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## Virtual imposters: Responses to avatars that do not look like their controllers

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We used ostracism as a platform to study anti-social behavior, and manipulated ostracizers' avatars digitally to be either physically similar or dissimilar to the ostracizers. In Experiment 1 participants were more aggressive toward ostracizers with disguised, as compared to revealed, identities. In Experiment 2 participants were more aggressive toward ostracizers who had chosen, as compared to been assigned, disguised identities. Experiment 3 added an inclusion condition which revealed that, while volition (choosing versus being assigned) identity disguise does affect how participants respond to anti-social behavior, it does not affect how participants respond to neutral behavior. We discuss the theoretical and applied implications of identity manipulation in virtual and physical worlds.

**Keywords:** Avatar; Identity; Imposter; Accountability; Disguise; Aggression; Identifiability.

The norm that individuals should truthfully portray themselves to others (Goffman, 1959) is frequently violated in computer-mediated interactions. Even in the early days of the Internet scholars told of rapes in cyberspace

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where one individual would take on the identities of others to commit virtual crimes (Dibbell, 1994). Today, crime reports warn of the ease of identity disguise and the associated dangers. For example, sexual predators use computer code names to disguise their real identities and pretend to be the same age as their juvenile victims (State of New Jersey Commission of Investigation & Attorney General of New Jersey, 2000). In another instance a perpetrator used created email addresses to send sexually explicit or derogatory messages under the cover of senior corporate executives (Howell, 2004). Does the fact that these individuals disguised their identities while committing these acts make their actions even more despicable? This research examines that question.

## LITERATURE REVIEW

### Identity disguise

When an individual disguises his identity he prohibits others from correctly linking his behavior with his identity. An individual may disguise his true identity by representing himself as an imposter. Christophe Rocancourt, for example, masqueraded as a French member of the Rockefeller family for several years before his true identity was revealed (Newman, 2003). An individual may also disguise her identity by representing herself as a fictional other. Pioneering scholars of computer-mediated interactions predicted that identity disguise would be a prevalent phenomenon in computer-mediated interactions (Donath, 1999; Turkle, 1997). In fact, Lori Drew from Missouri began one of the most famous online identity disguise cases when she represented herself as a fictional teenage boy on MySpace, tormenting a child who was also on MySpace until the child committed suicide (Steinhauer, 2008). The prevalence of identity disguise in computer-mediated environments is at odds with the documented human expectation that when others represent themselves with human-like avatars they will behave credibly (Nowak & Rauh, 2008).

### *The effect of identity disguise on behavior and social responses*

*Behavior.* When humans are identifiable they feel constrained to behave in socially acceptable ways because they know that the things they do and say can be attributed to them. For example, identified individuals will contribute more in group tasks (Williams, Harkins, & Latané, 1981) and negotiate fairer outcomes (Kramer, Pommerenke, & Newton, 1993) than individuals who cannot be identified. However, in some social contexts (Lea & Spears, 1991) when a person's identity is disguised it becomes more likely that he will behave anti-socially. Zimbardo (1969) asked participants

to either wear identifying name tags or to conceal their identity with lab coats and hoods. All participants were given a sanctioned opportunity to electrically shock another individual. The participants wearing lab coats and hoods administered significantly longer shocks than participants wearing name tags. Other research reveals that participants with disguised identities are more likely to act aggressively (Donnerstein, Donnerstein, Simon, & Ditrachs, 1972; Ellison, Govern, Petri, & Figler, 1995; Rehm, Steinleitner, & Lilli, 1987) and violently (Silke, 2003) than those individuals with revealed identities.

Scholars believe that identity disguise leads to similar effects in computer-mediated contexts (Suler, 2004). Research indicates that the anonymity of computer-mediated interactions gives people the confidence to engage in bullying. Several cyber-bullies reported they would not bully people in face-to-face interactions where they could be identified and held accountable (Kowalski, Limber, & Agatston, 2011). As Wesselmann and Williams (2011) review, identity disguise in online interactions might lead to uninhibited behavior such as insulting others (Sroull & Kiesler, 1986), sexual harassment (Barak, 2005), cyber bullying (Kowalski & Limber, 2007), or hatred (Coffey & Woolworth, 2004). Ostracism, as suggested by Wesselmann and Williams (2011), is another form of uninhibited behavior that should be examined in the context of identity disguise.

