Empathy toward vitual humans depicting a known or unknown person expressing pain

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Abstract. This study tested both (a) empathy toward the pain of an avatar when the avatar was a realistic representation of a known versus unknown person, and (b) the role of social presence in users' empathy toward avatar's pain. Forty-two participants were immersed in virtual environment where they can interact in real time with avatars. The participants had to discuss with an avatar that experienced acute and very strong pain, depicting familiar person and an unknown avatar. The sequence was randomized and both avatars expressed identical pain reactions. Repeated measures analyses of variance revealed that participants were empathic toward both avatars, yet more empathic to the known avatar. Participants' feeling of social presence (impression that known avatar was really there, with them) was a significant predictor of empathy.

Keywords. Empathy, pain, virtual reality, emotion, virtual human

Introduction

Results consistently shown avatars - 3D representation of a person - in pain can elicit reactions in the user. Concerning empathy reaction, using avatars may not be straightforward because, despite that facial expression of pain can elicit empathy [1], empathy is also affected by other complex processes including how pain is interpreted and perceived, the fact that avatars are not real, or that observer has a personal connection with the person in pain (e.g., a friend or a relative) [2]. Moreover, the interactions with avatars in virtual reality are influenced by social presence [3]. Social presence reflects how users immersed in virtual reality feel that avatars are really there with them.

This study tested both: (a) whether people felt more empathy toward the pain of an avatar when the avatar was a realistic representation of a person known as opposed to an unknown person, and (b) the role of social presence in users' empathy toward avatar's pain.

1. Method

The sample is composed of 42 adults (18 to 60 years old, 26 females and 16 males) who were familiar with Stéphane Bouchard. Participants were randomly assigned to two avatar conditions: (a) Known Avatar First (KAF; i.e., the immersion with the known avatar preceded the immersion with the unknown avatar, n = 22) or (b) Unknown Avatar

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First (UAF; i.e., the immersion with the unknown avatar preceded the immersion with the known avatar, n = 20). Each participant completed: (a) two items rated on a 1 to 7 scale measuring empathy toward the pain of the avatar ("I was empathic to the pain of the virtual person" and "the pain of the virtual character was credible"); and (b) the French-Canadian translation and adaptation of the Gerhard's social presence questionnaire [4].

All immersions were performed in the CAVE-like system at the Laboratoire de Cyberpsychologie de l'Université du Québec en Outaouais. A control / reference immersion was first conducted where participants interacted with a virtual cat. Then, in a virtual bar, the avatar invited participants to tell the story of the best thing that has ever happened to therm. While talking with the avatar, the avatar had an acute and painful stomach cramp.

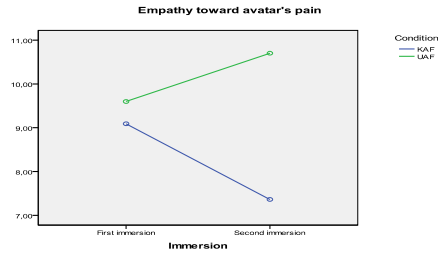
The main set of analyses was conducted to document the impact of observing pain in the Known and the Unknown Avatars using repeated measures ANOVAs. Multivariate regression analyses were conducted to assess the role of social presence.

2. Results

Participant's reactions were quite different in the immersions, as documented by the statistically significant interaction main effect (see Table 1). Those who met the Known Avatar first were significantly less empathic towards the pain of the Unknown Avatar and those who met the Unknown Avatar first were significantly more empathic to the pain of the Known Avatar in the second immersion. When looking at social presence, results were relatively stable from the control immersion to the first experimental immersion with an avatar. The interaction between the first and the second immersions revealed a clear impact of knowing or not the avatars.

The standard regression predicting empathy toward the Known Avatar revealed that social presence as main significant predictor [$F(3, 41) = 20.57$, $p < .001$].

Figure 1. Empathy toward and known and unknown avatar in pain (KAF = Known Avatar in the First immersion; UAF = Unknown Avatar in the First immersion). N = 42.



3. Conclusion

Despite the fact that the expression of pain was identical in terms of facial and verbal expressions as well as non-verbal behaviours, the users reported significantly more empathy toward the Known Avatar. Participants also related more strongly to the Known Avatar than the Unknown Avatar. Moreover the social presence - the extent to which the participants felt the avatar was really there, in the room with them, - was stronger with the Known Avatar than the Unknown Avatar. Finally, if social presence is an important factor in the suspension of disbelief toward 3D characters and the illusion that the virtual experience is real, researchers should consider using more frequently immersive technologies than simply displaying avatars on computer monitors when studying pain.

References

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