.31	10.52
The Netherlands	176	58.11	10.09	165	39.11	8.19
Rochester, MN	94	60.19	9.12	107	37.73	8.41

Reliability

Test-retest reliability was examined on a follow-up sample of 2726 boys and 2775 girls obtained from the ALSPAC sample (Golombok et al, 2008). The mothers made ratings of their child at ages 2.5 years, 3.5 years and 5 years. The test-retest reliability between ages 2.5 years and 3.5 years was .65 for boys and .63 for girls. The test-retest reliability for the longer 1.5 year interval between the ages of 3.5 years and 5 years was 0.68 for boys and 0.70 for girls, indicating that reliability increases with age. The pooled test-retest reliability across the sexes and ages was 0.67 (n = 5,501).

The split-half reliability calculated for the standardisation samples was 0.66 (n = 1,260) for boys and 0.80 (n = 1,070) for girls. For the ALSPC data the split-half reliabilities for boys were 0.73 at age 2.5 years, 0.77 at age 3.5 years and 0.80 at age 5 years. For girls, the split half reliabilities were 0.73 at age 2.5 years, 0.80 at age 3.5 years and 0.84 at age 5 years. The pooled split-half reliabilities across all these samples and ages were 0.74 for boys and 0.80 for girls, and 0.77 when pooled across sexes.

Validity

The PSAI has been validated on a group of 45 boys and 57 girls attending day-care in London in five different centres (mean age = 45.7 months, SD = 7.51). The inventory was completed by the mother while the day-care teachers carried out ratings of the boys on a six point scale ranging from a score of 1 for “Much more boyish than average”, through “More boyish than average”, “Slightly more boyish than average”, “Slightly less boyish than average”, “Less boyish

than average" to a score of 6 for "Much less boyish than average". The same procedure was followed for girls, but with "girlish" substituted for "boyish" throughout. For girls, the correlation between the inventory score and the teachers' ratings was .48 ($p < .0002$), while for boys the correlation was .37 ($p < .01$). The partial correlations between the PSAI scores and the validation ratings with age partialed out were .47 ($p < .0003$) for girls and .36 ($p < .02$) for boys, showing that age did not have any confounding influence on these validities.

Of some further interest were the partial correlations between the item scores and the day-care teachers' ratings with age partialed out. For boys, the items most likely to predict a teachers' ratings of boyishness were guns ($r = .35$, $p < .02$), avoiding risks ($r = - .34$, $p < .02$), swords ($r = .34$, $p < .02$), and trains, cars, and airplanes ($r = .30$, $p < .05$). For girls, the items that best predicted a teachers' ratings of girlishness were guns ($r = -.37$, $p < .005$), trains, cars, and airplanes ($r = -.33$, $p < .01$), and pretending to be a female character ($r = .29$, $p < .05$).

In a recent longitudinal study of a general population sample of 2,726 boys and 2,775 girls in the UK, PSAI scores at ages 2½, 3½ and 5 years predicted scores at age 8 on the Childhood Activities Inventory [CAI], an adaptation of the PSAI for 7-8 year olds that is completed by the child (Golombok et al, 2008).

Age related effects

Sex-typing increases during the preschool years, so that children before their second birthday are relatively less sex-typed, whereas by the time they are 5 years of age, sex-typing is very marked. Consequently, we would expect the scores on the PSAI to show this pattern. For boys between the ages of 2 and 6 years the correlation of the PSAI with age is .20 ($n= 1061$, $p< .0001$) while for girls it is -.24 ($n= 926$, $p< .0001$). The increasing differentiation is also demonstrated by the increase in the signal detection "*d* prime" function with age, which measures the extent of the overlap between the distribution of scores for boys and girls, with a larger score reflecting less overlap. For children aged 2 to 2½ years, this function is 1.86, whereas for children aged 5 years, it almost doubles to 3.24. The mean scores and their standard deviations for age bands 24 to 29 months, 30 months to 35 months, 36 to 47 months, 48 to 59 months, and 60 to 71 months for each sex are given in Table 3. A narrower 6-month age band was used for under-3s because of the more rapid change in these earlier months. It can be seen that a score of 40 for girls roughly represents the average femininity score of a girl at just before her third birthday. Younger girls have higher (less feminine), and older girls lower (more feminine), scores. For boys, a score of 60 roughly represents the average masculinity score for a boy as he approaches his third birthday. Younger boys have lower (less masculine) scores, and older boys have higher (more masculine) scores.

