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CASA, WASA, and the dimensions of us

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ABSTRACT

In this paper we replicate and extend the work of the Computers are Social Actors (CASA) researchers who repeatedly found evidence that humans treat computers with typical social norms as if they were humans. We performed a between-subjects 2×2 factorial experiment to test our hypotheses as well as an exploratory factor analysis to further refine and validate a construct which measures politeness. We retest the CASA hypothesis and found that our new hypothesis – Websites are Social Actors (WASA) reduces the CASA effect in contexts where individuals form a social attachment to websites instead of computers. We found evidence that suggests humans can exhibit politeness toward websites and literally (not virtually) treat them as social actors. Finally, we tease out the elements of politeness as a construct and identify the key items in the instrument for data reduction, and initiate efforts towards establishing reliability and construct validity. As we shall see, the results of an exploratory factor analysis are quite consistent to recent research in social cognition, and suggest that the politeness construct may be tapping similar and fundamental components of how humans engage with others in their social world.

1. Introduction

When faced with a situation in the presence of another individual, one has a variety of possible responses that will help guide the "situational properties" of the context (Goffman, 1963). Humans are unequivocally social. Most people engage in social interactions on a regular basis, with wide variations in the particular category of others (e.g., with peers, siblings, co-workers, parents, children, bosses, and strangers), as well as wide variations in context (e.g., at work, at school, at the office, on a team, and in a laboratory). Accordingly, the social knowledge humans must acquire to negotiate the complexities of these environments is substantial. In fact, our evolutionary responses to this demand may have driven the very nature of our cognitive abilities (Dunbar, 2003; Flinn, Geary, & Ward, 2005; Sterelny, 2007). A consequence of such demands on a boundedly rational human is that components of social interaction can be automated as pre-defined scripts and influence (especially initial) interaction without conscious deliberation (Langer, 1992; Langer & Abelson, 1972; Langer, Blank, & Chanowitz, 1978). Whether specific scripts are accumulated by social learning as norms (Fine, 2001) or even have a more evolutionary neurological basis (Bargh & Williams, 2006), the immediate behavioral manifestations are the same – with few cues and under relatively simple circumstances, humans can subconsciously engage knowledge that drives their subsequent behavior in a particular direction in social situations (Fiske, Cuddy, & Glick, 2006; Schacter, 1992). These responses are implicit and are unconsciously primed (Schacter & Buckner, 1998; Uleman, Saribay, & Gonzalez, 2008). Recent research has revealed that the human brain appears to process thinking about other humans (especially thinking about social situations) in a substantially unique manner (Harris, McClure, van den Bos, Cohen, & Fiske 2007; Mitchell, Macrae, & Banaji, 2006). People are preconditioned, primed and neurologically prepared to interact with other people.

What becomes increasingly interesting is that our unconsciously primed preconditioning on how we interact with others has translated into social norms that we apply to our interactions with technology. In this paper, we focus explicitly on replicating and extending one of the first empirical studies that uncovered this phenomenon. Our replication is of a particular study (Nass, Moon, & Carney, 1999) that has served as a canonical example of a set of efforts of a paradigm known as CASA – Computers are Social Actors. That study addressed one simple question: Are people polite to computers? Surprisingly, the study revealed that people were indeed polite to computers. Replication, of course, is a necessary component of research growth and control in science (Huxley, 1965; Popper, 1968), so we will re-examine the politeness hypotheses in respect to computers. However, the CASA research presented up to this point has focused only on standalone or networked computers as the unit of analysis – that is, the actual physical device that delivers the content with which humans interact. With the growth of the Internet, research has also begun to investigate the complex dimensions of social presence in websites

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(Hassanein & Head, 2007), but without specifically applying the CASA theory. Our research specifically examines the extent that this politeness phenomenon applies both to websites and to the physical devices through which the websites are accessed. We augment the CASA paradigm with a new WASA hypothesis – Websites are Social Actors. The primary focus in this work is to discern whether the politeness construct applies to devices or the interactive content delivered by the devices – computers or websites? En route to that end, we begin to tease out the elements of politeness as a construct and identify the key items in an instrument for data reduction, and initiate efforts toward establishing a simple, but effective instrument to assess politeness in such settings. Politeness response has been associated with numerous outcomes including compliance (Ohbuchi, Chiba, & Fukushima, 1996), perceived advice effectiveness (Goldsmith & MacGeorge, 2000), dominance (Dillard, Wilson, Tusing, & Kinney, 1997), and learning outcomes (Wang et al., 2008). Since the definitions of politeness have "shown considerable divergence and lack of clarity" (Meier, 1995), our analysis helps validate the original CASA work on politeness. As we shall see, the results of our research indeed supports the WASA hypothesis suggesting a mere presence effect of website interaction. Our exploratory factor analysis of the instrument results, although preliminary, are quite consistent with research in social cognition and social neuroscience, and suggest that the politeness construct may be tapping similar and fundamental components of how humans engage with others in their social world.

2. Prior research

2.1. Computers are Social Actors

The CASA paradigm, or perhaps more appropriately the CASA hypothesis, is derived from a more general theory called the Media Equation (media = real life) that emerged from a wide variety of studies investigating human responses to media (Reeves & Nass, 1996). The core findings of CASA seem unequivocal – humans tend to employ social rules of engagement when interacting with a computer that are equivalent to those engaged when interacting with another human being. For example, these studies have revealed that individuals can attribute gender stereotypes to computers (Nass, Moon, Fogg, Reeves, & Dryer, 1995), can identify with a computer as a teammate (either positively: (Nass, Fogg, & Moon, 1996), or negatively: (Johnson & Gardner, 2007)), can be influenced by politeness or flattery from a computer (Fogg & Nass, 1997; Johnson, Gardner, & Wiles, 2004; Mayer, Johnson, Shaw, & Sandhu, 2006) can recognize and react to differing "computer personalities" as they would to human equivalents (Moon & Nass, 1998; Nass et al., 1995), will provide social appropriate responses to a computer (Moon & Nass, 1998), are influenced by ethnic cues (Dotsch & Wigboldus, 2008; Pratt, Hauser, Ugray, & Patterson, 2007), and demonstrate and strongly react to social exclusion by a computer (Zadro, Williams, & Richardson, 2004). The theoretical stance of the CASA hypothesis is anchored in the study of individuals' social responses to media and contingent upon how these responses are engaged by social presence (Reeves & Nass, 1996). Therefore, the overarching hypothesis of all CASA experiments has been that given minimal social cues technology still exhibits adequate social presence to evoke social response from humans. In our case, the social response is being polite.

