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Journal of Language and Social Psychology 2010; 29; 5 originally published online Nov 18, 2009;
DOI: 10.1177/0261927X09351675

Journal of Language and Social Psychology
29(1) 5–23

DOI: 10.1177/0261927X09351675
http://jls.sagepub.com

Virtual Gender Identity: The Linguistic Assimilation to Gendered Avatars in Computer-Mediated Communication

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Abstract

This research examined how individuals' gendered avatar might alter their use of gender-based language (i.e., references to emotion, apologies, and tentative language) in text-based computer-mediated communication. Specifically, the experiment tested if men and women would linguistically assimilate a virtual gender identity intimated by randomly assigned gendered avatars (either matched or mismatched to their true gender). Results supported the notion that gender-matched avatars increase the likelihood of gender-typical language use, whereas gender-mismatched avatars promoted countertypical language, especially among women. The gender of a partner's avatar, however, did not influence participants' language. Results generally comport with self-categorization theory's gender salience explanation of gender-based language use.

Keywords

gender-linked language, social identity, intergroup communication, message production, stereotypes, prototypes

Gender-based communication is the focus of much scholarship. This work increasingly emphasizes computer-mediated environments. Research, for example, has examined how men and women communicate via e-mail (Colley & Todd, 2002), chat groups (Koch, Mueller, Kruse, & Zumbach, 2005; Thomson, 2006), instant messages

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(Fox, Bukatko, Hallahan, & Crawford, 2007), and other forms of computer-mediated communication (CMC). One issue in this empirical arena is gender identity and its manifestations in CMC. Scholars have argued, for example, that people perform masculinity online as a means to reify their gender identities (Herrmann, 2007). Other research has demonstrated that elevating the salience of gender identity prompted women to reference emotions in e-mail more than men especially in mixed-sex interactions (Palomares, 2008). Permeating this literature is a focus on the diverse, dynamic, and sometimes transient nature of gender identity; how it differentially presents itself in CMC given the circumstances; and the resultant communicative behavior of men and women (Murachver & Janssen, 2007; Palomares, Reid, & Bradac, 2004).

Whereas the primary concern of this work is how a sex-consistent gender identity affects communication, a relatively nascent interest is how people simulate a gender identity online that they would not otherwise perform in offline settings (Herring & Martinson, 2004; Hills, 2000; Rellstab, 2007). For example, a woman might pretend to be a man in an online chat. The few instances of this research have studied strategic or intentional portrayals of a different gender and focused on the communicative behaviors people employ in these forgeries and if others can recognize a disingenuous gender identity (Herring & Martinson, 2004; Hills, 2000; see also Thomson & Murachver, 2001); yet no known research has examined how more subtle cues might trigger the enactment of a different gender identity online. We refer to this phenomenon as virtual gender identity. Thus, we conducted an experiment to test if men and women would linguistically assimilate a virtual gender identity intimated by (matched or mismatched) gendered avatars representing them in text-based CMC. Specifically, our objective was to determine if and how men's and women's gender-based language would emerge as a function of gendered (i.e., masculine or feminine) avatars that represented them and their interaction partner. In pursuit of this goal, we first review research on language and gender, then present our theoretical orientation from which we deduce predictions, and finally report an experiment that implemented and tested this rationale.

Language and Gender in CMC

Research traditionally has emphasized gender *differences* claiming that men and women tend to use dissimilar language independent of the context, personal proclivities, or interaction partners (e.g., Lakoff, 1975; Mulac & Lundell, 1980; Tannen, 1990). The empirical evidence is somewhat compatible with this claim. Consistent with stereotypes, for example, meta-analyses demonstrated that women used more affiliative speech (e.g., references to emotion) and less assertive speech (e.g., direct language) than men (Leaper & Ayres, 2007). Over time, however, the focus has shifted away from gender and onto alternative (i.e., extragender) influences, especially those present in CMC. Whether in e-mail, newsgroup postings, blogs, discussion groups, online chats, or other computerized settings, the language of men and women largely depends on the specific circumstances and features of the technology and context (e.g., Colley & Todd, 2002; Fox et al., 2007; Herring, 1993; Huffacker & Calvert, 2005; Palomares, 2004, 2008, 2009; Savicki, Kelley, & Ammon, 2002; Thomson, 2006). In

fact, the same aforementioned meta-analyses also found several factors that moderated the gender effects often to an extent greater than gender alone (Leaper & Ayres, 2007). Language differences between men and women, thus, clearly exist, but they are highly sensitive to extraneous factors that may increase, decrease, erase, or even reverse the traditional gender-based patterns of use.

