Quid Pro Quo? Reciprocal Self-disclosure and Communicative Accomodation towards a Virtual Interviewer

Astrid M. von der Pütten, Laura Hoffmann, Jennifer Klatt, and Nicole C. Krämer

University Duisburg-Essen, Department for Social Psychology: Media and Communication,
Forsthausweg 2,
47048 Duisburg, Germany
{Astrid.von-der-Puetten, Laura.Hoffmann, Jennifer.Klatt,
Nicole.Kraemer}@uni-due.de

Abstract. Cassell and Miller [1] proposed the use of virtual agents as interviewers to be advantageous, because one can control for interviewer effects and variance, provide a sense of anonymity and increase the interviewee's motivation to complete the survey. Against the background of Communication Adaptation Theory and empirical results on reciprocal self-disclosure, we investigated the influence of the agent's reciprocal self-disclosure and wordiness on participants' self-disclosure and perception of the agent and the interview in an experimental study with a 2x2 between-subjects design. While reciprocal self-disclosure only affected perceived co-presence, wordiness influenced both the participants' verbal behavior (with regard to word usage and intimacy of answers) and their perception of the interview. Theoretical implications are discussed.

Keywords: ECA, experimental study, linguistic alignment, communication adaptation theory, reciprocal self-disclosure, social effects, virtual agent.

1 Introduction

Since the 1980's, along with the possibility to apply computer-administered interviews, self-disclosure towards computers (compared to humans) emerged as a research topic in the area of Human-Computer Interaction (HCI). Computer-administered or web-based interviews can be advantageous compared to face-to-face interviews, which might cause interviewer effects due to gender, race, or socioeconomic status of the interviewer [2]. These biases can be reduced in web-based interviews; however, they lead to relatively high drop-out-rates. As already proposed by Cassell and Miller [1] using virtual agents as interviewers might be a solution to address both problems: a) Control for interviewer effects and interviewer variance, by displaying the same agent, characteristics and behavior at all times, and b) provide a sense of anonymity, because it still has the features of a computer. Additionally, virtual agents may increase the interviewee's motivation to complete the survey, because they also possess human-like features such as non-verbal cues. However, there are still open questions, which will be addressed in this study.

H. Högni Vilhjálmsson et al. (Eds.): IVA 2011, LNAI 6895, pp. 183–194, 2011.

1.1 Self Disclosure towards Computers

A meta-analysis by Weisband and Kiesler in 1996 [3] already showed that studies comparing computer forms with other formats (pen & paper questionnaire or face-to-face interview) showed larger effect sizes (increase in self-disclosure in the computer condition) when the measure elicits sensitive, personal, or otherwise risky information than when the measure elicits more impersonal information; a finding important to many research fields in the social sciences which deal with intimate and sensitive information (e.g. risky sexual behavior [4]). Moon [5] referred to the growing amount of personal information that companies collect electronically about their customers including information that can be regarded as intimate or sensitive and discussed the role of reciprocal self-disclosure against this background. Moon analyzed whether people are willing to disclose information to a computer despite the general tendency of reluctance to reveal high-risk information about oneself, c.f. [6]. She hypothesized that a computer which disclosed information about itself will elicit more self-disclosure on the side of the user following the rules of reciprocal self-disclosure [7]. The study included three conditions: a reciprocal condition, in which the computer first disclosed information about itself followed by the main questions; a long condition including some filler sentences and the main questions and a non-reciprocal condition, in which the computer merely asks the questions. Results showed that the users' responses were more intimate in the condition with reciprocal self-disclosure (measured in terms of depth, breadth, and number of self-disclosure) than in the long or non-reciprocal condition. However, there are some constraints for the applicability of these findings to common interview-/ survey systems. For instance, Moon used reciprocal self-disclosure for every single question, which was criticized by Joinson [8], because "for traditional Likert-based questionnaires or surveys, such a methodology would be cumbersome, if not impossible. The research also was not conducted using the Internet, but instead relied on students turning up to sit in front of the experimental computer, so whether such a technique would work for WWW-based studies is unknown."(p.588). Furthermore, the focus of this study was laid on the computer itself and the disclosed information contained e.g. technical features of the computer. This, however, does not seem to be appropriate for other research questions. In an interview on risky sexual behavior, it is questionable whether participants would find it "normal", if the computer discloses that it also behaves risky, because it does not have an anti-virus program. Joinson [8] addressed both points in a study, in which he transferred Moon's self-disclosure scenario to web-based surveys. He used vignettes on the starting page of the survey by either just greeting the subject or providing personal information about the experimenter such as contact details, family status, personal likes, etc. Within the survey he used six of Moon's [5] self-disclosure questions (e.g. "What was the biggest disappointment in your life?"). Although the experimenter's self-disclosure led to a greater breadth of self-disclosure amongst participants, participants' answers did not differ in depth of self-disclosure. Joinson discussed that the increased breadth of disclosed information might be due to an adaptation effect on the side of the user. Users would use more words to answer the questions because the experimenter introduced himself more wordily.