*Social responses.* The identity disguise research reviewed above is conducted from the perspective of the disguised individual (e.g., Why do disguised individuals behave differently than individuals whose identities are not disguised?). However considerably less research focuses on the other side of this social interaction; that is, how are disguised individuals perceived or responded to differently than individuals whose identities are revealed? Some research suggests that identity-disguised actors are perceived and responded to differently than identity-revealed actors. For example, in one study (Rains, 2007a) participants were asked to participate in a computer-mediated group discussion about an ethical dilemma. Participants engaged in computer-mediated group discussions where all group members were either anonymous or identifiable. Afterwards, participants were asked to rate the credibility and influence of the other group members' contributions. Anonymous group members were perceived as less credible and less influential than identified group members. Rains (2007a) reasoned that anonymity may have led members to question the quality of contributions and motives of other group members, resulting in negative perceptions.

Other scholars have shown that identity disguise among animals elicits aggressive responses. Tibbetts and Dale (2004) manipulated and misrepresented the natural facial patterns of wasps; some of the subordinate wasps

were painted with the facial patterns of dominant wasps while others were left with their natural facial patterns. The wasps were then placed in staged conflicts with other unfamiliar wasps. Subordinate wasps who were experimentally manipulated to look like dominant wasps received considerably more aggression from dominant wasps than those wasps whose subordinate identities were not manipulated. Rohwer (1977) conducted a similar study with sparrows. The scholars hypothesized that the wasps and sparrows responded aggressively in order to impose a social cost on the imposters for their attempt to falsely portray themselves. However, there are few data about how humans respond to identity disguised others in anti-social interactions.

### OVERVIEW OF THE RESEARCH

Our first goal was to explore how participants would respond to anti-social behavior when the actor was represented by an avatar that either looked like the actor (identity revealed) or did not look like the actor (identity disguised; Experiment 1). Second, we wanted to explore how the actor's volition in his or her identifiability might affect responses to unidentifiable anti-social actors (Experiment 2). Finally we examined how responses to volition in identifiability might vary in anti-social and neutral contexts (Experiment 3).

An immersive virtual reality version of Cyberball, a stimulus originally developed by Williams and colleagues to induce feelings of ostracism (Williams, Cheung, & Choi, 2000; Williams & Jarvis, 2006), was designed to provide a platform for anti-social behavior (exclusion from the ball-tossing game) and neutral behavior (inclusion in the ball-tossing game). The experimenter led participants to believe that they were participating in a visualization study where they would toss a ball with two other avatars controlled by other participants in nearby locations (see Williams et al., 2000, for more information on this cover story). The avatars were actually controlled by computer algorithms.

Following Cyberball, participants were given the opportunity to aggress against the confederates. To measure aggression we utilized a hot sauce allocation measure (Lieberman, Solomon, Greenberg, & McGregor, 1999) used in other ostracism studies (Warburton, Williams, & Cairns, 2006). This dependent variable was chosen because research suggests that individuals may aggress against others to restore a generalized sense of personal power or control over others (Frieze & Boneva, 2001; Mueller, 1983).

### EXPERIMENT 1: IDENTIFIABILITY OF ANTI-SOCIAL ACTORS

All participants were excluded during the ball-tossing game, and we manipulated the information participants were given about the identifiability of the other ball-toss participants. Half of the participants were told

that the other ball-tossers were represented by virtual humans that physically resembled their controllers (identity revealed), while the other half of the participants were told that the other ball-tossers were represented by virtual humans that did not physically resemble their controllers (identity disguised). We hypothesized, in accordance with Rohwer (1977) and Tibbetts and Dale (2004), that participants would aggress more strongly against ostracizers who were represented by avatars that did not resemble their physical selves (identity disguised) than ostracizers who were represented by avatars that resembled their physical selves (identity revealed).

