Are People Polite to Smartphones?

How Evaluations of Smartphones Depend on Who Is Asking

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Abstract. Studies following the CASA paradigm showed that computers sending social cues elicited social reactions in their human users who e.g. adopted social norms (Reeves and Nass 1996). As these reactions were originally exclusive for human-human interactions, the derived paradigm stated that "computers are social actors" (CASA; Nass et al. 1994) referring to the theoretical concept of media equation, basically saying that "media equals real life" (Reeves and Nass 1996, p. 5). Nass et al. (1999) focused on the norm of politeness. In their experiment they showed that the evaluation of a computer was more positive if the computer itself asked for it compared to another computer asking. Our study adopts this experimental approach. However, as technology has evolved since the 1990's we replaced desktop PCs with smartphones transferring the CASA paradigm to modern devices. In a laboratory experiment, participants (n = 108) interacted with a smartphone which they evaluated afterwards. There were three different settings with (1) the target phone itself (2) another given smartphone or (3) the participants' own smartphone asking for the evaluation. Analysis of variance revealed significant differences between the first and third setting ($F[2,105] = 3.35$, $p = .04$, $\eta^2 = .06$) with evaluations being significantly better if the target phone itself asked for them. Homogeneous answers were interpreted as an indicator of dishonesty. Results revealed that evaluations on one's own smartphone were significantly less homogeneous than on the target phone ($F[2,105] = 3.20$, $p = .05$, $\eta^2 = .06$). Moreover, within experimental group 3, the participants' closeness to their own phone was shown to be significantly negatively associated with the evaluation of the target phone. In sum, results are interpreted as indicators of smartphones eliciting social norms of politeness. Hence, both the CASA paradigm and the integration of a psychological perspective constitute a heuristically fruitful approach for the analysis of users interacting with (modern) devices.

Keywords: CASA · Smartphones · Politeness · Media equation

1 Introduction

Have you ever been upset with your computer, blaming your device for not working properly? Although it was not the fault of the device but you who made a mistake? That

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was not very polite of you. However, why should you be polite to a technological device? Social norms like politeness are relevant in human-human interactions but seem to be inappropriate for human-computer interactions. A series of experiments describing "computers as social actors" (CASA) challenged this obviously correct assumption. Coming from the concept of media equation and the idea of media equaling real life (Reeves and Nass 1996), CASA studies transfer sociopsychological rules and norms of human-human interactions to human-computer interactions. Following theoretical assumptions and methodological approaches known from social psychology, they focused on social norms of human-human interactions and replaced one interaction partner with a desktop PC (Johnson et al. 2004). Hence, they revealed computers to be able to elicit social responses in their human counterparts, e.g. gender stereotypes (Lee et al. 2000) or rules of politeness (Nass et al. 1999). However, since CASA research climaxed in the 1990's, desktop PCs were analyzed, which were largely distributed and used devices back then. Today, mobile devices and especially smartphones have overtaken regarding both distribution and usage frequency. Furthermore, smartphones might have overtaken regarding characteristics of an allegedly "social actor". They accompany their owners throughout the day, supporting them regarding a variety of daily challenges and their users are consequently confronted with a variety of social cues. Thus, smartphones constitute an appropriate research object for modern CASA studies. Furthermore, politeness has been shown to fundamentally affect the interaction with a computer, thus providing a promising focus for first modern CASA studies.

Technology has evolved rapidly since the CASA studies were conducted in the 1990's. Nevertheless, empirical research focusing on modern devices is rare. Our study aims to make a contribution in closing this research gap and asks if users adopt politeness norms when interacting with smartphones, thus following Nass and colleagues (1999). We therefore ask: Do users follow social norms of politeness when evaluating a phone they had interacted with before?