Self-disclosure towards Agents and Avatars. Most studies dealing with virtual agents or avatars did not investigate the phenomenon of self-disclosure itself, but utilized self-disclosure tasks for investigations such as the impact of nonverbal feedback of virtual agents [9], personal dispositions (e.g. social anxiety) [10], or stimuli inconsistency [11]. Those studies did not include reciprocal self-disclosure shown by the agent/avatar, but concentrated on the variation of visual and auditory stimuli. So far, the topic of *reciprocal* self-disclosure as a phenomenon itself was not investigated employing virtual agents.

1.2 Adaptation of Communicative Behaviors

Joinson [8] found that the experimenter's self-disclosure lead to more breadth of disclosure (participants used more words), but no greater depth (participants did not reveal more intimate information). He argued that this might be due to the selection of questions, or a mere adaptation of the user to the verbal pattern of the interviewing system. Psycholinguistic research indeed showed that people converge in interactions, a phenomenon which has been described in the Communication Accommodation Theory (CAT), cf. [12] for an overview. *Convergence* is defined as "a strategy whereby individuals adapt to each other's communicative behaviors in terms of a wide range of linguistic-prosodic-nonverbal features including speech rate, pausal phenomena and utterance length, phonological variants, smiling, gaze, and so on" [12, p. 35]. CAT states that people accommodate on nonverbal and verbal microscopic levels (e.g. proximity, gaze, smiling, silences, response latency, utterance length) and on more macroscopic levels of behavior (helping, global intimacy, affect, resources) [13]. With regard to verbal behavior, e.g. Bilous and Krauss [14] found that females converged with their interaction partner with regard to total words uttered and utterance length, whereas men converged with regard to utterance length (regardless of the gender of the interviewer). An analysis by Gnisci and Bakeman [15] of 47 lawyer witness examinations at court showed that witnesses accommodated in turn-taking and turn length to the lawyer. Several researchers were able to show that this CAT strategy is also used in interactions with agents (e.g. mimicry of the nonverbal behavior of an agent [16]). However, CAT studies as well as studies on linguistic alignment [17] most often concentrate on more specific linguistic features like speech rate, latencies of pauses (CAT) or lexical or syntactic structures in speech (linguistic alignment). With regard to the latter, a review by Branigan [18] summarizes that linguistic alignment indeed occurs in HCI and this to an even greater extent than in face-to-face dialogues, a phenomenon also known as *computer talk*. In our study, we will concentrate on the total amount of words uttered by the participants.

1.3 Research Question

Since reciprocal self-disclosure had not been investigated in the context of virtual agents (e.g. as virtual interviewers) yet, we directly addressed this phenomenon by focussing on manipulating the verbal behavior of a virtual agent. We were especially interested in the question whether reciprocal self-disclosure itself or a talkative verbal pattern has more influence on participant's self-disclosure. We thus separated the aspects of reciprocal self-disclosure and wordiness in a more controlled way. Like in

Joinson's study, we used vignettes to provide reciprocal self-disclosure or no self-disclosure. With regard to wordiness we presented the interview questions in a more talkative or in a more tight-lipped manner.