Table 3. Means and Standard Deviations of PSAI Scores from the standardization studies for Boys and Girls Separately Across Age Bands

	Boys			Girls		
Age band (in months)	N	M	SD	N	M	SD
24-29	179	58.54	8.29	118	42.60	8.89
30-35	170	60.07	9.08	185	39.94	9.58
36-47	398	62.35	9.19	342	37.72	9.48
48-59	229	63.86	10.17	206	36.37	10.79
60-71	85	64.87	9.56	75	33.52	9.80

Age standardization

As with most developmental scales, it is often necessary to interpret PSAI scores in terms of the average score for the child's age cohort. In this particular case, the standardization procedures necessary to do this must be carried out separately for boys and girls as the distribution of scores for all children is bimodal around the two foci represented by the male and female averages, respectively. For boys and girls separately, various models were fitted to the regression of the score on age, and in both cases a straight line was found to remove all significant variance due to age. The linear regression equation is in these circumstances the best transformation for age adjustment. The age adjustment was of the same format as that used for standardization, which was carried out to approximate a mean of 60 and a standard deviation of 10 for boys, and a mean of 40 with a standard deviation of 10 for girls. Thus the standardized age-adjusted scores consist of three components: a scaling element for the initial PSAI score, an adjustment factor for age, and a constant term. They are as follows:

for boys, $b = a \times 1.075 - \text{Age} \times .177 + 0.88$

for girls, $b = a \times 1.026 + \text{Age} \times .218 - 8.33$.

where *b* is the age standardized score, *a* is the initial PSAI score, and Age is the age of the child in months.

To confirm that these transformations do indeed adjust for age effects, analyses of variance were carried out with the age bands as the independent variable. For both boys and girls, the results were not significant, the F statistic in both cases being less than 1. The Bartlett-Box *F* test for homogeneity of variance between these groups was also carried out. This test was not significant for either boys or girls. In spite of this, however, it is worthwhile noting that the standard deviation of the scores does tend to increase slightly with age for both boys and girls. The means of the standardized scores for the age bands are given in Table 4.

Table 4. Age standardized PSAI scores for each gender within five age bands, and for the ALSPAC sample after application of the age standardization formula

	Boys			Girls		
Age band (in months)	N	M	SD	N	M	SD
24-29	179	59.18	8.93	118	41.13	9.11
30-35	170	59.70	9.72	185	39.74	9.84
36-47	398	60.58	9.91	342	39.38	9.68
48-59	229	60.14	10.94	206	40.62	11.03
60-71	85	59.20	10.36	75	40.03	10.09
ALSPAC 30 months	2726	60.31		2775	40.17	
ALSPAC 42 months	2726	60.17		2775	38.83	
ALSPAC 60 months	2726	59.25		2775	40.77	

Discussion

The PSAI has been shown to be a reliable and valid psychometric technique for assessing sex-typed behaviour in young children. Although some further data on the test-retest reliability for boys in particular, would be desirable, the robust values obtained for split-half reliability are encouraging. The results from the validation study are very reassuring, and those for girls are particularly so, given the usual low reliability of single rating scales of the type used for the criterion measure.

The raters and children in the various studies came from a wide variety of educational levels and socioeconomic backgrounds. Each will, of course, have held biases associated with the demographic characteristics of the catchment areas of the various nurseries involved but these were themselves reasonably varied. The data from the Practical Parenting survey will contain a bias towards the characteristics of this magazine's particular readership, which is well-informed and interested as far as parental issues are concerned. This sample was drawn from throughout the UK. Only 2.6% of the respondents were not the mothers of the children being assessed (i.e. they were fathers, stepmothers, etc.). Of the female respondents, 95% were living with a male partner. There were no differences on PSAI scores within this Practical Parenting group in terms of geographical area or whether or not the mother worked outside the home.

