

Recommendation acceptance doesn't cost an arm and a leg

– the increase of trust and recommendation acceptance trough an open posture

Tobias Trame

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Universiteit Twente

Supervisors:

Dr. ir. P. W. de Vries

Dr. M. Veltkamp

Table of Contents

Title	1
Table of Contents.....	2
Abstract.....	4
Introduction.....	5
Recommendation Agents	5
Trust in the Context of Recommendation Agents.....	6
Social Information to Increase Trust.....	8
Embodiment.....	9
The Current Research	14
Study 1	16
Method	16
Results.....	20
Discussion	25
Study 2	27
Hypothesis Development	28
Method	30
Results.....	36
Discussion	37
General Discussion	39
Limitations and Future Directions	44
Practical Implications.....	46

Conclusions.....	46
References.....	47
Appendix.....	523

Abstract

In previous research social information was found to increase trust levels. In the present paper, this knowledge was placed in the context of recommendation devices in e-commerce, so called recommendation agents. Two separate studies aimed to answer two central questions. First it was investigated whether social information, or more specific, the open posture of a human-like figure automatically increases the level of trust in the recommendation agent. This was achieved by exposing participants to human-like figures, that adopted an open or closed posture, while the activation level of the trust concept was measured, using a lexical decision task. The hypothesis could be largely confirmed, leading to the second study, which was designed to check for a possible effect of the activation of the trust concept on actual trusting behavior in the form of claim acceptance. This was accomplished by confronting participants with claims in conjunction with open, closed, and neutral postured human-like figures, and asking them to indicate whether they judged the claims as trustworthy. The obtained results suggest partial confirmation of the hypothesis, limited in the way that only integrity-related claims were more readily accepted when presented in conjunction with an open postured figure. Based on the results of both studies, it was concluded that two mechanisms might be held accountable for the effect of posture on trusting behavior, one more automatic, and the other more deliberate.

Introduction

E-Commerce, so the buying and selling of goods, information, and services via the world wide web, is a big business (Kalakota & Whinston, 1997). In 2005, the global volume of e-commerce is estimated at about \$2.2 trillion (Lin, 2008). With an annual growing rate of 17.5%, in 2008 annual sales exceeded the number of 2.6 billion purchases in Europe (Lin, 2008; Synovate, 2008). Behind these figures, an inestimable quantity of online shops and products is presented to the customer, which bears a problem. Which shop, and which product should the customer choose, faced with an unmanagable range of possibilities? One approach might be to ask others, whereas “others” are not bound to be human. In such a case, the source of advise can be a *recommendation agent* (RA), which can be roughly described as an automatized tool, that can be implemented on websites and has the function of recommending products and services to the customer. In the following paper, the question is discussed of whether trust as generated by the presentation of social information increases the tendency to accept a recommendation stated by a RA. The results of the study might lead to improved RAs, who's recommendations are not only more readily accepted, but which also make only shopping experiences more convenient.

Recommendation Agents

As already mentioned, advice in the context of online purchasing is sorely needed. With more and more products and shops, information overload may be a threat to the quality of the purchase decision of a customer (Jacoby, Speller, & Kohn, 1977). One way of reducing information overload and improving the online experience of customers is the use of recommendation agents (Häubl & Trifts, 2000; Grenci & Todd, 2002; Xiao & Benbasat, 2003; Wang & Benbasat, 2005; Wang & Benbasat, 2007). RAs can be roughly devided into two classes: The *collaborative/information filtering class*, and the *content filtering class*.

Collaborative filtering refers to the technique of predicting an individual's preferences based on the preferences of other people and choices an individual makes during the interaction with for example an online shop (Good, et al., 1999). The connection between "other people" and the individual can for example be established through commonly purchased products. Content filtering on the other hand requires consumers to specify their needs and product preferences, based on which the RA generates product or service recommendations (Ansari, Essegaijer, & Kohli, 2000). In this study, the focus will be on collaborative/information filtering recommendation agents, because they require no effort on the part of the user, unlike content filtering recommendation agents. Here, customers do not have to fill in time-consuming questionnaires about their preferences, which might be hindering in the adoption of the RA, because perceived effort reduces the tendency to adopt (Davis, 1989). The importance and prevalence of collaborative filtering agents can be illustrated by means of Amazon.com, the biggest American online retailer with an annual revenue of \$19.2 billion (Vertical Web Media, 2009). Amazon.com uses a variation of collaborative filtering agents, namely an "item-to-item collaborative filtering recommendation agent", which is able to make useful recommendations with minimal available data from the user. But what are the factors that determine the likelihood of following the recommendation of a RA?

Trust in the Context of Recommendation Agents

Trust is one of the crucial determinants in the adoption of recommendation agents (Andersen, Hansen, & Andersen, 2001; Xiao & Benbasat, 2003; Wang & Benbasat, 2005; Komiak & Benbasat, 2006) and technology (Muir, 1987; Corritore, Kracher, & Wiedenbeck, 2003; Dzindolet, Peterson, Pomranky, Pierce, & Beck, 2003). Besides the pure adoption of a RA, trust also determines the degree of willingness to follow advice presented on a website (McKnight, Choudhury, & Kacmar, 2002b). Given these findings, it seems valid to assume

that trust also increases the willingness to follow the advice given by a RA (Wang & Benbasat, 2005). This might be due to the fact that uncertainty is generally higher in online interactions than in face-to-face interactions (Jarvenpaa, Tractinsky, & Vitale, 2000). Trust offers a possibility to reduce this uncertainty (Luhmann, 1979). In order to examine the role of trust more thoroughly, it might be useful to define the concept of trust first. Defining trust is a difficult enterprise, reflected in the state of trust definitions, which is described as “confusing potpourri” (Shapiro, 1987). However, the most accepted definition of trust is the “willingness of a party to be vulnerable to the actions of another party based on the expectations that the other will perform a particular action important to the trustor” (Mayer, Davis, & Schoorman, 1995; Rousseau, Sitkin, & Burt, 1998). In the context of recommendation agents, this means that the user or customer is willing to accept the risk of adopting the recommendation of the agent in his or her buying decision. One important aspect of trust, which also makes a clear and widely accepted definition difficult, is its multidimensionality (Mayer, Davis, & Schoorman, 1995). Mayer et al. conceptualize trust as having three dimensions or antecedents: Competence, benevolence, and integrity. Competence refers to the assumption of the trustor that the trustee has a given degree of expertise or competence to execute the task, the trustor asked for. When the assumed competence is high, the trust or trusting intention increases. Correspondingly, it was found that expertise *of* a salesperson increases consumer trust *in* the salesperson (Doney & Cannon, 1997). Benevolence on the other hand can be defined as the trustor’s perception that the trustee intends to act in the trustor’s interest (McKnight, Choudhury, & Kacmar, 2002a). Integrity, the last dimension or antecedent, can be described as the perception of the trustor that the trustee adheres to a set of principles, which the trustor finds acceptable. To conclude, trust as defined above can increase the tendency to follow the advice given by a

recommendation agent, leading to the question of how trust can be enhanced in a RA context in the first place.

Social Information to Increase Trust

In the light of the function of trust as enhancing the tendency of adopting the advice of a RA, retailers, that offer RAs, are thus well advised to provide means, that increase trust in the customer. In a RA context, this might be achieved by providing social information of some kind. A possible explanation for this mechanism might be that people, when in a state of uncertainty, tend to engage in attributional processes to reduce their uncertainty. Furthermore, they do so in an exaggerated manner, based on minimal information. This perspective is known as the *Hyperpersonal Perspective* (Walther, 1992). In the recommendation context, receivers of a recommendation pick up small bits of social information and translate these into inferences about the sender of the recommendation. Depending on the valence of these inferences, trust increases or decreases. Retrieving the tripartite conceptualization of trust stated by Mayer et al., this means that inferences may regard the competence, benevolence, and/or integrity of the recommendation sender. De Vries and Pruyn (2007) suggested that social information affects the adherence to a recommendation via social trust and not via competence. Translated to the Mayer et al. conceptualization of trust, social information affects trust or the trusting intention via inferences of benevolence and/or integrity.

To make this more concrete, a consumer may inspect the homepage of an online shop, besides products, also containing a photo of the owner and operator of the shop. Based on the photo, the consumer makes exaggerated inferences concerning the traits and intentions of the owner. With regard to trustworthiness, the consumer may make inferences concerning the benevolence and/or integrity of the owner. The outcome of this inferential process, so the

assumption of the owner being benevolent/upright (i.e. inhering a high level of integrity) or not, determines the degree of trust in the owner. In order to summarize, social information or social cues may influence the inference of trustworthiness via inferences of benevolence and integrity, while the nature of this mechanism will be discussed in the following paragraph.

The findings cited in this paragraph were all achieved with humans as targets of trust inferences. But in a RA context, these targets are inanimate bits and bytes, or plainly stated, pieces of software. Nevertheless, the findings should also hold for computers and software. More specifically, the CASA (Computers are Social Actors) paradigm states that human-computer interaction is fundamentally social and guided by the same rules and principles as human-human interaction (Nass, Steuer, & Tauber, 1994; Hassanein & Head, 2007).

Embodiment

In the previous sections a hypothetical chain of effects was identified. It was hypothesized that social information should influence social trust, which in turn increases the tendency to follow an advice. The question remains, which mechanism accounts for these effects. A promising candidate might be the concept of *embodiment*. Embodiment refers to a conceptualization of knowledge in terms of the brain's modality-specific systems (Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005). This view on knowledge determines, how perception, memory, judgment, reasoning, and emotion are conceptualized, namely by means of the modality-specific systems, so the sensory, motor, and introspective systems of the brain. This means that everything, which is encountered in the external world, is understood through a modality. For example the movements of another person are understood through processes in the motor area of the brain, that is also responsible for generating motor activity. Not only motor actions can be understood through embodiment, there is also evidence for embodiment in the context of sensation, emotion, and even high-

level cognitions, such as abstract concepts (Wilson M., 2002; Frith & Singer, 2008; Skoyle, 2008). Consider gender stereotypes for example. These stereotypes are represented in a modal form. For instance the female stereotype consists of the motor representation of female movements, the sensory representation of typical female smell, etc. The representation of different kinds of concepts in a modal form and the whole principle of embodiment is supported by findings from the area of neuroscience. Here it was found that the neural correlate of embodiment are *mirror systems*, or *mirror neurons*. Mirror neurons are braincells, that are activated when oneself performs an action, has a sensation or has an emotion. The crucial fact is that the same neurons are activated when the same action, sensation, and emotion of another person is observed (Morris, Frith, Perrett, Rowland, & Young, 1996; Rizzolatti & Craighero, 2004; Lamm, Batson, & Decety, 2007). Also abstract concepts seem to be understood by means of the modality systems of the brain. In accordance with this, it was found that participants pulled a lever faster when primed with positive abstract concepts, while they *pushed* it faster when primed with negative abstract concepts (Chen & Bargh, 1999). So the valence of the abstract concepts was translated into concrete motor activity, which indicates that these abstract concepts were coded in a modal form. All this seems to implicate that states in other persons are understood by simulating these states in oneself, which is the central assumption of the *Perceptual Symbol Systems* (PSS) theory. As will be made clear in the following section, the PSS theory provides a framework for understanding the hypothesized increase of trust through exposure to social information.