## Method

### *Sample*

A sample was recruited from the student body of a West Coast university and community college. Three participants were dropped from the initial sample ( $N = 23$ ) due to technical failure during the experiment (1) or because they guessed the purpose of the study (2). The final sample ( $N = 20$ ) consisted of 7 males and 13 females.

### *Design*

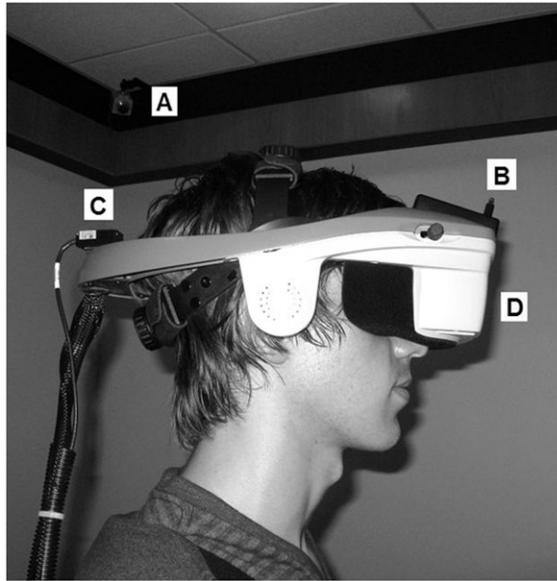
A two-condition, between-participants design was employed. Participants were randomly assigned to the identity revealed ( $n = 10$ ) or identity disguised ( $n = 10$ ) condition.

### *Stimulus*

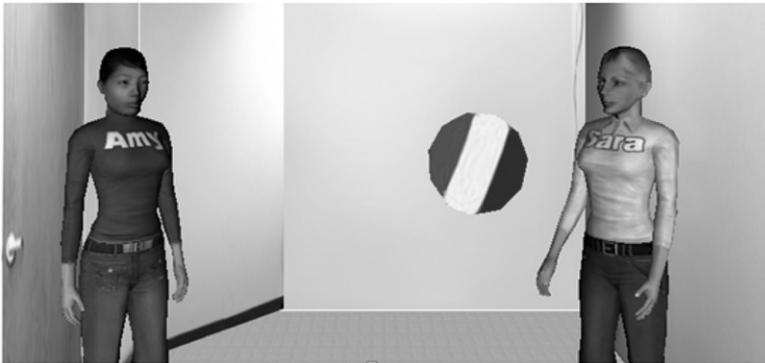
Participants were immersed in the immersive virtual reality version of Cyberball using the equipment described below (Figure 1). Each participant received 2 out of 40 total ball-tosses.

### *Apparatus and materials*

Each participant wore a head-mounted display (HMD, Figure 1) through which they saw the immersive, three-dimensional stimulus (Figure 2). The HMD was an nVisor SX. The display presented a visual field subtending approximately  $50^\circ$  horizontally by  $38^\circ$  vertically. Stereoscopic images were rendered by a 1900 MHz Pentium computer. Sensing equipment tracked users' motions (e.g., walking, turning their heads) so that a realistic visual depiction of the environment could be updated constantly based on the participants' movements and viewpoints. Participants' head movements were tracked by a three-axis orientation sensing system which continuously updated the simulated viewpoint. The position of the participant along

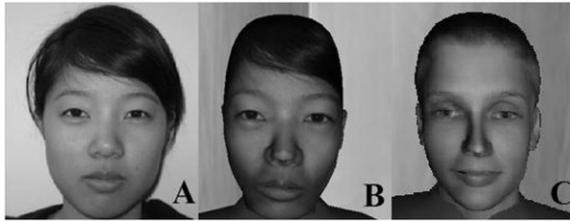


**Figure 1.** The set-up of the immersive virtual environment. Cameras at the corners of the room (A) track the position of an infrared light (B) on the HMD to determine where the participant is located in X, Y, Z space while the Intersense orientation device (C) assesses the rotation of the participant's head. These data are then transmitted to the rendering computer, which recreates the image of the room based on the tracking data stereoscopically on the HMD's screens (D).



