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The effect of behavioral synchrony with black or white virtual agents on outgroup trust

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ABSTRACT

Trust toward outgroup members is generally lower than it is toward ingroup members. Behavioral synchrony with virtual outgroup characters has been identified as a means of improving attitudes toward racial outgroup members, but this effect has not been tested for outgroup trust. We tested the effect of synchrony with an ingroup/outgroup virtual agent on a behavioral measure of outgroup trust. An experiment used an online economic game to obtain pretest and posttest measures of trust. In between these measures, participants played a dance video game on Xbox Kinect. They were randomly assigned to either an ingroup or outgroup agent (black or white) partner. Game score served as a continuous measure of synchrony with the agent. Regression analysis revealed that agent race moderated synchrony's effect on change in outgroup trust. Increased synchrony with an outgroup agent led to increased outgroup trust. Conversely, increased synchrony with an ingroup agent led to decreased outgroup trust. Findings are discussed with respect to implications for using virtual interactions to build outgroup trust in the real world.

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Trust in other individuals is essential to human progress, as it facilitates cooperation. Several factors determine cooperative behavior, including the human bias to affiliate with members of one's ingroup and to distrust outsiders (Seyfarth & Cheney, 2013). An *ingroup* is a cohesive unit consisting of members who share, for example, similar values, beliefs, or racial backgrounds, while all other groups are referred to as that person's *outgroups*. The innate tendency to trust members of one's ingroup has developed in humans through the course of evolution (Fiske, 2000). When our ancestors did not function as a unit with their ingroup, chances of surviving were diminished (Bateson, 2000). Group members who engaged in joint action stood a better chance of survival than those who did not.

The evolutionary benefits of cooperating with an ingroup are sometimes mirrored by a distrustful bias toward the outgroup (Brewer, 1999; Glaeser, Laibson, Scheinkman, & Soutter, 2000). This bias entails negative outcomes like dehumanization (Haslam, 2006), prejudice, and stereotyping behavior (Fiske, 2000) toward outgroup members. Given the need in our society for people to interact and cooperate with those outside their ingroup, overcoming the innate distrust toward outgroup members is an important concern. This study details a potential means for reducing outgroup distrust. Specifically, we present an intervention designed to test whether coordinated interactions with virtual outgroup agents in a video game can facilitate real-world trust in outgroup members.

1. Virtual interventions to improve outgroup trust

Interventions based on commonly used theoretical mechanisms related to outgroup affiliation (such as the contact hypothesis, Allport, 1954) require people to interact with outgroup members face-to-face under specific conditions (e.g., equal status and a common goal). This might be seen as the ideal setting to overcome outgroup bias and prejudice. Practically speaking, however, opportunities for sustained face-to-face interaction with outgroup members can be infrequent, as most people show preference for interacting with ingroup members (Brewer, 1999), and tend to organize in segregated living areas that limit intergroup contact

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(Amir, 1969). This lack of interaction minimizes the potential to improve intergroup relationships suggested by contact theories. Because of this concern, researchers have investigated other means of reducing outgroup biases. For example, some researchers have examined how imagined interactions can increase outgroup trust (Vezzali, Capozza, Stathi, & Giovannini, 2012), because real encounters are hard to establish. Other researchers have tried to simulate more realistic encounters by having participants interact with virtual outgroup members (Hasler, Hirschberger, Shani-Sherman, & Friedman, 2014). Virtual platforms such as video games may serve as a convenient alternative to face-to-face intergroup contact due to their accessibility and ease of use. Further, the entertainment value of video games may draw players to situations where they find themselves interacting with outgroup members in virtual environments more so than daily life.

One mechanism that may reduce real-world outgroup bias in this context exploits a player's movement-based interactions with virtual outgroup characters. This mechanism, which we refer to as *behavioral synchrony*, is the phenomenon whereby people perform behaviors matched together in time with another entity's movements (Hove & Risen, 2009). This type of synchrony creates a sense of unity that potentially lays the ground for affiliative outcomes such as trust. In the following sections, we explain the concept of behavioral synchrony and its ability to improve affiliative outcomes (including trust). Then, using a motion-sensing dance game for the Xbox 360 Kinect, we examine whether the effect of behavioral synchrony on racial/ethnic outgroup trust will be further strengthened if one's interaction partner specifically belongs to an outgroup. Finally, the findings of our study are discussed with respect to implications for using virtual interactions to build outgroup trust.

