When Messages Matter More: The moderating effect of avatar presence on message cue processing in cross-cutting political discussion

THESIS

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By

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Abstract

Just as visual cues influence our face-to-face conversations and behavior during cross-cutting political discussions, visual cues in computer-mediated communication (CMC) are hypothesized to do the same. The research presented here assesses the impact of visual cues offered by avatars on credibility, willingness to engage in cross-cutting political discussion, and reevaluation of a counter-attitudinal political idea. A 2x3 experiment revealed that there were no significant differences in credibility ratings, willingness to engage in cross-cutting political conversation, and reevaluation between those who interacted with a avatar high in human realism, one low in human realism and no avatar. However, there was a significant interaction between the textual credibility of a message and the decision to reevaluate a counter attitudinal political idea when an avatar was present. These results indicate that when an avatar is present, cues to message credibility become more important in reevaluation. Implications for CMC cue processing and future research are discussed.
Dedication

This manuscript is dedicated to my friends and family.
Acknowledgments

I would like to acknowledge R. Kelly Garrett, Brandon Van Der Heide, Robert Hagen, and Alex Street: Without Kelly’s advice and guidance, Brandon’s help and encouragement, Rob’s perseverance with the technical aspects of this project, and Alex’s adept programming, this work would not have been possible. I humbly thank you for the time and dedication you have put into this project.
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Fields of Study

Major Field: Communication
Table of Contents

Abstract ...................................................................................................................... ii
Dedication .................................................................................................................. iii
Acknowledgments......................................................................................................... iv
Vita............................................................................................................................... v
List of Tables .............................................................................................................. vii
List of Figures............................................................................................................. viii
Introduction................................................................................................................ 1
Literature Review........................................................................................................ 3
Hypotheses.................................................................................................................. 9
Method......................................................................................................................... 14
Results......................................................................................................................... 22
Discussion..................................................................................................................... 27
References.................................................................................................................... 32
List of Tables

Table 1. Experimental Manipulation of Message Credibility…………………………..16
Table 2. Experimental Conditions...........................................................................18
Table 3. Multiple Regression Analysis for Variables Predicting Reevaluation........24
Table 4. The Moderating Effect of Avatar Presence on Textual Cues Resulting in
          Reevaluation..................................................................................................26
List of Figures

Figure 1. Experimental Manipulation of Visual Credibility.................................15
Introduction

This study examines how visual self-presentation in online spaces can influence the consequences of political talk. In face-to-face conversations subtle visual cues allow us to assume and deduce things about others, which in turn influences our behavior towards them (Afifi, 2007, Burgoon, Dunbar, & Segrin, 2002). Just as visual cues influence our face-to-face conversations and behavior, visual cues in computer-mediated communication (CMC) are hypothesized to do the same. The research presented here assesses the impact of visual cues on political discussion and its outcomes online.

An estimated 40% of U.S. adults use the internet to chat talk about politics and political issues online (Wojcieszak & Mutz, 2009), and there is evidence that characteristics of CMC have improved the quality of political discussion among individuals. Text-based CMC promotes exposure to diverse viewpoints and access to more discussion partners (Min, 2007, Ho and McLeod, 2008). Online political discussion also facilitates the increased expression of minority opinions and dissenting views as well as reduced perceived social cost for that dissent. (Postmes, Spears & Lea, 1998, Min, 2007, Ho & McLeod, 2008). This evidence highlights the value of text-based CMC in terms of political discussion: reduced cues and degrees of anonymity experienced in text-based political discussion alleviate some of the detrimental social-psychological factors that prevent discussion and some of the potentially biasing message perception in initial face-to-face interactions such as gender, race, or physical appearance (Min, 2007).
Central to this investigation is the fact that many CMC environments where people meet, socialize, and talk about politics are not purely text-based. Many also include a visual element, namely an avatar. Avatars—the virtual and often self-defined representation of an individual in an online environment—is the primary social cue in an avatar-based chat spaces. An avatar serves as a prominent social cue that people can use to make sense of each other before discussion takes place (Kim 2009, Lee 2004). This study investigates how the visual cues provided by avatars affect online political discussion both by influencing perceptions of source credibility, which has been shown to have an impact on people’s behavior as it relates to both willingness to engage in cross-cutting discussion and reevaluation of counter-attitudinal opinions, and how perceptions of credibility influence people’s behavior in virtual worlds.
Literature Review

*Exposure to counter-attitudinal political messages online*

Consideration of alternative political opinions is one of the hallmarks of civil engagement and political tolerance (Kim & Kim, 2008). However, in order to consider differing political points of view, a citizen must not only have exposure to counter-attitudinal opinions, but also have some understanding of the various arguments that serve as rationales for the opposing view (Mutz, 2002). Exposure to differing points of view is generally considered to be positive not only for democracies, but for personal growth and the understanding of one’s own political attitudes as well (Mutz, 2002). Cross-cutting political discussion—“conversations across lines of political difference” (Mutz & Mondack, 2006, p. 140) is linked to greater political tolerance, reevaluation of political viewpoints, and even attitude change (Williams, Nunn & St. Peter, 1976, Mutz, 2002).