The PSS theory, an integrative theory of embodiment, puts embodiment at the core of information processing (Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005). The theory states that so called *convergence zones* (CZ) store the pattern of activation in a given modality, for example the sound of a horse in the auditory modality. Another

convergence zone may store the pattern of activation in the visual modality, for example the look of a horse. Then, a higher order CZ merges the single modality CZs to represent the look and sound of a horse, thus ultimately the horse as a whole. When retrieved, the higher order CZ activates those neural patterns, that were active when the horse was visually and auditorily encoded. In this way, the sensation of a horse is simulated. Importantly, not only sensory and motor modalities are used for conceptualization, but also the introspective modality. This means that also an introspective CZ exists, which contains information about the internal state of the holder of the representation, that is associated with the target of the representation. One might for example feel disgust at the sight of a horse. Then disgust is integrated into the higher order CZ and therefore added to the representation of a horse and can likewise be simulated when retrieved.

Furthermore the theory states that complex concepts (or higher order CZs) are established when different aspects of one concept frequently occur together in time and space. Here one can think of for example the look, the sound, and the internal state elicited by the confrontation with a horse. So, the final concept consists of the modal representations of different aspects of the concept. When one modal representation of an aspect of the concept is activated, the whole concept becomes more activated. This is what was found by Holland et al. (2005). They exposed participant to the scent of citrus cleaner, and let them eat a cookie. Those participants who were exposed to the scent removed crumbs more often. So the smell of citrus may have made the concept of “cleaning” or “cleanliness” more active, because it was frequently paired with other cleaning-related behaviors and concepts and thus became part of the more general concept.

In this way, traits of persons may be inferred based on their behavior and other readily observable aspects of the person, like the body posture. Behaviors are encoded in terms of modalities, for example the motor actions the person makes. If these motor actions,

represented in the form of a CZ are part of a more general concept, this concept is activated and retrieved more easily. In short, a trait is inferred. Once a trait is inferred, there is a tendency to act in accordance with that trait (Dijksterhuis & Bargh, 2001). For example, when the concept “elderly” is activated in participants, they walk more slowly across a certain distance, than control participants (Bargh, Chen, & Burrows, 1996). So, the activated concept triggers behavior, that is in accordance with the activated concept.

To summarize, the observation of behavior or other apparent aspects of an individual can activate a more general concept in the perceiver. This more general concept may trigger more specific behaviors, that are consistent with the concept. This mechanism might also be held accountable for the hypothetical chain of effects, that was identified previously. More specifically, social information, like the body posture of another person, might be part of the more general trust concept. Exposure to this kind of information should lead to an increased activation of the more general trust concept. Based on Dijksterhuis & Bargh (2001) it seems valid to assume that the activation of this concept is followed by an increased tendency to act accordingly, thus in a more trusting way. How can this process be translated to the RA context?

Embodiment in the context of trust in RAs

In order to increase the tendency of RA users to actually follow the given advice, social information about the RA might be presented. In IT contexts, assistants like RAs, which are designed to facilitate all kinds of tasks executed by humans, are often implemented in the form of *embodied agents*, thus programs, that are represented in a human-like form (Bailenson, Swinth, Hoyt, Persky, Dimov, & Blascovich, 2005). In the trust context, a wide range of appearance-related aspects of an embodied agent might be relevant (e.g. facial

characteristics, clothes, etc.). But one of the most general aspects is the posture which is adopted by the embodied agent.

An open, relaxed body posture is often associated with trust (Burgoon, 1991; Cowell & Stanney, 2003). In terms of the PSS theory, the association between trust and an open posture may be due to the fact that an open posture frequently occurs together in time and space with the presence of trust or truthfulness. Burgoon et al. (2005) found that deceiving individuals frequently cover their bodies with their arms, and keep the hands in the center of the body. In other words, they adopt a closed body posture. It is likely that the cooccurrence of closed body posture and deceit leads to an association between distrust and closed body posture. Likewise, an open body posture may become associated with truthfulness. In terms of the PSS theory, the posture representation becomes part of the more complex trust/distrust concept. Consequently, the activation of a posture representation activates the trust/distrust concept. Assuming that the trust concept is of unidimensional nature with trust and distrust as the extreme ends of one continuum (Mayer, Davis, & Schoorman, 1995; McAllister, 1995; Jones & George, 1998), different types of postures should drive the activation of the concept more in the direction of one or the other extreme. The presentation of a closed posture should lead to activation in the distrust direction, and the presentation of an open posture should lead to activation in the trust direction.

As already mentioned, the activation of a concept or trait leads to a tendency to act in accordance with that concept. Therefore, the perception of an open body posture should result in more trusting behavior. The perception of a closed body posture on the other hand should result in behavior, that is more dominated by distrust.

The Current Research

In the previous sections, a chain of effects was suggested, leading from the perception of the posture of a trustee via the activation of the trust concept to more trusting behavior.

This chain of effects was tested in two separate studies. In study 1, participants were asked to complete a lexical decision task, where an artificial human figure was utilized as a prime for words of eight different word categories, that had to be categorized as words and nonwords.

The posture of the figure was varied between open and closed, while the word categories were among others “trust/distrust”, and “benevolence/malevolence”. Here the dependent variable was the time, it took the participants to categorize the words, thereby measuring the activation of the trust concept among others. Based on the literature, the following hypothesis can be derived. Exposure to a human figure with an open posture should impel the activation of the trust concept in the direction of trust. Likewise, the closed posture of a human figure should impel the activation of the trust concept in the direction of distrust. As already mentioned, de Vries & Pruyn (2007) suggested that social information may increase trust via the inference of benevolence and/or integrity. Categorizing body posture as social information, it is legitimate to state that a given body posture should have an effect on the activation of the benevolence and/or integrity concept, while in the present research the investigations were limited to the benevolence concept, because it was found that the benevolence and integrity concepts highly correlate (Schoorman, Mayer, & Davis, 2007). This concept in turn is, according to the definition of trust, part of the more general trust concept (Mayer, Davis, & Schoorman, 1995). Thus the recognition of a given posture should have an effect on the activity of the benevolence concept and therefore the activation of the more general trust concept. Based on the CASA paradigm, one can also argue that these processes should also take place when the human figure is perceived to be a computer or computer-generated automatic agent (Nass, Steuer, & Tauber, 1994; Hassanein & Head, 2007).

H1: The benevolence concept should be most active, when primed by an open postured figure. When primed by a closed postured figure, the benevolence concept should be least active. It is assumed that the activation of the benevolence concept, when no prime is presented, lies between the levels of activation caused by an open, and closed postured prime, thus showing baseline activation of the benevolence concept. These activation patterns should be analogous to the activation of the trust/distrust concept. When the benevolence concept is more active, the activation of the trust/distrust concept is driven more in the direction of trust. When the benevolence concept is least active, this drives the activation of the trust/distrust concept more in the direction of distrust.

Opposite to the benevolence concept, the malevolence concept should be most active, when primed by a closed postured figure, while it should be least active when primed by an open postured figure. Again, when not primed by any stimulus, the activation should lie between the levels, when primed by a close and open postured figure. The trust/distrust concept should be driven in the distrust direction when the malevolence concept is most active, and it should be driven in the trust direction when the malevolence concept is least active.

Comparing the activation levels between the benevolence and malevolence concepts, the benevolence concept should be more active than the malevolence concept, when primed by an open postured figure. When primed by a closed postured figure, the malevolence concept should be more active than the benevolence concept. As already mentioned previously, the activation of the trust/distrust concept is bound to the activation of the benevolence and malevolence concepts. That means that the activation is driven in the direction of trust, when the benevolence concept is more active, and that the activation is driven in the direction of distrust, when the malevolence concept is more active.

The second study consisted of 2 parts. In the first part, a variation of the task used in the first study was implemented, while in the second part, participants were asked to indicate whether they perceived different statements about a service provider as being trustworthy. The statements were combined with different versions of those figures used in the first part of the study. Thus in the second study it was investigated whether the proposed activation of trust through an open postured figure translates to the behavioral domain as indicated by the findings of Bargh, Chen, & Burrows (1996).

H2: Statements, that are presented in conjunction with an open postured figure should be more readily accepted, compared to statements, that are combined with closed postured figures.

Study 1

Method

Participants

A total of 29 individuals, 18 female and 11 male, participated in the first study. The mean age of the sample was 23.72 years, with a range of 19 – 53.

Design

In the first study a two-factor 3 X 2 within-subjects design was utilized. The first factor constituted the posture of the human figure, encompassing the following levels: 1. Open posture, 2. Control condition, 3. Closed posture. The second factor described the category of the presented word, containing the following levels: 1. Trust/distrust, 2. Open/closed, 3. Benevolence/malevolence. Openness/closeness-related words were also used in the study as a manipulation check.

Stimuli

All experimental stimuli of the first study were presented on a 15' laptop screen in a resolution of 1024 x 768 pixels and a color depth of 32 bit. Two kinds of stimuli were used in the first study. As already mentioned, a priming paradigm was handled. The priming stimuli consisted of 2 different artificial male human figures (Figure 1) and one control stimulus. One figure was designed to show an open posture, while the other was designed to show a closed posture. The figures were about 513 pixels high and 239 pixels wide. They were presented on a gray background of 551 x 709 pixels, which also acted as the priming stimulus in the control condition, where only the gray background was presented. The target stimuli within the priming paradigm consisted of a total of 144 words, each fitting in one of the already mentioned categories. The categories "non-word" and "unrelated word" contained 48 different non-existing words and words that were not related to any of the other categories, while the categories "trust", "distrust", "benevolence", "malevolence", "openness", and "closeness" contained 8 different words each. The words were presented in "Times New Roman", size 14, and a yellow color, in order to ensure good readability. The yellow color was necessary because the words were projected in front of the figure which was rather dark-colored. Before each word, a fixation point in the form of a fixation pattern of dashes was presented at the same spot where the words appeared.