2 Theoretical Framework

2.1 CASA and Media Equation: Computers Are Social Actors Which Equal Real Life

The basic idea of this paper to conceptualize the device as an entity eliciting psychological reactions was established in studies on human-human interactions reaching back to the 1990's. Being confronted with a medium sending allegedly social cues the user instinctively reacts as if interacting with another human: rules originally exclusive for human-human interaction were adopted with technological devices. As "media equals real life" our media use is regarded as fundamentally social (Reeves and Nass 1996, p. 5). However, these processes operate automatically and are not consciously controlled. Furthermore, processes are universal and almost unavoidable as "media equation applies to everyone, it applies often, and is highly consequential"(Reeves and Nass 1996, p. 5). CASA research analyzing media equation transfers social dynamics known from human-human interactions to human-computer interaction (Nass and Brave 2005; Nass et al. 1994). Hence, rules and norms of human interactions, which are originally a subject of

social psychology are transferred to settings of a user interacting with a computer (Johnson and Gardner 2007; Johnson et al. 2004). Basically, the human interaction partner is replaced by a media device which does not even need to send complex social cues to be regarded as a "social actor". On the contrary: research revealed that minimal social cues are sufficient to elicit social responses (Nass et al. 1994). Presenting text on the computer screen or giving the computer a name results in users attributing a personality to the computer. Moreover, computers appearing similar to the participant's personality were rated significantly better than computers with a dissimilar personality (Nass et al. 1995). In addition, simply telling participants that a certain computer belongs to their team (signified by a color) affected the evaluation of this computer. Both its performance and its friendliness were rated significantly better than a computer belonging to a different team (Nass et al. 1996).

Although reacting social, participants did not consciously regard computers as social beings. If asked directly, they would deny the computers' humanity. Reeves and Nass (1996) introduced an evolutionary explanation to solve this contradiction. From this perspective our human brain adapted to our early ancestors' environment. A world in which living creatures and mostly humans were the only origins of rich social behavior. Successful interactions with these other human beings sending a variety of social cues was essential for the individual's survival and reproduction. Consequently, psychological mechanisms evolved, which allowed automatic and therefore efficient processing of complex social situations resulting in the evolution of rapid, automatic reactions (Buss 2015). Today's human behavior is still affected by these adaptations. In fact, we are not adapted to the modern but to our ancestors' world, a world where no digital media were present. Thus, we are not adapted to the interaction with media devices and the cues these devices send. Consequently, if they send cues which are at least similar to social cues sent by humans, these cues will elicit the ancient mechanisms originally evolved to efficiently react to other human beings. Consequently, we automatically and unconsciously react to cues given by a computer.

In sum, social cues elicit psychological mechanisms originally evolved to navigate through our ancestors' world. Today's computers or virtual agents will trigger these mechanisms if they imitate human behavior by sending social cues – even if these social cues are rather minimal. Consequently, people will react to computers by e.g. adopting social rules originally established for interactions with other human beings.

2.2 Social Norms: Politeness and Groups

CASA research focused on social psychological factors constituting social interactions. Social norms are one of the essential factors guiding social behavior. A large amount of social psychological literature offers different perspectives and therefore definitions of social norms (Cialdini and Trost 1998). Essentially, norms refer to "folkways" (Sumner 1907) or rules which are negotiated on a group-level guiding and restricting social behavior (Sherif 1936; Triandas 1994). According to Stephan, Libermann and Trope (2010) politeness constitutes "an integral part in any human society" (p. 268). Violations of norms are carried out by the social network itself reflecting and regulating social distance, which results in both social control and group coherence (Blake and Davis

1964). Norms can be both interculturally different or universal. Brown and Levinson (1978) postulate the norm of politeness to be universal and to refer to all participants of a social interaction to feel validated and therefore happy. Politeness is a subject of research in many field calling for an interdisciplinary approach (Holtgraves 2005). However, this study concentrates on the basic principles relevant for the CASA paradigm thereby only broadly referring to Brown and Levinson (1978), who adopted the concept of the individual's "face". Goffman (1967) defined face as the public identity in terms of a public image which is shared by others. Consequently, as the face depends on others, two individuals are mutually interested in the maintenance of each other's face. Basically, this intention results in multi-faceted polite behavior. Social desirability as a fundamental challenge for social science research can be partly explained by politeness strategies. First, social desirability refers to the individual's tendency to conform with societal norms. Second, social desirability refers to the tendency to accommodate responses to the interviewer himself and his perceived preferences. Respondents follow politeness norms and avoid offending the interviewer (interviewer-based bias; Finkel et al. 1991).