2.2. Social presence and social response

Social presence is here defined as the level of human-characterized communication implied by media so that an immediacy effect will allow an individual to mindlessly interact socially with that media (Reeves & Nass, 1996). Consistent with findings in social psychology (Langer & Abelson, 1972; Langer & Moldoveanu, 2000), individuals who exhibit CASA biases do so unknowingly and in response to remarkably simple and coarse cues of social interaction (Reeves & Nass, 1996). In addition, these types of findings (of subconscious response) are supported by research in social neuroscience where, for example, people can draw trait information from a face after an exposure of only 100 ms (Willis & Todorov, 2006) and reveal implicit racial attitudes via rapid amygdala activation (Phelps, Cannistraci, & Cunningham, 2003), as well as several other social response phenomena (Evans, 2008; Lierberman, 2007). Although the evidence is inconclusive on the module-specificity of social neurological processes, there is growing evidence that generally supports the idea that social contexts evoke "deeper" influences and responses, integrating automatic and deliberate thought, than previously thought (Beer & Ochsner, 2006; Behrens, 2009; Mitchell et al., 2006) and appears to support the notion that social psychology/cognition is a type of natural kind (Mitchell, 2009; Saxe, 2006). Thus, the basic scripts guiding social interaction with computers, just as those guiding social interaction with others (e.g., Shank & Ableson, 1977), can be engaged and influence behavior without substantial deliberation – they are "mindless" responses based on overuse of human social categories, over-learned social behaviors, or premature cognitive commitments to a perspective (Nass et al., 1995) as similar "mindless" responses often occur in social contexts with humans (Langer, 1992, 2000; Nass & Moon, 2000).

3. Study hypotheses

3.1. CASA hypothesis

Although efforts are expanding on discerning how media properties in general (Biocca, 1997; Lee, 2004), and properties of web technologies in particular, enhance social presence and effects (e.g., Hassanein & Head, 2007), with interesting, but as of yet unequivocal, results investigating anthropomorphic factors (e.g., Gong, 2008; Han, Jang, Humphreys, Zhou, & Cai, 2005; van Vugt, Konijn, Hoorn, Keur, & Eliens, 2007), our work focuses on the consequence of minimal (and established) cues of the prior study to discern "mere presence" impact on a phenomenon, analogous to the mere presence research in social psychology (Argo, Dahl, & Manchanda, 2005; Guerin, 1986; Latane, 1981; Markus, 1978; Zajonc, Wolosin, Wolosin, & Loh, 1970).[1] That is, we are further examining a phenomenon – politeness to a non-human artifact – and testing near the edge at which there is the "big switch" from (social) absence to (social) presence, but without substantial (or any) cognizance of the switch itself, or its consequences. The interpretation of presence in this work is not spatial or physical as in being in a room or some virtual space ("being there"), and is not addressing copresence ("being there with someone else"), but a more fundamental and abstract sense of simply "being together" with another individual (Biocca, Harms, & Burgoon, 2003). Our manipulated units are minimal: neither characters nor icons, but simply text-based interactions with a website.

The interesting and important element of CASA work we are replicating is that it "cleanly" demonstrated social presence (as determined by the politeness scale) of an artifact possessing very few anthropomorphic properties. In general, the simple cues that appear to activate these social response scripts with computers

[1] In the social psychology literature, "mere presence" classically refers to situation where another individual, or individuals are believed to be extant in the task at hand, functioning much like an audience (sometimes this has been called an audience effect). It addresses the impact of establishing the minimal element of a social context – someone else is present (or believed to be present). In our use of the term, we also address the impact of establishing a minimal element of a social context – the use of cues to suggest the (mere) presence of social interaction.

include the use of language (as text), interactivity, and voice (Nass, 2004). Language by its very nature is a unique and neurologically supported human capacity, though the extent is in discussion (Deacon, 1997; Pinker, 1994), serving as a cue for social settings and a *tool* for social coupling (Semin, 2000). Furthermore, its engagement as dialogue (in the broadest sense and in virtually any form) *establishes* social coupling as it is essentially embodies both individual and social processes (Clark, 1996). Finally, the particular form of language as speech (vocalizations made and heard) engage uniquely human neurological components that again cue social interaction (Nass & Gong, 2000). Using two of these cues in minimal form (interactive text), the original work has demonstrated that computers could engage social response scripts in a mindless manner (CASA). Our work seeks to determine if, again with these two minimal cues, websites can engage those same social response scripts (WASA). If they do, social presence will be evidence in the judgments of *politeness*. In the original study, participants interacted with a computer (text-based) in a tutorial session (presentation of a series of facts), followed by a testing session of multiple choice items allegedly based on the prior session, and concluding with a scoring session where the computer would provide evaluative commentary on the participant's performance (on the test). Upon completion, the participant would then fill out a questionnaire enabling the participant to rate extent to which (using a 10-point scale) 21 attributes (single adjectives, such as accurate, fair, fun, and friendly) described the tutoring and scoring sessions (rated separately). A single factor politeness score was defined by the average of all item responses. The critical manipulation was the source context for completing the questionnaire: complete the questionnaire at the *same* computer on which the session was held, move to a *different* computer to complete the questionnaire, or complete a *paper-and-pencil* version of the questionnaire (Nass et al., 1999).