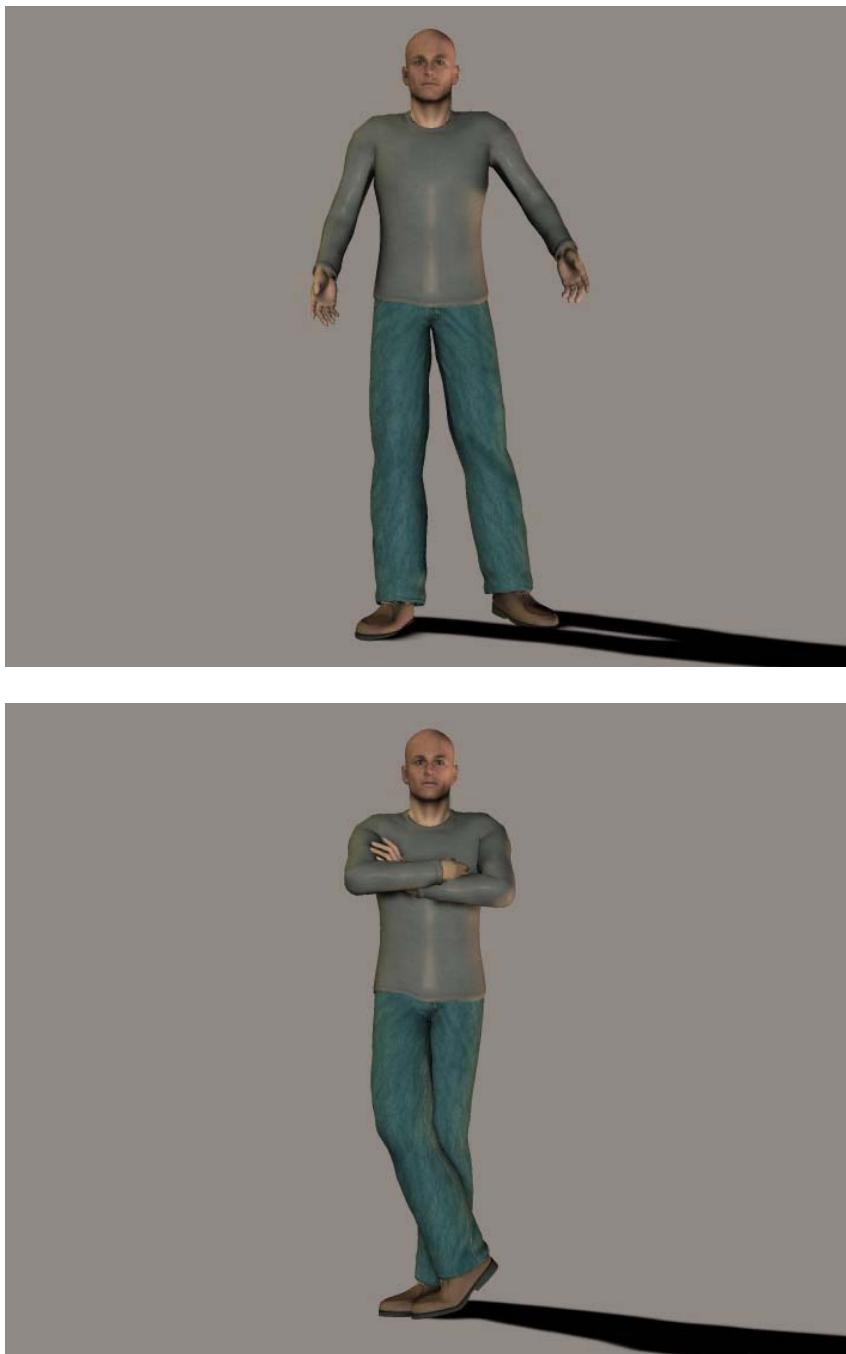


Figure 1. Figures used in study 1, adopting an open and closed posture. In the control condition, only the gray background was presented.

Procedure

All participants were welcomed, after which the experimenter started the experimental program, and asked the participants to carefully read the instructions, that were

given on the screen. There was no further intervention of the experimenter, so that all participants received the same instructions. These were presented within the experimental program. Participants were asked to complete a lexical decision task, where they had to indicate whether the presented letter-combination was an existing word or not. Therefore they had to press “Y” to indicate an existing word, and “-“ to indicate a non-word. In each single trial, one of the already described priming stimuli was presented and displayed during the whole trial. Shortly after the appearance of the priming stimulus, i.e. the human figure, the fixation pattern of dashes was presented at about the height of the hip of the human figure. The fixation pattern of dashes was presented for 500 ms and was then replaced by a word derived from one of the already mentioned categories. The selection of the figure and word in each trial was ensured to be random to prevent effects of order. Also, it was ensured that each word was paired with each of the priming stimuli once in order to enable within participant comparisons. Thus each word was paired one time with an open postured figure, one time with a closed postured figure, and one time with the control stimulus. This resulted in a total trial number of 432 (144 words, paired once with each of the three priming stimuli) trials, organized in 8 blocks à 50 trials (the last block consisted of 32 trials). After each block, there was a short break in order to attenuate fatigue effects.

Measures

The primary measure of the first study was the reaction time in response to the presented words. Shorter reaction times in one category of words are associated with an activation of the concept, underlying this category (Collins & Loftus, 1975). By using reaction times as a measure of concept activation, the validity of the first hypothesis, stating that the posture of an artificial human figure can have an effect on the activation of the trust concept among others, was tested.

Analysis

In order to test H1, three independent 2 X 3 analyses of covariance, all with reaction time as dependent variable, were conducted. The figure factor was used in all three analyses and comprises the levels “open posture”, “control condition”, and “closed posture”. The second or target word factor was varied between analyses. In the first analysis, this factor consisted of the levels “trust-related words” and “distrust-related words”. In the second analysis, the targets were “benevolence-related words” and “malevolence-related words”, while in the third analysis, the target words were related to openness and closeness. In all three analyses, the age of the participants was handled as covariate, because it was found that trust seems to increase with age (Sutter & Kocher, 2007). In the light of a relatively large variance in the age of the test persons in the current sample, the utilization of age as covariate seems to be a reasonable step.

*Results**Trust/Distrust Words*

The first analysis, utilizing trust- and distrust-related words as second factor, revealed a marginally significant interaction effect between posture and word-type [$F(2, 54) = 3.05, p = .06$]. Holding the type of word constant, pairwise comparisons showed significant differences between trust words, when primed with different stimuli. When primed with an open figure ($M = 588$ ms, $SD = 18$), and when primed with a closed figure ($M = 611$ ms; $SD = 17$), trust-words were recognized faster ($p < .01; p < .05$) than when primed with the control stimulus ($M = 639$ ms; $SD = 23$). The difference between trust-words, that were primed with an open posture and trust-words, that were primed with a closed posture was only marginally significant ($p = .06$). Here, trust-related words were recognized faster.

Concerning these differences for distrust-related words, only the differences between distrust-words primed with an open ($M = 622$ ms; $SD = 20$) and closed ($M = 615$ ms; $SD = 18$) posture, and distrust-words primed with control stimulus ($M = 649$ ms; $SD = 23$) were found significant ($p < .01$; $p < .01$). Both were recognized faster than distrust-words primed with a neutral stimulus. The difference between distrust-words, that were primed with closed postures, and distrust-words, that were primed with open postures was nonsignificant.

When holding the type of posture constant at the level “open“, only one significant difference between the word-levels was found significant in pairwise comparisons ($p < .05$). Here, trust-related words ($M = 588$ ms; $SD = 18$) were recognized faster than distrust-related words ($M = 622$ ms; $SD = 20$).

No significant main effects were found in this analysis.

The results of the first analysis are summarized in Figure 2, and Tables 1 and 2 (all tables can be found in the appendix).

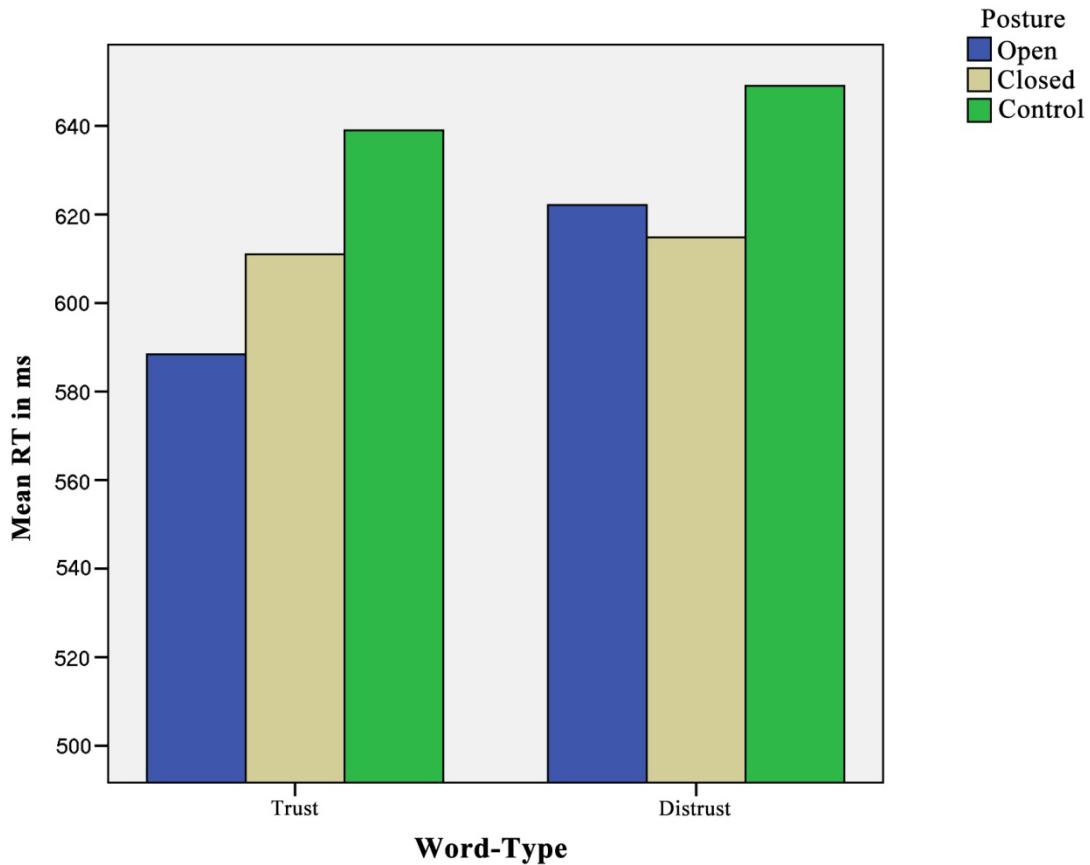


Figure 2. Mean reaction times (Estimated marginal means) in response to trust- and distrust-related words dependent on prime posture.

Benevolence/Malevolence Words

The second analysis revealed a significant main effect of type of posture [$F(2, 54) = 3.99; p < .05$]. A closer examination of this main effect shows that words displayed with an open postured figure in the background ($M = 680$ ms; $SD = 21$) were recognized significantly faster than words displayed with the control stimulus ($M = 709$ ms; $SD = 26$; $p < .05$). The same holds for words displayed with a closed postured figure ($M = 678$ ms; $SD = 22$) compared to words displayed in conjunction with the control stimulus ($p < .05$).

A main effect of type of word as well as an interaction effect did not reach significance.

The results of the second analysis are summarized in Table 3 (appendix) and Figure 3.