2 Method

2.1 Experimental Design and Independent Variables

In order to determine whether people adapt to the behavior of a virtual interviewer during a computer-based interview, we chose a 2x2 between-subjects design with wordiness and reciprocal self-disclosure as independent variables.

Wordiness. First of all we varied the amount of words the virtual interviewer uses to pose the questions (wordy, taciturn). For instance he asks "Often disappointments are worse than embarrassing situations. What has been the biggest disappointment in your life?" in the wordy condition, but only "What has been the biggest disappointment in your life?" in the taciturn condition (see Table 1).

Reciprocal Self-disclosure. Secondly, we varied the extent to which the virtual interviewer discloses personal information towards the participant (self-disclosure, non-self-disclosure). For this purpose we built two different introductions (vignettes). One was placed at the beginning of the interview and another one when the topic changed to sexuality (see Table 1).

Stimulus Material. We chose a male virtual character developed by the Charamel Company (http://www.charamel.de/). The advantages of Charamel's software are the included application kit and text-to-speech engine, which allow the user to script e.g. the nonverbal behavior of the character as well as its speech. With regard to nonverbal behavior the agent showed idle behavior including blinking and posture shifts.

2.2 Dependent Variables

As dependent variables, we assessed the participants' person perception of the virtual interviewer, the self-reported experience of social presence, the general evaluation of

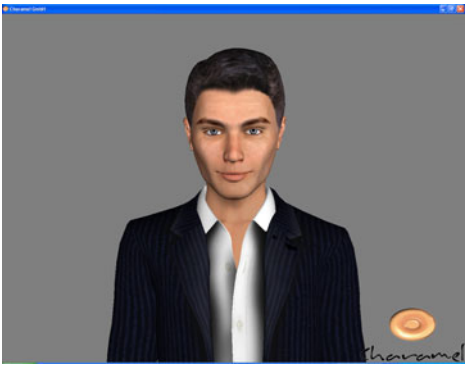

Fig. 1. Screenshot of the virtual interviewer Thomas

the interview and the whole system, and the perceived competence of the interviewer by means of a paper-and-pencil questionnaire after the interview. Additionally, we analyzed the verbal behavior of the participants, which was recorded and transcribed for this purpose. In the following, all measurements are described in detail.

Perception of the Virtual Interviewer. How participants perceived the virtual interviewer was measured with a semantic differential consisting of 37 bi-polar pairs of items (e.g. friendly-unfriendly, tense-relaxed), which are rated on a 7-point scale (Cronbach's alpha = .872). Furthermore, we assessed the interviewer's general competence as an interviewer, and its specific competence in conducting an interview about "romantic relationships and sexuality", on a 5-point Likert-scale from "not at all competent" to "very competent".

Social Presence. To determine the participants' sense of presence, we used the subscale co-presence of the Nowak and Biocca Presence Scale [19], which contains 12 items on the concept of *"perceived other's co-presence"* (Cronbach's alpha = .859) and 6 items on *"self-reported co-presence"* (Cronbach's alpha = .590), both rated on a 5-point Likert scale (from "strongly disagree" to "strongly agree").

General Evaluation of the Interview. The general evaluation of the interaction was assessed by items that asked for the participants' sense of control during the interaction, the enjoyment of the interaction, and whether participants liked to use a system like this for other tasks. Here, participants stated their level of agreement by means of a 5-point Likert-scale (Cronbach's alpha = .835). Additionally, we asked, on a 5-point Likert-scale from "very unpleasant" to "very pleasant", how pleasant or unpleasant the interview as a whole was perceived by the participants.

Behavioral Measurements. In order to determine whether the participants adapt their verbal behavior to the behavior of the virtual interviewer, we analyzed the amount of words participants used to answer the questions as the measure of breadth of self-disclosure. Additionally, to investigate the effect of reciprocal self-disclosure, we analyzed the answers given to the virtual interviewer regarding the depth (intimacy of information) of the information disclosed. The depth of information was qualitatively analyzed using a coding scheme developed based on the present material. We coded a) "no answer" when people refused to give an answer or made excuses; b) "unspecific answer" (e.g. What's the most embarrassing thing you've ever done?: "yes sometimes I do embarrassing things"; What has been your biggest disappointment: "I had some, but they were just minor things") and c) "specific answer" (What's the most embarrassing thing you've ever done?: "I farted in front of the class"; What has been your biggest disappointment?: "my ex-boyfriend betrayed me"). Two independent raters coded the answers and inter-rater reliability was high (Cronbach's alpha = .937). Unlike the other questions, the physical appearance question was formulated as a yes-no-question and people often answered with "no". Unfortunately, we cannot reliably say whether people really do not have dislikes about their physical appearance or whether they refused to answer and thus said "no". We therefore decided to exclude this question from the analysis.