**Figure 2.** An image from the participant's perspective inside the immersive, virtual reality version of Cyberball.

the X, Y, and Z planes was tracked via an optical tracking system. The system latency, or delay between the participant's movement and the resulting update in the HMD, was no greater than 45 milliseconds. Vizard 3.0 software was used to assimilate tracking and rendering. For



**Figure 3.** A photograph of one of the confederates (A) and the corresponding three-dimensional head that represented her in the identity revealed (B) and identity disguised (C) conditions.

more information on the technology in this lab please visit: <http://vhil.stanford.edu/tour/>

Five research assistants served as sex-matched confederates, one assisting per experimental session. Participants were informed that the confederate was one of the other participants in the ball-tossing game, physically located in a room down the hall. Each confederate's digital photographs were uploaded to a computer and modeled into a three-dimensional representation of the confederate's head using 3DMeNow software (Figure 3). The model of the confederate's head was loaded into the Cyberball world and attached to a generic body of the appropriate sex using Vizard 3.0 software. In the identity-revealed condition this virtual human stood to the participant's left, and a sex-matched, average attractive (as previously rated in a pre-test) virtual human that supposedly resembled the third participant in the study stood to the participant's right (Figure 2). In the identity-disguised condition sex-matched, average attractive virtual humans stood to the left and right of the participant.

### *Procedure*

All participants were recruited for a 1-hour session that would consist of two supposedly separate studies: a ball-tossing study and a taste-testing study. Upon arriving in the lab, participants completed a consent form and a short demographic survey.

*Ball-tossing study.* The participant was instructed that the ball-tossing game was a mental visualization task and that toss performance was not important (based on instructions delivered by Zadro, Williams, & Richardson, 2004).

In the identity-revealed condition the experimenter announced that the virtual human to the participant's left would look like and be controlled by another individual participating in the same study in a room down the hall.

The virtual human to the participant's right would look like and be controlled by another individual participating in the same study at another department.

In the identity-disguised condition the experimenter announced that the virtual human to the participant's left would be controlled by an individual participating from a room down the hall but would not resemble the controller. The virtual human to the participant's right would be controlled by another individual participating from another department across campus and would also not resemble its controller.

The experimenter did not inform the participant how he or she would be represented in the ball-tossing game. The participant put on the HMD and the Cyberball stimulus began. Afterwards the participant completed a filler questionnaire about mental visualization.

*Taste-testing study.* Participants were informed that this study was designed to explore the relationship between personality and food preferences. In reality this allowed the experimenter to administer a hot sauce allocation task that would measure the participant's post-ostracism aggression toward the confederate (Lieberman et al., 1999). The confederate joined the participant in the main lab to receive instructions about the study and then returned to the other room. The participant then tasted a food sample (three plain crackers) which was supposedly allocated by the confederate. The participant was asked to consume and evaluate the crackers.

Next the participant drew a slip of paper from a hat which always read, "Category 5: Hot and Spicy". The participant was presented with a small bowl of hot sauce, an empty cup, and the confederate's taste preference inventory. The participant was informed the confederate would be required to consume the entire sample. Participants read the confederate's taste preference inventory (which revealed that the confederate strongly disliked hot and spicy foods) before allocating the sample. The sample was weighed on a digital scale.

#### *Measure: Hot sauce*

Larger amounts of hot sauce were expected to represent greater aggression toward the confederate (Lieberman et al., 1999). Participants administered between .16 and 13.65 grams of hot sauce ( $M=5.02$ ,  $SD=4.12$ ).

#### *Manipulation check*

After the experiment each participant was asked to rate how similar the virtual human on the left and the confederate appeared on a scale of 1 ("not

at all similar”) to 5 (“extremely similar”); participants’ scores varied from 1 to 5. An independent samples *t*-test,  $t(15) = -3.27$ ,  $p < .005$ , confirmed that participants in the identity-revealed condition rated the confederate and virtual human as more similar ( $M = 3.11$ ,  $SD = .33$ ) than participants in the identity-disguised condition ( $M = 2.13$ ,  $SD = .84$ ).