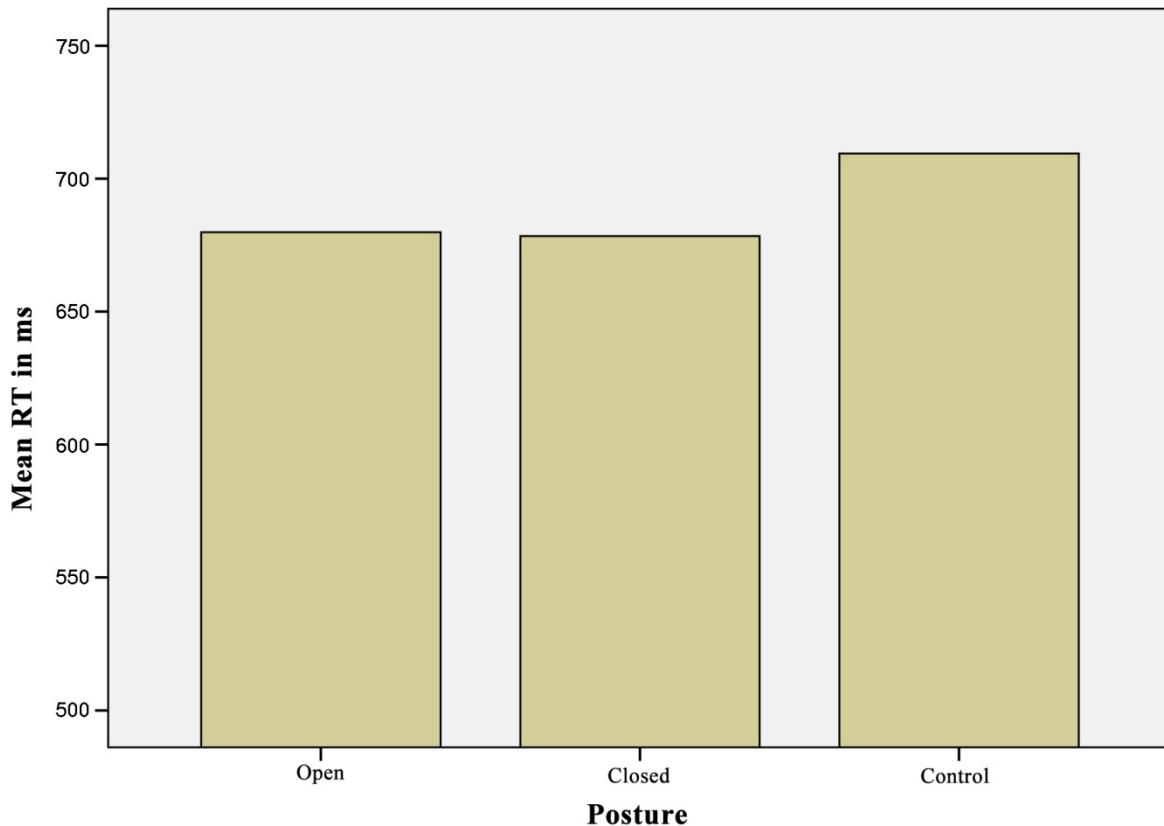


Figure 3. Mean reaction times (Estimated marginal means) in response to benevolence- and malevolence-related words dependent on prime posture.

Openness/Closeness Words

The third analysis provides evidence for an interaction effect between type of prime and type of word [$F(2, 54) = 3.96; p < .05$]. This effect is qualified by a faster recognition of openness-related words, when primed by an open postured figure ($M = 609$ ms; $SD = 16$), compared to the neutral prime ($M = 638$ ms; $SD = 22$) condition ($p < .05$). The speed of

recognition of openness-related words, that were preceded by a closed postured figure, did not differ significantly from openness-related words in the other prime conditions.

No main effects reached significance in this analysis.

The results of the third analysis are summarized in Figure 4, and Tables 4 and 5 (appendix).

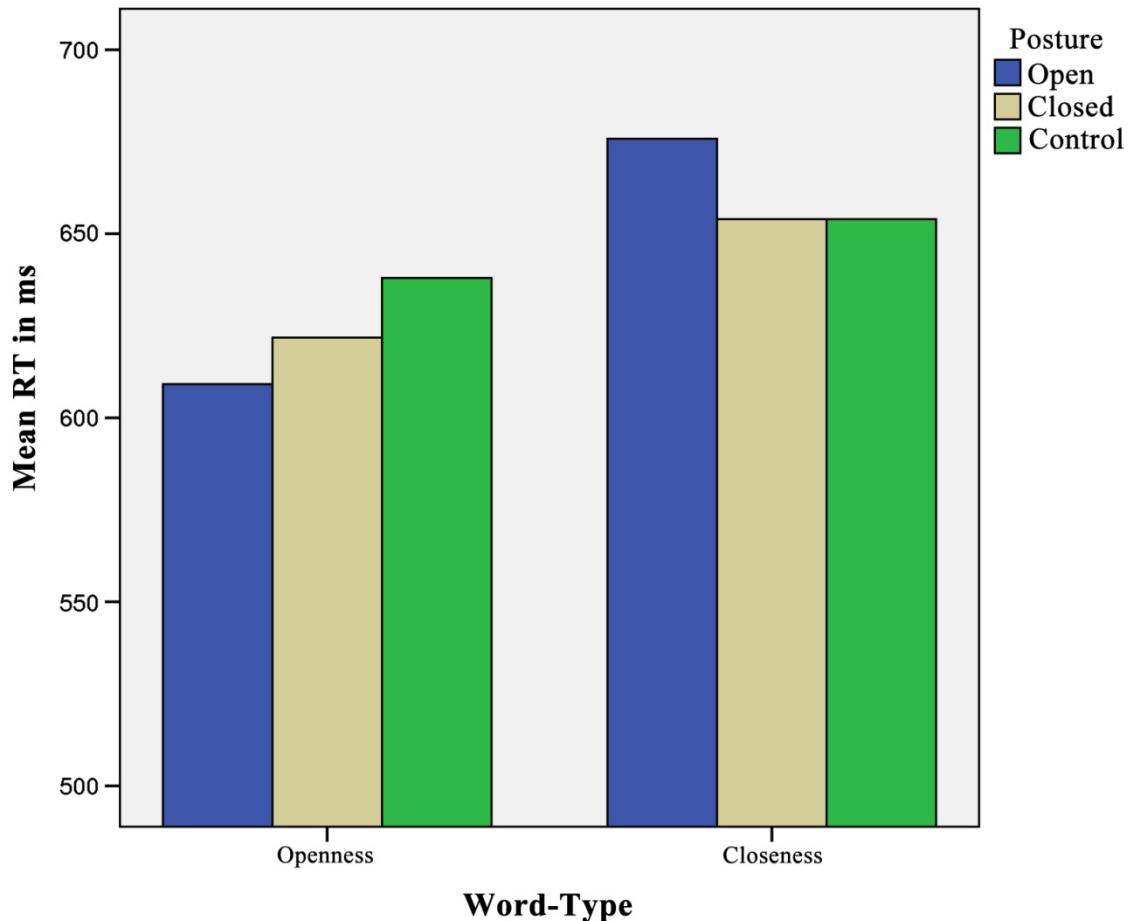


Figure 4. Reaction times (Estimated marginal means) in response to openness- and closeness-related words dependent on prime posture.

Discussion

Based on the results of the three analyses of the first experiment, H1 is partially supported. Favoring H1, it was found that word-type and prime-type interacted marginally significant, when trust- and distrust-related words were used as target-words. Specifically it was found that trust-words were recognized faster, when primed by an open posture, than when primed by a closed posture, or preceded by the control stimulus. Thus, an open posture seems to have activated the trust-concept more than a closed posture or a control prime.

Concerning the distrust-concept, the results indicate that there was no difference between open and closed postured primes. But when primed by these figures, distrust-related words were recognized significantly faster than when primed by a neutral stimulus. Thus, the distrust-concept seems to be activated equally strongly by an open and a closed postured figure, which is still a stronger activation than baseline. In support of the ability of an open posture to activate the trust-concept, it was also found that when primed by an open posture, trust-related words were recognized faster, than distrust-related words. To summarize, it seems valid to conclude that an open posture activates the trust concept more than a closed or neutral prime. Though there is some evidence that the activation of trust did not happen via the activation of the benevolence concept, because no significant interaction effect between word-type and priming stimulus was found when benevolence- and malevolence-related words were used as target words in the lexical decision task. Contrary to this finding, in H1 it was stated that an open posture should increase the activation of the benevolence concept more than a closed posture or neutral prime. The malevolence concept on the other hand should be more active when primed by a closed postured figure, than in case of open or neutral posture primes. Nevertheless, an interesting finding is that both, the benevolence and the malevolence concept were more active, when primed by an open postured and closed postured figure, than when primed by a neutral stimulus. A possible explanation for this

might be that aspects of the stimulus other than the posture might have increased the activation of both concepts (e.g. facial expression, social presence). The failure of the open and closed postured figures to activate the benevolence and malevolence concepts in different ways might be due to the fact, that the benevolence aspect of trust does not seem to be important in the early stages of a trust-relationship (Mayer, Davis, & Schoorman, 1995). Instead, Mayer et al. suggested that the perception of integrity has more impact on the trust assessment at the early stages of the relationship. This might be the case in the current study, because the stage of the trust relationship between the participant and the presented figures can definitively be described as early, due to the fact that there was no contact prior to the study. Thus the earlier proposed strong association or correlation between benevolence and integrity might not hold for the context of the current study. To summarize, the proposed effect of an open posture on trust was found. Nevertheless, this relationship does not seem to be mediated by benevolence. Still accepting the notion, that social information increases the activation of the trust concept via social trust, the relationship between posture und trust could be mediated by integrity.

Another interesting finding is, that a closed postured figure activates both, the trust and the distrust concept to equal extents and stronger than a neutral prime. Two possible explanations might account for this effect. Either the posture in itself, or other aspects of the stimulus cause the activation of both concepts as in the case of benevolence/malevolence. Based on the literature, which suggests a dissociation between trust and a closed posture, it seems more probable that aspects other than the posture account for the increased activation of both concepts. Because of the complexity of the presented figures, the effect could have been caused by aspects as facial expression and facial characteristics, which were found to be related to the perception of trustworthiness (Ekman & Friesen, 1974; Zebrowitz, 1997). Likewise, the increase of the activation of both concepts could have been caused by mere

social presence, triggered by the presentation of human-like figures. As facial cues, social presence seems to be related to trust and the perception of trustworthiness (Gefen & Straub, 2004). These two explanations might also be applicable concerning the fact, that open and closed postured figures increase the activation of the distrust concept to equal extends. To summarize, in addition to benevolence/malevolence, for both, the trust and the distrust concept, an effect of posture-irrelevant characteristics of the figure primes was found.

