Chapter 2

Computer Games for Girls: What Makes Them Play?

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In this chapter, we address the problem of girl appeal in game software.[1] Into a market that had long been dominated by male consumers sprung "Barbie Fashion Designer" in November 1996. Produced and developed by Mattel Media for girls six and older, it sold more than 500,000 copies in its first two months of sales. We are not sure if it should be classified as a game (and this point will be discussed later), but the significance of "Barbie Fashion Designer" is that it is the first piece of entertainment software to garner a mass market with girls.

We analyze why and how the "Barbie Fashion Designer" CD-ROM succeeded with young girls, where so many others failed before it. To develop an account of game features that girls find appealing, we draw from recent research on computer and video games, research on children's play and television preferences, and research by software developers. Our hope is that this analysis will illuminate for parents, educators, researchers, and software developers general principles for girl appeal in computer software.

Background

Ten years ago when we embarked on our research on the effects of video games on cognitive processes, we were struck by the fact that video games were a largely male pastime. Not only did young boys play video games more often than girls both at home and in arcades (Dominick 1984; Lin and Lepper 1987; Rushbrook 1986), but this difference persisted into the college years (Morlock et al. 1985). Moreover, one of the most comprehensive survey studies of the 1980s found that even kindergartners of both genders viewed video games as more appropriate to boys (Wilder, Mackie, and Cooper 1985). At the same time,

games were generally the first and most frequent childhood computer experience. Therefore we, like others, were concerned that females might be at a disadvantage where computer usage was concerned because of the speculation that computer and video games provide an easy lead-in to computer literacy (Loftus and Loftus 1983; Greenfield 1984; Greenfield and Cocking 1996; Kiesler et al. 1985).

Our interest in the question of gender specificity in video games was heightened by our own observations during a training study with a nonviolent game, "Marble Madness," conducted in the late 1980s (Subrahmanyam and Greenfield 1994, 1996). Our goal in that study was to assess the effects of video game training on spatial skills. Even before we had started testing, we were struck by how difficult it was to recruit girls—in a coeducational sports camp, not one girl signed up to participate in our study. This was so despite our consent letter clearly stating that participants would have to play either "Marble Madness," an action-maze game, or "Conjecture," a word game. We had deliberately selected a nonaggressive game, "Marble Madness," to ensure that the game would be equally appealing to both genders (Malone 1981). Yet we found that the boys in our study were much more enthusiastic about the training sessions in which they played the video game.

We also found that very soon into the training session, the boys figured out the intricacies of the game, such as the different levels and the strategies appropriate to each; they were also seen comparing notes about the levels they had reached and the scores they had obtained. This whole-hearted absorption in the game was missing among the girls, who were not overtly enthusiastic about playing and seemed almost relieved when they finished their training session. Interestingly, many of the boys in the control group who had to play the word game, "Conjecture," during the training, begged for and were given an opportunity to play "Marble Madness" at the conclusion of the experiment; none of the girls in the control group either asked for or played "Marble Madness" when given an opportunity to do so at the conclusion of the experiment. Although anecdotal, our observations were in line with other findings that females are not as interested in video games as males are.

In the years since, despite efforts by software developers to attract girls to video games, they have remained largely a male province. Most commercially available video games still do not reflect the interests and tastes of half of the potential game-playing population, namely girls (Kafai 1996). In one survey, Kubey and Larson (1990) found that 80 percent of game playing among nine- to fifteen-year-olds was done by boys. With the recent advancement of

multimedia interactive computer systems, and the powerful animation and sound effects available in CD-ROMs, the arcade environment has invaded our homes, causing more concern among educators, parents, and industry watchers that girls are not big consumers of computer games. There has been some industry response to these concerns, and games targeted exclusively for girls have come out on the market. The early attempts to make video games appealing to girls largely consisted of having female protagonists and making the content nonviolent. The gendering of games was furthered by the advertising, promotion, and packaging of the games in the ubiquitous pink and purple boxes (Kinder 1996). Despite these efforts, software designed for girls has not caught the fancy of girls, and the crowds in the video game aisles of toy stores and in arcades are mostly boys (Goldstein 1994). It is also relevant that the readership of magazines addressed to video game players is at least 90 percent male (Kinder 1996).

Why Did "Barbie Fashion Designer" Succeed?: Features That Attract Girls

Undoubtedly "Barbie Fashion Designer" benefited from the Barbie franchise and the retailing clout of Mattel's $1.7 billion industry behind it; yet the fact that other Barbie-based games such as "Barbie Story Maker," "Barbie Print and Play," and "Barbie as Rapunzel," all released simultaneously, were not such runaway successes suggests that there might be more to its success than the presence of Barbie and the hot-pink packaging.

Our analysis of the success of "Barbie Fashion Designer" is strongly influenced by the seminal work of Yasmin Kafai (1996), who explored what nine- to ten-year-old children wanted in video games by studying what they produced when given the skills and opportunities to create their own games. Her work revealed consistent gender differences in the kinds of games boys and girls create—not only do girls prefer less violence, but they also prefer different kinds of games, game characters, and game worlds.

