Full length article

The effect of an avatar's emotional expressions on players' fear reactions: The mediating role of embodiment

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ABSTRACT

This research aimed to demonstrate the effects of an avatar's emotional expressions on players' fear reactions during horror gameplay. In Study 1, we found that the emotional expressions of an avatar decreased fear reactions among players. This effect was mediated by avatar embodiment. More precisely, avatar emotional expressions lower avatar embodiment, which, in turn, positively predicts players' fear reactions. In Study 2, we replicated the findings of Study 1. In addition, we found that the effects observed in Study 1 were only present in interactive gameplay—not when players watched screen-captured footage of the game. In other words, we found evidence of a moderated mediation model in which interactivity moderates the effects of an avatar's emotional expressions on players' fear reactions through avatar embodiment.

1. Introduction

The most fundamental goal of entertainment media is to create emotions in its users. Various forms of media, including movies and video games, can produce strong emotions such as hope, sadness, joy, and fear. (Tan, 1996; Zillman & Cantor, 1977; Zillmann, 2011). In dramas, we hope and fear for our beloved protagonist; we weep when adored characters fail. We laugh at comedies, and we feel frightened to death by horror movies. Undoubtedly, the horror genre provides one of the best examples of how media are capable of moving viewers to strong emotional reactions, namely fear. A number of factors contribute to viewers' fear reactions. For instance, Harrison and Cantor (1999) report the depiction of blood or injury, as well as the use of suspenseful music, as triggers of fear reactions in the audience. Previous entertainment theory related to film has stressed the role of characters' emotional expressions in the generation of strong emotions in users. The mechanism through which a character's emotional expressions affect a viewer's emotional reactions has been referred to as empathy (Tamborini, Stiff, & Heidel, 1990; Wilson & Cantor, 1985; Zillmann, 2011).

Emotions are also a central part of the experience of playing video games. Therefore, it is unsurprising that the developers of horror games, such as the *Silent Hill* series (Toyama, 1999–2012) and *Slender: The Eight Pages* (Hadley, 2012), also intend to create strong emotional experiences for players by producing dark and scary environments with eerie sounds, horrifying creatures, and fearful emotional expressions of the avatar (e.g., shrieks of pains or heavy breathing) (Freeman, 2004; Grimshaw, Lindley, & Nacke, 2008). In a recent study by Lynch and Martins (2015), players of horror games reported feeling frightened during gameplay because of a host of stimuli, such as darkness, music, or the death or injury of the avatar. The emotional expressions of the avatar were not included in the list of frightening stimuli in this study (Lynch & Martins, 2015). At first glance, one would expect that—just like in movies—the stronger the emotional expressions by a mediated character in a game (i.e., the avatar), the more intense the player's emotional experiences. However, it is unknown whether the emotional expressions of a mediated character in a video game have the same effect on fear reactions as is seen in traditional linear media such as movies. While watching a horror movie, emotions most likely arise *indirectly* from *empathic reactions* to the protagonist, as the viewer is a mere witness to what happens on the screen (Madsen, 2016; Zillman & Cantor, 1977; Zillmann, 1991). However, while playing a horror game, fear most likely arises through a process that has been referred to as *identification*, *self-presence*, or *embodiment* (Biocca, 1997; Kilteni, Groten, & Slater, 2012; Ratan & Sah, 2015), because the player experiences the environment as an *active role-player* through his or her avatar (Klimmt, Hefner, & Vorderer, 2009; Lin, 2013b; Lynch & Martins, 2015; Peng, 2008).

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In other words, in video games, the avatar and the player are not distinct entities; rather, they merge into each other. This implies that the emotional expressions of a mediated character in a video game have a different effect on players' emotional reactions than they have in films: Emotional expressions of the avatar may (at least temporarily) disrupt the strong connection between the player and the avatar. As a result, the player realizes that it is not him or her who is in danger, and this, in turn, should decrease his or her fear.

To our knowledge, no existing empirical studies have examined the emotional effect of an avatar's emotional expression in video games. Therefore, in the first study presented here, we sought to contribute to research on emotional reactions to video games by examining (a) the effect of an avatar's emotional expressions on players' emotional reactions while playing a survival horror game and (b) the mediating role of embodiment in the generation of fear (Study 1). In the second study (Study 2), we aimed to (c) corroborate the findings of Study 1 and (d) show that the hypothesized effect of Study 1 is only present when the game is played rather than just watched.