Research has shown that people are most likely to take note of, and think about counter-attitudinal political opinions when they arise as a consequence of everyday political talk—situations in which political or controversial social issues suddenly spring up in an off-hand and casual way (Mutz, 2006, Kim & Kim, 2008). Not surprisingly, the same is true when it comes to everyday political talk online (Wojcieszak & Mutz, 2009). When considering exposure to counter-attitudinal political messages online, though, a distinction should be made between political and non-political discussion spaces:
There is sufficient evidence to show that most political talk that occurs online is centered in communities that revolve around politics directly or that are based on a commonality strongly correlated with political belief such as religion or ethnicity (Wojcieszak & Mutz, 2009). While the bulk of political discussion occurs in these places which can be described as being formed around a common identity (Sassenberg, 2002), the climate of political opinion amongst these communities is rather homogeneous. Political discussions in these spaces overwhelmingly center on agreement rather than disagreement, and there is less exposure to counter-attitudinal ideas (Wojcieszak & Mutz, 2009). However, online communities that have been characterized as common bond groups (Sassenberg, 2002) are the exception. It is in these communities that people are most likely to be exposed to counter-attitudinal political messages through incidental everyday talk. The online spaces that revolve around leisure activities, entertainment, and general socialization are made up of a more politically heterogeneous population, making them an environment where counter-attitudinal messages are most likely to be encountered (Wojcieszak and Mutz 2009). Virtual worlds, such as Second Life and World of Warcraft, tend to promote the creation of communities, and like other online discussion spaces, users of virtual worlds form common identity groups around political, religious, and social identities—a result of both in-world narrative structures and out-of-world belief systems (Boellstorff, 2008). However, much of the interaction that occurs in virtual worlds involves a wider context of leisure, entertainment, gaming, and socialization. Like the users of text-based communities centered on these non-political activities, users of virtual worlds who engage in everyday political talk have a unique
opportunity to be exposed to counter-attitudinal political viewpoints as a result of the size and heterogeneity of the user base.

*Credibility cues influence on political talk*

Evaluations of source credibility are important to face-to-face political discussions. This has been demonstrated clearly in the literature where source credibility evaluations are tied to physical appearance; research on visual credibility has shown that people are especially open to political messages from people who are seen as having a credible or attractive appearance (Lambert, 1972, Hickson, McCroskey, and Richmond, 2008). Individuals who are seen as having a credible appearance are also more successful in persuasion and compliance gaining (Burgoon, Dunbar, & Segrin, 2002, Affifi, 2007). Specifically, people who are rated as highly credible in appearance are more likely to get others to sign petitions, accept political literature (Darley & Cooper, 1972), and spur attitude change of previously held political attitudes (Burgoon, Dunbar, & Segrin, 2002).

The effect that visual cues presented by avatars have on attitude change itself is beyond the scope of this investigation, but the evidence that visual cues to credibility have an impact on a receiver’s willingness to discuss and reevaluate a counter-attitudinal political idea has consequences for political discussion in virtual worlds. Perceptions of source credibility in text-based chat environments are made with far fewer cues than what are available in avatar-based chat environments and face-to-face discussion, so it is likely that there is a credibility ‘blind spot’—the visual nondisclosure of the discussants—and that this accounts for some of the benefits of political discussion online. Physical
appearance cues to credibility in avatar-based chat environments may undercut this beneficial blind spot if an avatar is perceived as having low visual credibility—just as in face-to-face interaction.

