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Factors That Enhance Consumer Trust in Human-Computer Interaction: An Examination of Interface Factors and Moderating Influences

Eun-Ju Lee
University of Tennessee - Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by Eun-Ju Lee entitled "Factors That Enhance Consumer Trust in Human-Computer Interaction: An Examination of Interface Factors and Moderating Influences." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.

David W. Schumann, Major Professor

We have read this dissertation and recommend its acceptance:

J. Tom Mentzer, Ernest Cadotte, Robert Mee

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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                                 Dean of Graduate Studies

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FACTORS THAT ENHANCE CONSUMER TRUST IN HUMAN-COMPUTER INTERACTION: AN EXAMINATION OF INTERFACE FACTORS AND THE MODERATING INFLUENCES

A Dissertation
Presented for the
Doctor of Philosophy
Degree
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Eun-Ju Lee
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I thank my teacher, Dr. David Schumann

for his thoughtful and benevolent trust.

I thank my Father, Dr. Kwang-Bae Lee and my Mother, Oak-Kyung Hwang

for their thick and blind trust.

I thank Jesus

who trusted so much that he gave his own life.

And now, it's my turn -

my turn to trust, thoughtfully, benevolently, thickly, blindly, and selflessly.

ABSTRACT

The Internet coupled with agent technology presents a unique setting to examine consumer trust. Since the Internet is a relatively new, technically complex environment where human-computer interaction (HCI) is the basic communication modality, there is greater perception of risk facing consumers and hence a greater need for trust. In this dissertation, the notion of consumer trust was revisited and conceptually redefined adopting an integrative perspective. A critical test of trust theory revealed its cognitive (i.e., competence, information credibility), affective (i.e., benevolence), and intentional (i.e., trusting intention) constructs. The theoretical relationships among these trust constructs were confirmed through confirmatory factor analysis and structural equation modeling.

The primary purpose of this dissertation was to investigate antecedent and moderating factors affecting consumer trust in HCI. This dissertation focused on interface-based antecedents of trust in the agent-assisted shopping context aiming at discovering potential interface strategies as a means to enhance consumer trust in the computer agent. The effects of certain interface design factors including face human-likeliness, script social presence, information richness, and price increase associated with upgrade recommendation by the computer agent were examined for their usefulness in enhancing the affective and cognitive bases for consumer trust. In addition, the role of individual difference factors and situational factors in moderating the relationship between specific types of computer interfaces and consumer trust perceptions was examined.

Two experiments were conducted employing a computer agent, Agent *John*, which was created using MacroMedia Authorware. The results of the two experiments showed that certain interface factors including face and script could affect the affective trust perception. Information richness did not enhance consumers' cognitive trust perceptions; instead, the percentage of price increase associated with Agent *John*'s upgrade recommendation affected individuals' cognitive trust perceptions. Interestingly, the moderating influence of consumer personality (especially feminine orientation) on trust perceptions was significant. The consequences of enhanced consumer trust included increased conversion behavior, satisfaction and retention, and to a lesser extent, self-disclosure behavior. Finally, theoretical and managerial implications as well as future research directions were discussed.

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CHAPTER 1

INTRODUCTION

Introduction

The marketing discipline is currently experiencing a metamorphosis driven by the infusion of technology into the practice of marketing (Bitner, Brown, Meuter 2000). Companies now utilize digital technologies to deliver products and services to end-user consumers. Face-to-face consumer interactions are being replaced by human-computer interactions (HCI), and an increasing number of consumers are shopping and purchasing products and services *via* the Internet. At the same time, we are on the verge of a new technological era "when user interfaces are about to break out the desktop box" (Myers, Hudson, and Pausch 2000, p.3) towards more user-centered and humanized human-computer interactions (Norman 1998) utilizing hypermedia, high intensity information and communication technologies.

While the general trend toward automation continues, the public remains concerned about the increasing prevalence of human-computer interaction systems (e.g., Internet) that may ultimately replace human-human interaction. Electronic interfaces are often perceived to be deceptive and insecure; many consumers do not feel that they can *trust* electronic interfaces. As Hoffman and Novak (1998) note "consumers do not trust … enough to shop online." Perhaps the single most important factor affecting the use of the Internet as a purchasing medium is the presence or the absence of consumer trust.

