Computers in Human Behavior 57 (2016) 75–81

Contents lists available at ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Full length article

Are you convinced? A Wizard of Oz study to test emotional vs. rational persuasion strategies in dialogues

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ARTICLE INFO

Article history:
Received 30 September 2015
Received in revised form
23 November 2015
Accepted 2 December 2015
Available online 20 December 2015

Keywords:
Persuasion
Wizard of Oz
Dialogue
Emotional
Rational

ABSTRACT

This research explores ideal methods of persuasion through computer-mediated dialogue. We attempt to identify which persuasive strategy is most successful. We designed a Wizard of Oz laboratory experiment, where participants interact with a human wizard via a custom-developed web-based chat interface. The wizard attempted to persuade participants to learn more about Tai Chi using the following persuasive strategies: Emotional Positive, Emotional Negative, Rational Positive, and Rational Negative. Based on the results of the pre- and post-chat questionnaire, participants' interest in learning Tai Chi was significantly greater after completing the dialogue and 69% percent of the participants printed a flyer to receive more information. Furthermore, conversations using the Emotional Positive strategies resulted in more successful persuasion than rational ones. The results of our study suggest that Emotional Positive strategies may be the most effective. We also suggest successful strategies as a design guideline for autonomous dialogue systems for persuasion.

1. Introduction

Persuasion is ubiquitous in human interactions. For example: a doctor trying to persuade a patient to take her medication, a political candidate attempting to persuade voters, or a friend trying to persuade another as to which movie should win the Oscar. Persuasion in computer-mediated interaction involves different techniques than persuasion in face-to-face interaction (Wilson, 2003).

Captology, the study of computers as persuasive technologies, has received special attention within the Human-Computer Interaction community since the mid-90s (Fogg, 1997). Fogg (1998) defines a persuasive system as an "interactive technology that changes a person's attitudes or behaviors." Researchers have examined persuasive technologies to help people make healthy lifestyle decisions (Kallehave, Skov, & Tiainen, 2011; Mazzotta & de Rosis, 2006; Mazzotta, de Rosis, & Carofiglio, 2007), such as convincing people to take their medicine, reduce their alcoholic intake, or exercise more. Schulman and Bickmore (2009) found that participants had a more positive attitude towards exercising after engaging in a dialogue with a computer agent. Purpura, Schwanda, Williams, Stubler, and Sengers (2011) discuss the benefits, challenges and ethics of using persuasive technologies to encourage people to make healthy life choices.

There are different strategies that can be used to persuade people to do something they otherwise may not have done, such as positive, negative, rational, and emotional arguments (Mazzotta & de Rosis, 2006; Mazzotta et al., 2007; Wilson, 2003). While some studies have separated the four strategies (Wilson, 2003), others have grouped them together with emotional and rational arguments containing both positive and negative statements (Mazzotta & de Rosis, 2006; Mazzotta et al., 2007).

The use of Wizard of Oz studies to understand dialogue is fairly widespread (Munteanu & Boldea, 2000; Webb, Benyon, Bradley, Hansen, & Mival, 2010). Bradley, Benyon, Mival, and Webb (2010) found that dialogues do not differ significantly whether the participants know if they are chatting with a person or a machine.

The goal of this research is to explore the use of these different persuasion strategies in a computer-mediated environment with the goal to (a) understand persuasion strategies that may result in a better outcome for the persuader –that is, the interlocutor does what the Wizard persuades them to do; and (b) produce recommendations for designers of automatic dialogue systems for persuasion purposes.

Dahlback, Jonsson, and Ahrenberg (1993) argue that one way of achieving user-friendly dialogue systems is by performing a Wizard

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http://dx.doi.org/10.1016/j.chb.2015.12.011
0747-5632/

of Oz study first. In a Wizard of Oz study, instead of a dialogue system chatting with a human, a "Wizard" is hidden in another room and pretending to be the dialogue system. These techniques can enhance our understanding of human-computer dialogue in a hypothetically fully implemented dialogue system (Fraser & Gilbert, 1991).

In this study, we use a Wizard of Oz setup to examine different persuasive strategies and how they influence the behavior of the participants. We measure persuasion both using self-assessments of the participants and by measuring participants' actions.

2. Related work

2.1. Persuasion strategies

Miceli, de Rosis, and Poggi (2011) define persuasion as "an agent P's intention to modify, through communication, R's beliefs or their strength, as a means for P's superordinate goal to have R freely generate, activate or increase the strength of a certain goal q and, as a consequence, to generate an intention p instrumental to q, and possibly to have R pursue p; but the minimal condition is that R has that intention." In other words, persuasion can be defined as one's intention to modify another's beliefs through communication, and possibly to cause one to modify their behaviors in pursuit of this goal. Persuasion occurs in a dialogue when one party tries to convince another party "to act or believe in some desired way" (Young, Martell, Anand, Ortiz, & Gilbert, 2011).

