The effects of virtual agent humor and gaze behavior on human-virtual agent proxemics

Peter Khooshabeh[1], Sudeep Gandhe[1], Cade McCall[2], Jonathan Gratch[1], Jim Blascovich[3], David Traum[1]

USC Institute for Creative Technologies[1], 12015 E. Waterfront, Los Angeles, CA 90094
MPI Cognitive and Brain Sciences[2]
UCSB Department of Psychology[3], Santa Barbara, CA 93106

{Khooshabeh, Gandhe, Gratch, Traum}@ict.usc.edu ,
McCall.Cade@gmail.com, blasocovi@psych.ucsb.edu

Abstract. We study whether a virtual agent that delivers humor through verbal behavior can affect an individual's proxemic behavior towards the agent. Participants interacted with a virtual agent through natural language and, in a separate task, performed an embodied interpersonal interaction task in a virtual environment. The study used minimum distance as the dependent measure. Humor generated by the virtual agent through a text chat did not have any significant effects on the proxemic task. This is likely due to the experimental constraint of only allowing participants to interact with a disembodied agent through a textual chat dialogue.

Keywords: humor, proxemics, natural dialogue management, persuasion, social influence, culture

People follow implicit social norms that determine nonverbal behaviors during interpersonal interactions. Proxemics, which refers to physical distancing, is one form of nonverbal behavior. Here we studied whether a funny virtual agent would be approached more closely by individuals in embodied interaction with it. If a virtual agent is humorous, will listeners stay closer during an interpersonal interaction?

Undergraduate psychology students (N=54) participated for course credit. Four participants were excluded from the proxemics analysis due to technical errors during data capture in the walking task. The definition of proxemic distance was how close individuals got to the virtual agent just before passing him to read the number on his back.

The study employed a mixed two factor design with agent humor (humor vs. no humor) as a between-subjects factor and proxemics agent type (idle, gazing, & inanimate object) as a within subjects factor. The inanimate object was used as a control, and the other two types were animated agents. In the idle type, the agent did not look at participants; whereas the gaze agent looked at them.

About 55% of the participants said that the virtual agent was humorous, which suggests that the manipulation was not strong. However, independent coders of the conversation logs all rated the humorous virtual agent as funnier so this serves as a manipulation check [1]. After completing a dialogue with the humorous or non-humorous agent, participants walked toward each of the three different proxemic agents in succession, according to a randomized schedule, in order to read a number displayed on the agents' back. For the inanimate object proxemics task, there were two parallel tables that participants had to walk through in order to read a number on a far table that was perpendicular. This was a control condition that geometrically constrained individuals to walk slowly in the virtual world in order to pass through the two tables. Vizard rendered the environment (WorldViz, LLC) and participants wore an nVisor SX60 head-mounted display that was enabled with motion and inertial tracking (6 DOF Precision Position Tracker and InterSense InertiaCube 2).

The procedure in the proxemic task began with participants told to remain stationary at a fixed start location, at which time they wore a tracking backpack and HMD. Once they put on the equipment, participants were instructed that they would see Bradley, the virtual agent with whom they chatted, or some tables. Their task was to read a number that was on the back of the agent or on a table.

A repeated measures ANOVA on the minimum proxemic distance measure showed a main effect of the *proxemics agent type*, $F\ (2, 90) = 72.6$, $p < .001$, $\eta^2 = .62$. There was no significant interaction between agent type and humor conditions. Participants got closer to the inanimate object, a table, ($M = .22$ meters, $SD = .21$) compared to the idle ($M = .91$ m, $SD = .38$) and gaze agent ($M = .96$ m, $SD = .39$).

The results suggest that an ostensibly humorous virtual agent did not have an effect on individuals' proxemic behavior using a chat-based interaction technique. We pursued a purely linguistic medium to manipulate humor and did not use an embodied conversational agent so as not to confound the experimental design with other factors [1]. When participants interacted with the virtual agent, they saw a static image that represented the agent. It is possible that when participants performed the proxemics task they might not have associated that virtual human with the agent with whom they interacted (although they were explicitly told that it was the same agent). In current research, we put participants in more situated and immersive interactive experimental settings. For example, participants will use spoken language to communicate with an embodied conversational agent.

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References

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