

Editors' Introduction

Effects of Interactive Entertainment Technologies on Development

PATRICIA M. GREENFIELD

University of California, Los Angeles

RODNEY R. COCKING

National Institute of Mental Health

Interactive entertainment technology, involving a variety of marriages between computer and television, is becoming an increasingly important part of play in our society, both for children and adults. What are the effects of these new and rapidly changing media on development? This question can be broken down into three conceptually distinct parts: What are the developmental effects of interactive media *forms*? What are the developmental effects of interactive media *content*? What are the developmental effects of *interactivity* itself?

The first section of this issue, on the cognitive effects of video games, deals with the first question, the developmental effects of interactive media forms. The five empirical articles in this section explore the cognitive and information processing effects of a variety of action video games, currently the mass medium of interactive technologies, especially during childhood. Some of the symbolic media forms that are explored in these studies are three-dimensional spatial representation on a two-dimensional screen, iconic imagery, and the simultaneous representation of events in more than one screen location. These symbolic forms found in video games are intrinsic to and all-pervasive in more "serious" computer applications. Consequently, practice in comprehending these distinctive symbolic forms through video game play provides a kind of cognitive socialization for using a crucial cultural tool, the computer.

The second section, on the emotional effects of virtual reality, deals with the second and third questions, the effects of media content and the effects of interactivity per se. The single article that comprises this section investigates the impact of violent content in a virtual reality game on aggressive thoughts and feelings. At the same time, the study asks whether the same video content has a different emotional impact, depending on whether the subject merely observes it, as in television, or is part of it, as in virtual reality. As violence in "conventional" video games gets increasingly graphic (e.g., the recent game *Mortal Kombat*), developmental effects of "participating" in ever more realistic violent action through interactive media have become an issue of great social importance.

Thus far, the scant empirical research on the subject contains an important

paradox. Whereas Calvert (this issue) finds that interactive involvement in a two-person violent virtual reality game augments aggressive thoughts in college students, Silvern, Williamson, and Countermine (1983) found that a less realistic two-person violent video game reduced aggressive play in 5-year-olds. What is the source of this discrepancy? Is the crucial factor the augmentation of visual realism, the increased involvement in the virtual reality medium, or the age of the subjects? Future research is needed to decide what role each of these factors plays in the effects of interactive violence.

Whereas the first section of this issue, on video games, explores an interactive medium that has incredibly broad penetration in the U.S. and many other countries, the second section, on virtual reality, deals with a new interactive medium whose impact on childhood lies in the future. However, the pace of technological change is currently so rapid that this future will probably come about in the next few years.

In television, the viewer *observes* the screen world; in video games, the player *interacts with* the screen world; in virtual reality the player *becomes part of* the screen world (Calvert, this issue). It has been hypothesized (Sigel & Cocking, 1977) that as representational realism increases, the psychological distance between actor and medium decreases. In each of these three media, television, video games, and virtual reality, graphical quality is increasing to produce ever greater visual realism. CD-ROM, a medium not specifically included in this special issue, is an important part of this trend, especially because it allows participants to interact with video footage photographed in the real world. As these real-world images are incorporated into the play media of video games and virtual reality, research questions should focus on the developmental implications of ever decreasing psychological distance between person and medium.

By including a pioneering study of the developmental effects of a virtual reality game in this special issue on interactive entertainment technologies, we can begin to explore this progression of interactive involvement and visual realism that reaches into the future. Social scientists' earlier interest in behavioral implications of watching violence portrayed on television may be replaced by concerns for the consequences of participating in vividly depicted acts of violence and aggression that are displayed in naturalistic or realistic contexts. At the same time, the more extensive exploration of video games in the first section of this issue provides an important portrait of the interactive entertainment technology currently most central in today's world of the developing child.

REFERENCES

- Sigel, I.E., & Cocking, R.R. (1977). *Cognitive development from childhood to adolescence: A constructivist perspective*. New York: Holt, Rinehart and Winston.
- Silvern, S.B., Williamson, P.A., & Countermine, T.A. (1983). *Video game play and social behavior: Some preliminary findings*. Paper presented at the International Conference on Play and Play Environments.