Kafai (1996) concluded that whereas boys designed games resembling commercially available games such as Nintendo, girls did not; furthermore, at the time of the study, the girls stated that "they had no particular interest in pursuing video game-playing because they did not like the games, their content, and their violent aspects"(p. 62). Thus, existing games generally reflected boys' but not girls' tastes. Because this led to less video game experience for girls, we believe that the girls' designs in the study were less influenced by available video game models than boys' games were.

Most importantly, we assume that game designs reflect game preferences, even if these preferences have been accommodated by the market; action video games accommodate the tastes of boys, who therefore have more environmental experience with computer games than girls. However, prior experience is a two-way street. Children, like adults, are active selectors of their environments; they are not simply passive recipients of environmental influences (Scarr and McCartney 1983). At the same time, their selections are influenced by what environmental opportunities are available. It follows that children's active preferences would be operating as they designed games, just as these same preferences would operate as they selected games to play.

Given this line of reasoning, analysis of the game themes, settings, animations, and interactions developed by the children in Kafai's study (1996) can provide us with clues about the game features that are likely to appeal to the different genders. Our analysis is organized into subsections, each of which examines game features identified by Kafai and others: type of action, game genres and themes, game worlds, game characters, and modes of interaction. We will show that every one of the features that distinguish girls' game preferences from boys' are also found in "Barbie Fashion Designer."

At an even more basic level, we show that basic child-development research on boys' and girls' play and television preferences could have predicted the gender appeal of different kinds of computer software. Our thesis is that it is the concatenation of features identified in research studies on gender and play of various kinds that defines the success of "Barbie Fashion Designer." In other words, the research on the television shows that girls watch, the play activities that they engage in, and the computer games that they design have turned out to have both predictive and practical value in solving the long-standing problem of mass-market "girl appeal" in entertainment software. We believe that our analysis can be of general use in developing better software for girls.

"Barbie Fashion Designer" and Other Barbie Software Titles

Before presenting our account of play and gender, we first describe "Barbie Fashion Designer," as well as some of the other Barbie software titles as a comparison. This comparison is important because the other Barbie titles, released simultaneously with "Barbie Fashion Designer," were not as successful as "Barbie Fashion Designer." It may be that the overwhelming popularity of Barbie dolls with young girls was a necessary element in the success of "Barbie

Fashion Designer"; however, the lack of comparable success of the other Barbie software titles shows that the Barbie doll theme is not sufficient to explain the mass-market appeal of "Barbie Fashion Designer."

Using "Barbie Fashion Designer," girls design clothes for their dolls by choosing from a menu of themes such as vacation outfit or party outfit, styles such as jacket or pants, patterns, and colors; then they print the outfit on special paper-backed fabric that can be run through an inkjet or laser printer. At that point, the players use color markers, fabric paint, and other materials that come with the package to further enhance their designs. Finally, they assemble the parts of the outfit following the instructions provided by the software.

Other products using the Barbie franchise include "Barbie Story Maker," in which players create animated stories starring Barbie and all her friends, "Barbie Print 'n' Play," in which players create personalized print projects featuring Barbie, and "Barbie as Rapunzel," a computer adventure in which players help Barbie rescue the prince.

Violent Action: A Barrier for Girls

Violent Action in Computer Games

It is widely believed that the violent content of much video game activity is a major factor in turning girls off video games (Malone 1981; Greenfield 1996). While there is considerable awareness that aggressive themes are not appealing to girls, we revisit the issue of aggressive content as a starting point of our analysis.

Although violence remains a prominent aspect of most commercially available video games (Provenzo 1991), this was not always the case. The first game, "Pong," was nonaggressive. Aggression started in the second generation with "Breakout," which involved destruction but no human aggression. "Pac-man" started animate, but nonhuman aggression. The next generation of games, such as "The Empire Strikes Back," involved human aggression, which took on a more fantastic form with "Super Mario Brothers." It became more personal, with hand-to-hand combat, in games such as "Mortal Kombat." Violence continues to reign in the current generation of action games, which includes titles such as "Doom," "Duke Nuke'em," "Mace," "Hexen II," and "Mortal Kombat 2." These games often have the goal of blasting an enemy to smithereens; generally, mouse clicks fire off laser weapons, and the player has to zoom through tunnels or mazes to escape getting destroyed. The central theme in

most games involves someone getting killed, finding out why someone was killed, or taking over the world (Beato 1997; De Witt 1997).

Research suggests that girls do not find this violence appealing. For instance, Malone (1981) found that girls did not like a video game when an aggressive fantasy theme was added to it compared to the same game without the aggression. Others (Kafai 1996; Nancy Deyo, quoted in De Witt 1997) suggest that girls find the violent content of computer games boring. The empirical evidence confirms that boys are more likely to play games requiring aggressive competition (Heller 1982, cited in Morlock et al. 1986; Kiesler et al. 1985; Lin and Lepper 1987). In line with these tastes, Kafai (1996) found gender differences in the games designed by the children regarding feedback resulting from a player's action during the game. She reported that the feedback in boys' games was overwhelmingly violent, whereas the feedback in girls' games was overwhelmingly nonviolent.