2. Behavioral synchrony and affiliative outcomes

Foundational research on the connection between shared movements and affiliation stems from LaFrance (1979), who demonstrated that postural mirroring between students and their professors led to improved rapport between the two groups. These researchers measured what is now known as mimicry, the nonconscious mirroring of movements by people in an interaction (Chartrand & Bargh, 1999). While synchrony and mimicry differ in the degree of simultaneity of the interactions (e.g., synchronous actions are closer to simultaneous than mimicked actions), much of the research on these two concepts shows that they have similar prosocial outcomes, such as cooperation (e.g., Wiltermuth & Heath, 2009) and trust (e.g., Maddux, Mullen, & Galinsky, 2008). The present study focuses on trust, which we define as the degree of confidence one party places in another to behave in a way that provides desired outcomes (Kee & Knox, 1970).

Evolutionary logic may be used to explain why synchrony affects trust. Namely, the evolutionary function of synchronized behavior was to identify weak links, or “free riders” in the social group. Those who could not coordinate their behaviors with the group were likely to be liabilities to group goals (Wiltermuth & Heath, 2009). In line with this evolutionary account, such coordination of behaviors among individuals has been referred to as a means of social survival (Chartrand, Maddux, & Lakin, 2005), meaning that synchronized behavior facilitates feelings of similarity and affiliation crucial to thriving in a social environment.

Alternatively, the role of synchrony in facilitating affiliative outcomes may be explained from a neurological perspective. The reduction of the self-other boundary that occurs during behavioral synchrony can be demonstrated by a neurological phenomenon known as the perception-behavior link. This is a mental action whereby people perceive a particular behavior performed by another, and subsequently prepare to perform the same behavior (Chartrand & Bargh, 1999). Perceiving a behavior activates mental representations of that behavior in memory, which then automatically increases our chances of performing that same behavior (Chartrand et al., 2005). The link between one's perceptions of another's behavior and that person's performance of the same behavior is responsible for the feelings of similarity that develop between these individuals. These feelings of similarity ultimately lead to positive outcomes like interpersonal trust (Brewer, 1999).

Besides improving trust towards the person with whom one synchronizes, shared movements can increase affiliative behaviors even toward people not involved in the original synchronized interaction. One study demonstrated that participants who were mimicked by a confederate were more likely to assist individuals with whom they had never interacted (van Baaren, Holland, Kawakami, & van Knippenberg, 2004). Other studies have shown that positive effects of synchrony with an individual can generalize to whole groups (Reddish, Bulbulia, & Fischer, 2013), even if those people are members of an outgroup (Inzlicht, Gutsell, & Legault, 2012). Based on these findings, one can expect behavioral synchrony to improve both ingroup and outgroup trust.

3. Virtual synchrony's distinct effect on outgroup trust

Recent studies have shown that the effect of behavioral synchrony on attitudes toward outgroup members can be particularly strong if the partner with whom one synchronizes belongs to a racial/ethnic outgroup (Inzlicht et al., 2012). However, as stated above, opportunities for this effect to take place in real world settings are limited, leaving researchers to examine whether interactions with virtual outgroup characters can facilitate trust (Hasler et al., 2014).

Logic from the media equation (Reeves & Nass, 1996) asserts that people interact with virtual entities much in the same way they interact with real humans. Consistent with this logic, synchronizing with virtual agents (characters controlled by a computer) and avatars (characters controlled by the player) can elicit the same prosocial outcomes as synchrony with real people. For example, a recent study (Peck, Seinfeld, Aglioti, & Slater, 2013) showed that embodying a dark-skinned avatar in a virtual world, compared with a light-skinned or purple-skinned avatar, reduced implicit racial bias toward African-Americans. Notably, although this study focused on embodiment, participants' full-body avatars were synchronized with their body movements, suggesting the potential role of synchrony in this effect.

Behavioral synchrony with an outgroup virtual avatar has also been found to improve empathy toward that outgroup. For example, in a study by Hasler et al. (2014), Israeli college students interacted with a Palestinian virtual avatar who either mimicked or counter-mimicked (i.e., performed the opposite movements of) participant movements. Those in the mimicry condition subsequently showed higher empathy toward Palestinians. In each of these studies, the participant synchronized with an outgroup avatar, which led to positive attitudes toward outgroups. Although these studies made valuable contributions to establishing the role of synchrony in reducing outgroup biases, they were carried out on virtual platforms specially tailored for their studies, thus lacking external validity for testing virtual intervention. The current study uses the Xbox Kinect, a widely used platform, to build a virtual intervention to improve outgroup trust.

Aside from the Kinect's ease of use and availability, our study design offers other advantages for research in this area. First, whereas prior studies (Hasler et al., 2014; Peck et al., 2013) have featured a virtual *avatar* that mimics the movement of the player, our study's use of the Kinect allows us to observe the effects of

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