The results demonstrated that participants exhibited an unequivocal socially-based politeness behavior (a type of interviewer bias) when evaluating a computer-based tutor's performance on the same computer versus when the evaluation was done using a different computer or paper-and-pencil.[2] This bias is a type of social desirability response where individuals feel they must respond more positively to a first-person source asking for a self-evaluation [“How did *I* do?”] than when the evaluation is performed by a third party [“How did *she* do?”] (Nass et al., 1999). Nass argues that this result is based on the mere presence of the interviewer instead of any particular characteristics of the interviewer (Nass, 2004). In our experiment, participants interact with websites accessed via a computer. If the CASA hypothesis withstands, computers (as devices) will hold the ultimate rhetorical contract (over the websites) with the user and social presence will be “attached” to the machine. Therefore, our first hypothesis addresses the original CASA finding:

H1. Computers are Social Actors: CASA Hypothesis. Users will be more polite when evaluation feedback is solicited by the same computer on which they received a tutorial than by another computer.

3.2. WASA hypothesis

As noted, the CASA research has focused on standalone or networked computers and has established that computers can engage social response scripts. But can websites be social actors? Researchers *presume* they can, but our goal is to *demonstrate* they can, unconfounded with the machines used to access them. Now that more and more computer-based human interaction is web-based instead of application-based, this is an important research question left unaddressed by the CASA researchers. We suggest the process may work as follows. As the interaction with websites is one-to-many with a computer (i.e., one computer can access many websites), the social presence of the computer demonstrated in early studies (with a one-to-one mapping from computer to application) may be usurped by the websites. This would occur as three things happen. First, the one-to-many access mappings alter the *role* of the computer (in these situations) from a source of contact (for information and engagement), to that of a tool for accessing sources of contacts (i.e., “getting to a website”). Second, websites (as sources of information and engagement) afford a critical social cue to alter attention and increase social presence – interactivity. Finally, and as a consequence of the previous two, substantial focus shifts to the different contextual object, a website, whose social status is elevated sufficiently (though not consciously) to engage social response scripts (through text and interactivity). As the computer becomes less visible as the foci of attention shifts to that which is accessed, so does its social presence. A rhetorical contract of engagement (Ramey, 1989) now is tacitly assumed between the human and the website – the two are now *socially attached*. If this occurs, then the politeness responses evidenced in the Nass et al. (1999) study should be influenced by interacting with particular websites, and not by the particular computer on which these websites are accessed. This leads to our second hypothesis, which extends the CASA paradigm:

H2. Websites are Social Actors: WASA Hypothesis. Users will be more polite when evaluation feedback is solicited by the same website on which they received a tutorial than by another (unaffiliated) website.

3.3. Social attachment hypothesis – CASA vs. WASA

Finally, we explore if and where social attachment can occur (as we have defined it) when human–computer and human–Internet interactions both suggest social presence and can both engage social responses in competing contexts. With two sources of social presence, there are two possibilities for social attachment. How will they interact? For example, in the CASA studies, there was a social attachment to a physical computer. Moving to a different physical machine defined a different social attachment and elicited a different social response. Past studies accounted for the “physical distance” between the participant and the source (Nass et al., 1999), but in our case, the website and the computer reside in virtually the same location. Therefore, physical distance cannot predict which source participants would consider the most immediate. Rather, as we noted, it is the conceptual difference, rather than physical distance, that may drive shift in social attachment. As users seamlessly switch their attention from one website to another on the same computer, their focus is seen as “through the box” and not “in the box”. As users move to different computer, will the rhetorical contract with websites be broken? We suggest that it will not. Hence, our final hypothesis:

H3. Social Attachment Hypothesis. Users will develop social attachments to websites rather than to (physical) computers as evidenced by politeness responses.

The final component of our study is exploratory. As the original study incorporated a 21-item instrument collapsed as a single factor over the two sessions (tutoring, scoring), we conducted an

[2] In the original paper, two studies were conducted. The first used text-based displays from the computer as described, while the second study used voice-based output from the computer. The results of the second study supported the first. Because of this result, and the more common interaction form of text-based web access, we addressed only the first study form. Furthermore, because of the equivalence of the paper-and-pencil results, we eliminated that manipulation from the study.

exploratory factor analysis to the results of each item set separately to determine opportunities for data reduction, search for multidimensionality of underlying factors, and thus suggesting a design for a more efficient instrument. We believed that the two contexts (rate the tutorial session, rate the scoring session) were sufficiently different to engage different responses, and that the former context (tutoring) reflected the more likely representation of social encounters on the Internet. Therefore, we would test the reduced item set of the tutoring session against the proposed hypotheses to see if the original results would hold.

4. Methodology

4.1. Design

A between-participants 2 × 2 factorial experiment was conducted. All participants engaged a website that offered a computer-based tutorial located at a simulated website (eBusiness Tutor.com) on business topics, were then presented with a quiz on those topics by the website, followed by feedback from the website on their performance. Participants then evaluated their experience with the *tutorial* component of eBusinessTutor.com and then their experience with the *scoring* component (quiz and subsequent feedback provided) of eBusinessTutor.com. Participants were randomly assigned to one of four evaluation conditions, based on whether they would interact with an evaluation model provided by the same website (Website-Same) or directed to another third-party website (Website-Different), and whether they would remain at the same computer on which they received the tutorial (Computer-Same) or move to a different computer located across the laboratory (Computer-Different). Fig. 1 is a graphical representation of the experimental design.