Violent Action in Play and Television

Research on children's play suggests that boys' liking for violent video games is paralleled by the aggressive nature of their play. Compared to girls' play, boys' play more often includes activities such as play wrestling, war games, and fantasy aggression and results in more aggressive incidents (Goldstein 1994). A general complaint regarding the play style of the two genders is that boys' toys, video games, and play is full of violence and aggressiveness (Miedzian 1991; Tuchscherer 1988). In fact, Wegener-Spohring (1989) found that, compared to 29 percent of the girls in the study, 76 percent of the boys owned toy guns. A common tale of many parents is how their boys end up creating guns out of everyday objects such as bread, tortillas, and even shoes. One of us (Greenfield) remembers not permitting her preschool son to have guns; one day he took four saltine crackers in a square, removed one of the lower crackers, and used the remaining configuration of three crackers as a pretend gun.

The research on gender and children's television preferences shows the same results. Violent action-adventure series are very popular with boys, but not girls (Korich and Waddell 1986; Huston et al. 1990; Lyle and Hoffman 1971). In a recent longitudinal study, Huston et al. (1990) found that boys watched more action-adventure programs than did girls.

It must be noted, however, that the trends reported here are just that—there are girls who prefer playing war games with guns and watching violent

action adventure on television and boys who prefer playing dress-up games. There is also some recent evidence that the play styles of American boys and girls are converging (Singer and Singer 1990); nonetheless, we cannot escape the fact that these differences do exist in boys' and girls' play activities and appear relatively early (Goldstein 1994).

How Has the Software/Game Industry Responded to Concerns That Aggressive Content Is Not Appealing to Girls?

Kinder (1996) argues that because the game industry equates violence with action, games targeted for girls automatically lack any action (violent or not). According to her, this is one reason why the early games for girls, such as "Kiss," and the games based on *The Little Mermaid* and *Beauty and the Beast* were not commercially successful.

Application to "Barbie Fashion Designer"

Contrast this with the success of "Barbie Fashion Designer." Clearly there is more to designing games for girls than merely removing the violence. First, "Barbie Fashion Designer" differs from the less successful titles by involving a lot of action in creating Barbie's clothes. The comparison of "Barbie Fashion Designer" with these less successful nonviolent titles suggests that finding nonviolent forms of action may be part of the secret of girl appeal in entertainment software.

Game Genres and Game Themes

Genres and Themes in Computer Games

Another important feature of a computer or video game is the genre it belongs to and the theme that is embedded throughout its structure. Kafai (1996) reported that the games created by the children in her study fell into the following categories: adventure (unknown places to be explored), sports/skills, teaching context, and simulation. Note that Kafai asked children in a classroom setting to create games to teach younger children about fractions. While most of the boys created adventure hunts and explorations, the games created by the girls were more evenly divided among adventure, skill/sport, and teaching games.

This difference in the game genres was related to overwhelming differ-

ences in the underlying themes of the games: Kafai (1996) reported that not one girl incorporated the conflict between good and evil and the conquest of evil in her game, whereas boys overwhelmingly did so. Unlike girls' games, boys' games were concerned with the contest between good and evil, in which the player on the good side fights off bad guys to achieve a goal, such as recovering stolen goods, defeating demons or aliens, or finding lost treasures. In contrast, girls' games had few evil characters, although players sometimes had to go through some obstacles, such as descending a mountain without falling or avoiding a spider to find an unspecified treasure.

Gender differences in game creation are replicated by gender differences in game consumption. Cooper, Hall, and Huff (1990) found that when students in sixth through eighth grades were given math programs with different themes, girls reported stress when working with themes that involved actions such as shooting and propelling objects through fantasy space, as well as nonverbal graphic feedback; in contrast, boys reported more stress when using software in which aggression and shooting were absent, but which involved verbal feedback and cooperative narratives.

To summarize, studies of computer game design and game preferences suggest that girls are less enthusiastic than boys about the thematic embedding of good versus evil in story narratives. Nor, as we saw earlier, do they like the violent feedback that normally accompanies such themes. Unfortunately, most commercially available video games make strong use of narrative that involves both violence and the conflict between good and evil. Given this, what kinds of game themes are girls likely to find appealing? Let us look to research on children's social behavior as well as on their television preferences for answers to this question.

Genres and Themes in Girls' Other Activities

The literature on social behavior suggests that compared to boys, girls are more affiliative and that they are more interested in social activities (Grusec and Lytton 1988). In their play activities, girls have been found to be more socially oriented than boys (Coates et al. 1975). Along similar lines, the literature on television preferences suggests that girls like television shows that portray the gentler aspects of interpersonal relations rather than adventure, sports activities, violence, or science (Grusec and Lytton 1988; Korich and Waddell 1986). Lyle and Hoffman (1971) reported that by the first grade, boys showed an earlier preference than girls for action programs such as *Star Trek*, whereas girls pre-

ferred family situation comedies such as *I Love Lucy* and *The Flintstones*. Soap operas, which have an overwhelmingly female audience among teenagers and adults, are based overwhelmingly on dramas of love and family relationships. This seems to be quite universal. One of us (Greenfield) observed an exclusively female audience for a Mexican telenovella in a Mayan community in Chiapas, Mexico. Although the teenage girls knew hardly any Spanish, the language of the broadcast, they were able to explain to a newcomer relationships among all of the characters.