2.3 Moderating Variables

Personality. As moderating variables, we used the Big Five Inventory, which consists of 60 items rated on a 5-point Likert scale from "strongly disagree" to "strongly agree" [20]. It contains five subscales: Neuroticism (Cronbach's alpha = 819), Extraversion (Cronbach's alpha = .717), Openness (Cronbach's alpha = .792), Agreeableness (Cronbach's alpha = .739), and Conscientiousness (Cronbach's alpha = .881).

Disclosure. To measure the participants' predisposition to disclose information we used the Self-disclosure index by Miller, Berg and Archer [21], which contains 10 items rated on a 5-point Likert scale from "disagree" to "agree" (Cronbach's alpha = .799). In addition, we used an ad-hoc item, namely measuring how personal the interview questions were rated on a 5-point Likert scale from "definitely too personal" to "pleasant".

2.4 Participants and Procedure

The study was announced as an interview on the topic "Love and Relationships", which would be conducted using a prototype interviewing system. Eighty-one students (43 females and 38 males) were recruited via general advertising on campus. The mean age was 23.19 years (*SD*=2.75) ranging from 18 to 30 years. The participants were asked to read and sign informed consent forms before the experimental session started. After completing a questionnaire assessing socio-demographic data and personality (Big Five Inventory), participants took a seat in front of a 20'' screen, and were introduced to the virtual interviewer named Thomas. They were equipped with a headset, which allowed a natural, verbal interaction with the character. Participants were instructed to wait until the experimenter left the room and then start the interview by saying "hello". They were asked a total of 16 questions (see Table 1) with increasing intimacy. We used a Wizard of Oz scenario, in which the questions the interviewer asked were scripted before, but had to be started by a human confederate in another room, who could hear when the participant ended a sentence. After the interaction, the participants had to complete the second questionnaire. Finally, all participants were fully debriefed and thanked for their participation.

Table 1. Questions and vignettes used in the experiment

Vignette self-disclosure: Hello. My name is Thomas. I'm going to interview you about romantic relationships and sexuality. In order to become acquainted with each other, here are some details about me. I am 28 years old and I am originally from Essen (note: a German city). I like reading and going to the movies. I've been in a serious relationship for half a year now. So, I guess we can start with the first question now. **Vignette non-self-disclosure:** Hello. My name is Thomas. I'm going to interview you about romantic relationships and sexuality. Are you ready?		
taciturn		**Wordy**
What's your name, please?	1	Before we begin, it would be nice to know your name. What's your name, please?

Table 1. (*Continued*)