## Results and discussion

To test our prediction we utilized an independent samples *t*-test where identifiability served as the independent variable and hot sauce amount (grams) served as the dependent variable. In support of our hypothesis the *t*-test revealed a significant effect of identifiability on hot sauce allocation,  $t(18) = 2.88$ ,  $p = .01$ , partial  $\eta^2 = .32$ . Participants in the identity-disguised condition ( $M = 7.27$ ,  $SD = 4.39$ ) allocated significantly more hot sauce to the confederate than participants in the identity-revealed condition ( $M = 2.77$ ,  $SD = 2.29$ ). These results provide important initial evidence that individuals respond more aggressively toward identity-disguised others in anti-social interactions.

However, we wanted to further understand what attributes of identity-disguised interactions might exacerbate or reduce aggressive responses to the identity-disguised actors. Rains (2007b) reasoned that the voluntary use of anonymity should reveal that the actor is making a conscious attempt to conceal his identity to protect himself and avoid retribution or embarrassment. Conversely, Rains reasoned, in the case where anonymity is required perceivers have no reason to make that inference. Accordingly, we hypothesized that volition may affect how individuals respond to unidentifiable, anti-social actors.

## EXPERIMENT 2: VOLITION AND IDENTIFIABILITY

Experiment 2 explored how ostracizers’ volition in disguising their identities may affect how others respond to their anti-social behavior. All participants were informed that the other participants were controlling avatars that physically did not look like them. We manipulated what participants were told about the confederates’ volition in their identifiability; that is, whether the participant believed that the confederate had chosen or been assigned a physically dissimilar avatar. All participants were ostracized in the ball-tossing game.

We predicted that decreased identifiability in anti-social contexts may be perceived as more of an exacerbating factor when attributed to personal volition as compared to external constraints (i.e., interface design). Thus we hypothesized that participants would aggress more strongly against ostracizers who chose to use avatars that did not look like them (voluntary)

than ostracizers who were assigned avatars that did not look like them (involuntary).

## Method

### *Sample*

A sample was recruited from the student body of one West Coast university. Four participants were dropped from the initial sample ( $N=27$ ) due to technical failure. The final sample ( $N=23$ ) consisted of 6 males and 17 females.

### *Design*

A two condition, between-participants design was employed. Participants were randomly assigned to one of two conditions: involuntary identity disguise ( $n=11$ ) or voluntary identity disguise ( $n=12$ ).

### *Stimulus*

The stimulus from Experiment 1 was re-employed. Each participant received 2 out of 40 total ball-tosses.

### *Apparatus and materials*

The same immersive virtual reality technology from Experiment 1 was used for Experiment 2. A total of three different research assistants served as sex-matched confederates, one assisting per experimental session.

### *Procedure*

Experimental procedures were similar to Experiment 1 except where noted below.

*Ball-tossing study.* In the involuntary condition the experimenter informed the participant that the virtual human to the participant's left and right would be controlled by two individuals participating in the study from a room down the hall and a room across campus, and that these individuals had no control over what their virtual humans would look like.

In the voluntary condition the experimenter informed the participant that the virtual human to the participant's left would be controlled by an individual participating in the study from a room down the hall and that person had the option to use a virtual human that was personalized to look like him or her. The experimenter pretended to check with the other experimenter down the hall, and then revealed that the second participant had chosen not to use the personalized virtual human and instead chose a

virtual human that physically did not look like him or her. The experimenter proceeded to repeat the explanation for the other virtual human to the participant's right. Participants were not informed how they would be represented in the virtual environment. Then each participant engaged in the Cyberball stimulus.

*Taste-testing study.* Participants then took part in the taste-testing study.

#### *Measure: Hot sauce*

Participants administered between 0.15 and 36.68 grams of hot sauce ( $M = 6.46$ ,  $SD = 9.34$ ). An examination of the grams of hot sauce allocated by the participants revealed an outlier (more than two standard deviations above the mean), and was trimmed down to two standard deviations above the mean (25.14 grams).