Paralleling the real world, there is evidence that an avatar’s appearance may impact the perceived credibility of messages coming from it (Nowak & Rauh, 2005; Nowak & Rauh, 2008 Nowak & Rauh, 2009). Social information processing theory (SIPT) helps explain why this occurs (Walther, 1992; Walther & Burgoon, 1992). SIPT rejects the early assumption held by many researchers that text-based CMC is an impoverished medium devoid of social cues (Rice and Love, 1987). According to SIPT, although CMC offers fewer social cues than face-to-face interaction, users will compensate for the lack of visual information by adapting the available technology to relay social cues about themselves. In turn, they will also use the same conventions to reduce uncertainty about their interaction partners (Walther, 1996). In text-based CMC where there are no visual cues, SIPT stresses adaptive self-presentation and reliance on the social cues embedded the textual narrative in order to make judgments about the source. Both the meaning of the message and its presentation contribute to overall source evaluations and relational outcomes (Walther, 1996, Lo, 2008). As this adaptive process unfolds, the receiver engaging in text-based CMC will pick up on social cues that the sender may not even be aware of (Stephens, Houser & Cowan, 2009). Poor punctuation, heavy use of emoticons, internet slang, and so forth are textual credibility cues that receivers turn to in order to assess the credibility of the message, and can affect compliance gaining outcomes and attitudes toward the source (Stephens, Houser &
Cowan, 2009, Tormala, Brinol, & Petty, 2006). Although there is emerging evidence that textual cues to credibility are shifting and generational (Jesmer & Anderson, 2001, Stephens, Houser & Cowan, 2009), these cues form the basis on which users can judge the credibility of their interaction partner. For example, encountering terrible spelling might lead one to assume that their partner is uneducated, sloppy, or incompetent—cues to low credibility. An extensive and unusual vocabulary might form the impression of an educated partner, but it might also connote a snobbish individual.

These cue processing heuristics point to the fact that CMC users make judgments about their interaction partners based on the social cues they are presented with. When it comes to introducing avatars into political discussion, text cues and visual cues are interacting with each other—presumably in a way analogous to face-to-face dynamics. That raises the potential risk that visual cues could become more important than message content when assessing the source, introducing negative social psychological factors that are neatly avoided by text-based CMC. Of course, there is the potential benefit of greater conversational engagement if assessments of visual cues are positive and thus attributed to the interaction partner. Indeed, this is the way that perceptions of visual source credibility influence the outcomes of political discussions in face-to-face interactions.

Avatars as credibility cues

Avatars add a new dimension to traditional text-based chat, because not only do they increase the social presence of the interaction, they introduce visual cues that can also be used to make social judgments and reduce uncertainty about an interaction partner. It has already been shown how important credibility judgments based on visual
cues are to political discussion in face-to-face situations, the question becomes, how are avatars evaluated in terms of visual credibility? Visual expressions of identity via avatar are malleable (Boellstorff, 2008), and avatar creation engines allow for a large variety of self-representation to occur. Avatar customization options offer many possibilities, allowing users to appear not only as human, but also as animals (human-like or not), robots, inanimate objects, and even simple geometric shapes.

Previous research has shown that initial source evaluations of an avatar change dramatically depending on perceptions of the avatar’s level of human realism and androgyny (Nowak & Rauh, 2005; Nowak & Rauh, 2008 Nowak & Rauh, 2009). Realistic avatars that are gender-identifiable are consistently rated as more credible than less human looking, androgynous avatars, and the level of human realism of an avatar has been shown to boost ratings trustworthiness (Nowak & Rauh, 2005; Nowak & Rauh, 2008 Nowak & Rauh, 2009, Bente, Ruggenberg, Kramer, & Eschenburg, 2008). These findings are congruent with both face-to-face and virtual world studies that have examined the role that gender and human traits contribute to visual credibility assessments respectively (Widgery, 1974, Guadango, Blascovitch, Bailenson & McCall, 2007). Given the role that visual credibility plays in political discussion in the face-to-face context, the question whether visual cues presented by avatars have any impact on the outcome of political discussions should be examined in an environment where visual identity is created and instantly malleable.
Hypotheses

Previous research on visual credibility and cross-cutting political discussion allows for predictions to be made as to how specific visual cues will be interpreted in virtual worlds. Perceived source credibility based on appearance is an important factor in cross-cutting political discussion in the face-to-face context because it influences people’s behavior when confronted with a counter-attitudinal political view. Thus, it would be reasonable to expect that people will use the visual cues of the avatar to some extent in order to assess the credibility of the source in virtual worlds. In order to determine the relative importance people place on visual cues when making credibility judgments about those who disagree with them politically in virtual worlds, textual cues need to be presented alongside the visual. Combining visual and textual credibility cues allows for a distinct test of the idea that the temporal supremacy of visual cues influences source credibility judgments:

H1a: When visual cues are present, avatars with high human realism will have higher perceived source credibility than those exhibiting lower human realism.

H1b: Message credibility will influence perceived source credibility more in the absence of visual cues than when visual cues are present.
In the offline world, people are more willing to engage in cross-cutting conversation with visually credible communication partners (Darley & Cooper, 1972). This should hold in the virtual world as well. Thus, individuals presenting a high-credibility avatar and message are seen as more credible, and others are more likely to interact with them as a consequence.

H2a: People will be more likely to engage in cross-cutting political discussion with sources that they perceive as credible than sources that they perceive as less credible.