If we look at female tastes in reading, we find that romance novels are similar to soap operas in their thematic content. Considering the popularity of fairy tales with younger girls, we note that the thematic content of popular stories such as Cinderella and Sleeping Beauty is also very similar: romantic and family relationships.

Does a preference for positive relationships necessarily preclude the appeal of action in media? We think not. Our informal observations of reading preferences reveal that a popular genre among elementary school girls is that of mysteries, exemplified in book series such as the Boxcar mysteries, Babysitter's Club, and Nancy Drew mysteries. Books from these series typically narrate a mystery solved by either a female protagonist (Nancy Drew) or by groups of children (Boxcar mysteries and Babysitter's Club); while the stories often have some action, they usually contain no violence. Note, however, that these series feature realistic, often domestic, settings and characters, as well as female heroes, features to be explored later in this chapter.

Application to Software for Girls

Based on girls' social orientation and television tastes, we speculate that a thematic emphasis on the drama of human relationships might make video games more appealing to girls. Many within the software industry have likewise suggested that girls are partial to themes focusing on social relationships and social skills. Dangelmaier at Hi-D, a web-development company, has suggested that "females want experiences where they can make emotional and social discoveries that they can apply to their own lives" (quoted in Beato 1997). Graner Ray of HerInteractive similarly suggests that girls want games which allow them to create "mutually beneficial solutions for socially significant problems," which are conflicts in the social realm involving a group of people. Solving such conflicts allows girls to use skills such as diplomacy, negotiation, compromise, and manipulation. She contrasts such games with one in which

a lone space commando is up against a ceaseless supply of enemies, the kind of game that boys seem to like. The research on cooperation versus competition in peer relations similarly suggests that compared to boys, girls show a greater preference for cooperation (Ahlgren and Johnson 1979).

Based on our case studies of girls' reading preferences, we speculate that mystery-based themes are likely to appeal to girls in computer games as well if they involve cooperation and positive social encounters. Brenda Laurel of Purple Moon similarly speculates that girls like mysteries, but only in nonviolent contexts in which they can explore and be cooperative (quoted in Beato 1997). Given that girls do like mysteries in the print media, we suggest that girls' games do not have to be devoid of action. However, given girls' avowed dislike for aggression and their preference for cooperation over competition (Ahlgren and Johnson 1979), we speculate that in order to appeal to girls, the mystery/action component in girls' games must be nonviolent and must allow players to solve problems or mysteries and arrive at solutions by relating to and cooperating with others.

Application to "Barbie Fashion Designer"

Now consider "Barbie Fashion Designer": while it clearly has no violent content, it also does not include any of the aforementioned themes, such as group problem solving or cooperation. However, the player is making clothes for Barbie and solving problems in order to nurture and help another. This is similar to the goal of a character such as Nancy Drew in her mystery stories. Nurturance is also clearly an important theme in girls' doll play and fantasy play more generally.

It follows that there is more to marketing games for girls than removing the violence and endowing them with themes that allow cooperative group play. The theme of cooperation should probably be enlarged to include nurturant behavior, such as helping. Other game features, such as the setting or game worlds, are closely related to play themes. We next turn to the creation of play worlds.

Microworlds

Computer Game Worlds

Kafai (1996) also reports that there were differences between the genders with regard to the fantasy-reality dimension of the worlds in which boys' and girls'

games were situated. The games designed by the children were either set in fantasy places and imaginary worlds or in more realistic and familiar settings. She found that six out of eight girls used familiar real-life settings for their games, such as a classroom, ski slope, airport, or spider web. In contrast, seven out of eight boys had a fantasy setting, such as an imaginary city, island, or country.

Microworlds in Other Domains

Similar patterns of difference have also been observed in the toy preferences and pretend play of children as young as two years. (For a review of this literature, see Goldstein 1994, p. 115.) Girls' toy choices and pretend play appear to be based more on reality, whereas boys' tend to be based more on fantasy places and events. In their pretend play, girls show a preference for domestic themes (Tizard et al. 1976). They "play house" using household objects and dress-up clothes (Goldstein 1994). Although boys' play is not devoid of realistic settings and props, such as cars, trains, or airplanes (Tizard et al. 1976), they often create fantasy microworlds including adventure themes and fantasy events (Goldstein 1994). Such findings of sex-typed play and toy preferences have been reported for European and Asian children, as well as children in the United States (Goldstein 1994). Similarly, the mystery-book series popular with girls, discussed earlier, involve realistic settings and events. Another example of this are the Judy Blume books, highly popular with girls; author Blume tells realistic stories of teenage girls' lives.