4.2. Participants

Seventy-two undergraduate business students from a large southeastern university were chosen to participate in this experiment and received extra course credit for their involvement. Demographic information such as gender, age, and national origin were not captured as they were not reported in the original study. Analysis of post-experimental questionnaire data revealed no significant differences between condition groups on responses to questions addressing web use and familiarity ($F(3,68) = 0.27$, ns), comfort level on making web purchases ($F(3,68) = 0.83$, ns),

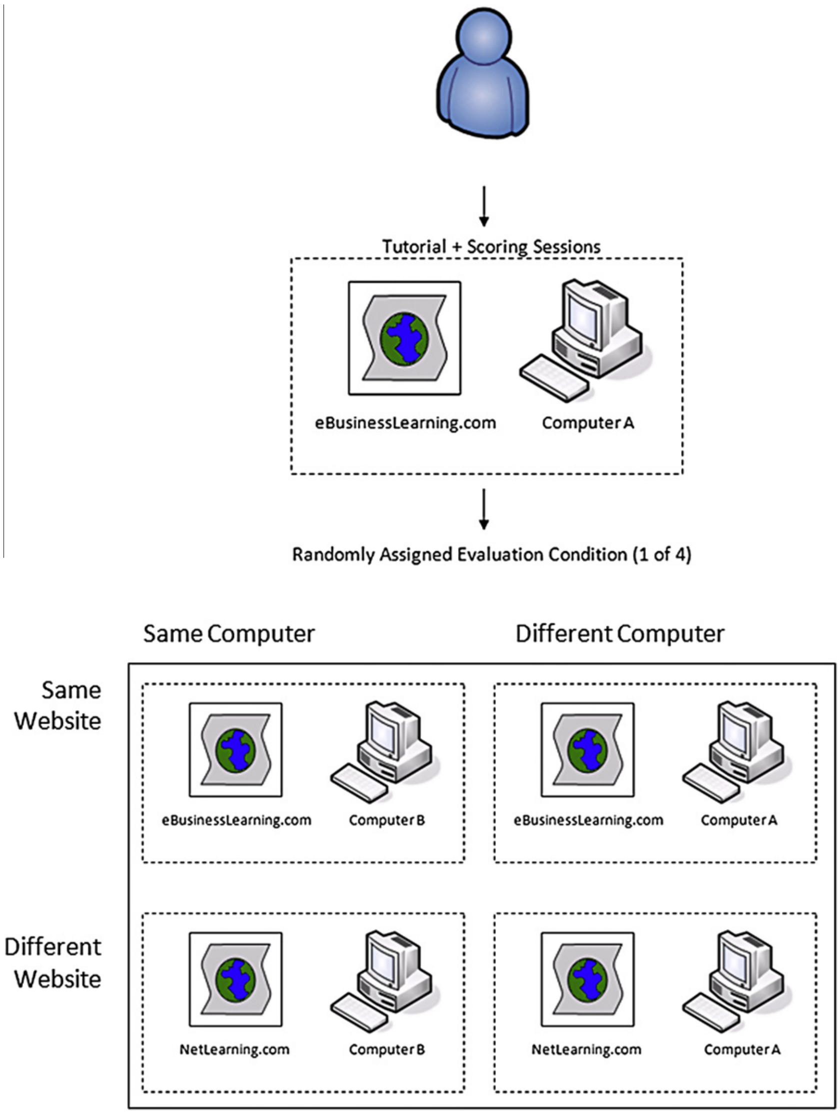

Fig. 1. Experimental design.

knowledge and experience of basic web technology ($F(3, 68) = 0.98$, ns), and trust in computer tutors ($F(3, 68) = 1.54$, ns). The descriptive statistics for these dimensions are given in Table 1. All values are based on a 9-point Likert scale. The experiment involved deception (the "reality" of the visited websites) and received approval by the appropriate review board of the university.

4.3. Materials

The participants used personal computers running Windows in a university research behavioral laboratory. Participants engaged the tutorial at the eBusinessTutor.com website, which was simulated using Authorware 5.1 (and also used to collect response data). The content of the eBusinessTutor.com tutorial addressed a series of topics about e-commerce, careers, and business etiquette. Participants viewed the Authorware application through a web browser and interacted predominantly through mouse clicks. Participants who were in the Website-Different condition provided feedback on their eBusinessTutor.com experience as prompted from a different website, NetLearning.com, which was also simulated using Authorware 5.1, accessed through a web browser and used to collect response data. NetLearning.com was described as an independent, third party site that collected evaluation data for their clients (in this case, eBusinessTutor.com) and their responses would be anonymous.

The post survey was designed to ensure that the manipulation checks and assumptions made in the study were valid. For instance, students were asked how many websites they visited to see if they realized that they went to different websites. They were also asked questions to determine if they perceived social presence in the model in terms of cues suggested by Nass (2004): the tutor website's apparent level of interactivity, method of communication, and appropriateness in taking the role of a tutor. As noted, the survey also tried to capture students' levels of familiarity with computers; whether or not they thought they would respond differently if they were part of another condition, and if they understood the true purpose of the study.

Table 1
Descriptive statistics, $N = 72$.

	N	Mean	*SD*
WebUse	72	8.47	1.784
Comfort	72	7.61	2.274
Experience	72	6.86	2.177
Trust	72	6.79	2.331

4.4. Procedure

The participants were first given verbal instructions and then provided with a form of consent, which they signed to participate in the study. The web browser (Internet Explorer) directed the participants to a fictitious website called eBusinessTutor.com. Participants were told that they would be learning facts related to e-commerce, careers, and business etiquette from this website and later tested on what they had learned. They were also told that the website would provide them feedback on how they performed on the test. A deceptive element paralleled the original study – all students were told that they answered 8 of the 12 test questions correctly, thus inducing a level of uncertainty in the process. In addition, the participants were told that the tutoring session would be interactive. They were also told that the purpose of the study was to evaluate the performance of the eBusinessTutor.com (Fig. 2) in order to research the benefits of distance learning through the Internet. These deceptions were revealed to the participants via an additional debriefing e-mail sent after the study was concluded.