The cues that people use to evaluate others in virtual worlds are important, of course, because they are expected to impact the outcomes of cross-cutting political conversation. Just as people are more willing to talk about their political dissent after an initial interaction with a visually credible source in face-to-face situations (Darley & Cooper, 1972), perceptions of visual cues to source credibility presented by an avatar may determine whether or not a cross-cutting political discussion will even occur in mediated situations as a consequence of everyday political talk. In other words, people may be more willing to engage in this kind of discussion with a visually credible source regardless of the effect of other cues. When no visual cues are present, people must rely solely on text-based cues and the content of the message to judge the credibility of the source. Controlling for source credibility, then people should be more likely to engage in cross-cutting political conversation with others that present a credible message.
H2b: When visual cues are present, people will be more willing to engage in cross-cutting political discussion the more human realism the avatar expresses, regardless of perceived source or message credibility.

H2c: When no visual cues are present, people will be more willing to engage in cross-cutting political discussion the higher the credibility of the message, regardless of source credibility.

One of the benefits of engaging in cross-cutting political discussion is that it allows one to gain a deeper understanding of their own political viewpoint, allows people to see a the rationale behind an opposing view, and leads people to reevaluate a counter-attitudinal political idea. (Williams, Nunn, and St. Peter, 1976, Huckfeldt, Mendez and Osborn, 2004). The idea of reevaluation is a particularly important consequence of cross-cutting political discussion online, because it is associated with tolerance; and thus likely one of the factors that contributes to positive outcomes of text-based CMC political discussion. However, people are less likely to enter into the reevaluation process when a counter-attitudinal message is seen as originating with a low credibility source (Cooper, et al., 1974, Lambert, 1972).

H3a: People will be more likely to reevaluate a counter-attitudinal idea after interacting with a more credible source than after interacting with a less credible source.
If visual cues are more important than message cues in predicting reevaluation, then reevaluation of a counter-attitudinal political message should occur more often when avatars present high credibility visual cues regardless of the influence of message or perceived source credibility. Alternatively, it would be expected that when visual cues are absent, people will be more likely to reevaluate a counter-attitudinal idea when it comes from a source with a credible message.

H3b: People will be more likely to reevaluate a counter-attitudinal political idea more often after interacting with an avatar high in human realism, regardless of perceived source or message credibility.

H3c: When no visual cues are present, people will be more likely to reevaluate a counter-attitudinal political idea more often the higher the credibility of the message, regardless of perceived source credibility.

Within virtual worlds, the visual cues of the avatar, which contain uncertainty reducing information that according to SIPT, can be used to form initial impressions of a CMC interaction partner (Walther, 1996). Similarly, in face-to-face interaction, a person’s physical appearance is a heuristic used for impression formation before conversation takes place, and initial impressions subsequently influence behavior during and after discussion. For instance, physical appearance has been shown to change the way that argument quality is assessed and in turn, impact discussion outcomes (Afifi, 2007, Burgoon, Dunbar, &
Segrin, 2002). In other words, visual cues have a direct impact in determining how we process message cues in face-to-face conversation, and it is reasonable to suggest that a similar process exists within CMC contexts where visual cues are available. If the presence of an avatar is conceptualized as a meta-visual cue, that raises an interesting question about how the presence or absence of an avatar may influence the way message cues are processed, and thus change the outcome of a discussion. The question is to what extent the presence of an avatar may change the way message cues are processed in a way that influences conversational behavior and discussion outcomes. For example, it is possible that modality effects exist between the way people behave in text-based conversations versus the way they behave when an avatar is present when assessing message cues. Thus, the following research question is proposed:

RQ: Does the presence or absence of an avatar influence the way that people process message cues during cross-cutting political discussion?
Method

Manipulation Design

Two avatars were designed using the SecondLife™ avatar creation engine. Visual cues to credibility based on the findings of Nowak and Rauh (2005, 2008), while Bente, Ruggenberg, Kramer, & Eschenburg, (2008) informed the final design of the avatars. The high credibility avatar was a human-looking female, and the low credibility avatar was a female animal with anthropomorphic traits (see Figure 1). All aspects of the avatars were identical except for the level of human realism of the face and parts of the body. The message credibility manipulation was designed in accordance with previous research where spelling errors, syntax and poor grammar have been used to successfully manipulate credibility (Rafoth, 1983, Stephens, Houser and Cowan, 2009). The message designed for the high credibility message condition was free of any such errors, and the low credibility message contained numerous errors (see Table 1).
Figure 1. Experimental Manipulation of Visual Credibility
<table>
<thead>
<tr>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actually, I was sick last weekend and spent most of the time in bed reading Barack Obama’s book, “The Audacity of Hope.” I’ve been wanting to read it for awhile. He’s such a phony and not all that great. He should have never been elected. He’s really screwing up the economy. I think he’s one of the worst presidents we’ve ever had and is ruining this country.</td>
<td>Actuly, i was sic then and layed around in bed reading Barac Obamas book, the odacity of hope. i really enjoying it. ive wanted too read it for a whilw. hes such a fony and not all that grate. He should not be president. hes reallly screwing up thw economy i think hes one of the worst presidants weve ever had and hes ruining his county.</td>
</tr>
<tr>
<td>Actually, I was sick last weekend and spent most of the time in bed reading Barack Obama’s book, “The Audacity of Hope.” I am really enjoying it. Obama is such a great man, and I am so happy that he was elected. He’s really turning the economy around. I think he’s the best president we’ve ever had and is doing great things for this country.</td>
<td>Actuly, i was sic then and layed around in bed reading Barac Obamas book, the odacity of hope. i really enjoying it. Obamas a really grate man, and im so happy that he was e;ected. Hes tuning the economy around. I think hes the best president weve ever had hes doing grate things for this county!</td>
</tr>
</tbody>
</table>