The emergence of three language features—references to emotion, apologies, and tentative language—has been particularly vulnerable to contextual instability within and across studies despite stereotypes and early conjectures that they are "feminine" language forms. References to emotion, or language that includes any mention of a feeling or emotion, have been indicted as typically associated with women's language (Mulac, Bradac, & Gibbons, 2001). Yet other research has shown that men reference emotion more than women (Mulac, Seibold, & Farris, 2000), that men and women use them equally (Thomson, 2006), and that their use depends on the salience of gender identity and dyadic sex composition (Palomares, 2008). Examinations of apologies—which some have construed as an indicator of politeness and a feminine language style (Herring, 1993; Lakoff, 1975)—have yielded a similarly diverse array of differences and similarities between men and women (O'Neill & Colley, 2006; Savicki, Lingenfelter, Kelley, 1996; Tannen, 1990; Thomson, 2006). Tentative language signals uncertainty, is typically associated with women (Herring, 1993; Lakoff, 1975), and like apologies and references to emotion is contextually dependent (Brouwer, Gerritsen, & De Haan, 1979; Carli, 1990; Palomares, 2008, 2009; S. A. Reid, Keerie, & Palomares, 2003; Tannen, 1990). We examined these three features because research frequently employs them in CMC as stereotypically gender-based language forms.

Self-Categorization Theory

Notwithstanding inconsistent results among the three language features, an explanation for the diverse collection of gender-based language manifestations is found in self-categorization theory (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987).[1] The basic premise of the theory is that people mentally represent social groups as contextually contingent prototypes or fuzzy sets of attributes that define in-group similarities in contrast to out-group differences. People internalize the group prototype that is most salient and relevant—a state called depersonalized. Prototypes operate not only to describe but also to prescribe, such that depersonalization provides a normative self-definition for how one should perceive and behave in a certain context.

When applied to gender and language phenomena (cf. Palomares et al., 2004), the theory maintains that if people interact devoid of a gender distinction, then one's gender is irrelevant and gender-based language is unlikely to emerge; but if a gender categorization is germane, then gender identity is applicable to one's self-construal, and people will behave according to the activated prototypical norms (Palomares, 2008; S. A. Reid et al., 2003). Gender-relevant interactions, thus, increase the salience of gender identity so that the prototype of intergender relations has significant consequences for language use. Self-categorization theory has been relatively successful in attempts to explain and predict a diverse array of linguistic behavior for men and women

in CMC. When sending an e-mail, for example, women referenced emotions significantly more than men only if gender was salient because the prototype of gender salience exploited supportiveness as a stereotypically feminine attribute (Palomares, 2008). We formulated our expectations for the experiment based on self-categorization theory.

Performing Virtual Gender Identities

A limited number of studies have examined the online performance of a different gender. The earliest scholarship highlighted intentional "gender swapping" on the Internet (e.g., a man posing as a woman) and documented and described its natural occurrence. People gender swap, for example, in text-based multiuser dungeons and similar online groups for a range of reasons (Berman & Bruckman, 2001; Bruckman, 1993; Danet, 1996; Donath, 1999; McRae, 1995; Menon, 1998; Rheingold, 1993; Turkle, 1995; Van Gelder, 1996). Assuming a different virtual gender identity has several sociological and psychological implications (Herrmann, 2007; Kendall, 2000; E. M. Reid, 1991, 1995; Rellstab, 2007; Rodino, 1997) especially considering that a substantial portion (40% to 60%) of online social-site members typically do so for some of their time online (Roberts & Parks, 1999). Relatedly, Internet users can strategically ambiguate their gender often via gender-neutral pseudonyms (Bechar-Israeli, 1995; Van Gelder, 1996). Gender equivocation, however, is more common among women than men (Jaffee, Lee, Huang, & Oshagan, 1995; Jazwinski, 2001), likely because it assuages gender biases that can occur in face-to-face interactions (Flanagin, Tiyaamornwong, O'Connor, & Seibold, 2002; Koch et al., 2005). Research has also examined the detection of real (Koch et al., 2005; Nowak, 2003; Thomson & Murachver, 2001) and false (Herring & Martinson, 2004; Hills, 2000) gender identities in CMC.

Whereas most research on virtual gender identities has recorded its natural occurrence, objectives, implications, and detection, recent examinations have studied the communicative behaviors people manipulate when intentionally performing a false gender. Such research has found that people seem to have control over macro forms of communication (e.g., topic) more than molecular forms (e.g., tentative language). For example, if told to pose as a different gender when interacting with an unknown partner via e-mail, participants typically exploited gender-stereotypical topics while having relatively little control over gender-typical syntactic and lexical choices (Hills, 2000). Likewise, in synchronous CMC, people successfully altered their topical content when intentionally performing a different gender but ineffectively changed molecular forms of communication; in fact, their molecular features actually gave cues to their true gender despite their effective topic manipulations (Herring & Martinson, 2004). Our experiment advances past research by not overtly instructing people to communicatively perform a different gender identity. Instead, we manipulated gendered avatars to test if people would automatically assimilate their language to a virtual gender identity without explicit direction to do so.

