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COMPUTER INTEREST DIFFERENCES IN PRESCHOOL CHILDREN ACCORDING TO SEX AND PSYCHOLOGICAL SEX-TYPING

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The computer interest of 3- and 4-year-old children attending a university-affiliated day care center was assessed via their participation in self-selected computer activities. Computer participation involved a 3-step process culminating in terminal interaction: proximity, observation, and working. Results of 2-way analyses of variance unexpectedly indicated higher computer interest scores for females than males; however, no effects were found for age. Pearson correlations indicated a pattern of negative relationships between boys' preference for the adult male role and the computer interest variables.

Keywords: computer interest, preschool children, sex differences, gender roles, psychological sex-typing.

Gender-role concepts are acquired early in a child's life. While gender constancy is not attained until 5–6 years of age (Slaby & Frey, 1975), children as young as 2 or 3 years can classify everyday objects as being appropriate for males or females (Schaffer, 1981; Thompson, 1975). According to social learning theory, sex-typing occurs through modeling and the processes of rewarding or punishing appropriate or inappropriate gender-role behavior (Mischel, 1970).

Sex-typing includes the attitudes, beliefs, and behaviors deemed culturally appropriate for one's sex; thus, it is critical relative to computer-related issues in a society that is increasingly technological. As computer technology has become more central to contemporary society, computer competence has become more necessary for societal participation,

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particularly in the occupational sphere. A voiced concern is that the computer era may further limit female occupational success (Hawkins, 1985). In fact, in computer-related research using school-aged, adolescent, and college populations, a male advantage has been found in computer attitudes (Collis, 1985; Dambrot, Watkins-Malek, Silling, Marshall, & Garver, 1985; Fetler, 1985), amount of computer interaction (Fetler, 1985; Hess & Miura, 1985; Sheingold, Kane, & Endreweit, 1983), and computer competence (Dambrot et al., 1985; Fetler, 1985; Hawkins, 1985; Lockheed, Neilsen, & Stone, 1985).

Little is known about preschool children's attitudes, perceptions, or behaviors toward computers. Preschool-aged children are in the process of developing their gender role, which includes the sex-typing of objects and perceptions of and behaviors toward those objects. We expected that, as is the case for older children, preschoolers would view the computer as masculine (Collis, 1985; Hawkins, 1985) and respond to it accordingly. Thus, we investigated preschool children's interest in computers as indicated by the selection of computer-related activities, and examined the relationships among computer interest variables and sex-typing. Males were expected to exhibit greater computer interest than females, and a high degree of sex-typing was expected to correlate positively and negatively with computer interest variables for males and females, respectively.

Method

Participants

Children enrolled in preschool groups at a university day care center participated in this study. They represent a variety of socioeconomic backgrounds; lower-class as well as middle- and upper-middle-class children attend the center. Although the majority of the children are White, a significant minority are Mexican American, and a few Black and Asian-American children also are enrolled.

Parental permission for participation was obtained for all 19 male and 14 female children. There were eighteen 3-year-olds and fifteen 4-year-olds.

Materials and Procedure

An Apple IIe Computer was made available for the 3- and 4-year-old groups to use for 45 minutes each day on each of 9 days. While one group had access to the computer, the other was outside on the playground. The computer was introduced during the morning self-selected activity period after all children had arrived at the center.

Several computer games deemed appropriate for preschool children were used. An adult supervisor illustrated the use of the game to interested children; it was just one of several activities available each day. Children

could then take turns using the computer: while one child was using the computer, two "waiting" chairs were available for other children wanting a turn. After the child using the computer completed 10 trials, the child in the first waiting chair would then have a turn. The child in the second waiting chair would move to the first waiting chair, and the second waiting chair would be available to another interested child.

The first 4 days were considered baseline days for computer access, after which pink construction paper strips and five feminine stickers were used to feminize the computer. On the sixth day of computer access, the computer was masculinized with five masculine stickers and blue strips of construction paper. The seventh day was another baseline day with no stickers or construction paper, a masculinized computer was used on the eighth day, and on day nine (the final day) the computer was feminized.

On every other day under each condition, the computer games were alternated to overcome the effects of using a specific game. Games alternated for the baseline condition were shape discrimination and picture drawing. Games alternated under the masculine and feminine conditions were matching letters and matching numbers.