2.3 CASA Studies Focusing on Social Norm of Politeness

How social norm of politeness affect users interacting with computers was described by Clifford Nass and his colleagues nearly twenty years ago. Users' evaluation of a desktop PC was affected by these users following social norms of politeness (Nass et al. 1994; Reeves and Nass 1996; Nass et al. 1999). Nass et al. (1999) conducted an experimental study. First, participants interacted with a desktop PC which "acted" as a tutor presenting facts on the topic of American culture. Second, participants were interviewed to evaluate the performance of that computer in one out of three settings: (a) they were interviewed by the target computer itself, (b) they switched to another computer, or (c) they answered a paper-and-pencil questionnaire. In line with the interviewer-based bias known from human interviewers (Finkel et al. 1991) Nass et al. (1999) demonstrated that participants would respond more positively when the computer itself asked for its evaluation compared to evaluations via paper-and-pencil and compared to evaluations at a different computer. Furthermore, they tested homogeneity of participants' evaluations with more homogeneous answers indicating dishonesty (Sproull 1986). Conforming their assumption, participants who were interviewed by the target computer itself evaluated this specific computer more homogeneously than participants evaluating via paper-pencil and via another computer. The authors concluded their findings to provide evidence that polite reactions can be elicited by a computer.

More current research on politeness strategies in human-computer interaction rather aims for optimizing the computer-based tutoring session (e.g. McLaren et al. 2011; Schneider et al. 2015). Although the session is presented by a computer, e.g. a virtual agent, this computer itself is not the main focus of interest. Instead, this research focuses on the effects of polite or impolite instructions and its effects on learning outcome, thereby deviating from CASA research. In contrast, studies on humanoid robots adopt the CASA perspective and analyze the effects of robots acting politely (e.g. Nomura and

Saeki 2009; Salem et al. 2013). However, they focus on technological devices rather emerging as part of everyday human-technology interactions.

2.4 CASA Studies Focusing on Today's Technology

Technological status quo has changed extensively since the CASA studies were conducted in the 1990's. Use of computers has become mobile with smartphones being one of the most popular devices (Pew Research Center 2018). In contrast to rather immobile desktop PCs, users carry their smartphone with them, using multiple applications for multiple reasons and independently of time and place. From a psychological perspective this pattern of usage might result in an emotional involvement with one's own phone (Walsh et al. 2011). Compared to desktop PCs, interacting with the phone integrates more variations and a larger amount of cues. Regarding the postulate that describes "computers as social actors", which referred to computers of the last century, smartphones seem to be predestined to act the part. However, CASA research on smartphones is rare. Goldstein, Alsiö and Werdenhoff (2002) analyzed personal digital assistants, but failed to replicate the results Reeves and Nass (1996) yielded. Kim (2014) showed that smartphones acting as a specialist in advertisement context were rated to be more trustworthy. Carolus et al. (2018) focused on smartphones eliciting gender stereotypes. They revealed that even minimal gender cues (pink or blue case) resulted in the ascription of gender to the phone and its performance was then evaluated gender-stereotypically.

In sum, CASA studies so far revealed computers to elicit social responses in their users, e.g. politeness effects regarding the evaluation of a computer participants had interacted with. The transfer of the CASA paradigm in general and the effects of politeness norms in particular are yet to come.

2.5 Hypotheses

In human-human interactions politeness has been found to be a social norm affecting conversational partners' behavior patterns (Brown and Levinson 1978). Nass et al. (1999) demonstrated these patterns to also occur when the conversational partner is a computer. Our study adopts the experimental design established by Nass et al. (1999) with two modifications: desktop PCs were replaced by smartphones and the paper-pencil-setting was replaced by the evaluation on the participants' own phone.

Referring to the interviewer-based bias and politeness norm, we postulate that the evaluations the target smartphone itself asks for will be more positive compared to evaluations a second smartphone asks for. If the participant's own smartphone asks for the evaluation, we hypothesize this evaluation will be even worse. Interacting with one's own phone should elicit interviewer-bias again. However, one's own phone is the interviewer now, a fact which results in users' attempts to maintain his face (Brown and Levinson 1978) and to accommodate to his perceived preferences. Following social norms in this setting corresponds to trying to avoid offending one's own phone, resulting in a more negative evaluation of the phone previously interacted with (Finkel et al. 1991).