Participants were also told that they would have the opportunity to then rate the tutor. In the Same-Website condition, the website that supplied the tutorial (eBusinessTutor.com) also supplied the instrument for participants to rate its performance. Performance ratings were divided into two sections. Participants received questions that allowed them to rate the "tutoring" session as well as a "scoring" session of the simple exam that followed the tutoring session, which included the feedback from the website on performance. In the Different-Website condition the participants

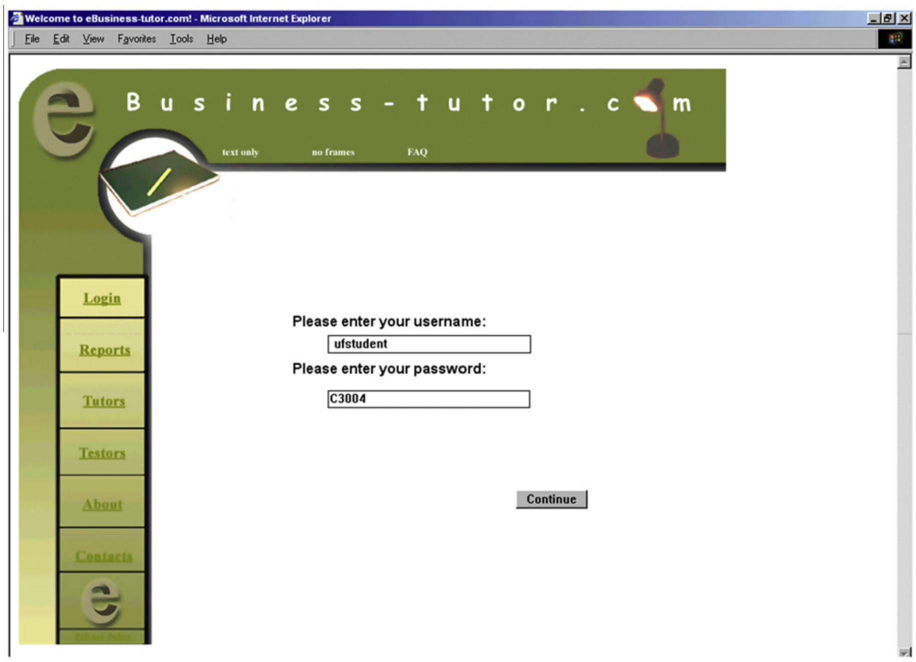

Fig. 2. eBusinessTutor.com Website.

were told that they would be going to an independent third-party website to evaluate the performance of their tutor (NetLearning.com, Fig. 3). Depending on the group, the evaluation of the tutor was done either on the Same-Computer or one across the room (Different-Computer).

4.5. Measures

The evaluation of the tutor and scoring sessions consisted of twenty-one adjectives presented as a 10-point Likert scale, and students rated them from one (describes very poorly) to 10 (describes very well). The adjectives for the *tutoring* session were analytical, competent, enjoyable, friendly, fun, helpful, informative, knowledgeable, likable, polite, useful, and warm. The adjectives used to evaluate the *scoring* session were accurate, analytical, competent, fair, friendly, fun, likable, polite, and warm (Nass et al., 1999). Paralleling the original studies, the average of the 21 adjective ratings across both sessions was obtained to serve as an aggregated participant evaluation of the eBusinessTutor.com experience that we refer to as *Undifferentiated Politeness* ($\alpha = 0.955$). Condition means, standard deviations, and observations are reported in Table 2. ANOVA results are reported in Table 3.

Table 2
Means and standard deviations for undifferentiated politeness.

Factor				
Website	Computer	*M*	*SD*	*n*
Same	Same	6.73	1.28	17
Same	Different	6.03	0.72	19
Different	Same	5.62	0.72	17
Different	Different	6.14	1.21	18

Table 3
Analysis of variance for combined undifferentiated politeness.

Source	df	MS	*F*
Website (W)	1	4.24	4.28*
Computer (C)	1	0.13	0.13
W × C	1	6.48	6.48*
Error	67	1.03	

* $p < .05$.

5. Results

5.1. Manipulation check

Questions in a post survey captured information for a manipulation check. All questions were asked using 10-point Likert scales. First, since an interaction has to occur to evoke a social response, we asked participants how much work they (the participant and the tutor) performed to complete the task (1 = I did all the work, 5 = Work was equally divided, 10 = eBusiness-tutor did all the work). Participants felt that the work was shared fairly equally between themselves and the tutor ($M = 5.9$, $SD = 1.71$), and there were no significant differences across the four conditions. Overall, participants believed that the tutor gave them a score based on their actual performance ($M = 7.19$, $SD = 2.18$); therefore, the manipulation check to ensure that the deception was not detected by the participants was successful. Most importantly, participants reaffirmed that their evaluation of the tutor would have been the same had they done the evaluation within any of the other conditions (Website $M = 8.18$, $SD = 1.79$; Computer $M = 8.69$, $SD = 1.59$). Again, there were no significant differences in responses across the four conditions. Since our results did find significant differences in the evaluations, this suggests that participants did not know that their evaluations suggested a socially desirable politeness response toward the tutor.

5.2. Undifferentiated politeness

As the results show, there was no significant main effect for Computer ($F(1, 67) = 0.13$, ns, $\eta_p^2 = 0.002$) offering no support for Hypothesis H1. Thus, participants did not vary in their undifferentiated politeness scoring when they evaluated their experiences with eBusinessTutor.com on different computers. However, they did differ in undifferentiated politeness scoring when a third-party

Fig. 3. NetLearning.com Website.

website did the evaluation, as a significant main effect for Website was found ($F(1,67) = 4.28$, $p < .05$, $\eta_p^2 = 0.060$), supporting Hypothesis H2, the WASA hypothesis. When interacting with a third-party website rather than the eBusinessTutor.com, participants scored their experience with eBusinessTutor.com significantly lower on undifferentiated politeness. Finally, the WASA hypothesis held only when participants remained at the same computer as a significant interaction effect occurred between Website and Computer ($F(1,67) = 6.48$, $p < .05$, $\eta_p^2 = 0.088$), not supporting Hypothesis H3 in total, but making it contingent. Thus, when participants were at the same computer, the context of a social presence shifted from the computer to websites; the movement to a different computer apparently disrupted the social presence effect of the website as measured by undifferentiated politeness. When accessing websites on the same computer, web afforded more social presence than the machine.