It is widely acknowledged that trust is a key element in successful marketing (Doney and Cannon 1997; Morgan and Hunt 1994). Marketing researchers have long studied trust in the organizational context, in channel relationships (Doney and Cannon 1997; Ganesan, 1994; Lewicki, McAllister, and Bies 1998; Moorman, Deshpande, and Zaltman 1993; Morgan and Hunt 1994), and in the personal selling context (Hawes, Mast, and Swan 1989; Milliman and Fugate 1988; Oakes 1990; Swan and Nolan 1985; Swan, Bowers, and Richardson 1999). However, little is known about the role of trust in human-computer interaction beyond the examination of security issues (Gefen 2000; Jarvenpaa, Tractinsky, and Vitale 2000). Studies in computer science and engineering (e.g., Muir 1987) have discussed trust from a technical standpoint such as encryption, but have not delved into the potential related psychological factors. Previous research on building human trust in an online environment proposed using third-party trust signals, such as the approval seal by TRUSTe (Friedman, Kahn, and Howe 2000; Palmer, Bailey,

Farad 2000), instead of investigating the possibility of establishing a trusting relationship between the two parties of a human-computer interaction, i.e., the person and the computer.

When examined closely, consumer trust can take richer meanings than transaction security and privacy protection. Trust is typically cultivated between two or more human beings through social interactions. That is, people may trust other people, but not inanimate technology. Thus, the notion of "trusting" computers as if they were human partners may be unfamiliar to consumers. In fact, the lack of trust in human-computer interaction may be attributed to the ontological gaps between the two parties in HCI, i.e., consumers' social nature and the computer's incompetence to afford social interaction (Norman 1998).

Interestingly, the CASA (Computers Are Social Actors) research suggests that the characteristics of a trusting/distrusting interpersonal relationship could be equally applicable to human-computer interaction. For example, recent studies by Reeves, Nass, and their colleagues (Fogg and Nass 1997; Nass et al. 1997; Nass, Moon and Green 1997; Reeves and Nass 1996), among others, have found that people consciously or unconsciously treat computers as real people. People could determine the personality of software via message interface with whom they were interacting (Moon 1996) and unconsciously applied the rules of interpersonal behavior to human-computer interaction (Ovans 1999). People also perceived similarities between computer personality and their personality and respond favorably or unfavorably depending on these perceived similarities (Moon 1996; Waern and Ramberg 1995). While a recent CASA study by Moon (2000) assumes a potentially intimate social interaction between human users and computers via text-based message interfaces,[1] to date relatively few studies have investigated how user interface can enhance consumer trust in a persuasive online marketing context. Even less research attention is given to the potential moderating influences including individual differences and situational factors on consumer perceptions and behavior in HCI. This dissertation research attempts to shed light on these gaps in the literature by providing an investigation of certain interface-driven trust strategies and the interaction between the computer interface, individual differences, and a situational factor.

The primary question addressed in this dissertation research is whether embedding certain trust facilitators in interface designs, such as face human-likeliness, script social presence, and information richness, can enhance consumer trust in HCI -- both the cognitive and affective bases for trust. Can a computer interface, for example, an Internet shopping agent (see Ansari, Essegaier, and Kohli (2000) and

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[1] Moon's (2000) study examined the exchange dynamics between consumers and computers using different message interfaces. Specifically, two experiments were designed to demonstrate how exchange principles such as reciprocity and sequence, which are relevant to interpersonal interaction, could equally be applied to the case where computers solicited intimate information from consumers through text-based conversation.

Urban, Sultan, and Qualls (1999) for examples), ever inspire consumer trust to the extent that consumers will make purchases and voluntarily disclose personal information? Specifically, would it be possible to enhance consumer trust (and especially the affective basis for trust) by creating computer interfaces that facilitate anthropomorphism and/or have social presence? Would it be possible to enhance consumer trust (and especially the cognitive basis for trust) by creating computer interfaces that provide rich information and make recommendations based on product expertise? How would interface types influence cognitive and affective bases for trust differently?

Another research question addressed in this dissertation is how human and situational factors moderate user perceptions about, and preferences for, specific user interface types. It is important to note that the appropriateness of a particular computer interface may depend on individual differences, such as user personalities (e.g., psychological gender orientation, need for association, and need for cognition) and situational salience of a consumer's shopping goal (e.g., experiential vs. instrumental goals).