H1: Participants will evaluate a smartphone significantly better if the phone itself asks for the evaluation compared to another phone asking.
H2: Participants will evaluate a smartphone significantly better if the phone itself asks for the evaluation compared to the participants' own phone asking.

Nass et al. (1999) also analyzed the homogeneity of responses which they postulated to be associated with the honesty of participants. According to the interviewer-based bias, we postulate that the evaluation will be more homogeneous if conducted on the target phone compared to the other phone and to one's own phone, as the latter two are regarded as being "more independent" resulting in more honest evaluations.

H3: Participants will evaluate a smartphone significantly more homogeneously if the phone itself asks for the evaluation compared to another phone asking.
H4: Participants will evaluate a smartphone significantly more homogeneously if the phone itself asks for the evaluation compared to the participants' own phone asking.

Smartphones exceed a desktop PC in frequency of usage resulting in users forming some kind of social relationship with their mobile devices. The intensity of this relationship might further influence the evaluation of the target phone, if one's own phone asked for it. Therefore, we hypothesize the closeness of participants to their own phone to be negatively associated with the evaluation of the target phone.

H5: Participants who feel closer to their phone evaluate the target phone significantly worse than participants who feel less close to their phone.

3 Method

3.1 Participants

108 volunteers participated in an experimental study at the University of Wuerzburg, Germany. They were recruited via flyers, social media postings and cold calls on the campus and were offered the chance to win a restaurant voucher. Participants' ages ranged from 18 to 52 (M 24.63 years; SD = 6.74). Gender was equally distributed (54 males). The majority of the sample was higher educated with 75.0% being qualified for university entrance and 21.3% having a university degree.

3.2 Procedure

Our study followed the approach established by Nass et al. (1999). However, we focused on smartphones instead of desktop PCs. Participants were instructed to interact with a smartphone which would guide them through their tasks. The experiment consisted of three parts: the tutoring, the testing and the evaluation session. During the tutoring session, the phone presented 20 facts, which participants were instructed to memorize. Previously, the experimenter had informed the participants, that the "tutor phone" would select these 20 facts from a pool of 1000 facts to best suit the participants' state of knowledge. Actually, all participants were presented the exact same 20 facts in the exact same order about Canada, e.g. "12.3% of Canada's total goods are imported from China"

or "On average, a Canadian woman has 1.6 children". Canada was regarded to be an appropriate topic because preliminary analysis has revealed Canada to be both a subject of lower emotional involvement and lower prior knowledge (e.g. compared to the USA). Next, within the testing session, the phone asked 12 single-choice questions referring to the topic of the tutoring session. Six questions were derived from the facts participants had been presented with before, six questions were new. After the test, the smartphone gave some feedback on the participants' performance. However, this feedback was generic, the test score reported was independent of the actual performance by the participant: "You answered 8 out of 12 questions correctly – what a great result! The smartphone provided you with helpful information and prepared you well for the test." In line with Nass et al. (1999), the self-praise of the smartphone was supposed to trigger a socially desirable and positive response. Finally, participants were randomly assigned to one out of three experimental settings to answer questions regarding the performance of the phone. The evaluation interview was either conducted by (1) the target phone itself, (2) by another foreign phone participants switched to or (3) by their own phone participants switched to. Thus, in contrast to the original study by Nass et al. (1999), we dropped the paper-pencil setting and focused on phones only. Furthermore, we took into account usage patterns of users primarily using their own phone, e.g. for the evaluation. Both the target phone as well as the second phone were Samsung Galaxy S5 models (operating system: Android). Hence, a between-subject design resulted in three experimental groups, which differed regarding the device that conducted the evaluation of the target phone. These devices asked four questions. Participants had to assess how well four adjectives described the tutoring skills of the target phone (analytical, helpful, useful, and informative). Answers were given on a 10-point Likert scale ranging from very poor to very well. The 21 items used by Nass et al. (1999) were content analytically reduced to only focus on the items which are relevant for the assessment of the competence of the phone regarding its tutoring skills. The resulting index of the mean score of these four items exhibited high reliability (Cronbach's Alpha = .91). Furthermore, participants answered using an adaption of the "Inclusion of Other in Self (IOS) Scale", originally assessing closeness in relationships (Aron et al. 1992). In this pictorial scale we replaced the other person who the participant being assessed feels close to with their smartphone. Thus the participants indicated their closeness to the phone or their involvement with their own phone. Finally, participants were debriefed.