1.1. Entertainment media and fear

Fear or fright, as Lazarus (1994) refers to this response, is an emotional reaction to "concrete and sudden danger of imminent physical harm" (p. 234). Lynch and Martins (2015, p. 299) point out that fear is a "stimulus-evoked reaction". This reaction goes along with physiological processes and behavioral responses. The former include increased heart rate or increased breathing frequency, whereas the latter comprise avoidance and defensive behavior (Kreibig, Wilhelm, Roth, & Gross, 2007; Smith & Lazarus, 1993). Both traditional media, such as films or books, and interactive computer games have the potential to cause users to feel frightened (Lynch & Martins, 2015; Madsen, 2016; Perron, 2009). In the following sections, we first outline the fear-eliciting mechanisms in traditional media and then turn to explaining how emotions arise during gameplay.

1.1.1. Fear in traditional media

A large part of the research on media-induced fright reactions has examined developmental differences in those reactions (Cantor, 1994; Harrison & Cantor, 1999; Hoffner, 1997) or focused on individual differences in fright reactions and in coping strategies (Hoffner, 1995, 1997). Other research has emphasized the need to consider the role of content features affecting fright reactions (Cantor, 2006; Hoffner, 2009). Among other features, such as the depiction of blood and gore or supernatural creatures like zombies or ghosts, the emotional expressions of protagonists (i.e., the victims) have been shown to contribute to viewers' emotional experiences (e.g., Tamborini et al., 1990; Zillmann, 1991). Empathy has been shown to be the key mechanism through which emotional reactions to a protagonist's expressions of emotional experiences arise (for a thorough review on empathy, see Preston & De Waal, 2002). The *three factor theory of empathy* explains emotional reactions to witnessing the emotional expressions of mediated characters (Zillmann, 1991). According to this theory, emotional experiences from witnessing others' emotional reactions result from the interaction of three components: the dispositional, the excitatory, and the experiential component. The dispositional component is a mechanism that guides one's responses and is associated with reflexive skeletal-motor reactions to emotional stimuli. The excitatory component is associated with viewers' arousal. The experiential component is the conscious experience of the other two components. In the context of horror movies, Tamborini et al. (1990) outline how fear arises through empathic

reactions to a victim's emotional expressions. This empathic reaction results from the interaction of the three components mentioned above: First, a viewer experiences a reflexive reaction of distress because of the high iconicity of film. These feelings of distress then result in an excitatory reaction indicated by heightened sympathetic arousal. In the last step, the viewer appraises his or her reaction as concordant to that of the character in distress and generates the appropriate emotional reaction by reminding him- or herself of similar events he or she has experienced in the past. From this description, it becomes clear that the more intense the emotional expression of the mediated character, the higher the levels of fear the viewer experiences. However, while watching movies, the user plays a relatively passive role; she or he is clearly separated from the character and acts as a witness (Madsen, 2016; Zillmann, 1991). Accordingly, Zillmann (1991) and Tan (1996) refer to film-elicited emotional reactions as *witness emotions*. This is different in video games.

1.1.2. Fear in interactive media

Empirical research on fear reactions in video games is rather limited (Lynch & Martins, 2015; Madsen, 2016; Perron, 2004). Lynch and Martins (2015) identified several stimuli and features of video games that caused fright reactions in players. Among the most often reported fear-inducing features of video games were darkness, disfigured humans, zombies, and the unknown. However, another important feature participants reported characterizes the difference between horror movies and horror video games: *interactivity* or *agency*. That is, although horror games have largely built upon horror movies (Perron, 2009; Rouse, 2009), there is a fundamental difference between horror movies and horror games: Whereas, in horror movies, viewers are merely witnessing what is happening on screen, video game players experience the game through a character, the so-called *avatar* (Ahn, Fox, & Bailenson, 2012). Lin (2013a, 2013b), for instance, argues that an enemy attacking a character is perceived as more self-relevant for a player than for a viewer. He refers to the difference between *enactive experience* and *observational experience* (see also Peng, 2008). This difference between horror movies and horror games also has implications for the effect of the emotional expressions of the mediated character (i.e., the avatar). Whereas a movie character's emotional expressions increase viewers empathetic fear, an avatar's emotional expressions remind the player that he or she and the avatar are not the same entity. The emotional expressions of the avatar can be regarded as a form of "distance management" (Klimmt et al., 2009, p. 360). This leads to our first hypothesis:

H1. Emotional expressions of the avatar lead to lower fear reactions than are observed when the avatar is silent.