#### *Manipulation check*

At the conclusion of the experiment each participant was asked to rate how much choice the confederate had in selecting his or her avatar in the ball-tossing game ranging from 1 ("no choice at all") to 5 ("an extreme amount of choice"); participants' responses ranged from 1 to 5. An independent samples *t*-test,  $t(21) = -6.25$ ,  $p < .001$ , confirmed that participants in the voluntary condition rated their confederates as having significantly more choice ( $M = 3.50$ ,  $SD = 1.24$ ) than participants in the involuntary condition ( $M = 1.09$ ,  $SD = .30$ ).

## Results and discussion

In accordance with our hypothesis, a *t*-test revealed a significant effect of volition on hot sauce allocation,  $t(21) = -2.18$ ,  $p = .04$ , partial  $\eta^2 = .19$ . Participants in the voluntary condition ( $M = 10.17$ ,  $SD = 11.80$ ) allocated significantly more hot sauce than participants in the involuntary condition ( $M = 2.41$ ,  $SD = 2.12$ ). In short, these results provide evidence that volition may be one of the key mechanisms humans use in determining how they will respond to disguised actors.

Several shortcomings were identified in Experiments 1 and 2 which prompted further questions and clarification. It was unclear what participants assumed about their own identity representations in Cyberball. We did not offer participants information about their identity representations, and it is possible that their own assumptions created unnecessary noise in our results. Also, in Experiments 1 and 2 we did not include a control condition in which participants were not ostracized, but

rather included in the ball-tossing game. Including this condition would have provided a more thorough understanding of the effects of actor identifiability in anti-social (exclusion) and neutral (inclusion) interactions. Finally, neither experiment examines the causal mechanism for the difference in aggressive responses.

### EXPERIMENT 3: VOLITION AND NEUTRAL VERSUS ANTI-SOCIAL CONTEXTS

Experiment 3 was designed to address the shortcomings listed above. Again we employed the Cyberball stimulus and the hot sauce measure. We manipulated volition as it was manipulated in Experiment 2 and, in accordance with previous research on ostracism, participants were either included in the ball-tossing game or excluded from the ball-tossing game. Thus, we hypothesized an interaction between volition and level of inclusion such that aggressive responses toward disguised confederates would be elevated only when provoked through an anti-social behavior (i.e., ostracism).

Finally, in order to further understand what might be driving such differential responses to identifiability, we conducted a pilot study before Experiment 3 to engage participants in open-ended interview questions after the ostracism stimulus. Based on the insights gathered from the participants' responses and perceptions of the other ball-tossers, we developed and pre-tested a perceived accountability scale that was heavily based on work from Drechsel (1987). This measure was employed and recorded in Experiment 3 (see Appendix for the list of questions used in the measure). We hypothesized that perceived accountability of the other participants in the ball-tossing game would mediate the effect of volition and inclusion level on aggressive response.

## Method

### *Sample*

A sample was recruited from the student body of a West Coast university. Ten participants were dropped from the initial sample ( $N=66$ ) due to technical failure (3) or suspicion (7) about the purpose of the study. The final sample ( $N=56$ ) consisted of 25 males and 31 females.

### *Design*

A  $2 \times 2$ , between-participants design was employed. Participants were randomly assigned to one of four conditions: exclusion/involuntary ( $n=14$ ), exclusion/voluntary ( $n=14$ ), inclusion/involuntary ( $n=14$ ), or inclusion/voluntary ( $n=14$ ).

### *Stimulus*

The stimulus from Experiments 1 and 2 was re-employed, except that each participant in the inclusion conditions received approximately 13 of the 40 total ball-tosses.

### *Apparatus and materials*

The same immersive virtual reality technology was used for Experiment 3. A total of seven different research assistants served as sex-matched confederates, one assisting per experimental session. Participants were always informed that they would be interacting with virtual humans that did not look like their controllers.