4 Results

Table 1 shows the descriptive results of the evaluations for all experimental groups revealing that the tutoring skills of the target phone would be evaluated best if participants were asked by the phone itself. Evaluation would be slightly worse if another foreign phone asked for it and would be worst if participants switched to their own phones.

Table 1. Means and standard deviations regarding "tutoring skills" of the target phone

Target phone itself	Foreign phone	Own phone
M 7.86, *SD 2.03*	*M* 7.54, *SD* 2.09	*M* 6.56, *SD* 2.51

A one-way ANOVA between the three experimental groups revealed a significant effect of the different "evaluation devices" on the evaluated "tutoring skills" of the target phone, $F(2,105) = 3.35$, $p = .04$, $\eta^2 = .06$. Tukey HSD tests were conducted to compare mean ratings of each experimental group. Disproving hypothesis 1, evaluations on the phone itself did not differ significantly from evaluations on another foreign phone, with $p = .82$. Confirming hypothesis 2, the target phone itself asking resulted in significantly better evaluations compared to the participants' own phones asking, with $p = 0.4$. Furthermore, evaluations on a foreign phone and on one's own phone did not differ significantly ($p = .15$).

Following Nass et al. (1999) the homogeneity of participants' answers was regarded as an indicator of dishonesty. Thus, we analyzed the differences of the variances within the phone evaluation between the three experimental groups. For each of the three experimental settings separately, we computed the mean variance of every participant across the four evaluation items. This mean variance was treated as the unit of analysis in a one-way ANOVA between the three experimental groups. The analysis revealed a significant effect of the different "evaluation devices" on the mean variance of evaluations, $F(2,105) = 3.20$, $p = .05$, $\eta^2 = .06$. Once more, we conducted Tukey HSD tests to compare each experimental group. Hypothesis 3 was not confirmed, as the variance of evaluations at the same phone ($M = 1.73$, $SD = 1.15$) was not significantly smaller than the variance of evaluations at another foreign phone ($M = 1.88$, $SD = 1.15$), with $p = .84$. However, hypothesis 4 was confirmed. The variance of evaluations at one's own phone ($M = 2.39$, $SD = 1.12$) was significantly higher compared to evaluations at the "tutor phone", with $p = .05$.

Hypothesis 5 refers to the third experimental group (own phone) in particular. To control for effects of participants' closeness to their smartphone, this subgroup was divided in two separate groups by splitting them at the median ($Mdn = 3$). Of the 36 participants in the former third group, 19 people were part of the group feeling less close to their phone (group 3a) and 17 people reported feeling closer to their phone (group 3b). Afterwards we conducted an analysis of variance with the first experimental group (evaluation at target phone) and the two new groups evaluating at their own phone to test for differences in the evaluated "tutoring skill" of the target phone. The analysis revealed significant group differences, $F(2,69) = 6.19$, $p = .003$, $\eta^2 = .15$. Tukey HSD tests comparing each group were conducted. Participants in group 1 ($M = 7.86$, $SD = 2.03$) did not evaluate the target phone significantly different than group 3a ($M = 7.42$, $SD = 1.44$). However, group 1 evaluated the target phone significantly higher than group 3b ($M = 5.60$, $SD = 3.09$), with $p = .002$. Group 3a also evaluated the target phone significantly higher than group 3b, with $p = .04$. Hypothesis 5 was therefore confirmed.