Most importantly, the activation of the trust concept seems to be increased by the open posture in itself and in addition to the posture-irrelevant effect, that was found for the trust concept primed by a closed posture, and for the distrust concept primed by open and closed postured figures. Additionally, no evidence was found for a mediating effect of benevolence, which indicates that the concept of integrity might have this role.

Study 2

Study 1 shows that trust increases through the confrontation with an open postured figure. Study 2 was designed to fulfill two purposes. First, it was tested, whether the main finding from study 1 can be confirmed, when potentially spurious influences of posture-irrelevant characteristics of the figure are eradicated. Here one can think of facial characteristics or social presence. This was accomplished by asking participants to complete a task, analogous to the one in the first study. The only differences were that the figures were visually impoverished, so that only the shape and therefore the posture was perceivable. Also, a neutral posture condition was added. By comparing this condition to the no-figure condition, an effect of social presence should be made visible. The second purpose of study 2 was to show, whether the increase of trust leads to more trusting behavior. Specifically, it was designed to demonstrate that this increase of trust leads to a tendency to accept claims about a product or service. This was accomplished by presenting statements over a service provider,

together with the logo of this provider. Also a figure was shown, that either adopted an open, a closed or a neutral posture. In a control condition, no figure at all was presented. Participants were asked to indicate whether they perceived the statement over the service provider as being trustworthy or not, which is an indication for accepting the claim or statement. This statement or claim was either related to competence, benevolence, or integrity.

Hypothesis Development

Based on the findings from the first study and the assumption stated in the previous section, the following hypotheses can be made as specifications of H2 (i.e. higher acceptance of statement, when statement is presented in conjunction with open postured figure), which was stated earlier in this paper.

H2a: The activation of the trust concept should vary between 4 administered conditions in the following way: The lowest activation of the trust concept should be evident for the condition in which no figure is presented. Because of a potential effect of social presence, the activation of the trust concept should increase in the neutral posture condition. There should be no difference between the closed posture condition and the neutral posture condition. The highest activation of the trust concept should be reached in the open posture condition.

Concerning the activation of the distrust concept, the situation is less clear-cut. In study 1 it was shown that the type of posture did not have an effect on the activation of the distrust concept. Still, the activation was higher than in the no-figure condition. Therefore it can be assumed that this activation might be due to a social presence effect or other stimulus

aspects. Thus either there should be no difference between conditions at all, when the richness of the stimuli is reduced, or the distrust activation increases through social presence. Due to the fact, that social presence is associated with trust (Gefen & Straub, 2004), it might be valid to speculate that the effect on distrust is due to aspects other than social presence, like facial cues. This assumption is supported by the idea, that social presence cannot readily take on valence. Facial cues and other characteristics are probably more suitable for carrying a negative valence.

H2b: There should be no effect of posture on the activation of the distrust concept, and no effect of social presence. Thus there should be no difference at all between the conditions, because of the impoverishment of the presented figures.

Due to the lack of findings in the assumed direction in the first study, it is suggested that also in the second study, there should be no relevant effects of the posture of a figure on the activation of the benevolence/malevolence, and the openness/closeness concepts. Nevertheless, they are included in study 2, to rule out the possibility that effects were overseen in study 1, due to potential spurious influences of aspects of the figures, other than the posture.

As already stated, trust increases the tendency to follow an advice (McKnight, Choudhury, & Kacmar, 2002b). Likewise it was found that there is a tendency to act in correspondence with activated concepts (Bargh, Chen, & Burrows, 1996). Therefore, in the context of RAs, trust should increase the tendency to accept a given advice, and thus to act more trusting. In study 1 it was shown that the open posture of a human figure can automatically increase the activation of the trust concept. As already mentioned, also social presence can increase the activation of the trust concept. Therefore the probability of

accepting a claim should vary between type of posture conditions in the following way, when claims are presented simultaneously with differently postured figures:

H2c: The probability of accepting a claim is highest, when the claim is paired with an open postured figure. When paired with a closed postured or neutral postured figure, the probability should be lower. The lowest probability should be evident when the claim is paired with no figure at all.

In the first study, it was found that the activation of the concept of benevolence is not affected by the posture of a figure. Assuming that the effect of the posture of a figure is generated via social trust, the concept of integrity should be affected by posture.

H2d: Compared to statements related to competence and benevolence, claims, that are related to integrity, are processed faster and accepted with a higher probability, when an open postured figure is presented, compared to instances where a closed postured, neutral or no figure at all is presented.

Method

Participants

A total of 48 individuals, 31 female and 17 male, participated in the second study. The mean age of the sample was 24.17 years, with a range of 18 – 67.

Design

The design in the first part of study 2 is analogous to that of study 1, with the only difference that the figure factor consisted of 4 instead of 3 levels. As already mentioned, a

neutral postured figure was added to the set of presented priming stimuli in order to investigate a social presence effect. Thus, either an open, close, or neutral postured, or no figure at all was presented.

Two factors were varied in the second part of study 2: The posture of the presented figure, and the type of statement. The figure factor was varied within participants and consisted of 4 levels. As in the first part of study 2, the figure either adopted an open, closed, or neutral posture, or no figure was presented at all. The type-of-statement factor was also varied within participants and consisted of 3 levels. Each statement was either related to competence, benevolence, or integrity. For one single participant, one type of posture was presented together with one type of statement. These combinations were counterbalanced between participants.

Stimuli/Procedure

The whole experimental procedure of the second study was presented on a 15' laptop screen in a resolution of 1024 x 768 pixels and a color depth of 32 bit. In the experimental part of the study, all text was presented in "Times New Roman", size 14, in red color (to ensure good readability). Participants were welcomed and asked to read the instructions on the screen. There was no further involvement of the experimenter. The study consisted of 2 main parts.

First Part

First, participants had to execute a task, analogous to the one in the first study. Like in the first study, participants had to complete a lexical decision task, where they were asked to indicate whether a presented letter-combination was an existing word or not. They had to do this by pressing either "X" ("yes, it is an existing word") or "N" ("no, it is not an existing

word’’). The words were preceded by a fixation pattern, consisting of 6 dashes, which indicated the place on the screen where the target letter-combination was about to emerge. This pattern was presented for 500 ms. In total, 72 different letter-combinations appeared as target combinations. Each combination was a member of 1 of 8 categories, that were already mentioned in the context of the first study (i.e. trust/distrust, openness/closeness, benevolence/malevolence, non-words, words unrelated to the other categories). The categories ‘‘non-words’’ and ‘‘unrelated words’’ each contained 24 letter-combinations and words respectively, while the other categories (i.e. trust/distrust, benevolence/malevolence, openness/closeness) each contained 4 different words.

Each letter-combination or word was accompanied by a human-like figure, or more specifically, a human-like figure was presented in the background, when the fixation pattern and the target letter-combination was depicted. The figures were variations of those utilized in the first study. More specifically, figures, that were used in the first study, were impoverished, so that only the outlines of the figures remained. The posture of the figures could still be perceived. Three different figures were presented: One adopting an open posture, one adopting a closed posture, and one adopting a neutral posture (Figure 5). The figures of about 513 x 709 pixels were presented on a white background.

Overall, the first part of the second study comprised 288 trials (72 letter combinations, each combined one time with each of the 3 figures, and the control stimulus), which were organized in 6 blocks à 50 trials (the last block consisted of 38 trials). After each block, a short break was attached in order to attenuate fatigue effects.



Figure 5. Human-like figure stimuli, used in the second study. They adopt an open, closed and neutral posture.

Second Part

In the second part of the second study, participants had to execute a judgment task, where they had to indicate whether they judge a statement stemming from 1 of 12 service providers as being trustworthy or not. The criterion for the selection of the service provider for the study was membership of the branch of correction services for academic texts in

English language. Such services were chosen, because they should be relatively unknown to students, due to relatively high prices, while students might still be involved, because they are potential future customers of such services. The providers were presented to the participants in form of a logo, that was retrieved from the website of the respective provider. The logos differed concerning size between 669 and 300 pixels in width, and 155 and 69 pixels in height. For a complete list of all logos, see Table 6 (appendix). Each logo was presented in the upper half of the screen, under which a statement was presented. This statement was given in the form of 1. person plural (“We...”), in order to let it appear to be expressed by the respective service provider. Each statement was part of 1 of 3 categories, consisting of statements related to competence, benevolence, and integrity, respectively (for a list of all statements, see Table 7 in the appendix). The statements were based on two trust scales, developed by Gefen & Straub (2004) and McKnight (2002a). Beneath each statement, a 20% scaled down version of one of the figures from the first part of study 2 was presented. For each participant, one type of figure was bound to one type of statement, while this was counterbalanced between participants. Under the figure, the question was depicted, whether participants judged the given statement as trustworthy or not. Previously they were instructed to make this judgment as fast as possible by pressing either “X” (“yes, I think that this statement is trustworthy”) or “N” (“no, I think that this statement is not trustworthy”). Overall, participants had to complete 12 trials.

Measures

Three different measures were applied in the second study. First, reaction times were measured in the lexical decision part in order to show the activation levels of the different concepts. Second and third, reaction times and judgment were measured in the judgment part.

Analysis

Analogous to the first study, three independent 2 X 4 repeated measures ANCOVA analyses were executed in order to test hypotheses H2a (i.e. trust concept activation in descending order: open posture, closed/neutral posture, control) and H2b (i.e. no effect of prime at all). Also these analyses were executed to test potential effects on the openness/closeness and the benevolence/malevolence concepts. In all analyses all levels (i.e. “open”, “closed”, “neutral”, “control”) of the figure factor were tested, while the target word factor was varied between analyses. In the first analysis, the target word factor levels were “trust/distrust”, in the second analysis, the levels “benevolence/malevolence” were used, while in the third analysis, the utilized levels were “openness/closeness”. In all analyses, reaction time was the dependent variable and the age of the participants was handled as covariate.

In order to test hypotheses H2c and H2d, two 3 X 4 repeated measures ANCOVA analyses were conducted. In the first analysis, the acceptance of a claim was tested as dependent variable. The first factor was the statement factor, consisting of three levels: “statement related to competence”, “statement related to benevolence”, and “statement related to integrity”. The second factor, as in the first analysis, was the figure factor, consisting of the levels “open”, “closed”, “neutral” and “control”. Analogous to the previous analyses, the age of the participants was handled as covariate for the same reason as in the first study (i.e. the increase of trust with age). In the second analysis, the reaction time necessary to indicate whether a claim is accepted as trustworthy or not was tested as dependent variable. The independent factors were equivalent to those in the first analysis. Unfortunately and due to technical problems, the data of some participants could not be used in the analysis of the second task.