Table 1. Experimental Manipulation of Message Credibility
Participants

Participants (n = 93) were recruited from a large Midwestern university for course credit. The mean age of the sample was 20.8 (SD = 2.26) and the sample was predominately (63%) female. Participants were told that the study was being conducted to examine the ways that people use different forms of computer-mediated communication to socialize, while simultaneously testing a new algorithm that analyzes online conversation content. Deception as to the true purpose of the study was necessary in order to minimize hypothesis-guessing and explain why participants would be answering survey questions that were specific to the interaction in the experiment. Participants were debriefed after the study.

Procedure

An experiment using a 2x3 factorial design was conducted over two sessions. These were two session pairs: one in late April and one in late May of 2010. In the first session, pretest measures of political ideology, internet use, virtual world use, and demographics were collected. A feeling thermometer was used to ascertain participants’ general feelings about Barack Obama in order to provide the correct cross-cutting political message in the second session. A period of one week elapsed before the second session was conducted. In the second session, participants interacted with a computer program which they believed to be another research participant. The program presented high, low, or no visual cues to credibility and presented a high or low credibility message. Participants were then surveyed about their interaction. Table 2 lists the number of participants randomly assigned to each condition.
Table 2. Experimental Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Low credibility message</th>
<th>High credibility message</th>
</tr>
</thead>
<tbody>
<tr>
<td>No visual cues to source credibility (text only)</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Visual cues to low source credibility</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>Visual cues to high source credibility</td>
<td>17</td>
<td>13</td>
</tr>
</tbody>
</table>

Experiment

The experiment was conducted in a university computer lab with four participants at a time using four identical, unfurnished apartments in SecondLife™, a virtual world platform. The instructions given by the researcher were the same across all conditions. The researcher informed the students that she is working with another researcher from another University to see how online conversations can be analyzed to automatically identify the topics being discussed, similar to Google ad-sense. Specifically, participants were told that the purpose of the study was to see whether or not the algorithm could create a subject-relevant questionnaire based on discussion content. They were informed that they would be interacting with a research participant from the other university who was a long-time Second Life™ user, implying that they had made their own avatar, and that those participants had different instructions than they did.

The researcher gave each participant a set of instructions that walked them through the steps of the study, after which there was little contact between the
participants and the researcher. First, participants were asked to write a detailed paragraph about something specific that they did last weekend in a notepad document, and that their counterparts were instructed to do the same. The only contact the researcher had with participants was to assist in this step of the study. Participants were then instructed to enter to the virtual research space. When they arrived at the space, the avatar representing the correct experimental condition was present, and they were asked to copy and paste the message they had written earlier into the instant message dialogue box. A custom-built computer program responded with a message from Table 1 that was counter attitudinal to the participant’s feelings about Obama after a 10 second delay, and the participant was asked to respond to the message. All text typed by the participant was saved in a log file for content analysis, and participants were then directed to open up an online survey in which the algorithm was ostensibly at work. Participants were then asked to rate their interaction partners’ credibility. Next, they were asked to complete the supposedly computer-generated section of the questionnaire which consisted of a self-report of willingness to re-evaluate their feelings about Barack Obama described below. Finally, participants were asked if they could guess what the study was about. After finishing the online survey, participants were de-briefed and thanked.
Measures

Perceived Source Credibility. Perceived source credibility is a composite measure of both visual and textual cues to credibility, and was operationalized as seven items from McCroskey & Tevin’s source credibility measure which tap into factors of competence and trustworthiness presented on a 7-point semantic differential scale. The final reliability for perceived source credibility was computed using Chronbach’s alpha (M = 26.56, SD = 7.25 $\alpha = .80$).