The third research question taps into the potential consequences of trust. What would be the consequences of consumer trust? Will consumers' behavior including conversion (actual purchase) and self-disclosure be facilitated by trust? Will consumer satisfaction and retention increase with enhanced trust?

Specific research questions are summarized below (see Figure 1-1):

1. ***Trust-Enhancing Interface Design Factors***. What interface strategies can be used to enhance consumers' trust in HCI? Is it possible to enhance consumer trust using human-like faces and warm scripts? (Social Interface) Will greater consumer trust be engendered by information richness? (Information Interface) How will interface types differ in their relative weightings on the affective and cognitive trust? In other words, will interface types influence affective and cognitive trust differently?

2. ***Individual and Situational Moderators.*** How do individual difference factors, such as individual personality (e.g., feminine orientation, masculine orientation, need for cognition, need for association), and a situational factor (e.g., salience of experiential vs. instrumental shopping goals), moderate the types of computer interfaces that are preferred and trusted more?

3. ***Trust Consequences.*** What are the consequences of trust? Does heightened trust facilitate consumer self-disclosure, purchase (conversion), satisfaction, and retention?

Background

Agents as Computer Interfaces

It is not hard to think of the examples of a variety of computer interfaces in consumers' daily lives. Consumers face many different forms of computer interfaces at gas pumps, ATMs, grocery stores, and e-ticket counters at the airport.
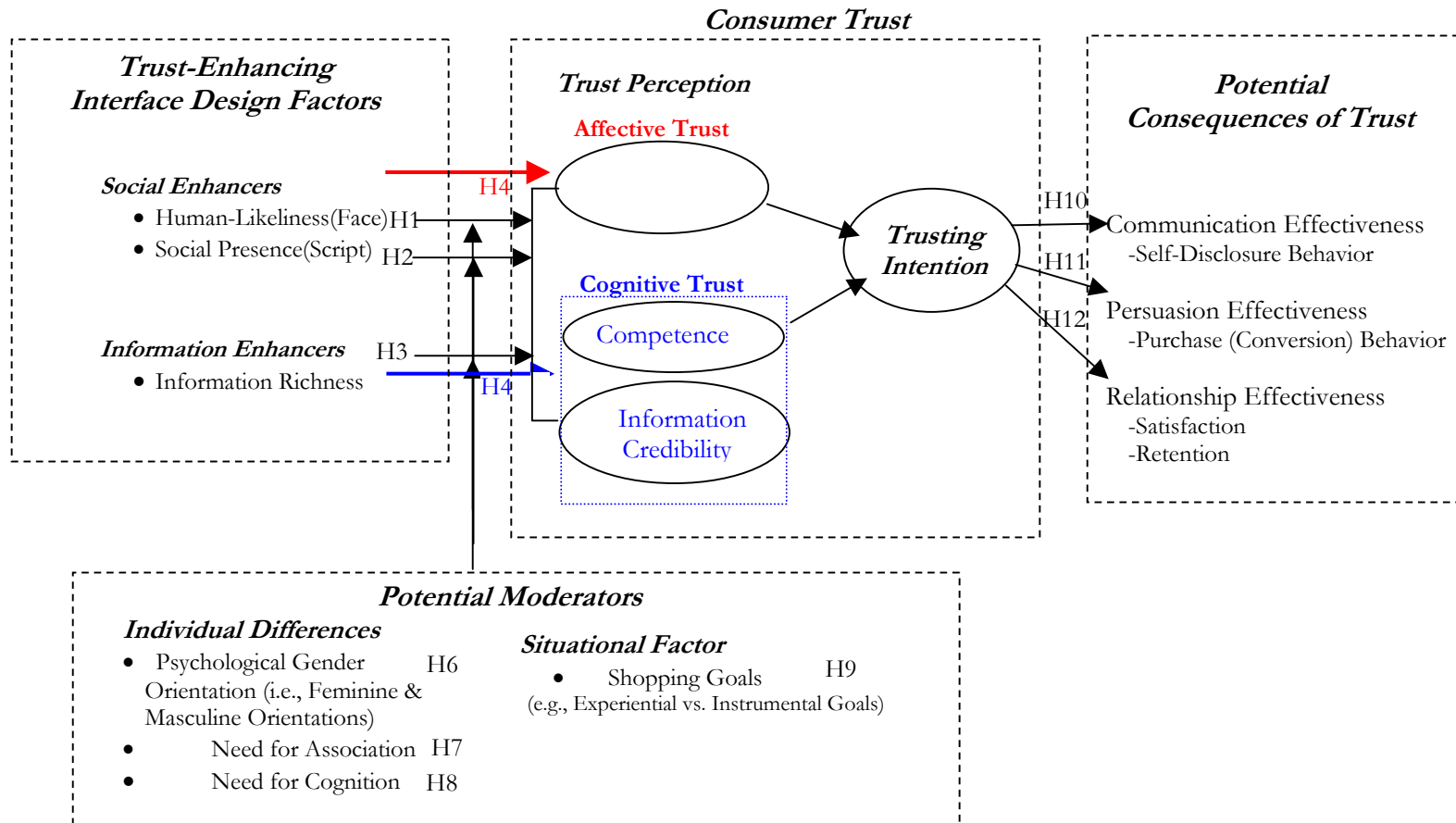
Figure 1-1. A Conceptual Model of Enhancing Consumer Trust in Human-Computer Interaction