*Results**First Part*

The results of the first analysis show that there is no main effect of the posture of the figure [$F(3, 138) = 1.77; p > .05$] and no effect of the type of word [$F(1, 46) = .31; p > .05$] on the reaction times concerning trust- and distrust-related words. Also, no interaction effect was found [$F(3, 138) = .54; p > .05$]. Likewise, no interaction [$F(3, 135) = 1.15; p > .05$] or main effect (for posture: [$F(3, 135) = .24; p > .05$]; for type of word: [$F(1, 45) = .31; p > .05$]) was found for benevolence- and malevolence-related words. Not differing from the previous observations, in case of openness- and closeness related no interaction [$F(3, 138) = .56; p > .05$] or main effect (for posture: [$F(3, 138) = .92; p > .05$]; for type of word: [$F(1, 46) = 1.03; p > .05$]) was significant.

Second Part

As in the preceding analyses concerning the second study, no significant effects were found. The hypothesized interaction between the figure factor and the statement factor only reached marginal significance [$F(6, 168) = 1.55; p = .17$]. Nevertheless, a closer examination, using pairwise comparison, revealed significant differences within the level “integrity” of the statement factor and between the levels of the figure factor. Here, integrity-related statements had a higher chance of being accepted (in all cases $p < .05$) when paired with an open postured figure ($M = 1.36; SD = .09$) compared to integrity related statements paired with a closed postured figure ($M = 1.61; SD = .09$), with a neutral postured figure ($M = 1.61; SD = .09$), and the control condition where no figure was presented ($M = 1.7; SD = .08$). The described patterns can be inspected in figure 6.

In this analysis concerning the reaction times in response to the statements neither significant main effects (for the type of statement: $F(2, 50) = .77; p > .05$; for posture: $[F(3, 75) = .93; p > .05]$) , nor a significant interaction $[F(6, 150) = 1.5; p > .05]$ was found.

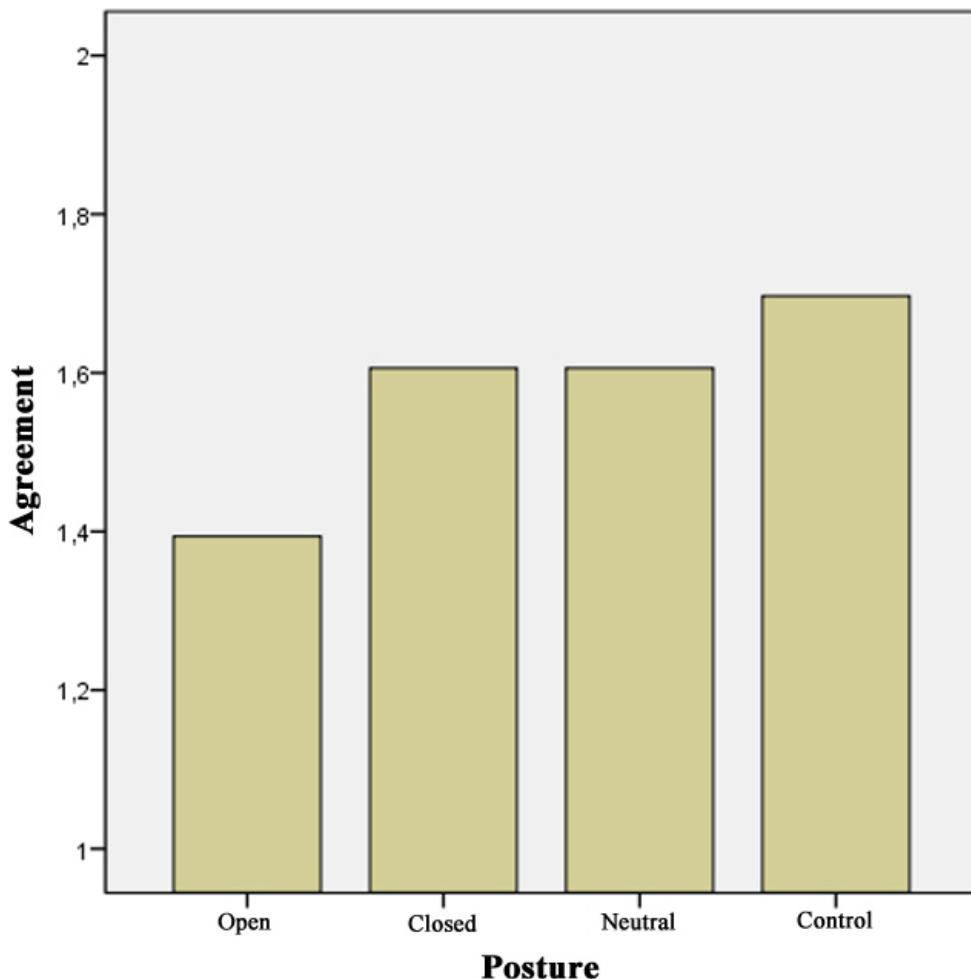


Figure 6. Agreement (Estimated marginal means) to integrity-related statements dependent on the posture of the figure.

Note. 1 indicates perfect agreement and 2 indicates perfect disagreement.

Discussion

The second part of the second study revealed that an open posture seems to increase the probability that integrity-related statements about a service-provider are accepted. Thus

H2c (i.e. effect of posture on general statement acceptance) could only be partially supported, because there is no effect of the posture on statements related to competence and benevolence. On the other hand, a proposed effect of posture on the judgment reaction times could not be found. Hence, there is also only partial support for H2d (i.e. more acceptance and faster processing of integrity-related statements). The absence of an effect of posture on the speed of processing of the presented statements seems to indicate that the effect of posture on the tendency to accept a statement is not of an automatic nature. Although this assumption needs to be handled cautiously, due to the potential spurious effects of reading time differences between participants. Nevertheless, one might cautiously conclude that integrity-related statements were accepted to a higher degree, when presented in combination with an open postured figure, but an automatic activation of the integrity concept does not seem to have taken place. The failure to activate the integrity concept is supported by the finding in the first part of the second study, where no effect of an open posture on the activation of the trust concept could be found. In the light of the behavioral effect of an open posture, and the failure to provide support for an automatic mechanism, it can be suggested that a more deliberate process could have led to the observed behavioral effect. Thus probably participants actively made assumptions about the integrity of the presented service providers, based on the figure, that was shown in conjunction. This inheres that also the assumption must have been made that the figure, which was presented as not being related to the task or the statement actually was related to it. Thus the only social cue available in the display might have been considered as source of the statement. To summarize, the second part of the second study provides evidence for a more deliberate mechanism, that accounts for the finding that an open posture increases the tendency to accept an integrity-related statement, and therefore to show more trusting behavior.

The first part of the second study revealed no effects of the posture of the figure on the activation levels of the concepts. Specifically and contrarily to H2a, no effect was found on the activation level of the trust concept. On the other hand, H2b was supported by showing that there was no effect of the posture of the figure on the activation of the distrust concept, and no effect of social presence. Because the results from the first part of study 2 have to be interpreted in the context of the results of the first study, they will be discussed more deeply in the following section, where an attempt is made at integrating the findings of both studies.

General Discussion

The question central in the current paper was, whether the posture of a figure could have an influence on the degree of trust and the tendency to accept a claim. It was hypothesized that the inspection of an open posture automatically increases the activation of social trust. Based on findings, that show that there is a tendency to act in accordance with concepts, which are activated beyond baseline, it was further assumed that this activation of the trust concept should lead to more trusting behavior. In the first study, evidence could be found that the exposure to an open posture indeed leads to a higher level of activation of the trust concept compared to the trust concept activation, when exposed to a closed postured figure, or no figure at all. Furthermore, no effect in the expected direction was found on the benevolence/malevolence concepts. Still accepting the notion, that social information (e.g. posture) affects trust via social trust (i.e. benevolence and integrity), it was argued that social information should affect trust via integrity. These findings can be understood by placing them in the framework of the PSS theory. The theory states that concepts, that frequently occur together in time and space, are grouped together to form a superordinate concept. Thus, in case of integrity, an open posture may be part of the integrity concept, because individuals, inhering a high level of integrity often adopt an open posture. As suggested by the definition

of trust, a high level of integrity might be associated with a high level of trust. Transferring this idea to the framework of the PSS theory, integrity may be part of the more general trust concept, leading to increased activation of the superordinate concept, when the subordinate concept is activated. Thus, in the terminology of the PSS theory, the open posture concept is part of the more general integrity concept, which again is part of the even more general trust concept. So, the exposure to an open posture ultimately leads to increased levels of trust.

Nevertheless, these conclusions have to be adapted in the light of the findings of the first part of study 2. Here the finding, that an open posture increases the activation of the trust concept could not be replicated. Considering a possible theoretical account for the failure to replicate the effect of an open posture, the only difference between the first study and the first part of the second study was the impoverishment of the figure stimuli in the second study. Therefore, it is reasonable to assume that the posture only has an effect on the activation of the trust concept, when additional social information, like facial characteristics, is present in the figure. Conceptually speaking, additional social information might moderate the relationship between an open posture and the trust concept. How can this moderation be explained within a PSS theory framework? The PSS theory states that complex concepts are formed due to co-occurrence of simpler concepts in time and space. Thus, as already stated, trustworthiness and integrity might co-occur with an open posture of the trustee. The crucial fact is that it seems unlikely that exceptionally the posture of a trustee co-occurs with trustworthiness and integrity, because when the posture of a trustee is visible, also other aspects of the outer appearance can be inspected by the trustor. Therefore, it might be the case that the concept of open posture alone is not part of the more complex integrity and therefore trust concept. Rather it seems more probable that the whole outer appearance of a trustee forms part of the complex integrity/trust concept, because in the real world, posture and other aspects of outer appearance of a trustee always occur together in time and space. Hence, both aspects of the

concept (i.e. posture and other characteristics) are necessary to activate the outer appearance concept, which is part of the more complex integrity and therefore the trust concept. To summarize, based on the findings in study 1 and the first part of study 2, it seems probable that the effect of an open posture on the activation of the trust concept is moderated by the presence of other outward appearance characteristics of the trustee (e.g. facial characteristics). Integrating the findings of the first study and the first part of the second study, another conclusion can be drawn, concerning a possible effect of social presence or posture-irrelevant characteristics of the figure. The first study revealed a supposed effect of social presence or other stimulus aspects on the activation of the trust as well as the distrust concept. In the second study, all characteristics of the stimulus except for the posture were eradicated from the figure. Because no effect of social presence could be confirmed here, the effects found in the first study might have been due to other characteristics of the figures (e.g. facial expression, etc.).

The purpose of the second part of study 2 was to show, whether the previously suggested activation of the trust concept, as caused by an open postured figure, translates to the behavioral domain. Despite evidence against an automatic activation of the integrity (second part of study 2) and the trust (first part of study 2) concept, it was found that statements related to integrity are accepted with a higher probability, when paired with an open postured figure. It was suggested that, due to the missing automatic activation of the trust and integrity concepts, a more deliberate process could have taken place, where assumptions were made about the integrity of the trustee.