5.3. Differentiated politeness

As noted, the general dependent measure was undifferentiated politeness defined as single factor average of 21 responses to questions covering attitudes concerning the interaction experience with the tutoring website. In order to further refine the metric, we conducted an exploratory factor analysis of the item sets. Furthermore, we separately analyzed the data from the two evaluation contexts (tutoring and scoring) to determine if there were underlying variations in structure resulting from two evaluation context effects. For each, a principle axis factor method was used to extract the factors and subject to oblique rotation (Costello & Osborne, 2005). Dimensionality was conservatively determined by a scree test (Cattell & Vogelmann, 1977; Costello, 2005). Both the Kaiser–Meyer–Olkin measure of sampling adequacy (tutorial data, KMO = 0.89; scoring data, KMO = 0.76) and Bartlett's test of sphericity (both $p < .001$) supported the viability of the analysis. The factor loadings are presented in Tables 4 and 5 for the tutoring and scoring contexts, respectively.

The results suggest that different structures indeed underlie the factors brought to bear in evaluating eBusinessTutor.com under two contexts: experiences with the tutorial interaction, and the scoring experiences post-instruction (quiz and feedback). Both reduced to two similar factors, with substantial reduction in items (tutorial politeness reduced by 25%, scoring politeness reduced by 33%), but varied in the items that comprised the two factors across the contexts The factor structures can be interpreted as describing how *Enjoyable* the encounter was as a social interaction (with a "tutor", with an "evaluator"), and how *Helpful* the encounter was in terms of the task context (quality of the tutorial process, quality of the evaluation process). As in interaction with human others, the pleasantness of an interaction can be orthogonal to its substantive value. Cronbach's alpha was acceptable for all item-factors (tutoring, Enjoyable: $\alpha = 0.929$, tutoring, Helpful: $\alpha = 0.891$, scoring, Enjoyable: $\alpha = 0.917$, scoring, Helpful: $\alpha = 0.814$). A Confirmatory Factor Analysis (CFA) resulted in a GFI = 0.96 for the tutoring session and a GFI = 0.94 for the scoring session. The lowest factor loading for tutoring was 0.58 while the lowest factor loading for scoring was 0.62. Given that this is an exploratory analysis to understand the dimensions of differentiated politeness and not to prove theory, these tests provide adequate validity for factor reduction, but subsequent confirmatory analyses will likely provide additional and detailed insights into the underlying model.

Given the apparent success of the differentiated politeness results in reducing the data, we reran the ANOVA using the rescaled items. First, we replicated the original analysis by substituting a combined differentiated politeness metric. This was taken as the average of the differentiated politeness terms: politeness assessing tutorial experience, politeness assessing scoring experience.

$$\text{Tutorial}_{\text{Politeness}} = \frac{\frac{1}{3}\sum_{i=1}^{3}(TF1_i) + \frac{1}{2}\sum_{i=1}^{2}(TF2_i)}{2} \tag{1}$$

$$\text{Scoring}_{\text{Politeness}} = \frac{\frac{1}{5}\sum_{i=1}^{5}(SF1_i) + \frac{1}{4}\sum_{i=1}^{4}(SF2_i)}{2} \tag{2}$$

Tables 6 and 7 show the summary data. The results were equivalent to those obtained with the original data set. A significant main effect was found for Website ($F(1,67) = 4.05$, $p < .05$, $\eta_p^2 = 0.057$) where evaluations by the same (eBusinessTutor.com)

Table 4
Factor loadings for differentiated politeness: tutoring context.

Item	Factor 1	Factor 2
Analytic	.492895	.281969
Competent	.768043*	.296757
Enjoyable	.281167	.837670*
Friendly	.511905	.546733
Fun	.164028	.882734*
Helpful	.703164*	.413946
Informative	.871285*	.129732
Knowledgeable	.732156*	.336670
Likeable	.390632	.808353*
Polite	.455147	.517276
Useful	.778427*	.366291
Warm	.469990	.641304
Variance explained†	.348	.657

* Loading >.70.
† Cumulative.

Table 5
Factor loadings for differentiated politeness: scoring session.

Item	Factor 1	Factor 2
Accurate	.052051	.812886*
Analytic	.264003	.514940
Competent	.294609	.819154*
Fair	.263919	.515139
Friendly	.707023*	.360257
Fun	.851037*	.152087
Likable	.930648*	.173849
Polite	.688682	.262115
Warm	.747828*	.320009
Variance explained†	. 372	.618

* Loading >.70.
† Cumulative.

Table 6
Means and standard deviations for rescaled undifferentiated politeness.

Factor				
Website	Computer	*M*	*SD*	*n*
Same	Same	7.31	1.54	17
Same	Different	6.14	0.97	19
Different	Same	5.76	0.97	17
Different	Different	6.44	1.68	18

Table 7
Analysis of variance for rescaled undifferentiated politeness.

Source	df	MS	*F*
Website (W)	1	6.97	3.91*
Computer (C)	1	1.08	0.60
W × C	1	15.12	8.49**
Error	67	1.73	

* $p < .05$.
** $p < .01$.

website were significantly higher than those by a third-party website; no main effect was found for moving to different computers ($F(1,67) = 0.334$, ns, $\eta_p^2 = 0.005$); and, a significant Website by Computer interaction was found ($F(1,67) = 7.32$, $p < .01$, $\eta_p^2 = 0.098$) indicating that the WASA effect disappeared when moving to a different computer. Consequently, the use of a combined differentiated politeness assessment reduced to 14 items afforded more efficient representations of the underlying constructs originally contained in the undifferentiated 21-item scale.