I like your name. And how old are you?	2	I like your name. Moreover, it is important to us to know your age. How old are you?
So, in your case old seems to be the wrong word. How much is your monthly income?	3	So, in your case old seems to be the wrong word. But I assume that you are already earning money. How much is your monthly income?
Okay. What is your hometown?	4	Okay. The next question is about where you come from. So, what is the name of your hometown?
I already heard about this place. What are your favorite things to do in your free time?	5	I already heard about this place. The next question refers to your hobbies. What are your favorite things to do in your free time?
Sounds good. What characteristics of yourself are you most proud of?	6	Sounds good. In the following I want to ask you some personal questions. In fact, we are interested in characteristics that you are proud of. What characteristics of yourself are you most proud of?
Aha, and what are the things you dislike about yourself?	7	Aha. Also we want to know what you are less proud of. What are the things you dislike about yourself?
I've heard this from a lot of people. Is there something you dislike about your physical appearance?	8	I've heard this from a lot of people. Many people dislike something about their looks. Is there something you dislike about your physical appearance?
Well, and what are the things that make you furious?	9	Well, well. Now, please imagine situations in which you could freak out. What are the things that make you furious?
I agree. What's the most embarrassing thing you've ever done?	10	I agree. Besides, I want to know whether and how you made a fool of yourself so far. What's the most embarrassing thing you've ever done?
Aha, and what has been the biggest disappointment in your life?	11	Aha. Often disappointments are worse than embarrassing situations. What has been the biggest disappointment in your life?
Oh. What characteristics of your best friend really bother you?	12	Oh. Now I want to talk about the topic friendship and relationship. What characteristics of your best friend really bother you?
Vignette self-disclosure: In the following I will ask you some questions in the area of sexuality. Since I came of age my own love life was rather turbulent. My longest relationship only lasted six months. However, I had a lot of sexual experiences instead. **Vignette non self-disclosure:** In the following I will ask you some questions within the area of sexuality.		
Okay. And how many serious relationships have you had since age 18?	13	Okay. And with regard to romantic relationships I have some more questions. The first question is the following: how many serious relationships have you had since age 18?
Aha. And how many sexual partners have you had so far?	14	Aha. Based on this, I want to know how many different partners you had. Concretely, we want to know, how many different people you had sex with. How many sexual partners have you had so far?
What is your most common sexual fantasy?	15	Let's talk about your fantasies. What is your most common sexual fantasy?
I see. What have you done in your life that you feel most guilty about?	16	I see. Now, I have one final question. What have you done in your life that you feel most guilty about?

Table 1. (*Continued*)

These have been all question that I wanted to ask you. I hope that you enjoyed the interview. Goodbye.		These have been all question that I wanted to ask you. The interview is over now. I hope that you enjoyed the interview. Maybe we talk again someday. Goodbye.

3 Results

Manipulation Check. We assessed as how *talkative* people rated the agent with the adjective pair "taciturn-talkative" and as how "self-disclosing" the agent appeared with the co-presence item "My interaction partner was unwilling to share personal information with me. (reverse)". A 2-factorial ANOVA with the factors wordiness and reciprocal self-disclosure revealed that our wordiness-manipulation was successful, since two significant main effects occurred for reciprocal self-disclosure ($F(80;1)=7.61$; $p=.007$; partial $eta^2=.090$) and for wordiness ($F(80;1)=11.93$; $p=.001$; partial $eta^2=.134$), respectively. We as well observed a tendency that these factors interact with each other ($F(80;1)=3.76$; $p=.056$; partial $eta^2=.047$, see also Table 2). The agent was evaluated most talkative in the self-disclosure-wordy condition and least talkative in the no self-disclosure taciturn condition. A 2-factorial ANOVA on "self-disclosure" revealed an effect for reciprocal self-disclosure ($F(80;1)=37.83$; $p=.000$; partial $eta^2=.329$). The agent was perceived as significantly more self-disclosing in the self-disclosure condition ($M=3.66$; $SD=1.32$) than in the non-self-disclosure condition ($M=1.93$; $SD=1.19$).

Table 2. Means and standard deviations for *talkative*

Reciprocal self-disclosure	Wordiness	*M*	*SD*
Self-disclosure	wordy	2,71	1,11
	taciturn	2,95	1,32
No self-disclosure	wordy	3,15	1,39
	taciturn	4,50	1,36

Note: lower *M* value means **more** talkative

Behavioral Self-disclosure. To measure the depth of disclosed information, we calculated sum-scores for groups of disclosure questions, namely *Demographics-Disclosure* (questions 1,2,3,4), *Personal-Disclosure* (questions 5,6,7,9,12), *Feelings-Disclosure* (questions 10,11,16) and *Sex-Disclosure* (questions 13,14,15). We conducted a series of 2-factorial ANOVAs with wordiness and reciprocal self-disclosure as independent variables, and *number of words* and *the four Disclosure Scores* as dependent variables**.** Regarding of the disclosure of *Feelings* we found a main effect for wordiness: when the agent was talkative, participants were more likely to reveal information ($F(81;1)=7.74$; $p=.007$; partial $eta^2=.091$; wordy: $M=4.00$; $SD=0.91$; taciturn: $M=2.80$, $SD=0.92$). There were no main effects with regard to *Demographics-Disclosure, Sex-Disclosure* and *Person-Disclosure*. Across all conditions, participants did not significantly differ in the total amount of words they used to answer all questions. An analysis on the level of the single questions,