It has been shown above that empathy is the central mechanism through which the emotional expressions of a mediated character translate into emotions in the viewer. An important feature of the empathy concept is that the mediated character and the viewer remain separate entities. The viewer is a witness of what is happening to the character on screen (Tan, 1996; Zillmann, 1991). In contrast, in video games, the player is not a mere observer, but rather becomes an integral part of the mediated world and experiences it through the avatar (Klimmt et al., 2009). Klimmt et al. (2009) argue that the avatar and the player merge into each other: The dyad becomes a monad. There are different concepts describing this player–avatar connection. *Identification* is probably the most prominent of these concepts (Cohen, 2001; Hoffner & Buchanan, 2005; Klimmt et al., 2009; McLeod, Liu, & Axline, 2014; van Looy, Courtois, Vocht, & Marez, 2012). Cohen (2001, p. 261) regards identification as "an imaginative process through which an audience member assumes the identity, goals and

perspective of a character." *Self-presence* is a concept highly comparable to identification (Ratan & Hasler, 2010). Ratan and Hasler (2010, p. 14) define self-presence as "the extent to which someone feels a connection to a virtual self-representation." However, we argue that the essence of the player–avatar connection is best understood as *embodiment* (Haans & IJsselsteijn, 2012; Kilteni et al., 2012; Ratan & Sah, 2015).

Embodiment is defined as the sense of ownership of the virtual body, the sense of self-location, and the incorporation of the avatar as a tool into the body schema (Biocca, 2014; Haans & IJsselsteijn, 2012; Kilteni et al., 2012; Ratan & Sah, 2015). Gallagher (2005, p. 234) defines body schema as "a nonconscious system […] of motor-sensory capacities that function below the threshold of awareness, and without the necessity of perceptual monitoring." Haans and Ijsselstijn (2012) argue that tools or technological artifacts (such as avatars) can be integrated into one's body schema. In other words, an avatar can become an extension of one's body schema and part of a player's body schema. This happens in a mostly unconscious manner. Ratan and Sah (2015) shed further light on the process of embodiment by arguing that visual information in the mediated environment is synchronized with players' inputs. For example, if the player moves the joystick to the right, the avatar turns right (see also Biocca, 2014).

Although we believe that identification, self-presence, and embodiment essentially denote the same process, namely the feeling of being the avatar and—more importantly—being able to act through the avatar, in our opinion, the most precise term to describe the perceived union of the player and the avatar during gameplay is embodiment (Haans & IJsselsteijn, 2012; Kilteni et al., 2012; Ratan & Sah, 2015). The concept signifies the central idea of the player–avatar connection during gameplay. In our opinion, both self-presence and identification are too abstract their conceptualization. We believe that, while playing a cognitively demanding game, players simply do not have enough cognitive capacity to relate their own identity or their physical appearance to that of the avatar (Lang, 2000). The concept of embodiment provides a coherent and parsimonious framework for understanding player–avatar connections that takes the unconscious nature of the process explicitly into account (Glenberg, 1997).

In the context of this study's inquiry, the emotional expressions of the avatar can obstruct the player's experience of being in control of the avatar's movements and interfere with the player's impression that the avatar is an extension of his or her body schema. In other words, if the player can hear the avatar's emotional expressions, he or she is reminded of the fact that he or she and the avatar are two distinct entities. This leads to our second hypothesis:

H2. Emotional expressions of the avatar lead to lower embodiment than are observed when the avatar is silent.

These avatar–player connections have been linked to different emotional outcomes. Lin (2013a,b), for instance, showed that identification is positively related to aggressive affect in a violent game. Hoeken and Sinkeldam (2014) found that stronger identification with a mediated character is related to stronger emotions—both negative and positive. Applied to the present study and the refined understanding of player–avatar connections presented here, we argue that the more a player feels embodied in his or her avatar in a horror game, the more intensely he or she experiences fear, because what is happening to the avatar is at the same time happening to him or her. Therefore, we hypothesize the following:

H3. There is a positive relationship between embodiment and players' fear reactions.

Because the emotional expressions of the avatar are

hypothesized to be related to embodiment (H2) and embodiment is expected to be related to players' fear, we argue that embodiment mediates the effect of an avatar's emotional expression on players' fear reactions. In other words, we expect embodiment to be the mechanism responsible for the effects of an avatar's emotional expression on players' fear reactions (see also Lin, 2013a,b; Peng, 2008). This argument leads to our fourth hypothesis:

H4. Embodiment mediates the effect of an avatar's emotional reaction on players' fear reactions.