Re-evaluation. Reevaluation of a message from a particular source was assessed using a modified version of Stromer-Galley and Muhlberger’s (2009) Deliberation Satisfaction, Reevaluation, and Future Deliberation measures, which they created based on the work of Schweiger et al. (1986). The questions were modified so only reevaluation is measured. Participants in all conditions were asked to indicate their opinion of the following statements: “This person made me reevaluate some of my assumptions about Barack Obama that I hold,” “This person uncovered some arguments for/against Barack Obama that I had not previously considered,” “This person made me question whether my own opinion on Barack Obama is the correct one,” and “I can see why this person feels the way they do about Barack Obama.” Participants indicated their responses on a 7-point scale anchored by strongly disagree and strongly agree. The final reliability for this measure was computed with Cronbach’s alpha (M = 8.945, SD = 4.71, $\alpha = .785$)

Willingness to engage in political discussion. Willingness to engage in political discussion was determined through a content analysis of participants’ responses to the
cross-cutting political message delivered by the chat-bot. The level of engagement was
determined by four factors: First, whether or not the participant gave a political response.
Second, if the participant shared their opinion about Barack Obama. Third, if the
participant offered any sort of political argument or justification, and finally, whether or
not the participant asked a political question. These four factors were used to create an
index that represented how willing the participant was to have a potential cross-cutting
political discussion with their interaction partner. The most willing received a score of 4,
and those that did not satisfy any of the engagement criteria were given a score of 0. The
inter-coder reliability between the two coders was computed using Krippendorff’s alpha
(Hayes & Krippendorff, 2007) and as recommended by Neuendorf (2002), averaging the
alpha scores for each coded item. The final reliability was  (M = 3.06, SD = 2.48, \( \alpha = .868 \)).
Results

Hypothesis 1a predicted that people would perceive an avatar with high human realism as more credible than one that was not as realistic, regardless of the credibility of the message. A univariate test of between-subject effects revealed that human realism was not a significant factor in judgments of perceived source credibility $F(3, 54) = .345, p = .56$. Hypothesis 1b predicted that message credibility will influence perceived source credibility more in the absence of visual cues. Regression analysis failed to confirm this hypothesis. Message credibility did not have a stronger impact on perceived source credibility in the text-only condition; the interaction between message credibility and the absence of visual cues was not significant ($\beta = -.145, t(78) = -.687, p = .494$).

In order to account for the failure of visual credibility or textual credibility cues to result in marked difference of perceived source credibility between groups, a posttest of both the visual and textual stimuli in their abstract form was conducted. Participants in the posttest ($n = 20$) were randomly assigned to evaluate one of the short paragraphs or avatar images in Figure 1 and Table 2 using the same 7 items from McCroskey & Teven’s (1999) source credibility used in the experiment. Participants did not receive any incentive for participating in the posttest. For each paragraph or image, the individual items were summed to measure perceived source credibility as was done in the experiment. In the case of the posttest ($M = 26.85, SD = 6.62, \alpha = .540$). Independent sample t-tests revealed that while textual credibility was manipulated successfully in the
abstract, visual credibility was not. There was a significant difference between mean scores for the high credibility (M = 28.2, SD = 5.4) and low credibility (M = 20.6, SD = 3.5) textual manipulation \( t(8) = 2.638, p < .05 \), but not the high credibility (M = 29.4, SD = 7.4) and low credibility (M = 29.2, SD = 6.7) visual manipulation \( t(8) = .045, p = .966 \). In other words, when message credibility was evaluated in the abstract, it was a successful manipulation. This suggests an interaction between visual cues and message credibility cues, which is discussed below.

Hypothesis 2a suggested that people would be more likely to engage in cross-cutting political discussion with high credibility sources than with low credibility sources. Regression analysis failed to confirm that perceived source credibility was a predictor of willingness to engage in cross-cutting political discussion (\( \beta = -.075, t(70) = -.626, p = .533 \)), so hypothesis 2a was not confirmed. Hypothesis 2b—that people would be more likely to engage in conversation with an avatar high in human realism when visual cues were present—was tested with a regression model that only included cases where an avatar was present. Results indicate that when controlling for message credibility, human realism was not a significant predictor of willingness to engage in cross-cutting political discussion (\( \beta = .185, t(49) = 1.05, p = .299 \)), so hypothesis 2b was not supported.