Based on the empirical findings of the presented research, and assumptions, that are based on the literature, a model is proposed. It describes the mechanisms, by which social information or more specifically, the posture of a human-like figure affects trusting behavior. Though parts of this model are highly hypothetical and not based on empirical findings from

the present studies, it acts as an ideal means, to summarize the main findings of the current research. Starting point of the model (Figure 7) is social information in the form of the posture of a human-like figure.

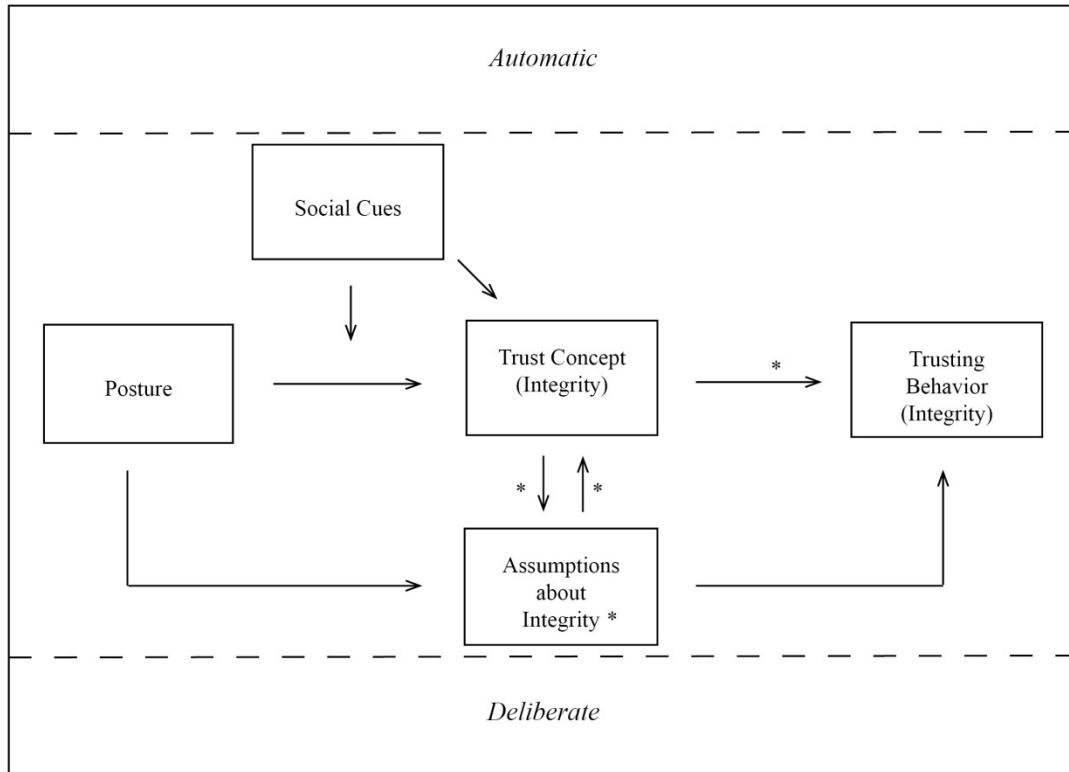


Figure 7. Model, integrating the findings of both studies, and illustrating the two proposed mechanisms, leading from the exposure to a posture to trusting behavior.

Note. * designates concepts and paths, that are merely assumed and not directly derived from empirical findings.

Corresponding with the findings of study 1 and the first part of study 2, it is suggested that this type of social information automatically affects the activation of the integrity concept, which is part of the trust concept. Therefore, the activation level of the trust concept is also affected. As already mentioned, this relationship between the posture and the trust concept is moderated by other kinds of social information (e.g. facial cues), which also have a

direct effect on the activation level of the trust concept. Based on the literature, a link between the activation level of the trust concept and trusting behavior can be suggested (Bargh, Chen, & Burrows, 1996). Nevertheless, this link could not be empirically supported in the second study, because no other social information was presented besides the posture. Therefore the activation level of the trust concept was not increased. This mechanism, leading from the exposure to an open postured figure to more trusting behavior might be of automatic nature. In study 2 empirical support could be found for an effect of an open posture on the acceptance of integrity-related statements. This could be explained by a more deliberate mechanism, which parallels the already described automatic one. Here, it is suggested that participants make assumptions about the integrity of the sender of the message, which is assumed to be the figure, that is presented together with the message, because it is the only source of social information. It is further suggested that based on the valence of the integrity assumption, trusting behavior is adopted or not. This trusting behavior however is limited to trusting behavior, that depends on the presence of integrity in the trustee. Although also hypothetical, it seems reasonable that the assumptions concerning the integrity of the trustee and activation level of the integrity and therefore the trust concept mutually affect each other.

While the described model includes the crucial findings of the current research, some other interesting results should not be omitted here. One finding of the first study was that an open posture activates the trust concept, while it does not inhibit the distrust concept. This is a somewhat puzzling finding, because it would be more straightforward to argue that the activation of one concept should at the same time inhibit the activation of the other, driving the activation below baseline. This expectation corresponds to a unidimensional model of trust, where trust and distrust are the endpoint of one dimension. According to this model, the activation of the trust concept should increase while the activation of the distrust concept

decreases simultaneously and vice versa. This is not supported by the current findings, because it was shown that a higher trust level does not necessarily lead to a lower distrust level: An open postured figure resulted in a higher activation of the trust concept than a closed postured figure and baseline activation. Primed by the same open postured figure, the distrust level activation was not lower than baseline (Figure 2). These results are more in favor of a multidimensional approach of trust and distrust, as proposed by Lewicki, McAllister, and Bies (1998). They state that trust and distrust should be conceptualized as two separate, but linked dimensions. In this way, the same stimulus may result in an increased activation of the trust concept, while the activation of the distrust concept does not decrease. Thus the same stimulus may influence both concepts independently. Additionally, the proposed interaction between openness/closeness-related words and type of posture was not found in the first study. It was expected that openness-related words would be recognized faster, when primed with an open postured figure, while closeness-related words would be recognized faster when primed with a closed postured figure. A possible explanation for this finding might be that open/closed postures are not associated with very general openness/closeness concepts. Thus an open/closed posture might not be encoded in terms of general openness/closeness, but more in semantic or functional terms (e.g. integrity).

Limitations and Future Directions

A number of factors in the proposed model are still of hypothetical nature. First of all, the executed studies do not deliver a clear indication for which specific social cues moderate the relationship between posture and the activation of the trust concept. Most probable, facial characteristics take this role, because facial characteristics and expression were found to be strongly related to the perception of trustworthiness (Ekman & Friesen, 1974; Zebrowitz, 1997). Nevertheless, this should be supported by empirical findings in the future. Likewise,

and although suggested by the literature (Bargh, Chen, & Burrows, 1996), a connection between a higher activation of the trust concept and an increased tendency to act more trusting could not be empirically confirmed due to the failure to increase the activation in the second study. Because this is a central aspect of the proposed model, this should also be matter of future research, for example in a study combining the first study and the second part of the second study as presented in this paper. Another important aspect of the model is the assumption of the automaticity and deliberateness of the described processes. To gain more certainty in this point, the assumption should be investigated directly in future research, for example by using a cognitive load paradigm. This could take the form of a replication of the second part of study two, only complemented by a cognitive load task, like the memorization of a multi-digit number. Due to this manipulation, a deliberate mechanism should be inhibited, resulting in the absence of an effect on trusting behavior. Also, in future research some effort should be put into the clarification of the working of the assumed deliberate process. Here, questions could be answered, as whether individuals actively make assumptions about the trustee. This could be achieved by administering a self-report survey, considering the fact, that explicit cognition is typically measured using this instrument (Bing, LeBreton, Davidson, Migetz, & James, 2007). To specify this idea, the second part of study 2 could be replicated with the addition of asking the participants to indicate whether they made assumptions about the service providers, and if so, whether these assumptions were about benevolence and trust. Another aspect of the study, that might be in need of improvement, is the fact, that the hypotheses might have been quite straightforward, paving the way for demand characteristics effects. Although this was not tested formally, more informal conversations with participants showed that there could have been confounding influences. Here one open question referring to the participant's suspicion concerning the hypotheses of the study could be added to the just mentioned self-report survey.

Practical Implications

The studies, presented in this paper, were intended to be placed in the context of online recommendation agents. One of the prime incentives of implementing RAs is the reduction of uncertainty and information overload, which was found to be fairly high in online retail, and represents one of the main obstacles to adopt internet shopping. It can be argued that the acceptance of the recommendations, provided by the RA, is a valid measure of the ability of a RA to reduce uncertainty. Furthermore, the mere use of RAs should effectively reduce information load while shopping online. Therefore, retailers should be well advised to implement RAs, that are presented as embodied agents. That means, that the RAs should be impersonated by human-like figures, which adopt an open posture.

Conclusions

Although some questions remain open, the presented research significantly contributes to current practical as well as theoretical concerns. First, evidence could be gathered for an increase in statement acceptance through the exposure to an open postured human-like figure. This finding can be of practical importance for all online retailers, that currently operate or intend to implement a RA on their website. Second, it could be shed some light on the mechanisms by which the increase of the acceptance takes place. Finally, evidence was found for a multidimensional approach to trust, conceptualizing trust and distrust as two separate dimensions.

References

- Andersen, H., Hansen, C. B., & Andersen, H. H. (2001). Evaluation of agents and study of end-user needs and behavior for e-commerce. COGITO focus group experiment report. Roskilde, Denmark: Riso National Laboratory.
- Ansari, A., Essegaeier, S., & Kohli, R. (2000). Internet recommendation systems. *Journal of Marketing Research*, 37, 363-375.
- Bailenson, J. N., Swinth, K., Hoyt, C., Persky, S., Dimov, A., & Blascovich, J. (2005). The independent and interactive effects of embodied-agent appearance and behavior on self-report, cognitive and behavioral markers of copresence in immersive virtual environments. *Presence*, 14 (4), 379-393.
- Bargh, J. A., Chen, M., & Burrows, L. (1996). The automaticity of social behavior: Direct effects of trait concept and stereotype activation on action. *Journal of Personality and Social Psychology*, 71, 230-244.
- Bing, M. N., LeBreton, J. M., Davidson, H. K., Migetz, D. Z., & James, L. R. (2007). Integration implicit and explicit cognitions for enhanced personaly assessment: A general framework for choosing measurement and statistical methods. *Organizational Research Methods*, 10 (1), 136-179.
- Burgoon, J. K. (1991). Relational message interpretations of touch, conversational distance, and posture. *Journal of Nonverbal Behavior*, 15 (4), 233-259.
- Burgoon, J. K., Adkins, M., Kruse, J., Jensen, M. L., Meservy, T., Twitchell, D. P., et al. (2005). An approach for intent identification by building on deception detection. *Proceedings of the 38th Hawaii International Conference on System Sciences*. HI, USA.