There are other interesting gender differences in boys' and girls' play. Boys' play generally includes more players. In contrast, girls are less likely than boys to play team sports; they are more person-oriented in their play activities and are more likely to engage in small-scale, turn-taking kinds of games, such as hopscotch and jump rope (Lever 1978; Winstead 1986; but see Thorne 1993, pp. 90–134 for a discussion of how girls and boys often cross into groups and activities of the other gender).

Research from industry sources suggests similar trends. Brenda Laurel of Purple Moon wanted to find out what kinds of interactive entertainments might appeal to girls (quoted in Beato 1997). She used a multipronged approach: she interviewed seven- to twelve-year-olds and observed the play styles of boys and girls when given props and other pretend products; she talked to people knowledgeable about children's play—toy store owners, teachers, scout leaders, and coaches; and finally, she examined the research literature on play theory, brain-based sex differences, and primate social behavior. Laurel found that, in

their pretend play, girls enjoyed role playing the lives of people in familiar settings that they create with props; they also liked to be in settings where they could practice their well-developed verbal skills.

Everyday observation of girls' play confirms that the preferred pretend play activity of girls is dress-up and role play of familiar characters. As the mother of a girl and a boy and as a frequent host to play sessions, one of us (Subrahmanyam) has noted consistent differences in the pretend play of her daughter and son and their same-sex friends. The girls like to act out everyday roles in elaborately set up replicas of familiar settings using props—playing teacher, mother, father, sister, or waitress at school, home, or restaurant. In contrast, the pretend play of the boys is filled with fanciful settings, characters, and events—Star Wars games in which they play Darth Vader, Luke Skywalker, or Han Solo and use their Millennium Falcon shooter to blast everything in sight into smithereens. It appears that the fantasies of girls center around real-life, everyday roles and characters, such as being a mother or teacher, whereas the fantasies of boys center around less realistic and more fanciful roles and characters such as Darth Vader and Superman.

While based on a tiny sample of subjects and describing only a portion of their play, Subrahmanyam's observations reflect the gender differences already noted in research on children's play. Of particular interest to us is that girls like to role play familiar characters in familiar settings by acting out the character's habitual actions—whether it is to give a lesson, put a baby to sleep, or take an order and bring a meal. Note also that the pretend play that girls engage in ties in with their preference for affiliative, nurturant, and positive relations.

Application to Computer Software for Girls

The findings reviewed above confirm and generalize the findings of Kafai (1996) concerning girls' preferences for everyday settings in their game designs. They suggest that girls should likewise find video and computer games set in more familiar settings appealing. By this account, most of the available games set in imaginary worlds would not make contact with the fantasy life of the typical girl.

Indeed, when computer games involve familiar settings with goals related to real-world tasks, girls do become interested in them. Catherall (1989) reports that girls became interested in programming computer-operated digital trains. Children are the "engineers," able to control over 250 accessory devices, such as switches and signals, and to run the trains successfully they must cooperate

with other players. It appears that gender differences between boys and girls disappear when computers are used for a real rather than a fantasy goal and involve interpersonal cooperation.

Application to "Barbie Fashion Designer"

We suggest that one reason for the success of "Barbie Fashion Designer" was because it fit in so well with the pretend play common among girls of this age. The Barbie line of dolls is unique in the extensive set of accessories and props that are commercially available. Girls who collect Barbies also collect accessories such as Barbie clothes, hand-bags, and make-up items, as well as props such as a van with camping supplies and a post-office setting. All of these toys are used to set up detailed replicas of familiar settings into which the child navigates Barbie and her friends. The variety of games that can be played with such props is literally endless.

Into this microworld came "Barbie Fashion Designer"—the clothes that the player imagines and designs on the computer can actually be created out of fabric and assembled, and the resulting outfit can then be used to clothe Barbie for any kind of pretend play that the player envisions.

"Barbie Fashion Designer" as a Tool Program

What stands out here is that the software itself does not engage the player in any kind of electronic pretend play. Instead, it helps the player create objects that can be used for the kind of role play that girls find compelling. Frank Evers (personal communication, August 31, 1997), a game producer for Activision, uses the analogy of a journey and its destination to capture the difference between these two uses of the computer—he suggests that whereas boys like the electronic journey, girls focus more exclusively on the destination. Instead of immersing the player in the game experience, the user interface of "Barbie Fashion Designer" allows the user to reach the destination of making clothes for Barbie. It is noteworthy that when the daughter of one of the authors (Subrahmanyam) used the software for the first time, she brought with her three Barbie dolls that had no clothes and placed them beside the computer. Her comment that "I really want to get her some clothes" is even more telling to us. A mother we talked to reported that she and her daughter, went one step further, using the printouts created on the "Fashion Designer" as patterns to cut and sew Barbie clothes from fabric.

Here the software makes the computer yet another accessory for Barbie play. The computer takes on the role of a tool and, unlike other games, ceases to be an end unto itself. Doug Glen, President of Mattel Media, points out that "Barbie Fashion Designer" "exists as a mere part of an overall play experience." He adds that unlike the traditional concept of the computer as a game machine, in this case it is a "power tool that makes things" (quoted in Beato 1997). This metaphor is rarely used when describing computer games.