Computer interfaces are software that shapes interaction between human user and computer (Johnson 1999). Interfaces represent digital machines;[2] yet expose technology to users in a more friendly way than the binary combinations of digital languages. Today, companies like Sony and Tatsuno Ishida are investing in robot technologies to develop robots that can talk, walk, and think like people (*Business Week* 2001).[3]

Recently, we began to see advanced computer interface agents supported by advanced multimedia capabilities of the Internet. For example, finali.com is an outsourcing service company that helps to set up and maintain customer relationship management systems for Internet-based companies. They use an intelligent agent who can "greet, and guide consumers and offer personalized promotions." This idea of having human-form intelligent agents on company Web site is analogous to having sales personnel in cyberspace instead of in a retail store.

Intelligent Agents on the Internet

With the rapid advancement of Internet technology, the amount of available information increased exponentially, and users face new problems of selecting and accessing relevant information (Rouet et al. 1996). Given consumers' limitations in information processing capacity, too much disorganized information is a problem that hinders consumers from embracing the Internet as a purchasing medium. Consumers may need help in avoiding potential information overload, reducing the vast amount of information to fit individual needs (Maes 1994). It is important to find efficient ways that enable users to interact with information systems in a manner that can prevent consumer information overload. Intelligent computer agents can be designed to serve this purpose, providing more relevant and personalized information to individual consumers. Intelligent software agents can also help consumers with a variety of tasks including those involved in negotiating and buying products over the Internet (Guttman and Maes 1998).

What does "intelligent agent" mean in the Internet environment? Intelligent agents are a form of artificial intelligence that operates somewhat autonomously in the Web environment (Wong and Sycara 2000). Lennon (1997) defines electronic agent as "prototype versions of systems of software in which

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[2] For example, robots are early representations of machine agents. Great human minds have always dreamt about robots. In B.C. 8000, Homer imagined a walking tripod in his book, *Illiad.*

[3] Although there are some technical hurdles to be overcome and thus it may take some time to commercialize robot technologies, scientists are working hard to endow human-like features to robots, e.g., the ability to learn to interpret and respond to human emotions (see *Affective Computer* by Rosalind Picard 1997), translucent metal skins that can change hue to depict emotions, etc.

computer programs are capable of learning from repetitive actions" (p.10).[4] Note another definition of intelligent agent by King (1995):

> An intelligent agent is considered to be a computer surrogate for a person or a process that fulfills a stated need or activity. The surrogate entity provides decision-making capabilities that are similar to the described intentions of a human. This surrogate can be given enough of the persona of a user or the gist of a process to perform a clearly defined or delimited task. An intelligent agent can operate within the confines of a general or precisely represented need and within the boundaries of a given information space.

Lieberman (1997) identifies two types of agents: interface agents, software that assist users in operating an interactive interface such as "clippy" in Microsoft Word or other context-sensitive help systems; and autonomous agents, software that can take actions and make decisions without user intervention and operate concurrently. Interface agents are programs that users can directly manipulate. Interface agents are becoming more popular particularly due to the increasing complexity of user interfaces. With the growth of menu operations and other interface choices added each year, the computer screen cannot begin to display all of them (Lieberman 1997). Employing interface agents, the user can request to bring up most relevant menu for the user.

