Human's Virtual Best Friend: The benefits of augmented reality social support animals

By Lindzi Wessel

Most pet owners can relate a moment when the only thing that got them through a bad day was the thought of their furry friend waiting at home, ready to soothe them with slobbery kisses, incessant purring or other forms of affection. Unfortunately, not everyone is lucky enough to be able to have pets around — certain vulnerable populations in hospitals, care centers and elsewhere, perhaps stand to benefit most from the kinds of comfort provided by animal companions but will never have access to them.

Now, though, researchers at Stanford have presented early evidence suggesting that *virtual dogs* could have similar effects. In a study published April 11th in the *International Journal of Human Computer Studies,* the investigators reported that participants preferred the support of a virtual dog to the support of a virtual human when performing a stressful task. Interviews of participants after the task indicated this was likely because the dogs were perceived as less judgmental and thus had a calming presence. The study suggests virtual support animals are valuable in circumstances where real animals can't be present, and the researchers say it should motivate further work to determine just when and how such simulated encouragement can be beneficial.

"This is the first rigorous quantitative study of what happens when you beam an augmented reality virtual support animal into your physical space," says Prof. Jeremy Bailenson, a senior author on the report and the founding director of Stanford University's Virtual Human Interaction Lab. "This is an important starting point for an area that warrants much more investigation."

A large body of work suggests that the presence of dogs can reduce stress and, in some cases, the emotional support benefits conferred by having a dog around can even exceed the support benefits provided by a spouse. But though the use of real dogs has come with positive effects, it can sometimes be limited due to allergies, sanitary concerns and the lack of someone able to adequately care for a live animal. During the onset of the Covid-19 pandemic, for example, scores of animal-assisted therapy programs were canceled as shutdowns spread around the world. And even in non-pandemic times, many clinics, nursing homes or patient residences are not equipped to house pets.

Bailenson, and the team, including the paper's first author Nahal Norouzi, thus wanted to know if a virtual dog could yield similar benefits in cases where real animals weren't an option. To test this, Norouzi, a postdoctoral scholar in the Synthetic Reality Lab at the University of Central Florida, recruited 33 university-affiliated individuals and asked them to perform a stressful task. Participants counted backwards by seven beginning with a four-digit number while their performance was reviewed by a judge—a researcher trained to maintain a neutral expression while sitting in front of participants, ostensibly evaluating their speed and accuracy.

During this stressful task, participants donned an augmented reality (AR) headset which created one of three conditions: Participants either saw a virtual human sitting on a chair in the corner nodding and smiling as they worked their way through the subtractions, saw a virtual dog in the same chair, periodically tilting its head and grinning, or saw nothing except what was actually in the room. The researchers measured participants' heart rates during the experiment and, at the end of the experiment, asked participants a series of questions about the perceived stress and difficulty of the task depending on what support condition they had.

Though researchers didn't find significant heart rate differences across conditions, they did see differences in how participants rated their experiences during the task. Participants reported that anxiety rose during their stress test both when no support figure was present and when a virtual human served as the support figure. In the virtual dog condition, however, reported anxiety was not significantly higher during the test than before the test, suggesting that having the dog in view helped keep anxiety down. Participants also reported finding the task more challenging when in the presence of a virtual support human when compared both to no support figure or a virtual dog, indicating that virtual humans as support figures might come with drawbacks not seen with virtual animals. In post-testing interviews with experimenters, participants cited perceived judgment as one reason virtual humans may have been less helpful.

“Animals are typically perceived to be non-judgmental in nature,” says Norouzi. “Even though the virtual human in the experiment wasn’t real and was designed to appear encouraging, it seemed they could still give participants the sense they were being judged.”

Virtual reality experiments are complicated, requiring intricate programming in order to make the virtual characters appear as if they are moving naturally through real space. Norouzi’s experimental design and code, says Bailenson, has set the stage for more experiments to assess the psychology of AR interventions in times of stress and discomfort. Importantly, the researchers say, virtual dogs—like the one created for this study—can be easily customized in ways that both robotic and real animals cannot, giving researchers flexibility to learn about what kinds of attributes make a support figure successful or not. In future experiments, for example, Norouzi would like to examine whether a virtual dog that gives concrete feedback becomes perceived more like a human, thus making it seem more judgmental.

“We now have the beginning inklings of how to implement this technology, how to study these questions quantitatively and have preliminary data,” says Bailenson. “Now we can do more to assess the relationship between human-made support animals and psychological benefits, and it’s an area that really does need more work.”

Source Article: Norouzi, N., Kim, K., Bruder, G., Bailenson, J.N., Wisniewski, P., Welch, G.F., (2022). The advantages of virtual dogs over virtual people: Using augmented reality to provide social support in stressful situations. *International Journal of Human-Computer Studies*, *165*, doi: 10.1016/j.ijhcs.2022.102838

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