1.1.3. The moderating role of agency

The main argument of our study is that the elicitation of emotion works differently in interactive video games than in traditional media. However, we have not yet addressed the key variable supporting this argument: interactivity (Lin, 2013a,b) or agency (Peng, 2008). Interactivity can be understood as a media or a psychological variable that facilitates agency (Kiousis, 2002). That is, the interactive media environment allows users to participate actively rather than just witnessing what is happening. In other words, interactive media allow users to become agents rather than observers.

A study by Peng (2008) on self-efficacy found that playing a game instead of watching it had a positive effect on both the player–avatar connection and perceived self-efficacy. Research has shown that agency also plays an important role in the emotional effects of mediated messages. Lin (2013a, 2013b), for instance, found that players felt more aggressive after playing a game than after watching recorded gameplay. In terms of fright reactions, Lynch and Martins (2015) found interactivity to be the most frequently mentioned feature causing players to feel frightened. Madsen (2016) conducted the first study in which agency was experimentally manipulated to examine its effect on fright reactions to survival horror games. The study found that participants showed stronger physiological reactions (higher skin conductance, faster heart rate, and higher respiratory rate) while playing a horror survival game than when only watching captured footage of the game. However, agency does not necessarily have a direct effect only on emotional reactions; it can also act as a moderator. Lin (2013a), for instance, showed that agency exacerbated the effect of violence in a video game on aggressive outcomes. Applied to the present study, this means that the effect of an avatar's emotional expressions on a player's fear reaction could work differently at different levels of agency.

Therefore, we hypothesize the following:

H1b. Agency moderates the effect of an avatar's emotional expression on players' fear reactions in such a way that the negative effect predicted in H1 only holds while playing the video game and not while watching it.

H2b. Agency moderates the effect of an avatar's emotional expression on embodiment in such a way that the negative effect predicted in H2 only holds while playing the video game and not while watching it.

H4b. The indirect effect hypothesized in H4 is moderated by agency in such a way that this indirect effect only holds while playing the video game and not while watching it.

Taken together, our hypotheses result in a moderated mediation model. This model is depicted in Fig. 1.

2. Study 1

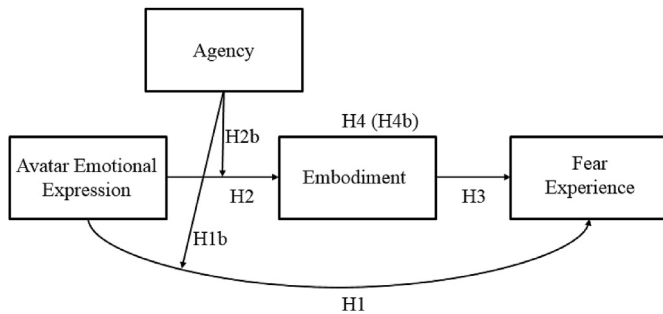Study 1 was designed to test hypotheses H1, H2, H3, and H4. We

Fig. 1. Moderated mediation model predicting players' fear.

conducted an experimental study using a survival horror game with an avatar that either expressed emotions or was silent.

2.1. Method

2.1.1. Participants

A total of 103 undergraduate students at a large university participated in the experiment. Among the respondents, 56.3% ($n = 58$) were female. On average, participants were 20.94 years old ($SD = 1.74$). They were randomly assigned to one of the two experimental conditions. They participated for the partial fulfillment of course requirements.

2.1.2. Design, stimulus material, and experimental manipulation

The study employed a factorial between-subjects design with character emotional expressions (present vs. absent) as the experimental factor. The survival horror game *Amnesia: The Dark Descent* (Grip, 2010) served as the stimulus. The game is set in a castle in the 19th century. At the beginning of the game, the game character (i.e., the avatar) wakes up in a tomb, and the player learns that he suffers from amnesia. The player's task is to find a way out of the castle where the tomb is located. The game is played from the first-person perspective. One significant advantage of the game is the possibility to mod it—that is, one can create user-defined levels. To ensure internal validity, we created a map that was the same for each player and that could only be passed through in one direction. Emotional expressions of the avatar consisted of hysteric wheezing and fast and loud heartbeats. In the control group, the avatar was silent.

2.1.3. Procedure

Upon arrival, each participant was welcomed and escorted to a carpeted laboratory, 21 × 15 feet in size. After giving informed consent, the participants were asked to fill out a preliminary personality questionnaire that is not reported here. They were then seated in front of a large screen (6.6 × 9.8 feet), given instructions on how to play the game, and asked to play a short practice session. For this session, we used a different virtual environment than the one we used for the experimental session. All participants used an Xbox 1© controller. Next, each participant played a seven-minute session. Then, they filled out a questionnaire measuring the dependent variables. Finally, the participants were debriefed and dismissed.

