Chapter 9
Causing Fear, Suspense, and Anxiety Using Sound Design in Computer Games

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ABSTRACT

This chapter provides a theoretical foundation for the study of how emotions are affected by game sound as well as empirical evidence for determining how to promote fear, suspense, and anxiety in players using sound effects. Four perspectives on emotions are described: Darwinian, James-Lange, cognitive, and social constructivist. Three basic properties of diegetic sound effects were studied: volume, timing, and source. Results strongly suggest that the best sound design for causing fear is high volume and timed sound effects (synchronized game sound with visual moment) and somewhat suggest that sourced sound effects also promote fear. For anxiety, results strongly suggest that the best sound design is medium volume sound effects. Results also suggest that acousmatic and untimed sound effects evoke suspense rather than anxiety. Low volume sound effects are not effective at evoking fear, suspense, and anxiety due to potential masking by other sounds. Implications and future research directions are presented.

INTRODUCTION

Computer games are audio-visual entertainment media that provide an escapist experience (Grimshaw, 2007). That is, computer games utilize both audio and visual media to capture players' attention and engage players' motor and mental skills; thus immersing the players in the gameworld. This immersion provides an escape for players from everyday life. Immersion occurs when the game: (1) "monopolizes the senses" (Carr, 2006, p. 68), (2) engages the player psychologically, and (3) requires physical action (see Nacke & Grimshaw, 2011 for more on immersion). The authors of this chapter believe that all three components of immersion are highly linked and can be (and are) used to evoke emotions from players.

Visuals and sound are often used to elicit specific emotions among the consumers of computer games. Currently, however, the computer game

DOI: 10.4018/978-1-61692-828-5.ch009

industry is focused on the quality of the graphics within the game. The computer game industry has clear guidelines for visuals, but not particularly for sound. Yet, sound is as least as important, if not more important, than visuals for creating immersion and evoking emotions (Anderson, 1996; Grimshaw, 2007), though often underrated by the players (Cunningham, Grout, & Picking, 2011). Sound can change the player's perception of images to the point where the sound dominates even when the player is presented an opposing relationship between the sound and image (Collins, Tessler, Harrigan, Dixon, & Fugelsang, 2011). Unfortunately, as Collins (2007) states, "work into the sonic aspects of audio-visual media has neglected games [and] video games audio remains largely unexplored" (p. 263). Furthermore, as Serafin (2004) wrote, "[s]o far no quantitative results are available to help designers to build soundscapes which allow the user to feel fully immersed" (p.4). And, finally, according to Nacke and Grimshaw (2011), "not much work has been put into sensing the emotional cues of game sound in games, let alone in understanding the impact of game sounds on players' affective responses".

The purpose of the current chapter is to create a theoretical foundation and empirical evidence for the study of how emotions and affect are impacted by game sound. Although Roux-Girard (2011) "firmly believes that adopting a position that emphasizes reception issues of gameplay can provide a more productive model than one that would be grounded directly in the production aspects (implementation and programming) of game audio", we believe that researching the impact of the production aspects of game sounds is just as productive. Ultimately, we believe that both approaches are equally viable and should be used to understand the experience of game sounds. Whereas Roux-Girard attempts to understand the effect of game sounds from a top-down approach, our intent is to build from bottom-up a research foundation upon which further inquiry into the relationship between emotions and game sound can be conducted. Furthermore, our aim is to produce valid results that are able to both explain phenomena and be useful for game designers. Specifically, this chapter describes a study to determine the best sound design principles pertaining to game sound effects (defined here as all diegetic game sound except dialogue) to cause fear and anxiety in players—two common emotions that players feel while playing computer games. The empirical research examines how to manipulate three basic properties of game sound (volume, timing, and source) through a game level designed to evoke fear, suspense, and anxiety. Through this quantitative and qualitative examination, the general design principles of how to develop game sound effects to promote fear and anxiety is better understood.

BACKGROUND: LITERATURE AND FIELD REVIEW

In order to design games and perform research using game sound for promoting fear, suspense, and anxiety, both theories of emotion and the current state of the art design of sound effects in games are important to understand. Emotions and affect are elusive in nature, and difficult to define (Cornelius, 1996). For instance, some consider emotions and affect to be the same psychological construct, while other researchers consider affect to be the conscious experience of emotions. In either case, our research measures the conscious experience of emotion, whether that is considered affect or emotion or both. Furthermore, rather than define emotion and affect, which is attempted in Nacke and Grimshaw (2011), we will describe emotions from the perspectives of four theoretical traditions of research on emotion in psychology (Cornelius, 1996). These schools of thought on the sources and development of emotion are the Darwinian theory of emotions, James-Lange theory, cognitive theory, and social constructivist theory. Our intent is to provide an understanding of the emergence