5 Discussion

CASA research has revealed that social norms, e.g. politeness, originally established for human-human interactions are adopted by users interacting with a computer. The objective of this study was (1) to transfer the CASA paradigm to modern devices and (2) to examine effects on the evaluation of a phone as a consequence of which device asks for the evaluation. Therefore, this study followed the experimental design introduced by Nass et al. (1999) but focused on smartphones. Three evaluation settings were distinguished: evaluation took place on the target smartphone itself, on another phone or on the participants' own phone. The third setting particularly illustrates the differences between the use of desktop PCs and smartphones. While the former were primarily used in the office or at home, users of today's smartphones are constantly in touch with them throughout the day, which may potentially affect the evaluation. Results revealed that a smartphone was rated significantly differently depending on the evaluation setting. Results revealed only the difference between "own phone" and "target phone" to be significant with the target phone being evaluated worse on one's own phone. Thus, results confirmed hypothesis 2, but disproved hypothesis 1. Descriptive values of hypothesis 1 at least revealed that evaluations on the target phone itself were slightly, but not significantly, better compared to another phone. Analyses of the homogeneity of answers could be interpreted as one's own phone allowing participants to answer more honestly. One's own phone seems to appear as a more independent interviewer resulting in more honest answers. In addition, results point out the relevance of phone ownership associated with familiarity and a more emotional relationship. Accordingly, feeling close to one's own phone affected the evaluation of the foreign phone participants had interacted with before. Emotional aspects seem to be worth considering when it comes to users interacting with their devices.

According to the interviewer-based bias (Finkel et al. 1991) and the norm of politeness (Brown and Levinson 1978), participants seem to ingratiate themselves to a phone interviewing them. What seems to be counterintuitive has been shown by CASA studies before: electronic devices seem to elicit social responses which seem to differ depending on the individual's familiarity with the device. Consequently, it will make a difference, if the "other" phone is just another foreign phone or the participants' own phone. In addition to Nass et al. (1999), who refer to honesty as the reason for different evaluations, our results could be interpreted as an indicator for the "relationship" the participant has with the device to not only affect honesty but to trigger further social reactions. According to social identity theory (Tajfel 1978; Tajfel 1979) and group processes (Tajfel et al. 1971), interacting with one's own phone to evaluate another phone might elicit ingroup biases. As members of one's own group are favored and members of the out-group are rather derogated, the more negative evaluation of the target phone with participants' own phone asking the questions might trigger these processes.

The current study included several limitations. First, although we consequently referred to Nass et al. (1999) we modified some aspects due to the smartphone setting and due to the German population. We changed the topic of the tutoring session from US culture to Canadian culture. Preliminary studies revealed German participants to be less familiar with it as well as less emotionally involved. Thus, potential biases regarding

tutoring session were avoided. However, the facts presented by the phone differed. Furthermore, due to the decreasing use of paper-and-pencil in general and in the context of smartphone interaction in particular, we dropped the paper-and-pencil setting. Hence, we are not able to compare different types of media. Moreover, we only used a small choice of four items compared to the original 21 items. However, we concentrated on the tutoring performance of the target phone, thus only using items directly referring to this competence. Analysis of reliability revealed our short scale to be reliable resulting in a less demanding way of performance assessment. However, measures need to be evaluated and developed further to assess the performance of a tutoring device (Carvalho et al. 2017). Finally, our sample lacks diversity as participants were mainly students of the local university. Besides common criticism regarding a sample of younger and more highly educated participants than average, the sample's familiarity with smartphones is crucial. Participants needed to interact with smartphones throughout the experiment resulting in the samples' habits of media use potentially affecting the results. Future samples will need to incorporate both older and less educated participants.

In sum, results confirm the idea of phones being able to elicit polite behavior and emphasize the importance of ownership and the emotional aspects associated with one's own device. Furthermore, the underlying question if the CASA paradigm can be transferred to modern technology can be approved. Transferring the CASA paradigm to smartphones seems to be a promising approach for analyzing social phenomena in users interacting with their own and with foreign devices.

6 Conclusion

To conclude, transferring the CASA paradigm to modern devices resulting in "smartphones as social agents" has been shown to be a heuristically fruitful approach for future analyses. Smartphones seem to elicit seemingly inappropriate social reactions in their users which are the result of psychological mechanisms deeply rooted in mankind. Future research will need to analyze these rather unconscious processes and the integration of a psychological perspective will be a promising approach. Moreover, this study provides indications exceeding scientific approaches. We interact with a variety of devices (e.g. phones, tablets, smart home assistants, and robots), which might trigger social reactions developers need to be aware of. At least when it comes to the evaluation of the device itself or services it provides, users' feedback might be biased by the device which is asking and by the (emotional) relationship users have with this device.

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