Using Physiological Response Data to Examine Horror Video Game Enjoyment

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Horror is a curious entertainment genre. Some of the most popular novels, films, and video games contain elements and processes purposefully meant to induce fear, shock, and other negative emotions in willing consumers. This internal conflict phenomenon is attracting academic and entertainment industry investigations into the mechanisms and implications of horror entertainment from psychological (e.g., Lin, Wu & Tao, 2018), communication (e.g., Hoffner & Levine, 2005), and social and cultural perspectives.

In horror films, directors lead their audiences through linear presentations of information. In comparison, when horror video game players interact with game systems, they explore their environments, trigger events, and consider survival strategies at their own paces. In addition to prolonging and manipulating the most intense periods of suspense, horror game players can psychologically prepare themselves for the shocks they know are coming and thus manage their individual fearful/joyful gaming experiences. Horror games and films share some similarities in how they present supernatural phenomena, but they use narrative approaches that reflect differences in player autonomy and player-system interaction (e.g., Perron, 2004; Garner & Grimshaw, 2011).

Today we are witnessing new types of horror-game consumption that fit the frameworks of streaming apps such as Twitch.tv and YouTube Gaming. Individuals who are curious about horror games but are afraid of playing them can watch a Twitch gaming session, exchange opinions in chat rooms, and make suggestions for player actions. Such fear-sharing and joint-suggestion experiences are not available to horror film viewers or solo horror game players. One major challenge for horror game designers is making sure that pauses for players to consider strategic options (or for Twitch audiences to vote) do not interfere with gaming tempos so as to cause excessive damage to player immersion or flow sensations. Although no game actions

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occur during such pauses, it is important to ensure that player and watcher focuses do not waver.

Toward these goals, eye movement data is currently considered an indispensible tool for monitoring or measuring participant attention, as well as for understanding holistic processes associated with horror game enjoyment. We used eye movement tracking equipment to record fixation and saccade pattern data for players of the horror video game "The House," and used other equipment to record heartbeat rates, eye blink frequencies, and pupil constrictions. These data were integrated with data for player mouse actions at different horror event stages to identify gaming behaviors. Study participants were also requested to complete a questionnaire designed to measure their motivations and preferences for horror video games. The combined data were used to examine changes in player senses of immersion during high-suspense periods, and to identify differences among individuals who express various game-playing motivations.

Our main findings were (a) the combination of heartbeat rate and pupil constriction served as an accurate measure of player immersion and enjoyment; and (b) fixation frequency increased and average fixation period length decreased as immersed players made progress in a game—a finding that conflicts with previously reported immersion patterns for non-horror game genres. We also found that immersed players paid more attention to clues presented during high-suspense game situations while still maintaining awareness for possible shocks. In contrast, less immersed players paid greater attention to game event triggers that might result in stopping gameplay as quickly as possible, as finding clues in horror narratives makes less sense for them.

We offer our findings in support of game developer and virtual reality equipment manufacturer efforts to embed eye-tracking functions into their products, and to make the best use of gaze and eye-movement pattern data for real-time user feedback so as to enhance feelings of suspense in horror games.

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