2.1.4. Measures

Fear was measured using three items from the Differential Emotion Scale (Izard, Dougherty, Bloxom, & Kotch, 1974) ($M = 3.23$, $SD = 1.17$, $\alpha = 0.93$).

To measure *embodiment*, three items were formulated following

research by Ratan and Sah (2015) and van Looy et al. (2012) (e.g., "While playing, I had the impression that I acted through the avatar," $M = 3.18$, $SD = 0.98$, $\alpha = 0.93$).

Manipulation check. Finally, to assess the success of the experimental manipulation, we formulated four items (e.g., "I could hear the avatar wheeze, breathe, and sigh," $M = 3.69$, $SD = 1.11$, $\alpha = 0.85$). For all measures, the participants responded on a five-point Likert scale (1 = *I strongly disagree* to 5 = *I strongly agree*). A list of all items can be found in Table 1 in the Appendix.

3. Results

An analysis of variance (ANOVA) showed that the experimental manipulation was successful: Participants in the group that was exposed to emotional expressions of the avatar showed significantly higher levels of perceptions of emotional expressions ($M = 4.35$, $SD = 0.63$) than did participants playing the game with a silent avatar ($M = 3.00$, $SD = 1.10$), $F(1, 101) = 46.82$, $p < 0.001$, $\eta_p^2 = 0.37$.

The first hypothesis (H1) predicted that participants in the group with a silent avatar would experience higher levels of fear ($M = 3.43$, $SD = 1.10$) than would participants in the group with avatar emotional expressions ($M = 3.04$, $SD = 1.10$). Because the avatar in the game was male, we controlled for gender (see also Lin, 2013b). The results of an analysis of covariance (ANCOVA) did not support this hypothesis, as the difference was not significant: $F(1, 100) = 3.35$, $p = 0.07$, $\eta_p^2 = 0.04$.

To examine H2, H3, and H4, a mediation model was estimated using the PROCESS macro by Hayes (2013) (Model 4). The experimental variable was entered as a dummy-coded variable (0 = avatar emotional expressions present). Embodiment was entered as a mediator, and we controlled for gender. Having experienced fear was entered as the dependent variable. The model estimates are depicted in Table 2, which shows support for H2, H3, and H4. That is, the avatar's emotional expressions affected embodiment, such that participants who played the game with a silent avatar experienced higher levels of embodiment did than participants whose avatar expressed emotions ($b = 0.56$, $SE = 0.19$, $p < 0.001$). Embodiment, in turn, affected fear reactions ($b = 1.18$, $SE = 0.32$, $p < 0.001$) and also mediated the effect of the experimental manipulation on fear reactions, as indicated by the significant indirect effect of the avatar's emotional expression on players' fear reactions through embodiment ($b = 0.65$, $BootSE = 0.27$, $BootCI = 0.24$ to 1.36).

4. Discussion

The results of Study 1 demonstrate that the emotional expressions of a mediated character indeed have the opposite effect in video games as they have in horror movies. However, because the total effect of avatar emotional expression on players' fright reactions was not significant, we cannot conclude that a silent character leads to more fear than does a character expressing fear. However, more importantly, our data demonstrate that the effect of an avatar's emotional expression on players' emotional reactions works through the mechanism of embodiment. That is, hearing the avatar's emotional expressions disrupts the feeling of embodiment. Altogether, this mediation model could be confirmed by our data. It seems that, while playing video games, emotional experiences are mediated through a different mechanism than is seen while watching movies.

However, demonstrating the specificity of the effects of a mediated character's emotional expressions on emotional reactions in video games requires evidence that these effects are only observed while playing a game and not while simply watching the game as a witness. In fact, Study 1 was based on the argument that

Table 2
Mediation model: Indirect effect of avatar emotional expression (IV) on fear reactions (DV) through embodiment (M).