On the other hand, autonomous agents have the capability to run without needing to interact with the user in taking actions and making decisions. Hence, its operation is not conversational. The user can provide task commands with certain parameters, and the agent can perform the task independent of user intervention (Lieberman 1997). Ultimately an advanced agent will become autonomous to the extent that its actions and choices depend upon its artificial intelligence rather than on knowledge built-in by the programmer. Murch and Johnson (1998) have discussed past development of intelligent software agents dating back to 1994 and predict the future advancement of the agent technology (See Table 1-1).

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[4] Intelligent agents are often identified with the following characteristics (Wooldridge and Gennings 1995 as referred to in Murugesan 1998, p. 97).

- Autonomy: agents perform majority of their tasks without the direct intervention of humans or other agents.
- Social Ability: agents interact, when they deem appropriate, with other agents and humans in order to accomplish their tasks and to help others. Thus, agents should have a means by which they can communication and an internal mechanism for deciding what and when social interactions are appropriate generating requests and judging incoming requests.
- Proactiveness: agents take the initiative to do certain tasks when appropriate.
- Responsiveness: agents perceive their environment and respond in a timely fashion to changes occurring in the environment.

Table 1-1. Intelligent Software Agents Development

Year	Development
1994-2005	Agents are host based, standalone, and search the web using fetch processes.
1997-2005	Agents are host based and combine standalone with negotiation. The adoption of XML will create an environment in which these agents can operate.
1998-2010	Agents are mobile and highly personalized, but standalone.
1999-2010	Agents are mobile and capable of negotiating with computers and other agents.
2005-2020	Agents employ subagents. Agents are able to traverse any computer connected to the web and utilize resources by negotiating with computers and other agents.
2010-2050	Agents can activate and inhabit real world and pursue goals beyond the virtual.
2005-2050	Agents are self-replicating and can design agents tailored to specific needs. Agents develop agents to carry out their tasks and needs as required. These manager agents are independent, and self-motivating, and in many respects have human capability.

Borrowed from Murch and Johnson (1998), p. 39.

Shopping Agents

Industry analysts predict that one of the most significant changes that will occur in e-commerce is the commercialization of Internet-based software agents, so-called "shop bots" that can search for information, compare prices, negotiate with merchants, and conduct transactions on behalf of consumers, based on the instructions provided (Deloitte Research 2000).

In the interactive marketplace, the customer has more choices compared to the traditional marketplace: the customer may negotiate with the seller in real-time, find multiple alternative suppliers (Schultz and Bailey 2000). With today's advanced computer technologies, it is possible to design and implement software systems that can engage in such market negotiations. They are intelligent "shopping agents" or "shop bots." Short for robot, shop "bots" are computer programs that run automatically, query multiple sellers on the Internet to gather information about consumer products and services (Greenwald, Kephart, and Tesauro 1999, p.58).

There are different types of software shopping agents that assist consumers' decision-making process. One of the first commercially developed shopping agents was the auction or negotiation agent. Anderson Consulting's (now defunct) BargainFinder, which shopped for the best price for CDs from a number of online CD retailers (Knapik and Johnson 1998, p.344), provides a good example. [5]

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[5] While the 'shot-bot" concept behind this Web site was provocative and novel, several problems associated with the shop bot technology, such as slow speed and lack of any specialized knowledge, were also cleary present. Since most cross-merchant shopping agents were limited to comparing various product

Interestingly, Maes (1994), a renowned computer scientist, pointed out two main problems with computer software agents (p.811). The first problem is a *competence* problem; computer agents need to acquire the knowledge needed to decide when and how to help users, let alone have the flexibility to deal with the users' sometimes spontaneous and unpredictable needs. Computer science still has a long way to go to reach that point. The second problem is a *trust* problem: how can the users feel comfortable delegating important tasks to a computer agent? Although users want competent agents who can complete tasks successfully, it is not a good idea to initially provide the users with high sophisticated and autonomous agent, because human users may become threatened with loss of control (p. 812).