Our analysis suggests that "Barbie Fashion Designer" appeals to girls because it aides the role play that they habitually engage in. Like other interactive toys, such as Lego and Tinkertoys, the "Fashion Designer" becomes a tool in the player's imaginative play.

Characters

Characters in Computer Games

Another relevant aspect of game structure is the characters. Commercially available games rarely cast females in the main role, and even when females are present, they rarely take on an active role (Kinder 1996; Provenzo 1991; Rushbrook 1986). Kinder writes that these games frequently portray the central character as a male hero whose purpose is to save someone (usually a female) or to obtain treasures. Although the big game manufacturers have always claimed to design games without regard to gender (Frank Evers, personal communication, August 31, 1997), researchers, parents, and other groups soon recognized that most commercially available games were "modeled on only one half of the population, at most, and reflect the values and views of only one gender" (Cocking and Greenfield 1996, p. 5). In Kafai's study (1996), girls complained that females were rarely cast in the role of a main character. Female protagonists have become optional in some of the hand-to-hand combat games, but when they are included, they are aggressive and have the physical attributes of a male-defined sex symbol. This is true of the protagonist of "Tomb Raider," a game that was released in early 1997 and has a mainly male audience.

What do we know about girls' preferences regarding the number and kinds of game characters? Not surprisingly, in Kafai's study, girls and boys created games with very different kinds of characters. Boys created several supporting characters with fantasy names, whereas girls created only one or two supporting characters. Most importantly, boys cast the main character as a fantasy figure and assigned a specific gender to the character; most girls left open the character's gender and age, making it possible for the player to identify and

empathize with the character. That is, girls addressed the player with a more generic "you." Here again we see that the girls preferred to create characters playing realistic roles, with playing "oneself" possibly the most realistic of all. Another issue here is empathy and identification versus social distance. Fantasy characters, of course, have greater distance from the self than playing oneself does.

Characters in Other Kinds of Play

Boys' preference for more characters in their computer games ties in with the gender differences found in the number of children in a play group: girls generally play with one or two other children whereas boys tend to play in larger groups. This difference appears by the kindergarten years and is well established by the time a child enters elementary school. (Eder and Hallinan 1978).

In their pretend play, girls often take on real family roles such as mother, father, baby, or sister. In contrast, boys often become fantasy characters such as super heroes and spacemen. Goldstein (1994) reports that these preferences exist on an interactional level. With regard to girls' reading preferences, one finds a similar focus on real and familiar roles; for example, the Judy Blume books focus on teenage girls with whom the readers can identify.

Application to Software Design for Girls and "Barbie Fashion Designer"

Recently, software companies and companies that have traditionally created toys for girls have responded to concerns about gender by creating games that have female protagonists and characters. "Kiss," "The Girls' Club," and the games based on Barbie, *The Little Mermaid*, and *Beauty and the Beast* are examples (Kinder 1996). However, these games have not been as commercially successful as "Barbie Fashion Designer." The use of a female character may have been a necessary part of "Barbie Fashion Designer"'s success, but the failure or lesser success of other software titles with female characters shows that this feature is not sufficient by itself. Undoubtedly, there is more to designing games for girls than merely having females as the lead characters.

"Barbie Fashion Designer" Goes One Step Further

The preference for playing oneself is actualized in the "Fashion Designer" program, where the main active character is you the player, the clothes designer.

Although the image of Barbie is ubiquitous, and her voice guides the player through the various steps of outfit design, the player is the main character and *she* has control over how the game proceeds. This appears to be exactly what girls like in games—to identify with, or better still, to be the game's main character.

Modes of Interaction

Interacting With Computers

Next we examine game structure and playing strategies and skills to comment on how the "Barbie Fashion Designer" game might have capitalized on girls' preferred style of interacting with computer games. Research has revealed differences in how boys and girls approach and interact with video games. Our study on the effect of video game practice on spatial skills turned up the surprising finding that boys benefited more from the training than girls in terms of video game skill (Subrahmanyam and Greenfield 1994, 1996). One reason could be that, because of boys' greater previous video game experience, they had learned how to learn a new game better than girls. Myer's extensive ethnographic study in a computer store (1984) confirms the development of such learning strategies among players. Thus, games with explicit instructions might be more appealing to players with less game experience, compared to games such as "Marble Madness" in which the player has to figure out playing strategies and tricks by trial and error.

Greenfield has suggested that one factor in the better average male performance could be that the average male adopts a more experimental (trial-and-error) approach than the average female. That is, the average male may be more willing to "learn by acting before he understands all of the rules and patterns of the game" (Greenfield 1996, p.88). There is some evidence that this is indeed the case. Smith and Stander (1981) found this to be true among anthropology students who were first-time users of a computer system. The willingness of boys and men to act without full understanding could explain the appeal of action and adventure games in which experimentation yields instant feedback. Again this suggests that girls would prefer games that do not reward such a trial-and-error approach. Games that are more predictable and that lay out the rules and patterns at the start might therefore be more appealing to them.