### *Procedure*

The experimental procedures were similar to Experiment 2 except where noted below.

*Ball-tossing study.* We attempted to clarify what participants might assume about their avatar representation in the virtual world. We created a cover story describing that, based on random assignment, some participants would get to choose what they looked like in the virtual world and some participants would merely be assigned an avatar that would be modeled either to look like them or not look like them. With respect to the actual participant, the experimenter consulted a mock condition spreadsheet and always informed the participant that he or she would not be allowed to choose but would instead be assigned a virtual human that would be modeled using the participant's photographs and would look like him or her. Each participant then engaged in the immersive virtual reality Cyberball stimulus. Afterward, participants completed the perceived accountability scale.

*Taste testing study.* Participants then participated in the taste testing study.

### *Measures*

*Hot sauce.* Participants administered between .05 and 209.92 grams of hot sauce ( $M = 4.18$ ,  $SD = 5.60$ ). An examination of the grams of hot sauce allocated by the participants revealed four outliers, which were trimmed down to 2 standard deviations above the mean (15.38 grams).

*Perceived accountability.* The perceived accountability response scores were determined by calculating the mean of each participant's total score.

Lower scores on this scale represent greater perceived accountability in the other ball-tossing participants, and higher scores on this scale represent lower perceived accountability. Participants' perceived accountability ratings ranged from 2.2 to 5 ( $M=3.94$ ,  $SD=.79$ ) and the internal consistency of the scale was acceptable (Cronbach's  $\alpha = .83$ ).

### *Manipulation checks*

The experimenter conducted a manipulation check on perceived volition using the same scale described previously; responses ranged from 1 to 5. An independent samples  $t$ -test,  $t(53) = -9.92$ ,  $p < .001$ , confirmed the expected pattern; participants in the voluntary conditions rated the confederates as having significantly more choice in their avatars' appearance ( $M=3.07$ ,  $SD=1.11$ ) than participants in the involuntary conditions ( $M=1.00$ ,  $SD=.00$ ). Additionally, another manipulation check was conducted to determine whether participants in the ostracism conditions perceived receiving a significantly lower percentage of ball-tosses than participants in the inclusion conditions; responses ranged from 0% to 65%. An independent samples  $t$ -test,  $t(53) = -20.06$ ,  $p < .001$ , confirmed that participants in the ostracism conditions perceived receiving a lower percentage of the ball-tosses ( $M=6.02$ ,  $SD=3.15$ ) than participants in the inclusion conditions ( $M=39.26$ ,  $SD=8.16$ ).

## Results and discussion

### *Hot sauce weight*

We analyzed the amount of hot sauce that each participant allocated to the confederate in a two-way ANOVA where volition and inclusion level served as the two independent variables and hot sauce weight served as the dependent variable. The ANOVA revealed a significant effect of ostracism on hot sauce allocation,  $F(1, 52) = 9.39$ ,  $p < .01$ , partial  $\eta^2 = .15$ . Participants in the exclusion conditions ( $M=5.56$ ,  $SD=5.51$ ) allocated significantly more hot sauce to the confederate than participants in the inclusion conditions ( $M=2.25$ ,  $SD=3.18$ ). The main effect of volition on hot sauce allocation was not significant,  $F(1, 52) = 2.08$ ,  $p = .16$ , partial  $\eta^2 = .04$ . Additionally the ANOVA revealed a significant interaction effect of inclusion level and volition on hot sauce allocation,  $F(1, 52) = 12.82$ ,  $p < .01$ , partial  $\eta^2 = .20$ . In the exclusion conditions participants in the voluntary condition ( $M=8.28$ ,  $SD=5.63$ ) allocated significantly more hot sauce to the confederate than participants in the involuntary condition ( $M=2.83$ ,  $SD=3.93$ ), but this same difference was not detected among participants in the inclusion voluntary condition ( $M=1.10$ ,  $SD=1.16$ ) and the inclusion involuntary condition ( $M=3.39$ ,  $SD=4.10$ ).

