Sex Differences Related to Video Arcade Game Behavior

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Recently, video arcades have served as a social gathering locale for children of all ages. Due to the fact children spend considerable time playing video games, possible effects of this activity are of interest to social scientists and the public at large. The present research used a naturalistic observation to explore participants' sex and age classification (≤ 18 or ≥ 19), and whether more men and boys or women and girls participated in the playing of violent video arcade games. We found that not only are arcade patrons primarily men and boys, but they also tend to play more violent video arcade games than their female counterparts. Possible reasons for and implications of these findings are considered.

IN RECENT YEARS, VIDEO ARCADE GAMES HAVE become increasingly popular. “Americans spend more money annually on video games than they do on movie tickets” (Dill & Dill, 1998, p. 408). Video arcade games have spread into the household arena as well (with systems like Nintendo, Sega, and Sony PlayStation) and now can be found on many computers. Rideout, Foehr, Roberts, & Brodie (1999) estimated that approximately 10% of children under the age of 18 participate in video game-playing behavior for at least 1 hr per day.

According to Ball (1978), video games help children learn attributes such as hand-eye coordination, decision-making skills, and the following of directions. Moreover, Provenzo (1991) states, “video games provide important insights into the values we hold as a culture. Their content reveals a great deal about our attributes concerning violence, our fears and hopes for technology, and the social status we assign to minority groups and women” (p. 99). Sandra Calvert, director of Georgetown University’s Children in Media Project, suggests that video games are directly related to computers and that because of the lack of computer software and games targeted toward young girls, we may be guiding girls away from careers in technology (Rabasca, 2000). Games may strengthen gender stereotypes that already exist in our culture. Due to the potential impact of arcade games on young, impressionable minds, any sex difference in video arcade game behavior should be seriously considered.

Funk and Buchman (1996) concluded that regardless of whether video games are played at home or in the arcade, by children or adults, boys and men are found to engage in more playing behavior than girls and women. Likewise, a survey given to fourth, fifth, and sixth graders by Lin and Lepper (1987) showed that boys played more video games both at home and in arcades. Additionally, Kaplan (1983) found that boys spent four times the amount of time playing video games than girls. Finally, Greenfield (1994) states that boys’ ability to implement the use of logical and strategic planning skills in the process of learning a new game may contribute to this apparent sex difference.

In addition to a possible sex difference, there is the problem of the ever-growing popularity of violent video arcade games. Contemporary arcade games
SEX DIFFERENCES IN ARCADE BEHAVIOR  □ Jurica, Alanis, and Ogletree

depict individual characters throwing vicious kicks and brutal punches, and striking his/her opponent with such force that bloodshed is often the outcome. “Savage kicks and the ability to use violent weapons against one’s opponent are what determine success in the games” (Provenzo, 1991, p. 51). The days of pinball and Ms. Pac-Man are far behind us.

According to Klein (1984), video games provide a fantasy environment to be controlled, with survival being the ultimate goal. Many of these violent games are explicit in that they provide the participant(s) with the time, the setting, and a clear objective, thus creating a desire within the player(s) to fulfill a mission and/or purpose. Sex differences in video arcade game playing also may be related to the violent content of these games; men and boys may be more likely than women and girls to be interested in and participate in such video games.

The limited research previously conducted on sex differences in behavior related to video games has utilized survey/questionnaire methodologies. Because parents, peers, and others may regard games as being more appropriate for boys than girls, a social desirability response tendency might bias questionnaire data. Moreover, Subrahmanyam and Greenfield (1994) noted that girls, in relation to boys, lacked the desire and motivation to partake in studies on video games. Therefore, observing the actual behavior of the participants in the arcade setting provides another, perhaps less biased, assessment of sex differences, complementing the questionnaire data already obtained. For these reasons we decided to conduct a naturalistic observation of sex differences in video arcade game behavior. We hypothesized that not only will more men and boys engage in the playing of video arcade games, but also that they will play more violent versus nonviolent games than their female counterparts.

Method

Participants

We observed a total of 183 participants playing video arcade games. There were 31 women and girls and 152 men and boys engaged in playing behavior. One hundred thirty-eight participants were classified as being ≤ 18 years of age, and 45 were categorized as being ≥ 19 years of age. All of the observations took place in suburban middle-class neighborhoods in Austin and San Antonio, Texas.

Materials

We designed a data-recording sheet in order to categorize the participants into one of several categories. This sheet had six columns: the name of the game, notes about the game, men and boys ≤ 18 years old, men ≥ 19 years old, women and girls ≤ 18 years of age, and women ≥ 19 years of age. The data-recording sheet was designed so a check could be easily placed in the correct box corresponding to the participant’s sex and age while aligning horizontally with the name of the game the participant was playing. Finally, we used stopwatches to allow for a 1-min observation period in which the researcher could categorize the participant’s sex, age, and the name of the game he/she was playing.

Procedure

Before data collection began, pretesting was conducted in order to determine appropriate age categorizations, adequate times and sufficient time intervals for observation, and a proper procedure. Initially, both a male and female researcher collected data at each location during pretesting. However, because a high concordance rate (94.7%) was found, only one researcher observed and recorded data at each location during the study. After frequenting local arcades every Saturday and Sunday for 2 weeks, the method and procedure of data collection were established. We established two age categories to separate high school–age and younger adolescents from their college-age and older peers and to simplify the methodology by decreasing the possibility of errors made by guessing participants’ exact ages.