Our final exploratory analysis examined differentiated (i.e., 2-factor) politeness for tutorial context alone. We reasoned that the most common type of interactions involved information provision, assistance or service, rather than examinations on the information exchanged. By separating the two factors of Helpful and Enjoyable, we would get additional insight into how the factors interact within this common context. Given that this component of the instrument involved only eight items, evidence of effect would suggest an efficient mechanism to rapidly assess politeness.

Analyses of variance were conducted on the two factors for the items listed with summary information listed in Tables 8 and 9. The results provided insight into sources of the two significant effects (main web-effect, Web × Computer interaction) of the undifferentiated approach (see prior Tables 3 and 7). First, judging interactions as *Helpful* varied significantly whether the individual was interacting with the same website at which tutorials were received. When reporting how *Helpful* a website was, websites mattered but the computer on which they were accessed did not (suggesting a significant WASA effect).

Second, judging interactions as *Enjoyable* was a bit more complex for these participants. When rating the enjoyment of a tutorial experience, if the requesting website was the same as the one on which they received their tutorial, the participants' reaction differed conditionally on whether they were conducted at the same computer or not. If they were at the same computer, they rated the experience as significantly more enjoyable than if they accessed the same website from a different computer. However, the influence of the computer disappeared if they accessed a 3rd party website for the rating (suggesting a conditional CASA effect). In addition, participants at the same computer rated the experience as significantly less enjoyable if they accessed a 3rd party website, but the influence of the 3rd party disappeared if they moved to a different computer (suggesting a conditional WASA effect).

Table 8
Means and standard deviations for differentiated politeness scale.

Website	Computer	*M*	*SD*	*n*
Helpful				
Same	Same	8.00	1.51	17
Same	Different	6.93	1.57	19
Different	Same	6.28	1.47	17
Different	Different	6.71	2.03	18
Enjoyable				
Same	Same	6.76	1.56	17
Same	Different	4.57	1.90	19
Different	Same	4.62	1.54	17
Different	Different	5.72	2.09	18

Table 9
Analyses of variance for differentiated politeness scale.

Source	df	MS	*F*	η_p^2
Helpful				
Website (W)	1	16.72	6.00*	.082
Computer (C)	1	1.78	0.63	.009
W × C	1	9.85	3.53	.050
Error	67	2.78		
Enjoyable				
Website (W)	1	4.37	1.34	.027
Computer (C)	1	5.27	1.62	.011
W × C	1	47.65	14.69**	.138
Error	67	3.24		

* $p < .05$.
** $p < .001$.

5.4. Politeness scale validity

Although scale validation is an ongoing, empirical process (Nunnally & Berstein, 1994), we can present initial supporting evidence. The EFA factor loadings (Tables 4 and 5) present evidence for both convergent–divergent validity of the constructs. For additional evidence, the average correlations of within-factor items significantly differed from the average correlations of the items from the other factor (Helpful: $t(48) = 4.87$, $p < .001$, CI = .09–.22; Enjoyable: $t(34) = 7.11$, $p < .001$, CI = .22–.40).

Finally, there is interesting additional construct validity component demonstrated by viewing other measures and manipulations (Cronbach & Meehl, 1955). The resulting two factors (Helpful, Enjoyable) are remarkably similar to the Competence–Warmth dimensions found as the two core factors in a wide variety of social perception research (Cuddy, Fiske, & Glick, 2008; Fiske et al., 2006). By reducing the 21 items into these two factors that are consistent with literature and also arriving at consistent results with previous studies, this gives additional depth and validation to the CASA politeness study.

In conclusion, we examined if the politeness construct found for computers (CASA hypothesis) as defined by Nass et al. would hold for accessing websites via computers (WASA hypothesis) and how they would interact (Social Attachment hypothesis), using the undifferentiated 21-item politeness scale (Nass et al., 1999). The CASA hypothesis (Hypothesis H1) was not supported – there was no difference between politeness behaviors when moving to a different computer. The WASA hypothesis (Hypothesis H2) was supported – people were significantly more polite to the website at which they received the tutorial. The Social Attachment hypothesis (Hypothesis H3) was contingently supported – the WASA effect held only if the individuals were at the same computers used to access the websites. If individuals were at the same computer, the most polite (same website) and least polite (other website) scores were obtained. Our exploratory factor analysis generated the same results from a reduced Politeness scale of 14 items, but also generated two specific underlying constructs highly related to emerging research describing how humans automatically engage social evaluation: Helpful (Competence) and Enjoyable (Warmth). When we reran the analysis using these factors separately to tease out their impact on the politeness construct (as dependent variables, but from the tutorial-only components reflecting a more common context of use), the Helpfulness factor accounted for the main WASA effect and the Enjoyable factor accounted for the Social Attachment interaction.

6. Discussion

6.1. Contributions

This study is the first to attempt to replicate a key study underlying CASA and demonstrate how websites over the machines that access them provoke a stronger social response from humans with regard to a specific version of a social rule – politeness. Consequently, an unquestioning acceptance of this assertion would be inaccurate – switching computers decreases the social attachment to websites. This may be because the lack of realism in our study design where participants were asked to move to a different computer within the same room to continue the evaluation portion of the task. In reality, using different computers to access websites would generally occur within a lapse of time and in different locales. However, showing that the CASA effect is superseded by a WASA effect given the Same-Computer conditions is worthwhile. Other research has found that generalizations of CASA findings to small devices may not be hold (Goldstein, Alsiö, & Werdenhoff, 2002) and generalizations of CASA findings to all computer-based survey contexts may not be appropriate (Aharoni & Fridlund, 2007; Ohbyung & Sukjae, 2008). Showing evidence that websites may be treated as social actors opens up a new world of interpersonal communication norms that web designers and HCI researchers may apply in a human–website interaction model. The findings of our EFA shed light on a more refined politeness construct. As noted and confirmed by our analysis, research has converged in demonstrating two dimensions of social perception and judgment: Warmth and Competence (Cuddy et al., 2008). If the two factors are tapping into those elements, this explains components of the politeness effect: the non-conscious nature of the effect (Willis & Todorov, 2006), the difference between intent (Enjoyable) and ability (Competence) as distinct factors (Fiske et al., 2006), and the influence of social presence to engage socially cued scripts. Being able to efficiently evaluate a source and tease out a politeness effect will help us better understand social desirability bias present in any context the politeness construct is appropriate.