Predictor	Mediator Variable Model (DV = Embodiment)			
	b	*SE*	*t*-Value	*p*-Value
Avatar Emotional Expression (0 = present)	0.56	0.19	2.96	0.00
Gender (0 = male)	0.09	0.19	0.47	0.64
Model summary $R^2 = 0.08$, $F(2, 100) = 4.49$, $p = 0.01$				

Predictor	Direct Effect Model (DV = Fear Reactions)			
	b	*SE*	*t*-Value	*p*-Value
Avatar Emotional Expression (0 = present)	0.51	0.62	0.81	0.42
Embodiment	1.18	0.32	3.69	0.00
Gender (0 = male)	2.03	0.60	3.38	0.00
Model summary $R^2 = 0.23$, $F(3, 99) = 9.98$, $p < 0.001$				

	Indirect Effects of Avatar Emotional Expression on Fear Reactions			
	b	Boot *SE*	BootLLCI	BootULCI
Embodiment	0.65	0.27	0.24	1.36

Note: b = unstandardized coefficient, bootstrap samples = 5000, IV = Independent variable, DV = Dependent variable, M = Mediator, Boot SE = Bootstrap standard error, BootLLCI = Bootstrap lower level confidence interval, BootULCI = Bootstrap upper level confidence interval.

this is the case, but the study does not provide evidence for this argument's validity.

5. Study 2

Study 2 was designed to examine the moderating role of agency. More precisely, in Study 2, we aimed to demonstrate that the effects found in Study 1 are only found for enactive mediated experiences and not for observational mediated experiences (i.e., when the video game is played and not when it is just watched). Based on studies by Lin (2013a, 2013b), we expected agency to moderate the effects found in Study 1, as predicted in H1b, H2b, and H4b.

5.1. Method

5.1.1. Participants
A total of 104 undergraduate students at a large university participated in the second experiment. Most (72.1%, $n = 75$) of the participants were female. The average age was 20.43 years ($SD = 1.77$). The participants were randomly assigned to one of four experimental conditions. As in Study 1, they participated for the partial fulfillment of course requirements.

5.1.2. Design, stimulus material, experimental manipulation, and procedure
The study employed a 2 (agency: play vs. watch) × 2 (character emotional expressions: present vs. absent) between-subjects design. We used the same game as in Study 1, and the manipulation of the avatar's emotional expressions was also the same ($n_{character\ emotional\ expressions\_present} = 60$, $n_{character\ emotional\ expressions\_absent} = 45$). Agency was manipulated as in previous studies (Lin, 2013a, 2013b; Peng, 2008): Participants in the play condition played the game, and participants in the watch condition watched a screen capture of someone else's gameplay (a participant in Study 1). Participants in the watch condition saw a version either with ($n = 30$) or without ($n = 21$) avatar emotional expressions. We applied the same procedure as described for Study 1.

5.1.3. Measures
Study 2 used the same measures described for Study 1. Fear was measured with the same three items from the Differential Emotion Scale ($M = 3.14$, $SD = 1.15$, $\alpha = 0.91$). The same three items used to measure embodiment in Study 1 were also used here ($M = 2.97$, $SD = 1.10$, $\alpha = 0.85$). Finally, in Study 2, we again assessed the success of the avatar emotional expression manipulation with the same four items used in Study 1 ($M = 3.54$, $SD = 1.11$, $\alpha = 0.79$).

6. Results

First, we tested whether the manipulation of the avatar's emotional expression was successful, including being independent of the manipulation of agency. Results of a 2 (agency) × 2 (avatar emotional expression) ANOVA revealed that the manipulation was successful, as participants in the condition where the avatar expressed emotions scored higher on the manipulation check measure ($M = 4.13$, $SD = 0.66$) than did participants in the condition where the avatar was silent ($M = 2.75$, $SD = 1.10$), $F(1, 100) = 61.48$, $p < 0.001$, $\eta_p^2 = 0.38$. Agency had no effect on the manipulation check: $F(1, 101) < 1$, *ns*. There was also no effect observed for the interaction between agency and the avatar's emotional expression $F(1, 101) < 1$, *ns*.