Greenfield has suggested that gender differences in the application of logical and strategic planning skills to game playing may be another contributing factor to differences in learning to play video games. She points to a study by

Mandinach and Corno (1985), which found that boys used these processes more than girls and were more successful at playing a computer adventure game called "Hunt the Wumpus." Of note is the finding that these differences appeared in spite of equal experience with computers in general and equal liking for the game.

Other work also suggests that boys and girls might have very different styles of interaction with computers that influence the kind of games that they find appealing. In her book *The Second Self*, Turkle (1984) describes a project in which boys and girls were taught programming in LOGO. She describes two styles of mastery when programming computers, hard and soft. She defines hard mastery as the "implementation of will over the machines through the implementation of a plan." In contrast, soft mastery is defined as more interactive, where the "overall shape emerged from interaction with the medium."

In describing the distinction between hard and soft mastery, Turkle recalls Lévi-Strauss's distinction between the scientist and the *bricoleur*. The former is akin to a formal science of the abstract; the latter is related to the science of the concrete, or an informal folk science. Just like the *bricoleur*, a soft master likes to work with a set of concrete elements. He or she works on a problem by "arranging and rearranging the elements working through new combinations"; combining a closed set of materials, surprisingly, leads to new results (see Turkle 1984, pp. 104–110).

Turkle further draws parallels between hard and soft masters and their preferred play behavior. She describes hard masters as viewing the world as something to be brought under control. According to her, such children play with things that they can operate on, such as blocks and Tinkertoys. In contrast, soft masters see the world as beyond their direct control and something they need to accommodate. These children generally played with toy soldiers or dolls. They like to use props from the adult world such as cowboy hats and grown-up clothes and shoes for dress-up, as well as to engage in fantasy play with other children. Hard masters view the computer as an abstract entity and identify with an abstract part of it, whereas soft masters treat the computer as a physical object and identify with it for the purpose of fantasy play. Most interesting to us is Turkle's observation that girls tend to be soft masters and that hard masters are overwhelmingly male.

Kafai (1996) has also observed that commercially available games generally proceed at a rapid rate, and use sound and visual effects to accentuate the pace and to create arousal; she suggests that girls do not like such quick-paced

interactions. Some confirmation for this comes from a recent study in a museum setting, which found that girls did not like playing games that involved quick-paced interactions (Inkpen et al. 1993). Kafai also found that, whereas boys designed games with action guided but not paced by the player, girls used a mode in which the player controlled the timing as well as the direction of the game. Similarly, Brenda Laurel of Purple Moon suggests that girls like games that allow them to play in an exploratory, open-ended fashion, so they can have control over their environment (quoted in Beato 1997).

Application to "Barbie Fashion Designer"

"Barbie Fashion Designer" embodies many of the structural features that girls like and that are suited to girls' computer experience and skills. It is essentially a menu-driven game, with meaningful icons, and few surprises; it therefore does not require the use of a trial-and-error strategy. The player's role appears similar to Turkle's description of soft masters and the *bricoleur:* the software provides the player with a limited set of choices, which are then combined in many different ways to create an astonishing variety of creations to clothe Barbie for more pretend play. To start, a player has to work through a Theme Workshop, a Design Workshop, and Accessories Workshop. Each workshop offers many options to choose from. After the player creates an outfit she likes by picking and choosing from the different workshops, she can then add fabric designs in the Fabric Design Workshop or color them in the Color Workshop. Finally, the player can view Barbie in her new outfit in the Dressing Room or send Barbie down a runway in the Fashion Show. In the end the player can either save the outfit or print and assemble the design. Given Turkle's description of soft masters, it is not surprising that girls find "Fashion Designer" appealing.

"Barbie Fashion Designer" embodies still other features preferred by girls—it is not fast paced, and instead allows the player to set the pace. Moreover, rather than being used to accentuate the pace and create arousal, the music is slow and is in the background.

Gender Stereotypes

In some senses the success of "Barbie Fashion Designer" is ironic because the Barbie line of toys is viewed as perpetuating unfortunate gender stereotypes. It

does seem surprising that a product line regarded suspiciously by feminists and others should become so influential in providing computer-literacy experiences for girls, an area where girls have been at a disadvantage.

But then, boys' computer literacy has been built on a bedrock of games that perpetuate male stereotypes of violence and aggression. If a value judgment is to be made, the female stereotypes of which "Barbie Fashion Designer" is constructed seem quite prosocial. The main danger is one of body image: girls growing up with the impossible or unhealthy ideal of the Barbie body, with its wasp waist and disproportionately large hips. (We believe this is more a problem of the Barbie doll than of "Barbie Fashion Designer.") With regard to male stereotypes, one can also say that the conquest of evil has its prosocial elements, even if it requires violence.