A gendered (i.e., masculine or feminine) avatar can heighten the salience of gender. Avatars are graphical self-representations in a computer-mediated environment that can

reveal social information in an otherwise cue-limited setting (Blascovich et al., 2002). Interacting via avatars, for example, can impart levels of trust and intimacy similar to an audio–video mode of mediated communication but more than text-only communication (Bente, Rüggenberg, Krämer, & Eschenburg, 2008). Gender inferences of anonymous others depend on their avatars even if avatar representations are known to be arbitrary (Lee, 2007a). People prefer avatars that closely represent themselves over less accurate digital representations, especially in terms of gender (Nowak & Rauh, 2005). In fact, avatars have behavioral consequences by inducing avatar-consistent communication: In line with attractiveness stereotypes (cf. Langlois et al., 2000), intimacy (e.g., self-disclosures) was greater for people represented by attractive than less attractive avatars (Yee & Bailenson, 2007, Experiment 1). Likewise, in a second study that capitalized on confidence stereotypes of tall people (cf. Young & French, 1996), participants who assumed an avatar taller than their negotiation partner's avatar were more likely to decline their partner's unfair offer than if their avatar was shorter. Given that people heed avatars cognitively and behaviorally, a gendered avatar might affect gender-based language because it yields a gender self-definition germane. According to self-categorization theory, however, these linguistic consequences would depend on the nature of the avatar and its ramifications for gender salience: A gendered self-representation in CMC will intimate the prototype for gender-based linguistic behavior. Specifically, masculine avatars will implicate male-linked language norms, whereas feminine avatars suggest female-typical language norms. As a result, people linguistically assimilate to these communicative norms.

These effects, however, are likely more robust for women than men. Women tend to be more responsive to gender salience than men are (Palomares, 2008; S. A. Reid et al., 2003), and they tend to identify with their gender more strongly than men do (Cameron & Lalonde, 2001). In fact, men were less likely than women to take a gendered avatar into account when inferring an anonymous partner's gender (Lee, 2007a). Women also are more accurate when decoding others' nonverbal communication and are generally more sensitive to it than men are (Hall, 2006). Because women tend to be particularly reactive to visual communicative stimuli and gender salience, we expect a woman to use more stereotypically feminine language when her avatar is consistent (i.e., feminine avatar) than inconsistent (i.e., masculine avatar) with her true gender; yet the effect of this corresponding pattern for men will likely be less extreme if it manifests at all. Thus, we present the following:

> *Hypothesis 1a-c:* Women, but not men, use more gender-typical language—(a) references to emotion, (b) apologies, and (c) tentative language—when the gender of their avatar matches their true gender than when it mismatches.

We also tested the effects of a CMC partner's gendered avatar because it too can play an influential role in computerized interactions. In most circumstances, gender differences are more likely in intergroup (i.e., mixed-sex) than intragroup (i.e., same-sex) interactions. For example, women referenced emotion more than men when gender

was salient but chiefly in mixed-sex e-mail exchanges (Palomares, 2008); likewise, gender differences in tentative language were present in intergroup but not intragroup CMC (Palomares, 2009). Self-categorization theory accounts for such effects by arguing that mixed-sex interactions render an intergender distinction more pertinent than same-sex settings do, such that assimilation to the prototype of gender salience becomes more likely (Hogg & Turner, 1987). We, therefore, might expect a partner's gendered avatar to affect gender-based language as well, which is analogous to other research revealing partner-avatar effects for nongender groups. People in a virtual environment, for example, maintained greater distance when encountering an avatar of an ethnic minority than an avatar of an in-group member, especially if they held implicit prejudice toward the minority out-group (Dotsch & Wigboldus, 2008).

