

The Effect of Static Anthropomorphic Images on Emotion Perceptions in Mobile-Phone Communication

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Abstract

We describe how static anthropomorphic images of avatars affected users' emotion perceptions of interactants and medium when they engaged in a conversation on a mobile telephone. We utilized measurements of social presence, specifically interactant satisfaction and social richness of medium. The items of these two measurements were modified to include new items of emotional credibility. The results showed no statistically significant effect of static anthropomorphic images on the perceptions of interactant satisfaction and social richness of medium. However, mobile telephone users who saw no images reported significantly higher interactant satisfaction.

1. Introduction

People are likely to use a mobile phone to make social ties stronger, even between strangers. The technological development of mobile phone services means that the small screen of a mobile phone is now called upon to display various computer-generated graphics such as game characters, social agents for online shopping or education, etc. Earlier studies [1, 3, 4, 5, 8] have reported the impact of visual images of both human and nonhuman beings in virtual environments, but on computer systems having large visual displays, as compared to the very small mobile phone screen. Further, a different type of measurement has not been used to evaluate users' interactant satisfaction in the emotionally communicative situation typical of mobile phone use. Both these limitations imply the need for research into the impact of anthropomorphic images in communications whose utility is strongly or primarily emotional, via technology which permits only very limited visual displays.

2. Research Problems and Questions

Walther's "hyperpersonal communication" [9] theory supports the idea that people feel more affection and emotion with their interactants when they have fewer cues. This leads to the prediction that "lean" media may actually provide a stronger perception of emotional

social presence than "rich" media in some instances. Introducing the impact of anthropomorphic images into this speculation, it may be that people's responses to a highly

anthropomorphic image in a rich medium might be similar to their responses in a situation in which no image is displayed in a lean medium like the limited display of a mobile phone [2]. Moreover, it has been found that simply adding human faces to interfaces is not necessarily preferable in all cases [1]. Therefore, we aimed at testing the following hypotheses.

H1: People will report higher satisfaction with their interaction partners when they are represented by no images, rather than by high or low anthropomorphic static images in emotionally engaged and synchronous mobile-phone communication.

H2: People will report higher social richness of medium when their interactants are represented by no images, rather than by high or low anthropomorphic static images in emotionally engaged and synchronous mobile-phone communication.

3. Experiment Design

The basic research design is a 3x3 factorial between-subjects experiment involving two factors: three levels of static anthropomorphic images: high anthropomorphic, low anthropomorphic, and no image; crossed with three gender combinations of dyadic partners: male-male, male-female, and female-female.

3.1. Participants

Ninety-eight university students (45 males and 53 females) were recruited at two northeastern universities. Each participant was paired with someone whom they were unlikely to know beforehand. The participants were randomly assigned to one of nine experimental conditions in the 3 x 3 design.

3.2. Procedure

The interaction took place in two separate rooms to avoid any initial face-to-face interaction. Participants were asked to complete a pre-test questionnaire measuring demographics and mobile phone use. They were then given a hypothetical conversational scenario which asked them to take on the role of a student seeking to find out if the other person was a suitable match with whom to share an apartment. Participants were given a mobile phone and a hands-free headset which allowed participants to look at the

static anthropomorphic image on the screen during the conversation. The typical conversation lasted about 10 minutes. When the participants finished the conversation, they were asked to complete a post-test questionnaire.

3.3. Measurement Instruments

3.3.1. Response Variables

Interactant Satisfaction. A 15 item Likert-type scale was measured with a 7 point metric. Among 15 items, 6 items were adopted from the items of social attraction used in Nowak's study [3]. The other 9 items, called emotional credibility, were newly created to measure interactants' emotional perceptions of their interaction partners. The new items originate in the studies of Mayer and Salovey [6], which Smith applied to describe the results of the Emotional Intelligence test [7].

Social Richness of Medium. A 5 item Likert-type scale was measured with a 7 point metric. These 5 items were modified from the items of "subjective social richness of the medium" used in Nowak and Biocca's study [4] and worded to be applicable to a mobile-phone communication.