To test the moderation hypotheses (H1b and H2b), we conducted a 2 (agency) × 2 (avatar emotional expression) multivariate analysis of covariance (MANCOVA) with the experimental factors as the independent variables, and fear and embodiment as the dependent variables. As in Study 1, we controlled for gender. The analysis revealed a marginally significant multivariate effect of agency: Wilks' $\Lambda = 0.94$, $F(4, 98) = 2.97$, $p = 0.05$, $\eta_p^2 = 0.06$. There was no multivariate effect of avatar emotional expression on the dependent variables: Wilks' $\Lambda = 1.00$, $F(4, 98) < 1$. However, we found a marginally significant multivariate interaction effect: Wilks' $\Lambda = 0.94$, $F(4, 98) = 3.08$, $p = 0.052$, $\eta_p^2 = 0.06$. Univariate analyses revealed that fear was not effected by the experimental factors or by the interaction between the two (all $Fs < 1$). Thus, H1b could not be confirmed. However, agency had an effect on embodiment: $F(1, 99) = 5.86$, $p = 0.02$, $\eta_p^2 = 0.06$. The interaction between the two factors also had a significant effect on embodiment: $F(1, 99) = 6.11$, $p = 0.01$, $\eta_p^2 = 0.06$. This interaction is plotted in Fig. 2, which shows that avatar emotional expression had opposite effects on embodiment in the two agency conditions: When participants watched the screen-captured footage of the game, the emotional expressions of the avatar led to higher levels of embodiment than were observed when the avatar made no emotional expression. If, however, participants played the game,
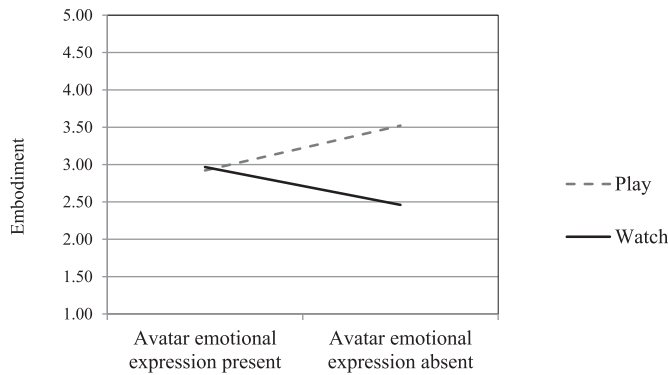
Fig. 2. Interaction effect of avatar emotional expression and agency on embodiment.

we found the same effect as in Study 1, namely higher levels of embodiment when the avatar was silent.

To test H3 and H4b, we conducted a moderated mediation analysis using the PROCESS macro by Hayes (2013) (Model 8, see Table 3). Embodiment was entered as a mediator, and agency was entered as a moderator. As can be seen in Table 3, agency and the avatar's emotional expression interacted to predict embodiment ($b = 1.04$, $SE = 0.42$, $p = 0.02$). Embodiment, in turn, predicted fear ($b = 0.24$, $SE = 0.10$, $p = 0.02$). The mediated interaction was also significant ($b = 0.25$, $BootSE = 0.16$, $BootCI = 0.03$ to 0.70). Overall, H3 and H4b are supported by our data. Although there was no total effect of avatar emotional expression, no effect of agency, and no effect of the interaction between the two predictors on fear, we can still conclude that there is a moderated mediation effect (Hayes, 2009).

7. Discussion

We conducted Study 2 to corroborate the findings of Study 1 and to provide evidence that the mechanism of fear reactions during horror gameplay only works when people engage in playing the game rather than only watching a game session. We were successful in both aims. We found the same mediating effect of avatar emotional expression on players' fear reactions through embodiment, which replicated the findings of Study 1. Further, in Study 2, embodiment only mediated the effect of avatar emotional expressions on players' fear when they played the game. Overall, the proposed moderated mediation model was supported by our data.

However, in Study 2, fear was not directly affected by the avatar's emotional expressions, and the interaction between agency and emotional expression did not predict players' fear. This lack of an interaction effect between the emotional expression of the avatar and agency is consistent with previous findings by Lin (2013b), who did not find an interaction effect of violence and interactivity on affective reactions. However, more importantly, the lack of a direct effect does not necessarily mean that there is no indirect effect (Hayes, 2009); according to our theoretical argument, a direct effect does not have to occur, as embodiment is conceived as a necessary antecedent of emotional reactions.

8. General discussion

Taken together, our findings demonstrate the validity of our argument that emotional expressions of avatars affect media users' emotions in the opposite way from how they would in horror movies. That is, in contrast to what is observed for horror movies, the emotional expressions of the mediated character seem to have decreased users' fright reactions. Empathy has been shown to be the key mechanism through which the emotional expressions of a

Table 3
Moderated mediation model: Indirect effect of avatar emotional expression (IV) on fear reactions (DV) through embodiment (M), moderated by agency (Mo).