In the case of both "Barbie Fashion Designer" and violent space fantasies, we can see girls and boys conforming to the idealized roles and scenarios that society—particularly through mass media—has placed before them. Over time, male role models have moved away from cowboys to space warriors as female role models have moved from wives and mothers to high fashion models and career women. (Barbie dolls started with the image of a high-fashion teenage model, and, as ideal female roles have changed, has lately become career oriented.)

Is "Barbie Fashion Designer" a Game?

An important issue regarding "Barbie Fashion Designer" is whether it is truly a game. Evers (personal communication, October 1, 1997) maintains that it is not a true game because it lacks goal orientation and barriers to overcome. He also suggests that the appeal of most computer games lies in their ability to immerse the player in a fantasy rooted in the electronic world. "Fashion Designer" has no storyline and does not envelop the player in a computer fantasy. Instead, the software is another accessory used by the player to fantasize about Barbie in the physical world. Our thesis is that "Barbie Fashion Designer" connects the player to the real world, and unlike other games (both computer and traditional board games) has concrete rather than symbolic goals. We believe it is this appeal to concrete goals that made "Barbie Fashion Designer" appealing. Indeed, software that engages the player in a purely electronic fantasy has not yet been as successful with girls as software that uses the computer as a tool.

Most games also tend to be tightly governed by rules. Traditional board games, such as "Candy Land" and "Chutes and Ladders," as well as computer-

based games, such as "Super Mario" or "Duke Nukem," have elaborate rules and procedures described in instructions or manuals. Usually there is an end point to the game and the winner is either the person who crosses obstacles to reach the end point first or the one who vanquishes enemies to win a treasure or save a princess. In contrast, "Barbie Fashion Designer" has very loose rules, with considerable flexibility in how the player progresses through the different workshops. Moreover, there are no obstacles and the player works on her own, at her own pace, and is not in competition with another player or even the computer itself. Board games such as "Chutes and Ladders" are popular with young girls because they have a social quality that computer games lack.

What Works?

Our analysis suggests that there are some game features that are more appealing to girls than others. These features are related to all aspects of games, including the thematic content and focus, as well the kinds of strategies and computer-playing skills demanded of the players; one particularly important feature appears to be whether the game interfaces with the reality of players' lives.

Our analysis of "Barbie Fashion Designer" reveals that it incorporates many of the features that girls find appealing in games and lacks features that they dislike. First, the game clearly lacks aggressive content, which turns girls off. On the plus side, by helping girls create outfits for Barbie, the computer assumes the role of another accessory in girls' pretend play, which tends to be based on real-life models and roles, and is usually more person-oriented. Here creation is in the service of nurturance, a popular play theme for young girls. "Barbie Fashion Designer" does not demand sophisticated playing strategies nor a trial-and-error approach; instead it uses menus and icons to guide the player through the designing process. The emphasis is on combining existing elements to create uniquely new creations that appeal to the player. Here the electronic medium is used to design a realistic person-oriented fantasy—a fantasy that is then realized in the physical world of Barbie dolls.

Our analysis is confirmed by another recent release from Mattel Media, "Barbie As Rapunzel." This CD-ROM embodies some of the features that girls do not like, and as our own analysis would predict, has not been as successful as "Barbie Fashion Designer." In "Barbie as Rapunzel," Barbie assumes the role of the beautiful and brave princess. The software requires the player to play games and solve puzzles on the computer to discover clues that will help Rapun-

zel save Prince Galen, who is under a wicked witch's spell. Although it is an interactive adventure, it does not involve realistic characters or support play with real Barbie dolls. "Barbie as Rapunzel" also contains the unpopular morality theme of good versus evil, although it occurs in the context of a familiar and well-liked fairy tale and has no violence.

Girls' Games versus Androgynous Games

A final issue concerns whether we need games designed specifically for girls versus games for gamers, that is, androgynous games. Perhaps in an ideal world, girls would be included in the digital revolution through the development of games that appeal equally to boys and girls. In reality, however, most games have attracted at least three boys for every girl (Cassell and Jenkins, this volume). Therefore games targeted specifically toward girls may be necessary to reach a mass audience of girls.

Indeed, in recent times we have seen a rise in the number of computer games marketed exclusively for girls. This trend in computer games parallels the general trend in the toy industry toward gender-specific marketing. The dangers of such gender stereotyping are evident in the remarks of a frustrated eight-year-old girl, who said, after an hour of wandering the aisles of a toy store, "All the toys are either too boyish or too girlish. Why don't they have something in the middle?" Although we have focused here on identifying game features that appeal to girls, we would like to caution against designing girl games that stereotype "girl" interests. The ultimate challenge facing software developers is to design games that appeal to any gamer, regardless of gender.

Conclusion

We have used the recent success of the "Barbie Fashion Designer" among girls, as well as research on play, television preferences, and tastes in literature to identify game features that girls might find appealing. Our analysis suggests that girls like nonaggressive play activities that allow them to create fantasies set in familiar settings with familiar characters. The "Barbie Fashion Designer" allows girls to do just this and becomes one more accessory in their role play. Our analysis suggests that girls find certain game features appealing: designing and selecting computer software for girls need not be a hit-or-miss affair.

Notes

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