Precisely predicting how another's gendered avatar might interact with a gendered graphical self-representation, however, is difficult because what constitutes "mixed sex" is muddled when gendered avatars are introduced in CMC to represent anonymous interactants. That is, whether people compare their true or virtual gender with their partner's gendered avatar can alter their inter-/intragroup determination. For example, a woman who is represented by a masculine avatar when interacting with a partner using a feminine avatar might consider the interaction to be intergroup if she contrasts her and her partner's avatars; whereas if she compares her partner's avatar with her actual gender, then she might conclude that the interaction is intragroup. In fact, Lee (2007b) found that dyadic team members felt stronger group identification when their avatars belonged to the same gender category (rather than different categories). Such results suggest that perceptually salient, albeit explicitly arbitrary, avatars can serve as a formative basis for an intra-/intergroup distinction. Nonetheless, if and how self-other avatar comparisons have effects beyond fostering group cohesion remains unclear in Lee's study; that is, even when participants thought "My partner and I are similar," by virtue of the similar avatars, they might not have fully embraced the specific identity represented in the avatars ("We are both masculine"), especially considering that their avatar's gender always mismatched their true gender in the study. By examining social perceivers' linguistic behavior as a function of their own and their partner's gendered avatars, the present study extends past work. Yet given the difficulty gendered avatars present for ascertaining the inter-/intragroup nature of an interaction in anonymous CMC, we ask this research question:

Research Question 1: Does the gender of a partner's avatar influence (via either main or interaction effects) gender-based language use?

Method

Participants and Design

Participants were 157 undergraduates (74 men, 83 women) enrolled in communication classes at a large, West Coast university. A 2 (participant's gender: men vs. women) ×

2 (gender matching of participant's avatar: match vs. mismatch participant's true gender) × 2 (gender of partner's avatar: male vs. female) between-subjects design was employed wherein participants completed a trivia game with an ostensible partner both of whom were represented via gendered avatars in synchronous text-based CMC.

Avatar Manipulations

Two masculine and two feminine avatars manipulated self and partner representations. An additional 50 undergraduate students (66% women) participated in a pretest to confirm an effective manipulation of avatar gender. Participants first saw one of the four cartoon characters and then indicated how feminine and masculine the character was on 10-point scales (1 = *not at all masculine/feminine*, 10 = *very much masculine/feminine*). The femininity rating was reverse coded and then combined with the masculinity rating to form a femininity–masculinity index ($r = -.86$, $p < .001$; range: 2-20). A 2 (participant gender) × 2 (avatar gender) analysis of variance (ANOVA) established that male characters were considered to be more masculine ($M = 14.24$; $SD = 3.71$) than female characters ($M = 5.16$; $SD = 1.95$), $F(1, 46) = 113.91$, $p < .001$, $\eta_p^2 = .71$. Furthermore, one-sample t tests revealed that the attribution of masculinity to male characters was significantly greater than the scale midpoint (11.00), $t(24) = 4.37$, $p < .001$, whereas female characters were perceived as significantly less masculine (or more feminine) than the scale midpoint, $t(24) = -14.97$, $p < .001$. There was no interaction between participants' and avatars' gender, indicating that both men and women perceived the avatars' gender as intended, $F < 1$. The four avatars served to randomly manipulate participants' avatar gender and the partner's avatar gender. A participant's avatar was never identical to his or her ostensible partner's avatar in the main experiment.

Procedure

Participants played a computerized trivia game with someone whom they believed to be another study participant. To reduce participants' suspicion about the purpose of the experiment, they were first asked to choose a letter on the computer screen, ranging from A to E, to determine the avatar (i.e., cartoon character) that would represent them during the interaction. Unbeknownst to the participants, however, the character's gender was randomly predetermined to be either male or female regardless of their true gender and the chosen letter. Once the participants' avatar and their ostensible partner's avatar appeared on the computer screen, participants selected a number, ranging from 1 to 10, to determine a set of questions to be asked during the game. Regardless of the number chosen, however, the computer presented a fixed set of fast-food trivia. For each multiple-choice question, participants indicated their initial answer and confidence level and typed a comment to their partner. After participants typed a comment, the participant's and the partner's characters showed their initial responses, as illustrated in Figure 1. The partner's responses were preprogrammed and held constant across conditions, and their comments contained no apologies, tentative

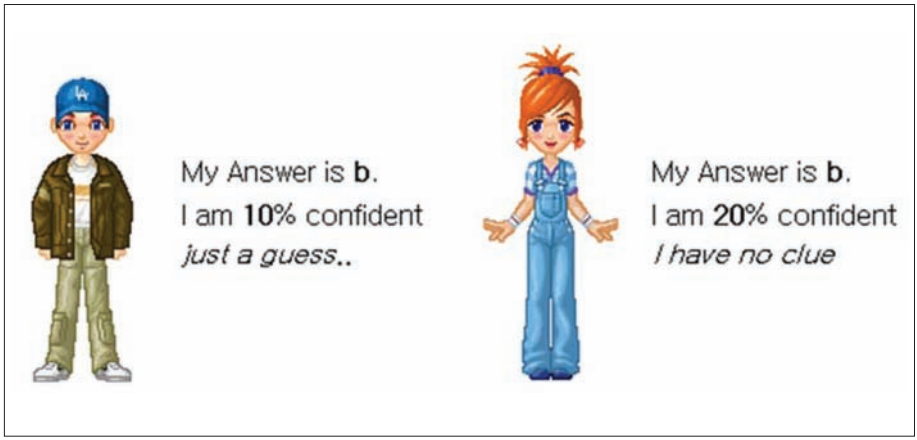

Figure 1. Sample screen snapshot of avatars with responses: Participant with a male avatar and a female partner character