In the application of the PSAI, attention should be paid to the choice of scoring, as the scale can be used in both age-unadjusted and age-adjusted forms. The former can be treated in most circumstances as a criterion-referenced measure of the absolute level of sex-typed behaviour, independently of the child's age or sex. This allows the direct comparison of boys and girls with each other and also gives a measure of the extent to which the child engages in masculine or feminine activities. It does, however, have a bimodal distribution, so that care will need to be taken in the choice of appropriate statistics when data from both sexes are to be included in the same analysis. In some cases, data from boys and girls will need to be analyzed separately.

One particular situation that required such separate analysis was age standardization, where the standard deviation used in calculating standardized scores had to be from a normal distribution. It is for this reason that the age-standardized procedures have to be carried out separately for boys and girls. As with most developmental scales, there are many circumstances in which age-standardized scores are required. It is important to remember, however, that because of the separate age standardizations for boys and girls, it is not appropriate to compare or relate the age-standardized PSAI scores across sexes.

Although children's knowledge of gender role stereotypes, as measured by their understanding of the toy and activity preferences of boys and girls in general, have sometimes been considered to reflect children's own preferences, Eisenberg (1983) points out that the two are not equivalent and should not be treated as so. The PSAI is a measure of gender role adoption rather than knowledge about gender role stereotypes. It could be argued that observation of children's behaviour, either in a laboratory or a natural setting, would provide a more valid measure of gender role adoption than parental report. However, observational assessments only allow short episodes of behaviour to be examined and, particularly when this is carried out in a laboratory, the behaviour observed may not be typical of the child's normal repertoire. In addition, direct observation cannot easily be carried out with large numbers of children. Instead,

by using ratings by a parent or other care giver, the PSAI provides an assessment based on observation of the child's behaviour over a long period of time in a variety of settings.

As the respondent does not usually observe the child in all situations, it remains possible that the ratings fail to take account of some behaviours or characteristics while over-emphasizing others. For example, children's behaviour at home and at school may differ so that the parent may not be aware of relevant behaviours which are engaged in only at school. Bias in responding may also result from the parent's own preferences and expectations regarding the child's sex-typed behaviour, or as a result of the child adapting his or her behaviour according to the parent's likes or dislikes. For example, a boy who likes playing with guns may refrain from doing so in the parent's presence if he knows he is likely to be punished. However, the high correlations found between mothers' and teachers' scores suggest that the PSAI is valid across different situations.

Acquiescence effects in most psychometric scales are neutralized by counterbalancing positively with negatively scoring items. In the PSAI the same neutrality is achieved by counterbalancing male with female items. Social desirability has been minimized as much as possible by a balancing of positive and negative degrees of desirability. A further effect which may contaminate scores on the PSAI is the availability of toys of a particular type, or the opportunity for particular types of activities. The toys and activities chosen for the PSAI items are ones which are considered to be widely available in industrial society, even if sometimes this may be only in second-hand or self-made form. Where items are not endorsed simply because a toy was not available, or there was no opportunity for a particular activity, the scores will regress towards the population mean, which in most cases will result in girls receiving a less feminine rating and boys a less masculine rating. This effect should be kept in mind by researchers.

With the notable exception of researchers in the areas of androgyny (Bern, 1974; Spence, 1984) and gender identity disorder (Green, 1987; Zucker & Green, 1992), the investigation of gender development has overwhelmingly focused on comparisons between the sexes rather than on individual differences within groups of boys and girls. The PSAI has been designed for both purposes, and it is hoped that it will be useful not only in investigating sex differences and similarities, but also in examining the variation that exists in the development gender role behaviour in boys and girls.

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Golombok, S. & Rust, J. (1993a) The Pre-School Activities Inventory: A standardized assessment of gender role in children. *Psychological Assessment, 5,* No. 2, 131-136.

Golombok, S. & Rust, J. (1993b). The measurement of gender role behaviour in pre-school children: A research note. *Journal of Child Psychology & Psychiatry, 34,* No. 5, 805-811.

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