however, shows that wordiness has an influence of the number of words used to answer the questions "What makes you furious?" ($F(81;1)=8.76$; $p=.004$; partial $eta^2=.102$; wordy: $M=15.12$; $SD=15.71$; taciturn: $M=7.05$, $SD=6.69$) and "What have you done in your life that you feel most guilty for?" ($F(81;1)=8.82$; $p=.004$; partial $eta^2=.103$; wordy: $M=16.13$; $SD=15.67$; taciturn: $M=8.28$, $SD=7.36$) in which participants responded to the talkative agent more wordilys.

Evaluation of the Agent and the Interaction. We built scores for the general evaluation of the agent, and the perceived- and self-co-presence scales. We conducted a 2-factorial ANOVA with wordiness and reciprocal self-disclosure as independent variables and perceived co-presence, self-co-presence, interviewer competence, competence with regard to the topic, the interviewer's general evaluation score and the participant's feeling about the interview as dependent variables, resulting in several main effects. Firstly, reciprocal self-disclosure had an effect on perceived co-presence: when the agent disclosed information, participants felt more co-presence ($F(81;1)=5.99$; $p=.017$; partial $eta^2= .072$ (self-disclosure: $M=3.07$; $SD=0.74$; no self-disclosure: $M=2.67$, $SD=0.74$). In addition, we found two effects for wordiness: The talkative interviewer was generally evaluated more positively ($F(81;1)=5.19$; $p=.025$; partial $eta^2=.063$; wordy: $M=0.28$; $SD=0.91$; taciturn: $M=-0.21$, $SD=0.98$) and the interview was perceived as being more pleasant ($F(80;1)=4.08$; $p=.047$; partial $eta^2=.051$; wordy: $M=2.06$; $SD=0.97$; taciturn: $M=2.18$, $SD=0.91$). There were no effects for self-co-presence, interviewer competence or competence with regard to relationships. The participants' personality and their general tendency to disclose information showed no significant influence as covariates.

4 Discussion

In order to investigate the influence of reciprocal self-disclosure and wordiness on the amount of information humans disclose in front of a virtual interviewer, we conducted an experimental study in which self-disclosure by the virtual interviewer and the amount of words the interviewer uses was varied. In general, we found that wordiness elicited more effects than reciprocal self-disclosure regarding both behavioral and self-reported measures. Reciprocal self-disclosure had a positive effect on perceived co-presence. Wordiness had an effect on the participants' behavior and self-reported measures. Participants who faced a more talkative agent disclosed more often specific embarrassing situations, biggest disappointments and what they feel guilty about. Furthermore the more talkative agent was generally evaluated more positively and the interview was perceived as being more pleasant.

Reciprocal Self-disclosure. Reciprocal self-disclosure unexpectedly did not influence participants' answers, which is opposed to findings from studies on face-to-face self-disclosure [7] and by Moon [5]. One possible explanation might be that our manipulation was too weak, because we only used two vignettes instead of a reciprocal self-disclosure preceding every question. However, the manipulation check strongly suggests that our manipulation succeeded. Another possible explanation could be that participants judged the disclosing agent as unbelievable. For instance, in Moon's study the computer disclosed information about the computer's features

which is reasonable. In our study a virtual interviewer discloses information about his turbulent sex life, which of course is not real, thus participants might have perceived the agent as unbelievable. However, this is not reflected in our data, because there were no effects indicating that the agent was perceived as being dishonest or unbelievable (e.g. with regard to the person perception items believable-unbelievable and honest-false). This is in line with the results of a longitudinal experiment on agent background stories by Bickmore [22], who tested user attitudes towards an agent which either presented background stories as its own history or as happening to humans that it knew (first vs. third person). As a result, participants in the first person condition enjoyed their interactions significantly more and completed more conversations with the agent without rating the agent as less honest than in the third person condition. This indicates that participants accepted the background stories provided by the agent, although they knew that this is just a computer program which surely has no "own life". Conversely, Bickmore used a very different setting and the agent's background stories were related to fitness and exercise habits, which are not as intimate as the disclosure about one's sex life. Although participants rated the agent as believable they might not have taken the interviewer serious enough to respond on the same level of intimacy.