language features, or references to emotion (e.g., "I have no clue," "D seems too obvious"). At this point, participants submitted their final answer and confidence level, after which the computer presented the next question without revealing the correct answer or the partner's final response to the previous question. This procedure was repeated for 12 unique questions that were held constant across all conditions. Finally, participants were debriefed.

Language Coding

The comments that participants wrote to their ostensible partner during the trivia game served as the source of gender-based language use. All comments formed a transcript booklet with only a unique number identifying each participant's transcript. Two research assistants, who were blind to the design and hypotheses, underwent training sessions where they learned definitions for, saw several examples of, and practiced coding each language feature. Once well-trained and pretested for sufficient reliability, the assistants individually coded all language features one at a time and then settled disagreements via postcoding discussions. Across all language features the coders agreed at a rate of at least 87% (Krippendorff's αs > .90).

The operationalizations of the three language variables were modeled after past language and gender research (Palomares, 2008; S. A. Reid et al., 2003; Thomson & Murachver, 2001). *References to emotion* were any mention of an emotion (e.g., happy, that should thrill you, mad, excited). *Apologies* were defined as a statement of being sorry (e.g., I'm sorry, forgive me, I was wrong and won't let it happen again). *Tentative language* was defined as the combination of three unique language features that indicate uncertainty and low confidence: hedges (e.g., might, pretty much, sort of,

maybe, probably), disclaimers (e.g., don't trust me, but I'm not sure, I may be wrong, who knows though) and tag questions (e.g., don't you think? isn't it? right?).

Results

Pretest

To ensure that the experimental task did not overtly favor one gender, we used fast-food trivia whose gender neutrality was confirmed in previous studies (Lee, 2005). Specifically, when asked to indicate how interested they were in the fast-food questions (1 = *not at all interested*, 10 = *very much interested*), men ($M = 2.89$; $SD = 2.42$) and women ($M = 2.20$; $SD = 2.00$) did not significantly differ, $t(110) = 1.66$, $p = .10$ (Lee, 2005, Study 1). In addition, participants directly rated how gender biased they thought the questions were (1 = *not at all gender biased*, 10 = *very much gender biased*), and the mean ($M = 3.81$; $SD = 1.88$) was significantly lower than the scale midpoint (5.5), $t(75) = -7.80$, $p < .001$ (Lee, 2005, Study 3).

Hypothesis Tests

A series of 2 (participant gender) × 2 (participant avatar) × 2 (partner avatar) ANOVAs was computed for (a) references to emotion, (b) apologies, and (c) tentative language. One-tailed a priori contrasts tested any hypothesized differences (as indicated), whereas two-tailed tests compared conditions when a difference was not expected or when a possible difference was not explicitly hypothesized (Tabachnick & Fidell, 2007). Figure 2 displays the pertinent results.

References to emotion. A significant interaction emerged between participants' gender and self-representation avatar, $F(1, 149) = 5.64$, $p = .02$, $\eta_p^2 = .03$. No other effects were statistically significant, all Fs < 1. Participants' avatar had a greater impact for women than men, which is consistent with Hypothesis 1a: Women used more references to emotion when the character correctly represented their gender ($M = .84$; $SD = .99$) than when it did not ($M = .44$; $SD = .82$), $t(153) = 1.95$, one-tailed $p = .03$, $\eta_p^2 = .02$; yet men's references to emotion did not significantly vary across the male ($M = .54$; $SD = .82$) and female ($M = .87$; $SD = 1.10$) avatars, $t(153) = 1.50$, $p = .14$. When the interaction was decomposed within the self-representation conditions, gender differences were more pronounced in the mismatched than matched avatar condition. If participants' character's gender mismatched their true gender, then men used more emotional references than did women, $t(153) = 2.04$, $p = .04$, $\eta_p^2 = .03$; when the avatar correctly represented their gender, women tended to reference emotions more frequently than men, but this difference was not statistically significant, $t(153) = 1.39$, $p = .17$.