- Chen, S., & Bargh, J. A. (1999). Consequences of automatic evaluation: Immediate behavior predispositions to approach or avoid the stimulus. *Personality and Social Psychology Bulletin*, 25 (2), 215-224.
- Collins, A. M., & Loftus, E. F. (1975). A spreading activation theory of semantic processing. *Psychological Review*, 82, 407-429.
- Corritore, C. L., Kracher, B., & Wiedenbeck, S. (2003). Online trust: Concepts, evolving themes, a model. *International Journal of Human-Computer Studies*, 58 (6), 737-758.
- Cowell, A. J., & Stanney, K. M. (2003). On manipulating nonverbal interaction style to increase anthropomorphic computer character credibility. *Workshop on Embodied Conversational Characters as Individuals, Autonomous Agents and MultiAgent Systems*. Melbourne, Australia.
- Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13 (3), 319-340.
- de Vries, P., & Pruyne, A. (2007). Source salience and the persuasiveness of peer recommendations: The mediating role of social trust. In *Persuasive Technology* (pp. 164-175). Berlin: Springer.
- Dijksterhuis, A., & Bargh, J. A. (2001). The perception-behavior expressway: Automatic effects of social behavior. In M. P. Zanna, *Advances in experimental social psychology* (pp. 1-40). Academic Press.
- Doney, P. M., & Cannon, J. P. (1997). An examination of the nature of trust in buyer-seller relationships. *Journal of Marketing*, 61 (April), 35-51.
- Dzindolet, M., Peterson, S., Pomranky, R., Pierce, L., & Beck, H. P. (2003). The role of trust in automation reliance. *International Journal of Human-Computer Studies*, 58 (6), 697-718.

- Ekman, P., & Friesen, W. V. (1974). Detecting deception from the body or face. *Journal of Personality and Social Psychology*, 29, 288-298.
- Frith, C. D., & Singer, T. (2008). The role of social cognition in decision making. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 363 (1511), 3875-3886.
- Gefen, D., & Straub, D. W. (2004). Consumer trust in B2C e-Commerce and the importance of social presence: experiments in e-Products and e-Services. *Omega The International Journal of Management Science* (32), 407-424.
- Good, N., Schafer, J. B., Konstan, J. A., Borchers, A., Sarwar, B., Herlocker, J., et al. (1999). Combining collaborative filtering with personal agents for better recommendations. *AAAI-99 Proceedings*, (pp. 439-446). Orlando, FL, USA.
- Greici, R., & Todd, P. A. (2002). Solutions driven marketing. *Communications of the ACM*, 45 (3), 65-71.
- Hassanein, K., & Head, M. (2007). Manipulating perceived social presence through the web interface and its impact on attitude towards online shopping. *Inernational Journal of Human-Computer Studies*, 65 (8), 689-708.
- Häubl, G., & Trifts, V. (2000). Consumer decision making in online shopping environments: The effects of interactive decision aids. *Marketing Science*, 19 (1), 4-21.
- Holland, R. W., Hendriks, M., & Aarts, H. (2005). Smells like clean spirit. *Psychological Science*, 16 (9), 689-693.
- Jacoby, J., Speller, D. E., & Kohn, C. A. (1977). Brand choice behavior as a function of information load. *Journal of Marketing Research*, 11 (1), 63-69.
- Jarvenpaa, S. L., Tractinsky, N., & Vitale, M. (2000). Consumer trust in an internet store. *Information Technology and Management*, 1 (1-2), 45-71.

- Jones, G. R., & George, J. M. (1998). The experience and evolution of trust: Implications for cooperation and teamwork. *Academy of Management Review*, 23, 531-546.
- Kalakota, R., & Whinston, A. (1997). *Electronic commerce: A manager's guide*. Reading, MA, USA: Addison-Wesley.
- Komiak, S. Y., & Benbasat, I. (2006). The effects of personalization and familiarity on trust and recommendation agents. *MIS Quarterly*, 30 (4), 941-960.
- Lamm, C., Batson, C. D., & Decety, J. (2007). The neural substrate of human empathy: Effects of perspective-taking and cognitive appraisal. *Journal of Cognitive Neuroscience*, 19 (1), 42-58.
- Lewicki, R. J., McAllister, D. J., & Bies, R. J. (1998). Trust and distrust: New relationships and realities. *Academy of Management Review*, 23 (3), 438-458.
- Lin, K.-J. (2008). E-commerce technology: Back to a prominent future. *IEEE Internet Computing*, 12 (1), 60-65.
- Luhmann, N. (1979). *Trust and power: Two works by Niklas Luhmann*. Chichester, England: John Wiley Sons.
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *The Academy of Management Review*, 20 (3), 709-734.
- McAllister, D. J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal*, 38, 24-59.
- McKnight, D. H., Choudhury, V., & Kacmar, C. (2002a). Developing and validating trust measures for e-commerce. *Information Systems Research*, 13 (3), 334-359.
- McKnight, D. H., Choudhury, V., & Kacmar, C. (2002b). The impact of initial consumer trust on intentions to transact with a website. *Journal of Strategic Information Systems*, 11, 297-323.

- Morris, J. S., Frith, C. D., Perrett, D. I., Rowland, D., & Young, A. W. (1996). A differential neural response in the human amygdala to fearful and happy facial expressions. *Nature*, 383, 812-815.
- Muir, B. M. (1987). Trust between humans and machines, and the design of decision aids. *International Journal of Man Machine Studies*, 27 (5-6), 527-539.
- Nass, C., Steuer, J., & Tauber, E. R. (1994). Computers are social actors. *Proceedings of the SIGCHI conference on Human factors in computing systems: celebrating interdependence* (pp. 72-78). New York: ACM.
- Niedenthal, P. M., Barsalou, L. W., Winkielman, P., Krauth-Gruber, S., & Ric, F. (2005). Embodiment in attitudes, social perception, and emotion. *Personality and Social Psychology Review*, 9 (3), 184-211.
- Rizzolatti, G., & Craighero, L. (2004). The mirror-neuron system. *Annual Review of Neuroscience*, 27, 169-192.
- Rousseau, D. M., Sitkin, S. B., & Burt, R. S. (1998). Not so different after all: A cross-discipline view of trust. *The Academy of Management Review*, 23 (3), 393-404.
- Schoorman, F. D., Mayer, R. C., & Davis, J. H. (2007). An integrative model of organizational trust: Past, present, and future. *Academy of Management Review*, 32 (2), 344-354.
- Shapiro, S. P. (1987). The social control of impersonal trust. *American Journal of Sociology*, 93 (3), 623-658.
- Skoyles, J. R. (2008). Why our brains cherish humanity: Mirror neurons and colamus humanitatem. *Avances in Psicología Latinoamericana*, 26 (1), 99-111.
- Sutter, M., & Kocher, M. G. (2007). Trust and trustworthiness across different age groups. *Games and Economic Behavior*, 59, 364-382.
- Synovate. (2008). *EIAA online shoppers*. European Interactive Advertising Association.

- Vertical Web Media. (2009). *America's top ten retail businesses*. Retrieved November 3, 2009, from Internet retailer: <http://www.internetretailer.com/top500/list.asp>
- Walther, J. B. (1992). Interpersonal effects in computer-mediated communication: A relational perspective. *Communication Research*, 19, 52-90.
- Wang, W., & Benbasat, I. (2005). Trust in and adoption of online recommendation agents. *Journal of the AIS*, 6 (3), 72-101.
- Wang, W., & Benbasat, I. (2007). Recommendation agents for electronic commerce: Effects of explanation facilities on trusting beliefs. *Journal of Management Information Systems*, 23 (4), 217-246.
- Wilson, M. (2002). Six views of embodied cognition. *Psychonomic Bulletin and Review*, 9 (4), 625-636.
- Xiao, S., & Benbasat, I. (2003). The formation of trust and distrust in recommendation agents in repeated interactions: A process-tracing analysis. *Proceedings of the 5th international conference on electronic commerce* (pp. 287-293). Pittsburgh, PA: ACM.
- Zebrowitz, L. A. (1997). *Reading faces: Window to the soul?* Boulder, CO, USA: Westview Press.

Appendix

Table 1

*Trust/Distrust-Related Words.**Differences between RT means (in ms) with trust- and distrust-related words as targets, dependent on priming condition*

Difference	Posture								
	Open			Neutral			Closed		
	Mean	SD	Sig.	Mean	SD	Sig.	Mean	SD	Sig.
Trust - Distrust	-34	13	0.01	-10	11	0.35	-4	13	0.76

Table 2

*Trust/Distrust-Related Words.**Differences between RT means (in ms) in different priming conditions with openness- and closeness-related words as targets, dependent on word-type*

Difference	Word-Type						
	Trust			Distrust			
	Mean	SD	Sig.	Mean	SD	Sig.	
Open - Neutral	-51	13	<0.01	-27	9	<0.01	
Open - Closed	-23	12	0.06	7	12	0.55	
Neutral - Closed	28	13	0.05	34	13	0.01	

Table 3

*Benevolence/Malevolence-Related Words.
Differences between RT means (in ms) in different priming conditions with benevolence- and malevolence-related words as targets*

Difference	Mean	SD	Sig.
Open - Neutral	-30	11	0.04
Open - Closed	1	12	1.00
Neutral - Closed	31	13	0.06

Table 4

*Openness/Closeness-Related Words.
Differences between RT means (in ms) with openness- and closeness-related words as targets, dependent on priming condition*

Difference	Posture								
	Open			Neutral			Closed		
	Mean	SD	Sig.	Mean	SD	Sig.	Mean	SD	Sig.
Openness - Closeness	-67	19	<0.01	-16	16	0.33	-32	14	0.28

Table 5

*Openness/Closeness-Related Words.**Differences between RT means (in ms) in different priming conditions with openness- and closeness-related words as targets, dependent on word-type*

Difference	Word-Type					
	Openness			Closeness		
	Mean	SD	Sig.	Mean	SD	Sig.
Open - Neutral	-29	11	0.01	22	16	0.19
Open - Closed	-13	15	0.41	22	17	0.21
Neutral - Closed	16	17	0.34	0	11	1.00

Table 6

Logos used in study 2.

English Text Doctor

Your Personal Online Writing Assistant



PROOF-READING.COM



WRITEITPERFECT.COM
YOUR TRUSTED WRITING EXPERTS



Table 7

Statements presented in the second part of study 2, translated from Dutch.

Type of Statement	Statement
	<i>"We are proficient text-correctors."</i>
Competence	<i>"We perform our task as text-corrector in an excellent way."</i>
	<i>"Generally speaking, we are a good text correction provider."</i>
	<i>"We are very able concerning the correction of texts."</i>
Benevolence	<i>"We will act in your best interest."</i>
	<i>"When you need help, we will do our very best to help you."</i>
	<i>"We are interested in your success, not only in that of ours."</i>
	<i>"We treat you in a benevolent way."</i>
Integrity	<i>"We are honest when making a deal with you."</i>
	<i>"We are honest."</i>
	<i>"We stick to a bargain."</i>
	<i>"We are fair-minded."</i>