3.3.2. Control Variable In the analysis of this study, gender combinations of interactants were considered a measured control variable. Participant dyads were almost evenly distributed across male-male (15), male-female (15), and female-female (19) pairs.

4. Results

Reliability tests showed good internal consistency among the 15 items of Interactant Satisfaction when they were combined into a summed scale (Cronbach's alpha = .85), as well as the 5 items of Social Richness of Medium (Cronbach's alpha = .82). Overall ANOVA results did not reveal a statistically significant main effect for the degree of anthropomorphism on either Interactant Satisfaction [F(2, 95)=2.4, p=.10] or Social Richness of Medium [F(2, 95)=.34, p=.71]. There was no main effect for the gender mixture of the dyads on Interactant Satisfaction [F(1, 96)=.80, p=.37] or Social Richness of Medium [F(1, 96)=.09, p=.77], nor for the interaction of avatar anthropomorphism and dyad gender type on Interactant Satisfaction [F(2, 92)=.45, p=.64], or on Social Richness of Medium [F(2, 92)=.18, p=.83].

However, a comparison of the no-image condition to all conditions in which an avatar was present showed a significant difference in users' Interactant Satisfaction [F(1, 96)=4.8, p=.03], with users who saw avatars reporting lower Interactant Satisfaction (M=4.84, SD=.70 versus M=5.15, SD=.57 for those who saw no image). The eta square value for this difference was .05 which could be considered a medium effect size in Cohen's (1988) terms. This is partial

support for Hypothesis 1. The same comparison of avatar versus no avatar conditions did not result in a significant difference in users' reports of the Social Richness of Medium [F(1, 96)=.04, p=.84]. There is thus no support for Hypothesis 2.

5. Conclusions and Discussion

In this study, participants reported feeling more engaged in their communication when they did not use any anthropomorphic images representing their partners on the small screen of a cell phone. In an open-ended question in the post-test questionnaire, there is an indication that participants' expectations of the anthropomorphic image quality and behavior may have affected their evaluations of the interaction partner and the medium. This finding may mean that dynamic images might provide greater emotional connection between conversational partners, reversing the negative effect of static images found in this study. That possibility remains a topic for future research. Furthermore, there was no evidence of gender effects on Interactant Satisfaction in this study. Conventional wisdom would predict these effects, particularly in mixed-gender dyads. We propose to further explore this subject in further studies.

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References

- [1] Koda, T. Agents with faces: The effects of personification. In *Proceedings HCI 1996*. 1996.
- [2] Mosmondor, M., Kosutic, T., and Pandzic, I. LiveMail: Personalized avatars for mobile entertainment. In *Proceedings 3rd International Conference on Mobile Systems, Applications, and Services*. 2005.
- [3] Nowak, K. L. The Influence of Anthropomorphism and Agency on Social Judgment in Virtual Environments. *Journal of Computer Mediated Communication*, 9(2), 2004.
- [4] Nowak, K. and Biocca, F. The effect of the agency and anthropomorphism on users' sense of telepresence, copresence, and social presence in virtual environments. *Presence: Teleoperators and Virtual Environments*, Vol. 12, No. 5, 2003.
- [5] Nowak, K. and Rauh, C. The influence of the avatar on online perceptions of anthropomorphism, androgyny, credibility, homophily, and attraction. *Journal of Computer-Mediated Communication*, 11(1), 2005.
- [6] Salovey, P., Brackett, M., and Mayer, J. *Emotional Intelligence: Key readings on the Mayer and Salovey Model*. Dude Publishing. 2004.
- [7] Smith, J. *Emotional Intelligence Report: EIQ16 Questionnaire*. (2004) http://www.myskillsprofile.com/eiq16_sample_report.pdf
- [8] Takeuchi, A. and Naito, T. Situated facial displays: Towards social interaction. In *Proceedings CHI'95 Human Factors in Computing Systems*, Addison Wesley. 1995.
- [9] Walther, J. B. Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research*, 23, 3-43, 1996.