Apologies. We found a significant interaction between participant's gender and avatar for apologies, $F(1, 149) = 4.11$, $p = .04$, $\eta_p^2 = .03$. No other effects were statistically significant, all Fs < 1. Hypothesis 1b received tentative support: Women were

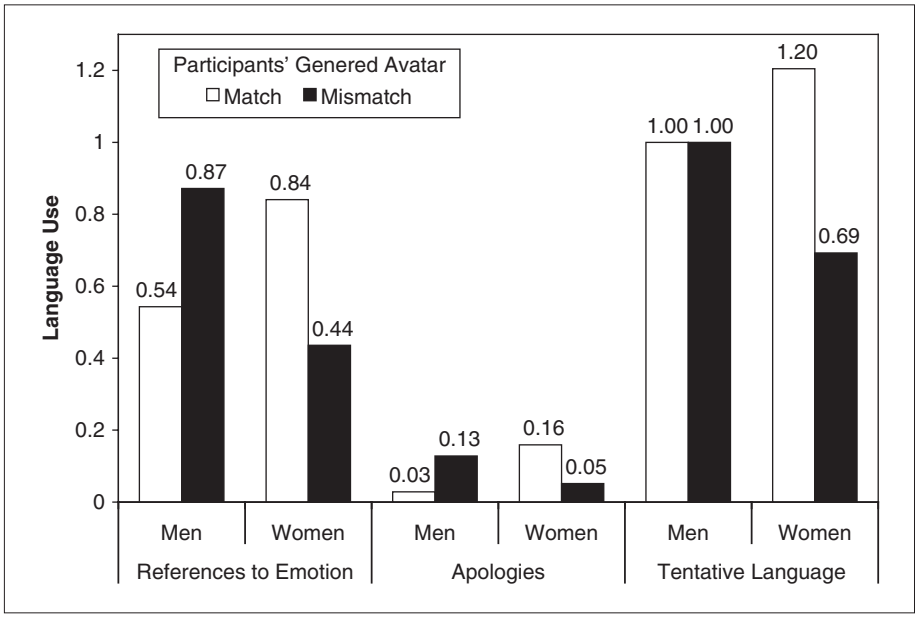

Figure 2. Effects of matched versus mismatched gendered avatars on gender-based language use for men and women

more apologetic when the avatar matched their gender ($M = .16$; $SD = .37$) than when it mismatched ($M = .05$; $SD = .22$), $t(153) = 1.56$, one-tailed $p = .06$, $\eta_p^2 = .02$; whereas men's apologies did not statistically significantly differ across the two conditions (match: $M = .03$, $SD = .17$; mismatch: $M = .13$, $SD = .41$), $t(153) = 1.36$, $p = .18$. Within the matched self-representation condition, women used more apologies than men, although this effect did not reach statistical significance, $t(153) = 1.83$, $p = .07$, $\eta_p^2 = .02$. The same gender difference with mismatched avatars was not statistically significant, $t(153) = 1.08$, $p = .28$.

Tentative language. There were no significant main or interaction effects on tentative language use, all Fs < 1.84. Even though the interaction between gender and self-representation failed to reach statistical significance, $F(1, 149) = 1.75$, $p = .18$, we still tested Hypothesis 1c because omnibus tests are dispensable when specific predictions exist (Rosenthal, Rosnow, & Rubin, 2000; Wilkinson & Task Force on Statistical Inference, 1999). Supporting Hypothesis 1c, women were more tentative when a female avatar matched their true gender ($M = 1.20$; $SD = 1.25$) relative to a mismatched male character ($M = .69$; $SD = 1.08$), $t(153) = 2.04$, one-tailed $p = .02$, $\eta_p^2 = .03$. In contrast, men's tentative language use was identical when the character either correctly ($M = 1.00$; $SD = .97$) or incorrectly ($M = 1.00$; $SD = 1.21$) represented their true gender. Comparing men and women within each self-representation condition, however, yielded no significant effects, both ts < 1.20.

Discussion

Overall, the results suggest that a gender-matched avatar increases the likelihood of gender-typical language use, whereas gender-mismatched avatars promote countertypical language. That is, people not only communicatively perform gender when they intentionally decide (Herring & Martinson, 2004) or are explicitly directed (Hills, 2000) to pose as a different gender, but they appear to adopt the language that conforms to gendered norms that the visual cue of a gendered avatar intimates. A departure from past studies, however, is that this linguistic assimilation to a virtual gender identity is more likely among women than men: Past research did not demonstrate different gender performances of male and female online users; rather, men and women alike were able to change macro aspects of their communication (e.g., topic). Apparently, men are capable of performing femininity communicatively when such acts are intentional or explicitly researcher induced, but they are less likely to do so when the trigger is a relatively subtle visual cue such as an avatar.