### *Perceived accountability*

To test whether the different aggressive responses were driven by the participants' perceptions of the confederate's accountability, we entered perceived accountability into the ANOVA described above (Baron & Kenny, 1986). The perceived accountability factor did not emerge as significant,  $F(1, 49) = .20$ ,  $p < .66$ , partial  $\eta^2 < .01$ , and its entry into the model did not eliminate the effects of inclusion level,  $F(1, 49) = 6.96$ ,  $p = .01$ , partial  $\eta^2 = .12$ , or the inclusion level by volition interaction,  $F(1, 49) = 9.50$ ,  $p < .01$ , partial  $\eta^2 = .16$ . Perceived accountability was not found to mediate the effect of inclusion level and volition on aggressive response.

## GENERAL DISCUSSION

Overall these studies demonstrate strong differences in aggressive responses to identifiability as influenced by volition and context (anti-social versus neutral). In Experiment 1 participants in the unidentifiable condition made the confederate consume more than twice as much hot sauce as participants in the identifiable condition. In Experiment 2 participants in the voluntary condition made the confederate consume more than four times as much hot sauce as participants in the involuntary condition. And in Experiment 3 ostracized participants were again more aggressive toward ostracizers who had chosen identity disguise than those ostracizers who had been assigned identity disguise; however, participants in the inclusion conditions were not differentially aggressive toward the other ball-toss participants as based on volition.

### **Perceived accountability**

We proposed perceived accountability of the other ball-toss participants as a possible mechanism that would help explain the difference in the participants' aggressive responses. This difference in appraisal of the ostracizer's motivations may have led participants to sanction the ostracizers more heavily. This assessment would coincide with Johnson and Downing's argument that aggression toward identity manipulation "in many instances, could reflect a simple reduction in perceived negative sanctions" (1979, p. 1537). However, neither a complete nor partial mediation was detected in further analysis; this mechanism is preliminary and more work needs to be done to assess its ability to explain responses to identity disguised actors in anti-social contexts.

### **Virtual actions and physical responses**

Previous instances reveal that virtual behaviors may elicit not only virtual (Eastwick & Gardner, 2009) but physical world responses and punishments

as well. In 2005 a Chinese gamer stole a virtual “dragon sabre” from another player in the online game Legend of Mir 3. The victim responded by stabbing the gamer to death in the real world (BBC News, 2005). Thus we see that perceivers may have exceedingly strong physical world reactions to online interactions, and these reactions may be heightened when the actor chooses to virtually disguise his or her identity.

### Limitations and future directions

The relatively small number of participants in these studies is a limitation of this research. In addition we begin to explore but cannot confirm what mechanism might be operating in the relationship between identifiability and aggressive responses in anti-social interactions.

### CONCLUSION

The current studies provide a platform for investigating the effects of identity manipulation in avatar-based interactions. These results are interesting because, while identity manipulation is exponentially easier in computer-mediated environments, this research further shows that identity manipulation may still not be more widely expected or accepted in these contexts.

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## APPENDIX

1. To what extent do you think the other participants in the ball-tossing game felt sensitive to you for their actions?
  - Extremely sensitive
  - Very sensitive
  - Moderately sensitive
  - Slightly sensitive
  - Not at all sensitive
2. To what extent do you think the other participants in the ball-tossing game felt answerable to you for their actions?
  - Extremely answerable
  - Very answerable
  - Moderately answerable
  - Slightly answerable
  - Not at all answerable
3. To what extent do you think the other participants in the ball-tossing game were worried that you would misunderstand their actions?
  - Extremely worried
  - Very worried
  - Moderately worried
  - Slightly worried
  - Not at all worried
4. To what extent do you think the other participants in the ball-tossing game were responsive to general public expectations about ball-tossing?
  - Extremely responsive
  - Very responsive
  - Moderately responsive
  - Slightly responsive
  - Not at all responsive
5. To what extent do you think the other participants in the ball-tossing game felt responsible for the ramifications of their actions?
  - Extremely responsible
  - Very responsible
  - Moderately responsible
  - Slightly responsible
  - Not at all responsible