The five most masculine and five most feminine stickers were chosen by pretesting with five adult males and five adult females, from a selection of 22 stickers. The most frequently selected stickers were used to decorate the computer. Activity around the computer was videotaped during the first three baseline days and during one feminine and one masculine day.

Children were individually administered the Sex Role Learning Index (Edelbrock & Sugawara, 1978). Half the children of each sex were tested by a male research assistant; the other half were tested by a female research assistant.

Scoring

Five-second episodes from the videotapes, chosen at 3-minute intervals, were scored by two research assistants, who worked together until a minimum criterion of 80% agreement was reached. Then, the videotapes were independently scored using the following categories: proximity—within 2 feet of the computer as indicated by tape on the floor; observation—sitting in one of the two waiting chairs next to the computer and observing computer-related activity; and working—sitting at and interacting with the computer.

Computer interest ratio scores were calculated for proximity, observation, and working under baseline, masculinity, and femininity conditions, yielding nine computer interest scores for each child. The ratio score for each of the nine variables was the number of times that each computer behavior occurred divided by the total number of possible

episodes for that variable, with higher scores implying greater computer interest. Videotaped data were adjusted for child absences.

The Sex Role Learning Index (SERLI; Edelbrock & Sugawara, 1978) was used to assess sex-role preference. Because one research assistant did not correctly administer the sex-role discrimination section of the SERLI, data from this part of the instrument were not used.

Results

Nine two-way analyses of variance were performed to examine the effects of sex and age on each of the computer variables. For observation and working baseline variables, girls, $F(1, 29) = 4.500$, $p = .043$, scored significantly higher than boys, $F(1, 29) = 5.039$, $p = .033$. Under the feminine condition, 4-year-olds scored higher than 3-year-olds did on proximity, $F(1, 26) = 6.308$, $p = .019$. No significant main or interaction effects were found for the masculine condition.

To examine possible relationships between computer activity and sex-role variables, Pearson correlation coefficients were calculated by sex (see Table 1).

Table 1. *Correlations Between Sex-Role Preference Scores and Computer Interest Variables by Sex*

Condition		Sex-role preference: Child		Sex-role preference: Adult	
		Boys	Girls	Boys	Girls
Baseline:	Proximity	.31	-.06	-.52*	.33
	Observation	-.34	.04	-.26	.32
	Working	.14	.01	-.54*	-.10
Masculinity:	Proximity	.04	-.32	-.26	-.06
	Observation	-.32	.17	-.53*	.11
	Working	-.18	.06	-.54*	.06
Femininity:	Proximity	.05	-.72**	-.08	.11
	Observation	-.39	.02	-.22	-.39
	Working	.01	.59*	-.27	.09

Note. * $p < .05$, ** $p < .01$.

Discussion

Our finding that, for the baseline condition, preschool-aged females spent more time on the computer-related tasks of observing and working, was unexpected and suggests that these children were interested in the computer and viewed it as an appropriate tool for female use. In prior research with older children, adolescents, and young adults (see, e.g., Dambrot et al., 1985; Fetler, 1985; Lockheed et al., 1985), males have consistently shown greater interest and participation, and computers have been perceived by participants of both genders as masculine in nature.

Before these sex-role stereotypes regarding the computer can be ruled out, however, future researchers must address a possible bias inherent in the present study. Because of the nature of the procedure utilized to measure computer interest, a possible alternative explanation for the females' greater involvement in the computer-related tasks is that willingness to wait, or patience, was being measured in addition to computer interest. As previously described, participation in the computer tasks involved proceeding through a three-step process that involved some waiting during the first two steps. Indirect support for this hypothesis may be found in the relationships between the computer interest variables and sex-role preference scores. For boys, negative correlations were found between preference for the adult male role and the computer interest variables (composed of the three-step procedure). Boys with a greater preference for action-oriented stereotypical adult male roles (such as firefighter, carpenter, policeman, soldier, and doctor) and the equipment associated with these roles were the least likely to proceed through the process that culminated in working at the computer.

Although a possible bias favoring patience may have influenced the outcome, our behavioral analyses suggest that these preschool-aged children viewed the computer as appropriate for female use and that young females and males were equally as interested in computer activities. The findings are especially noteworthy because previous researchers (see, e.g., Collis, 1985; Hawkins, 1985; Hess & Miura, 1985; Sheingold et al., 1983) have repeatedly found a general male advantage for computer-related issues that is evident by elementary school age. Our findings support a positive change relative to the future occupational participation of currently young females in an increasingly technological society.

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