Factors that influence the success of persuasive interaction can range from the attractiveness of the persuader (Reinhard, Messner, & Sporer, 2006) to the valence and intensity of emotional content in the interaction i.e., negative and positive emotions (Kopelman, Rosette, & Thompson, 2006; Nabi, 2002; Rosselli, Skelly, & Mackie, 1995). However, technology-mediated dialogues cannot always mimic all the modalities necessary to replicate what occurs in a face-to-face dialogue. In particular, this inclusion of emotional components in dialogue has been taken up by previous research on persuasive technologies. For example, Marsella and Gratch (2002) built a virtual agent that used emotional arguments to help people cope with distress. Their argument is a cognitive one: that emotion focused strategies can help alter individual beliefs. For example, an individual may alter her beliefs about a goal that was previously considered stressful.

Wilson (2003) discusses four different persuasive strategies: a reward strategy, a punishment strategy, a logic strategy, and an emotion strategy. A reward strategy is where the message contains a positive outcome, while in a punishment strategy the message contains a negative outcome. A logic and emotional strategy provides rational and non-rational messages, respectively. Gilbert (1995) defines an emotional strategy as "one in which the feelings being communicated by the participants are more important than the words being used to communicate those feelings." On valence, Levin, Schneider, and Gaeth (1998) proposes that positive framing in negotiations highlights positive consequences for the interlocutor and conversely, negative strategies highlight negative consequences for the interlocutor. Kopelman et al. (2006) mixes both rationality and valence and differentiates between positive emotional strategies that leave the other party "feeling good" and negative emotional strategies that "employ negative reinforcement (threats)." Wilson (2003) found that for computer-mediated communication, positive reinforcement, or the reward strategy —as he calls it—worked best to persuade people, as measured by self-reports of the participants, followed by the punishment strategy and logic strategy, with the emotion strategy as the worst strategy. While in a face-to-face environment the emotion strategy was the best, followed by logic, reward, and punishment.

While Wilson (2003) found that the emotional strategy was the worst strategy for persuasive strategies via computer-mediated communication, other researchers have found this to be the ideal strategy (Mazzotta & de Rosis, 2006; Mazzotta et al., 2007). Mazzotta and de Rosis (2006) collected a corpus of persuasive messages and categorized them into rational versus emotional and positive versus negative. They framed the scenarios into positive and negative information. Positive included "eating fruits and vegetables is good for health," while negative included "eliminating fruits and vegetables from diet may have detrimental effects on your health." Rational statements discussed the positive or negative effects of a diet rich or poor in vegetables. Emotional responses were categorized as statements that would appeal to someone's emotions, such as telling them "you are a clever cook." With this data, they created videos of pairs of virtual agents talking to each other and asked a new set of participants to choose the scenario that would have worked the best on them. The results of their study found that Emotional Positive dialogues were the most persuasive. Positive arguments were preferred to negative ones and emotional strategies were more frequent than rational ones.

Based on the previous literature, while positive persuasive strategies appear to be more successful than negative strategies, the benefits of emotional versus rational are unclear.

2.2. Rational and emotional arguments

Aristotle's *Rhetoric* (1954) discusses how to gain an audience on your side through *Ethos*, *Pathos*, and *Logos*. While *Ethos* pertains to the credibility of the presenter, *Pathos* appeals to human emotions, and *Logos* is the logical appeal.

Holtgraves (2015) has done research on more rational (cognitive) and emotional (affective) rhetoric and its effect on people. In one study, Holtgraves (2015) framed statements as cognitive or affective. He asked students to report "what [they] think about [themselves]" vs. "what [they] feel about [themselves]". In this study, the manipulation that changed a statement was simply the change in one word: "think" for "feel". He found that reported thoughts about the self were more negative when the question was framed affectively (feel). This kind of manipulations are common in the literature of persuasion (c.f. Mayer and Tormala, 2010). However, emotions have a large influence on human behavior (Marsella & Gratch, 2002). Appealing to emotions has been shown to be an effective approach to persuasion in different lines of research. In advertising, Heath, Brandt, and Nairn (2006) found that emotional content can influence brand favorability better than rational. Political researchers found that appealing to people's emotions can impact voting behaviors (Brader, 2005), and in fact, there is a well-known quote, "In politics, when reason and emotion collide, emotion invariably wins" (Westen, 2007).

While managers tend to use rational arguments when implementing organizational changes, applying emotional elements would be more successful (Fox, Amichai-Hamburger, & Evans, 2001). Emotional Strategies do not necessarily refer to irrational ones (Miceli, de Rosis, & Poggi, 2006). Using emotional strategies for persuasion can be an effective way to convince people to do something they otherwise may not have done.

2.3. Hypothesis

There are different methods of persuasion such as Emotional Positive, Rational Positive, Emotional Negative, and Rational Negative. Previous literature has shown that positive strategies are more effective than negative ones (Mazzotta & de Rosis, 2006; Wilson, 2003). However, there is debate within the literature about whether rational or emotional persuasion is more effective in