Predictor	Mediator Variable Model (DV = Embodiment)			
	b	SE	t-Value	p-Value
Avatar Emotional Expression (0 = present)	0.48	0.30	−1.59	0.12
Agency (0 = watch)	−0.01	0.27	−0.05	0.96
Agency * Avatar Emotional Expression	1.04	0.42	2.47	0.02
Gender (0 = male)	0.30	0.23	1.29	0.20
Model summary $R^2 = 0.12$, $F(4, 99) = 3.24$, $p = 0.02$				

Predictor	Dependent Variable Model (DV = Fear Reactions)			
	b	SE	t-Value	p-Value
Avatar Emotional Expression (0 = present)	−0.05	0.31	−0.17	0.86
Agency (0 = watch)	−0.03	0.28	−0.10	0.92
Agency * Avatar Emotional Expression	−0.11	0.44	−0.25	0.80
Embodiment	0.24	0.10	2.39	0.02
Gender (0 = male)	0.84	0.24	3.56	0.00
Model summary $R^2 = 0.18$, $F(5, 98) = 4.34$, $p = 0.00$				

Agency	Conditional Direct Effects of Avatar Emotional Expression on Fear Reactions by Agency			
	b	SE	t-Value	p-Value
Watch	−0.05	0.31	−0.17	0.86
Play	−0.16	0.30	−0.54	0.59

Mediator	Conditional Indirect Effects of Avatar Emotional Expression on Fear Reactions by Agency			
	Agency	b	Boot SE	Boot 95% CI
Embodiment	Watch	−0.12	0.10	−0.40 to 0.01
Embodiment	Play	0.14	0.09	0.01 to 0.41
Indirect effect of IV * Mo through M		0.25	0.15	0.04 to 0.70

Note: b = unstandardized coefficient, bootstrap samples = 5000, IV = Independent variable, DV = Dependent variable, M = Mediator, Mo = Moderator, Boot SE = Bootstrap standard error, BootLLCI = Bootstrap lower level confidence interval, BootULCI = Bootstrap upper level confidence interval.

protagonist affect viewers' emotional reactions. More precisely, the more a protagonist expresses his or her emotions in a movie, the higher the empathetic reactions in the viewer (Tamborini et al., 1990; Zillmann, 1991; 2011). Our study has shown that, while playing a game, an avatar's emotions affect players' emotional reactions through the mechanism of embodiment. This sense of body ownership and of the incorporation of the avatar as a tool into one's body schema decreased if the avatar expressed emotions reminding the player of the fact that he or she and the avatar are two distinct entities. Following Klimmt et al. (2009), one could argue that the emotional expressions of the avatar turn the monad back into a dyad by disrupting embodiment.

Our research could have implications for developers of horror games: In contrast to makers of horror movies, who are well-advised to let actors express emotions as much as possible to increase fear reactions in viewers, developers of horror games should possibly avoid creating avatars that express their emotions to avoid disrupting player—avatar connections, because this disruption, in turn, would decrease players' fear.

8.1. Limitations and directions for future research

Like most research, our study is not without limitations and open questions to be considered in future research. First, the game we used was played in first-person view, and there was no visual information about the avatar. Whether we would observe the same effects if the players could actually see their avatar is an open question. Research by Kallinen, Salminen, Ravaja, Kedzior, and Sääksjärvi (2007) suggests that there are differences between modes of gameplay in terms of user experiences. Therefore, future research should examine the effects of third- and first-person perspectives on embodiment and players' fear reactions.

Second, strictly speaking, we did not provide complete evidence to demonstrate that computer games work differently from movies in eliciting emotions. To do that, we would have needed to show that empathy mediates the effect of the avatar's emotional expressions on media users' fear in the watch condition. However, we believe that our study does provide preliminary evidence of the difference between emotion elicitation in films and games.

Concerning the measurement of fear, one could argue that our study leaves some room for improvement. We used a self-report measure to assess participants' fear reactions. Future research could provide deeper insights by using psychophysiological measures, such as heart rate or electrodermal activity (Lin, 2013a, 2013b; Madsen, 2016).

Finally, one could ask whether the mechanisms we found also apply for positive emotions or other negative emotions. For instance, in a game like Mario Kart 8 (Shiraiwa, 2014), the avatars more or less constantly express their—mostly positive—feelings. One could argue that the avatars' expression of joy after success could reinforce players' positive reactions rather than weaken them. Future research might therefore also consider positive emotions, as well as other negative emotions, such as anger.

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Appendix

Table 1
Items used in Study 1 and Study 2.

Construct	Item
Fear	While playing, I felt…
	…fear.
	…frightened.
	…fright.
Embodiment	
	While playing, I felt as though the avatar's body was my own body.
	While playing, I had the impression that I acted through the avatar.
	While playing, I felt like I was inside the avatar.
Manipulation check	
	I could hear the heartbeat and the breathing of the avatar.
	While playing, I repeatedly heard the heartbeat of the character.
	While playing, I could hear the character fearfully breathing more quickly.
	I could hear the avatar wheezing, breathing, and sighing.

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