Hypothesis 2c stated that when there were no visual cues present, willingness to engage in cross-cutting political conversation would be dependent on message credibility cues. Regression analysis using only the cases where no avatar was present indicated that message credibility cues did not account for any of the variance in people’s willingness to engage when visual cues were absent (\( \beta = .076, t(26) = .388, p = .701 \)).
Hypothesis 3a concerned reevaluation of a counter-attitudinal political idea after interacting with either a high credibility source or a low credibility source in CMC. The prediction that exposure to credible sources would result in higher levels of reevaluation was confirmed by a multiple regression analysis (see Table 3). Based on this model, hypothesis 3a—which anticipated greater reevaluation after interacting with a credible source was confirmed $\beta = .264, t(71) = 3.425, p < .001$. But Hypothesis 3b, which predicted that people would be more likely to reevaluate a counter-attitudinal political message after interacting with the avatar high in human realism, and 3c, which predicted reevaluation after interacting with a textually credible source, were not supported. Visual cues to credibility ($\beta = -.456, t(71) = -.716, p = .476$) and textual cues to credibility ($\beta = .1.447, t(71) = 1.314, p = .193$) were not significant predictors of reevaluation.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$B$</th>
<th>$SE\ B$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Source Credibility</td>
<td>.264</td>
<td>.077</td>
<td>.377**</td>
</tr>
<tr>
<td>Visual Credibility</td>
<td>-.456</td>
<td>.637</td>
<td>-.076</td>
</tr>
<tr>
<td>Textual Credibility</td>
<td>1.447</td>
<td>1.101</td>
<td>.145</td>
</tr>
</tbody>
</table>

$R^2$                                        .155

$F$                                           4.426**

$N$                                          76

Table 3. Multiple Regression Analysis for Variables Predicting Reevaluation
Whereas hypotheses 1-3 are concerned with how the relative importance visual versus textual credibility may influence aspects of cross-cutting political discussion in virtual worlds, RQ1 was concerned with how visual cues themselves—the presence of an avatar—would have an effect on the relative importance of textual cues in the decision to engage in cross-cutting political discussion and reevaluate a counter-attitudinal opinion.

Regression analysis was used to test for an interaction between the presence of an avatar and textual credibility on the dependant variables used in the experiment. No significant interaction was found between avatar presence, message credibility, and the willingness to engage in cross-cutting political discussion. However, a moderating relationship between avatar presence, textual credibility and reevaluation was confirmed: Textual cues to credibility had a stronger impact on reevaluation of a counter attitudinal political idea when an avatar was present ($\beta = .446$, $t(76) = 2.36$, $p = .021$), so hypothesis 4b was supported. Results of this analysis are presented in Table 4.
Table 4. The Moderating Effect of Avatar Presence on Textual Cues Resulting in Reevaluation

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Source Credibility</td>
<td>.263</td>
<td>.067</td>
<td>.398**</td>
</tr>
<tr>
<td>Presence of Avatar</td>
<td>-2.138</td>
<td>1.295</td>
<td>-.212</td>
</tr>
<tr>
<td>Textual Credibility</td>
<td>-1.768</td>
<td>1.689</td>
<td>-.182</td>
</tr>
<tr>
<td>Presence of avatar X textual credibility</td>
<td>4.867</td>
<td>2.061</td>
<td>.446*</td>
</tr>
</tbody>
</table>

\( R^2 \) .203

\( F \) 6.095**

\*p < .05. \**p < .01
Discussion

This study presents two important findings about cross-cutting political discussion online. First, there is clear evidence that perceived source credibility plays a role in people’s decision to reevaluate a counter-attitudinal political idea. That perceived source credibility is highly correlated with reevaluation is not a surprising finding in itself—that has been demonstrated in many face-to-face studies. What is interesting, though, is that when presented with a counter-attitudinal message from a stranger during an initial interaction online, people made a decision about source credibility which, in turn, impacted their behavior. This is an important finding, because virtual worlds contain an element of the fantastic and unbelievable (Boellstorff, 2008). That assessments of source credibility continue to influence people in virtual worlds contributes to the growing literature of what real world communication conventions operate the same way in CMC.

Second, the moderating relationship that avatar presence has on message credibility and reevaluation of a counter-attitudinal idea presents intriguing questions about the link between cue processing and behavior across CMC modalities. The moderating effect of avatar presence on the relative importance of message credibility in determining reevaluation suggests a fundamental difference between the way cues are processed when an avatar is present. That message credibility cues such as grammar, syntax and spelling would become more important in determining reevaluation in the presence of visual cues is interesting, because it is evidence that the use of an avatar
alters the influence of textual credibility on reevaluation when confronted with a counter-altitudinal message.

One possible explanation for this is the increased social presence that the use of an avatar brings to the interaction. Social presence refers to the feeling of being present in a mediated setting with another social actor, and is experienced on a continuum anchored by text-only and face-to-face interactions (Biocca, Harris, and Burgoon, 2001). In text-based communication, low social presence makes it easier for people to freely communicate their opinions, even when they are perceived to be unpopular. The less social presence felt, the less opportunity to incur social cost for dissent. In virtual worlds, however, social presence increases by virtue of avatar and shared spaces. Conversations that take place in virtual worlds are characterized by higher levels of social presence than those that take place in text-only environments, and this may account for the difference that message credibility cues are processed, thus shaping how people respond to political messages.