Six arcades (three in Austin and three in San Antonio) were used to monitor playing behavior. Each location was observed twice on Saturday at 8:00 p.m. and twice on Sunday at 3:00 p.m. Proceeding through each location in a clockwise manner, the researcher observed each video game for a 1-min interval. During each 1-min interval, the researcher noted the name of the game and the participant’s sex and estimated age classification (≤ 18 or ≥ 19). In the process of walking through the arcade, any game that was not being played was still observed for a 1-min interval to account for the possibility of late arrivals. The researcher conducted only one rotation around each arcade, with particular care taken to ensure that participants were not observed more than once.

In order to categorize the individual games as violent, one of the following criteria had to be met: (a) the character(s) controlled by the participant must engage in the throwing of savage kicks or knockout punches, or use weapons in hand-to-hand combat against an opponent, or (b) the game involved the killing of an opponent using missiles, lasers, or artillery (commonly found in futuristic and war games). We categorized the remaining games that did not involve hand-to-hand combat or the killing of an opponent as nonviolent.
Results

Chi-square tests analyzed the nominal data obtained in this study. The number of men and boys (152) engaging in arcade game behavior was significantly greater than the number of women and girls (31), \( \chi^2(1, N = 183) = 80, p < .001 \). A total of 138 of the participants involved in playing behavior were estimated to be \( \leq 18 \) years of age, whereas 45 were estimated to be \( \geq 19 \) years of age, \( \chi^2(1, N = 183) = 47; p < .001 \). After placing each game into one of the two categories (violent or nonviolent), a \( 2 \times 2 \) (violent vs. nonviolent; men vs. women) chi-square test examined whether or not the variables were independent. A significant association was found between participant sex and violent/nonviolent video games \( \chi^2(1, N = 183) = 4.395, p < .05 \); even though the participants played more nonviolent games overall, the men and boys were more likely than women to play violent video arcade games (see Table 1).

Discussion

Our naturalistic data clearly support the presence of a sex difference in video arcade game playing behavior reported in earlier research (Funk & Buchman, 1996; Kaplan, 1983; Lin & Lepper, 1987). There may be several underlying factors that contribute to the fact that more men and boys participate in the playing of video arcade games. Some factors center on the socialization of boys and girls in traditional Western culture. For example, if social acceptance is contingent upon an apparent sex difference, then adolescent girls risk the possibility of their playing behavior being classified as inappropriate (Funk & Buchman, 1996). Therefore, continued participation in such activities is likely to be halted for fear of group isolation and/or parental scorn. Also, success in violent arcade games may be contingent on the participants’ greater likelihood of engaging in play behavior being classified as inappropriate (Funk & Buchman, 1996). Therefore, continued participation in such activities is likely to be halted for fear of group isolation and/or parental scorn.

Along with socialization, a person’s ability to use spatial skills may be a determining factor in the ability to perform well on video arcade games. Previous research has concluded that girls and women do not perform as well as their male counterparts on spatial performance tests (Halpern, 1986; Maccoby & Jacklin, 1974). In addition, participants may improve their spatial skills by repeated video game exposure (Okagaki & Frensch, 1994; Subrahmanym & Greenfield, 1994). Thus, sex differences in spatial ability may affect the playing of video arcade games, and conversely, the playing of video arcade games may influence this spatial ability.

Additionally, according to Provenzo (1991), video games “...function almost exclusively in the private sector. Unlike textbooks, which are subject to public scrutiny and selection, or children’s books, which must pass through library approval boards, the video game market is largely controlled by the consumer—that is, the child who is purchasing the game or having it purchased for him” (p. 102). Because a majority of video games are designed by men and directed toward the male market (Cooper & Mackie, 1986), contemporary video arcade games contain a small percentage of female characters and tend to possess random acts of violence. The limited number of female characters portrayed in aggressive/independent versus passive/dependent roles in these games could also be a contributing factor in women’s limited participation in video arcade games.

In summary, our data not only support a sex difference in the playing of video arcade games, but we also found a significant association between participants’ sex and violent versus nonviolent games. Even though the participants were more likely to play nonviolent games overall, men and boys were more likely to play violent video arcade games. Although the aggressive content as well as differential gender role portrayal in arcade games may contribute to the male participants’ greater likelihood of engaging in playing behavior, the playing of such games may affect participants themselves. Notably, it is possible the existing sex disparities in spatial ability may be further widened, aggressive tendencies may be strengthened, and stereotypical sex representations may be reinforced. “As scientists, we should add new research to the currently small and imperfect literature on video game violence effects and clarify for society exactly what these risks entail” (Anderson & Dill, 2000, p. 789). In the future, perhaps a market comprised of video arcade games oriented toward women and

<table>
<thead>
<tr>
<th>Sex</th>
<th>Nonviolent</th>
<th>Violent</th>
<th>Both</th>
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</thead>
<tbody>
<tr>
<td>Male</td>
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<td>65</td>
<td>152</td>
</tr>
<tr>
<td>Female</td>
<td>24</td>
<td>7</td>
<td>31</td>
</tr>
<tr>
<td>Both</td>
<td>111</td>
<td>72</td>
<td>183</td>
</tr>
</tbody>
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TABLE 1

Numbers of Participants Playing Violent/Nonviolent Video Games
girls, portraying independent, assertive heroines overcoming difficult obstacles through cooperative, rather than aggressive, winning strategies will lead to an abatement of the current sex difference and an increase in female participants.

References