Self-categorization theory explains how the gender of a digitized self-representation affects participants' gender-based language: Because a gendered avatar implicated the language appropriate for the context, people conformed to gender-based language expectations. The theory suggests that such gender-based language norms were transmitted via avatars that defined the prototype of gender salience. Specifically, a masculine avatar implied male-typical language norms, just as a feminine avatar conveyed female-typical language norms. Consequently, participants linguistically assimilated to a virtual gender identity. Self-categorization theory also addresses how women are especially more likely than men to use gender-typical language when the gender of their avatar matches their true gender. That is, because women tend to be particularly reactive to visual stimuli (Hall, 2006) and gender salience (Cameron & Lalonde, 2001), they were more susceptible to gendered avatars than men were.

Our data also highlight a recent claim that gender-based language is highly dynamic because of gender salience and its prototype. One should not ipso facto expect identical or even highly similar patterns among all forms of gender-based language across contexts (Palomares et al., 2004). We demonstrated that either countertypical or typical gender-based language emerged depending on the prototype of gender salience induced by avatars. In fact, although apologies and references to emotion manifested in the same general pattern, tentativeness was only partly similar (see Figure 2). At the same time, the relatively small effect sizes ($<.04$) of the current research seem to support the gender similarities hypothesis that asserts men and women are primarily similar and any differences between them are small and few (Dindia, 2006; Hyde, 2005). Meta-analyses are compatible with this hypothesis (Hyde, 2005; Leaper & Ayres, 2007). The overall differences we found between men and women were less frequent than the moderator-produced effects. Taken together, even when some situational factors induce gender differences in language style, the magnitude of such differences is relatively small, suggesting that men's and women's linguistic behavior is more similar than different. Moreover, given the small size of these effects, they are likely not readily apparent in everyday interaction, as other research suggests (Mulac, 2006).

The current experiment also extends past work on the impact of gendered avatars in CMC. In a sense, the findings that arbitrary gendered avatars shape people's perceptions of and behavioral responses to anonymous strangers in an otherwise cue-deprived environment (e.g., Lee, 2007a, 2007b) are not surprising. That is, although participants were likely to conform to a partner with a male avatar more than a partner with a female avatar on male-oriented issues (Lee, 2007a) and identified more with a partner whose avatar shared the same gender as their own avatar (Lee, 2007b), the absence of individuating cues that would have enabled them to form more personalized, and presumably more accurate, impressions about unknown partners likely fostered this seemingly unreasonable reliance on random visual cues. However, our experiment advances previous research by demonstrating that gendered self-representations significantly modify individuals' own language styles, which are supposedly more static than perceptions of and conformity to complete strangers.

The level of automaticity of linguistic assimilation to a virtual gender identity is unknown based on the current data; yet we imagine the process is relatively unconscious. Herring and Martinson (2004) speculated and provided some evidence that "unconscious use of gendered discourse styles can reveal one's actual gender even when one is [intentionally] performing a different gender (or trying not to give off any gender cues)" (p. 427). In a similar study of the conscious performance of a different gender, participants typically manipulated gendered topics successfully but less effectively controlled gender-typical syntactic and lexical choices that tended to match their true gender (Hills, 2000). Unlike this previous work, however, the focus of current participants was likely on winning the trivia game rather than manipulating their language. In addition, avatars were ostensibly assigned randomly. Consequently, participants probably thought the gendered nature of the avatars was arbitrary and peripheral to the game, as confirmed in postexperiment debriefings. Our findings that people nonetheless altered their gender-based language in line with the relatively subtle visual cues to gender identity, thus, seem to comport well with an automatic or mindless argument.

That this process is unconscious is also consistent with other theorizing on gender-based language. Mulac, Bradac, Palomares, and Giles (2009) distinguished between gender-linked language stereotypes and schemata: Stereotypes about gendered communication are accessible to conscious thought and focus on macro forms of communication (e.g., topic), but schemata are implicit and primarily responsible for gender-based language production. Coupling past research on the intentional or conscious performance of gender that demonstrates accurate control over topics but failed control of molecular behaviors such as language (Herring & Martinson, 2004; Hills, 2000) and the current data that suggest an unconscious effect on language warrants a distinction between gender-linked language schemata and stereotypes. Future research should assess more directly the constituents and outcomes of gender-linked language stereotypes versus schemata. Whereas this objective might be relatively straightforward for stereotypes because their mental representations are explicit, doing so for schemata might take some ingenuity. One possibility is to use a method similar to the assessment of implicit prejudice (cf. Dotsch & Wigboldus, 2008).