For example, the main difference between text-based discussion and discussion in virtual worlds is that in virtual worlds there are visual cues present; avatars and shared virtual space increase social presence. The constant factor between the two, however, is that text, or more simply put—typing—is used for communication in both. It is possible that increased social presence results in a change between the way people process textual cues. If that is the case, subtle shifts in the way people perceive textual credibility between modalities may influence their decision to engage in political discussion or reevaluate an idea when confronted with a counter-attitudinal opinion.
Future research should investigate if the increase in social presence activates a heightened salience of self presentation that is reflected back on interaction partners—resulting in more a critical assessment of cues presented by others.

Some intriguing, albeit unanticipated results from this study are actually non-results. First, this study fails to find a link between message credibility on perceived source credibility in virtual worlds, despite confirming the effectiveness of the message manipulation in an offline test. This raises an interesting question concerning the relationship between message credibility and perceived source credibility. The data suggest that although message credibility has been shown to influence source perceptions in many contexts (Rafoth, 1983, Stephens, Houser and Cowan, 2009) the effects seem to be somewhat diminished in a virtual world. One possible explanation for this is that prior research has shown that if a CMC interaction partner is viewed as a social actor or part of the same team, people will evaluate the interaction partner more favorably than they would if presented with a message unattached to a social source (Nass & Moon, 2000, Lee, 2010). It is possible that when message credibility cues were evaluated in the abstract as they were in the posttest, judgments of credibility were harsher than when participants were confronted with someone whom they believed to be a social actor participating in the same task as they were. Thus, people were more willing to overlook the poor grammar and spelling errors intended to manipulate message credibility because they were delivered by someone in the same position as themselves.

Second, the failure of visual cues to have a predictive outcome on any of the dependant variables was surprising, given the previous research on credibility and the
human realism of avatars (Nowak & Rauh, 2005; Nowak & Rauh, 2008 Nowak & Rauh, 2009, Bente, Ruggenberg, Kramer, & Eschenburg, 2008). The manipulation check raises an important question of how perceptions based on visual cues should be measured in virtual worlds. On one hand, the avatars used in the experiment may not have differed enough in terms of human realism to reproduce the visual credibility manipulations supported by previous studies. On the other hand, there is the possibility that the method of determining the visual source credibility of avatars is insufficient to tell the entire story: Previous research on avatar credibility has relied on a larger range of avatars exhibiting low human realism, and has used single or double item measures from McCroskey & Teven’s (1999) scale to assess source credibility. This method of measurement may detract from the more subtle ways that visual cues can influence the other factors that contribute to perceived source credibility as used in this study, such as trustworthiness, goodwill, and competence (McCroskey & Teven, 1999). Although the manipulation may have been too subtle for the purpose of this study, it should be noted that the avatar meant to activate judgments of low visual credibility is representative of the kind of non-human avatars frequently created by users of SecondLife™ (Boellstorff, 2008). While it is possible that low credibility visual cues impact cross-cutting political discussion negatively, it may only be the radically non-human avatars that pose a threat.

Perhaps the greatest limitation of this study, however, is an experimental design flaw which resulted in poor measurement of people’s willingness to engage in cross-cutting political conversation. The data fail to show a connection between perceived source credibility and willingness to engage in cross-cutting political discussion, which
could be explained by individual differences in communication apprehension, self-censorship, or experimental apathy, but it is more likely the result of a design of an inadequate recreation of cross-cutting political conversation: Participants were only asked to respond once to their partner, and the nature of the program controlling the avatar ruled out any opportunity for the participant to respond a second or third time. Future research might better replicate cross-cutting political discussion by using a research confederate to control an avatar.

The research presented here is clear evidence that the visual cues of virtual worlds have real consequences in determining people’s behavior after participating in cross-cutting political discussion, suggesting that visual cues do matter. On one hand, this is a potential benefit for cross-cutting political discussion in virtual worlds, because it is a signal that people are more willing to attend to the textual credibility of the message when an avatar is present before reevaluating. But on the other hand, it is a potential risk because of the extra emphasis on textual cues in virtual worlds; what may be a solid argument delivered with poor message credibility cues may be dismissed, whereas the same argument may be reevaluated in a text-based setting where message credibility does not hold as much weight. Future research should concentrate on untangling the interaction between visual and message cues, and under what conditions one becomes more important than the other in determining communication outcomes across modalities where social presence differs in computer-mediated environments.
References