Approximately 76.2% of North Americans access the Internet (World Internet Usage Statistics, 2009). The Internet has replaced many traditional interpersonal interactions with online equivalents. Traditionally human roles adapted to the Internet include e-learning (Sloman, 2001), e-commerce, and survey-based research. For instance, US retail e-commerce sales were $38.7 billion in the first quarter of 2010 (US Census Bureau, 2010). According to the Pew Internet & American Life Project, 32% of Internet users have rated ‘‘a product, service or person using an online rating system” (2005). Pertinent outcomes associated with these web interactions include perceived usefulness, trust, enjoyment, consumer attitudes (Hassanein & Head, 2007), psychological capital including hope, self-efficacy, optimism, and resiliency (Luthans, Avey, & Patera, 2008), satisfaction, performance, mental workload (Thompson, Sebastianelli, & Murray, 2009), and more. Understanding the nature of the role played by both computers and websites in regard to social responses exhibited by humans is an integral part of Human–Computer interaction as a science. If websites can also evoke a socially polite response from humans (similar to computers) with relatively little social cues, it may well be that other theories of social attribution (Marakas, Johnson, & Palmer, 2000) may be applied to human–web interactions to impact a plethora of other online outcomes.

Common perspectives of social presence (Biocca, 1997; Lee, 2004) as well as current theories of anthropomorphism (Epley, Waytz, & Cadioppo, 2007) overlook the fundamental, mere presence end of the phenomena. We suggest and agree with Reeves and Nass that minimal cues can generate mere presence, and that mere presence itself can have a substantial effect on behavior (Reeves & Nass, 1996). The causal mechanisms are left to be explicated, but because these types of responses are automatic, social, and seem to result in a Warmth–Competence evaluative structure, attention may be paid to the work on automatic-controlled social evaluation research (Cunningham, Johnson, Gatenby, Gore, & Banaji, 2003).

6.2. Limitations

We see four primary limitations of this study. First, university students were used as participants in a small study, and thus may restrict generality, so inclusion of other (and larger) population samples and should ensue. If we consider that university students are somewhat more technologically literate than the general population (and assuming that it matters), then that bias may actually define a lower bound of the effect. Second, our evaluations were done closely in time. This version of more temporally-lagged and technological heterogeneity interactions should be explored and crossed with the CASA–WASA findings. Third, there is no well-defined or agreed upon definition of ‘‘politeness”, so caution should be taken when reading this type of research and clarity should be addressed when conducting it. We felt a discussion on differentiated politeness was needed because the original CASA study combined 21 seemingly diverse adjectives together in an instrument to measure a politeness effect. By performing an exploratory factor reduction, we were able to demonstrate that their instrument did successfully capture two of the main dimensions used by social psychology to measure social perception. While our analysis does give an added level of credence to the instrument used to measure politeness for this context, we by no means intend to imply that we have validated a theoretical construct to measure politeness across the board. Finally, we did not assess any key personality variables of our participants. Recent research in information systems suggest that personality factors are useful in assessing technology acceptance and use (Devaraj, Easely, & Crant, 2008), so it would be interesting to include those elements to how such individual factors impact elements of politeness, as it seems to impact social facilitation (Uziel, 2007). Many of the limitations of our study arise due to the fact that we were conducting a replication study and decidedly chose to repeat the methodology chosen by the original CASA researchers. However, we feel the necessity of accurate replication was more vital to this research than the trade offs in limitations.

6.3. Implications

This research has replicated and further refined the CASA hypothesis that social presence is evidenced by minimal cues of evocative technological objects: computers *and* websites. The metric for assessing social presence was straight-forward: ratings of interaction properties would exhibit a specific and systematic socially situated bias – politeness. When co-located in time and space (i.e., on the same computer), people were more polite to the website on which an interaction sequence occurred than a perceived third-party website.

The Internet has become a substitute for many traditionally human-based social interactions such as shopping, counseling, education, dating, and research. The immediate implications for this research address post-transaction reviews as are often done for online interactions. Many website evaluation situations are conducted following the interaction by a third party context (e.g., OfficeMax and BizRate), while others offer self-evaluation contexts (e.g., Amazon). Our work informs that stream by suggesting that designers may need to reevaluate the biases in the web-based data collection tools that could result from participants' social interaction with the website as a social actor – politeness skews evaluation responses.

Our focus on politeness is important, as research on politeness in human–computer interaction is growing (Mayer et al., 2006); however, as there is wide variance in the definition of the construct, how it is operationalized, and how it is measured, one must be careful on generalizations for practice. It is not an issue of correctness; it is an issue of precision and communication. Our explication of the politeness construct as used in these studies suggests a mediated relationship involving fundamental social perception processes. The politeness construct used in our study was found to be closely related to the fundamental constructs people use to rapidly assess their social environment: Warmth and Competence (Fiske et al., 2006).

7. Conclusion

As we set out to replicate and extend the CASA hypothesis, instead we found a main web-effect or WASA effect which suggests that at least while stationed at one computer, individuals tended to form a stronger social attachment to the websites than to the computer itself – suggesting that Websites are Social Actors. Surprisingly, the CASA effect became insignificant in this scenario. However, there was a significant interaction effect between computers and websites when individuals changed from one computer to another such that the web-effect essentially disappeared. Overall, we confirmed that there are interesting social if not interpersonal norms at play between humans, computers, and the web – showing that computers can be social actors (CASA), websites can be social actors (WASA), and evaluations for individuals, computers, and websites can be boiled down into Warmth and Competence, two dimensions of us.

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