Notwithstanding the previous theoretical supposition and implications, because we did not directly measure nor manipulate gender salience (or any other cognitive processes), our account of linguistic assimilation still awaits a more absolute empirical validation. Clearly then, the absence of a gender salience measure is a limitation. Yet to an extent, two points assuage this disadvantage. First, much other research demonstrates that gender-based language is a function of gender salience (Palomares, 2004, 2008; S. A. Reid et al., 2003). Gender salience has even operated as a mediator of the effects of a contextual stimulus on gender-based language (Palomares, 2009). In other words, there is a clear cascading causal link from stimuli to gender salience to gender-based language. Second, the feasibility of actually measuring gender salience is questionable: Assessing gender salience might not have been practical or effective because, as stated previously, we anticipate an unconscious process of the linguistic assimilation to gendered avatars. In other words, unknown is the ability of an explicit measure of gender salience to accurately gauge an unconscious process. Still, considering that we cannot assume gender salience would have played the same causal role in the current experiment as found in past research, some measure of gender salience might have been useful herein.

Thus, employing an implicit measure of gender salience might allow a test of its mediational effects thereby providing a more direct test of self-categorization theory's account. To do so, the linear order of effects should be well established by measuring gender salience immediately before language production; although introducing such a measure between the avatar assignment and language production might prove pragmatically awkward if not difficult (at least in designs similar to the current one). Another option is to implement gendered (i.e., masculine, feminine) topics to heighten gender salience, which would yield subsequent language effects. If gender salience was directly or indirectly manipulated somehow, then perhaps the gender of the partner's avatar would have also moderated language use. Thus, researchers should seek to vary gender salience in ways other than using gendered self-avatars because avatars seem to only subtly influence gender salience. Perhaps when gender salience is unambiguously heightened, then partner–avatar or other effects will emerge.

Another possible limitation is that the effects for women might have been more robust than for men, not because of our proposed rationale, but because the three language features examined are considered stereotypically feminine. In other words, if features associated with men were also employed, then perhaps men would have displayed more language variation depending on their gendered avatar. This issue, however, is not likely a problem because other research has demonstrated that men's language can fluctuate in ways similar to women's language variation. For example, men and women alike used more references to emotion under certain conditions (Thomson, Murachver, & Green, 2001). Likewise, men were more tentative than women for feminine topics, just as women were more tentative than men for masculine topics (Palomares, 2009). Admittedly though, the cues (i.e., gendered topic) responsible for the language changes in Palomares were more explicit than in the current research (i.e., avatars). Indeed, our rationale explicitly drew on the idea that

because avatars are subtle visual cues, to which women are likely more reactive or sensitive than are men, linguistic assimilation would be greater for women than men. Even so, future research might employ stereotypically masculine language features (e.g., directives, references to quantity) along with feminine features when examining men's and women's assimilation to gendered avatars to fully mitigate this concern.

Conclusion

The current article provided evidence that gender-based language use in CMC is susceptible to the influence of arbitrarily assigned gendered avatars that represent oneself, especially for women. In fact, prior to our work herein, extant research on gender-based language production from a self-categorization theoretical perspective had not included the influence of technological factors, such as avatars. That features of CMC can change gender-based language is meaningful considering that gendered forms of language are consequential for communicators: Tentative language encourages judgments of incompetence and low status compared with direct styles (Carli, 1990; S. A. Reid et al., 2003), and references to emotion foster ratings of intelligence and pleasantness (Mulac, 2006). Such language-effect outcomes are especially noteworthy in CMC when other social cues are negligible and language plays a central role in impression formation (cf. Walther, 1993, 1996). Additional research on the linguistic assimilation to a virtual gender identity, therefore, would be advantageous to increase the understanding of when, how, and why men and women communicate similarly and differently.

Authors' Note

An earlier version of this article was presented at the annual conference of the International Communication Association in Chicago, 2009.

Acknowledgment

The authors thank Howie Giles and two anonymous reviewers for helping improve the effectiveness of this article.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

Funding

This study was financially supported in part by the Institute of Communication Research, Seoul National University.

Note

1. The social identity model of deindividuation effects (SIDE model) is a specific version of self-categorization theory focusing on CMC contexts (Postmes, Spears, & Lea, 1998,

2002), which is akin to other instantiations of the theory with a specific focus, such as the self-categorization theory of social influence (Abrams & Hogg, 1990). Even though we could have explicitly drawn on the SIDE model to the same avail, we chose to highlight self-categorization theory because (a) doing so is consistent with past language and gender research in CMC (cf. Palomares, 2004, 2008) and non-CMC contexts (S. A. Reid et al., 2003) and (b) the SIDE model is deeply rooted in self-categorization theory and thus would draw on the same explanatory mechanism to make identical predictions in the current investigation (cf. Lea, Spears, & De Groot, 2001; Postmes & Spears, 2002).

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