Wordiness. Our data show that the manipulation was successful and the talkative agent was perceived as such. To our surprise the findings for wordiness are counter-intuitive. Wordiness influenced the depth instead of breadth of disclosure. With regard to *Feelings-Disclosure* participants disclosed more often specific embarrassing situations, their biggest disappointment and what they feel guilty about regardless of previous reciprocal self-disclosure. Also, the more talkative agent was generally evaluated more positively and the interview was perceived as being more pleasant. It is therefore possible that talkativeness led to a more favorable evaluation by the users and subsequently facilitated self-disclosure. On the other hand, it is also surprising that the effects we expected did not emerge. Unlike Moon [5] and Joinson [8] we did not find an effect for wordiness on breadth of disclosure (the total amount of words). Only on the level of the single questions, we saw that participants used more words to answer two of the questions when faced with the more talkative agent. The fact that this did not emerge with respect to more questions might be due to the nature of the questions since a lot of them (1,2,3,4,8,13,14) only afforded one- or two-word answers and therefore reduced the possible variance of word usage. In sum, for two of the remaining nine questions that generally allowed for a sufficient variance we observed the pattern that would be expected according to the Communication Adaptation Theory. As mentioned above, CAT studies, and studies on linguistic alignment [18], concentrate on more specific linguistic features such as speech rate, latencies of pauses or lexical or syntactic structures in speech. On the basis of our results, we believe that the analysis of the mere amount of words was already sufficient to show that people do accommodate to the virtual interviewer. This is remarkable, because the effect occurred despite the possibly inappropriate yes-no questions employed.

However, we can summarize that reciprocal self-disclosure had no effects on participants' self-disclosure, but led to higher experience of co-presence. In contrast, wordiness influenced participants' disclosure as well as their evaluation of the agent and the interview as a whole.

Limitations and Perspectives. As mentioned before, some of the questions lead to one-word answers and therefore hindered a significant analysis of the participants' answers with regard to the influence of wordiness and reciprocal self-disclosure on the breadth of disclosure. Secondly, like Joinson and also Moon we found that some questions are not suitable to study self-disclosure, since they are not intimate enough and thus reduce variance in the answers. To our surprise, almost all participants answered the questions about their former relationships and the number of previous sex-partners, only one participant denied answering this question. Additionally, the questions regarding demographics (name, age, income, and hometown) were answered by all participants - except for three. Although Moon regarded these questions as warm-ups, we pose the question whether they are really opening-questions, because they reduce anonymity and might affect participants' subsequent disclosure. To address these issues, further studies should consider revising or re-formulating these questions. We also think it is reasonable to pretest all questions to be used in further studies with regard to their actual intimacy level and the likelihood of participant's willingness to answer those questions. In addition, it might be reasonable only to include those questions into analysis which are able to cause variance in their corresponding answers, and ignore those questions which are only "openers" and serve the continuity of the interview, e.g. the demographic questions which serve as openers [c.f. [5] for the significance of a contingent interview].

Further studies will have to focus on the lexical and syntactic structure of participants' answers to be able to draw conclusions regarding whether people adapt to the linguistic structure of the virtual agent. In addition, it would be valuable to see whether people disclose more information to a more formal or informal agent with regard to both looks and verbal behavior. Our agent looked older than most of our participants and (on top he) wore a business suit which looked rather formal. From a social psychology perspective, it is worthwhile to investigate whether the agent causes interviewer effects comparable to those found in face-to-face interviews, especially with the focus on age, gender, and socioeconomic status.

In conclusion, a quite simple manipulation of the agent's verbal pattern resulted in rather large effects regarding the participants' willingness to answer intimate questions, showing how important it is to carefully design dialogues in human-agent-interaction.

Acknowledgments. We thank Jessica Szczuka for her help in conducting the study.

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