Knapik and Johnson (1998, p.348) note that "people in general feel comfortable with agents finding resources and helping with research, but when it comes to making important decisions based on the data agents gather and analyze, humans may never trust them." One of the reasons is that computers and intelligent agents are not people, thus they may not adhere to a code of ethics to follow. Unless computer programmers are moral and live by a code of ethics, computer agents may not become ethical in practices. A mandatory establishment of the ontology of agent ethics has yet to come (Knapik and Johnson 1998).[6] However, it should also be noted that because of its machine-identity, consumers could trust computer agents to be accurate and not to make irrational assumptions or decisions as human agents would.

Conversational Agents

In the 1950s, a scientist, Alan Turing devised a test for artificial intelligence. The purpose of the Turing test was to demonstrate the fact that the computer could "think" as humans did, challenging the prevalent belief that computers were no more than inanimate machines. In a typical Turing test, a human interrogator is placed in a room with a computer terminal. The person engages in two conversation sessions: one with a computer conversant and another with a human conversant, but the interrogator is not told which is the human and which is the computer. After conversing with both conversation

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offerings only on price instead of comparing the full range of service/value package, some retailers have blocked such price-oriented shopping agents from their Web sites (Guttman and Maes 1998; Knapik and Johnson 1998).

[6] Isaac Asimov's science fiction novel lists the Three Laws of Robotics (from *Handbook of Robotics, 56th Edition, 2058 A.D.*, as quoted in *I, Robot):*
1. A robot may not injure a human being, or, through inaction, allow a human being to come to harm.
2. A robot must obey the orders given by human beings except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

partners, the interrogator will identify which is which. Using a variety of subjects, if the interrogators guessed correct only 50% of the time, then it is a random guessing that shows that the computer successfully proved its humanness.[7]

In fact, Turing machines are the early examples of modern conversational agents. A conversational agent, or a "chatterbot," is a program that attempts to simulate conversation with a human user. Early conversational agents were devised with the aim of (at least temporarily) deceiving the human interrogator into believing that they were talking to another person, and not to a machine (http://www.simonlaven.com). Examples of these conversational agents include *ELIZA*, the first computer psychiatrist. *ELIZA* was the evocative sensing technology that made people aware of the dissolving boundaries between humans and computer artifacts (Turkle 1995).

Recently, researchers in the computer science field have rediscovered the possibility of the embodied conversational agents (ECA). Unlike the early generation of conversational agent, ECAs not only use typed languages, they also utilize face displays, eye gaze, gesture, voice, emotion, and speech (Cassell 2000).[8] Embodied conversational agents are human-like "in the way they use their bodies in conversation" (Cassell et al. 2000, p.29).

The technical realization of ECA requires multimodal interfaces that endow the agents with perceptual capabilities, such as speech recognition and vision, and on-screen multimodal responses including speech and gesture generation. In addition, designing conversational agents involve social issues such as agent appearance, personality, and communication and domain expertise (Churchill et al. 2000). Because people may apply the same social rules that govern human-human relationships to human-computer interactions (Reeves and Nass 1996), human users are likely to infer the personality and competence of the agents from the agent's speech pattern and appearance. Figure 1-2 represents the relationship between human users and conversational agents and influencing factors.

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[7] Many advocate the validity of the Turing test, because in order to pass the Turing test, the computer has to display a variety of knowledge, emotions, flexibility, and adaptability to new situations and people. For example, interrogators sometimes request the computer to compose a poem or sing a song, discuss meanings of symbols, and to explain why a certain joke is funny – tasks that cannot be tackled without intelligence. John Searle (1997), in his article "Minds, Brains, and Programs," notes that simulating human language should be differentiated from truly understanding a language. That is, computers that passed the Turing test might be capable of manipulating formal properties of linguistic symbols, however, they were not capable of *understanding* semantic properties (meanings). "Understanding, not simulating, language is the true indication of humanness," says John Searle.

[8] Ideally, ECAs can be defined as the computer agents that have the following properties (Cassell et al. 2000, p. 29): (1) the ability to recognize and respond to verbal and non-verbal input; (2) the ability to generate verbal and non-verbal output; (3) the ability to deal with conversational functions such as turn-taking, feedback, and repair mechanism; and (4) the ability to give signals that indicate the state of the conversation, as well as to contribute new propositions to the disclose.

Personality

Situational Issues

Knowledge and Skills

Human-Agent Relationship Issues

Personality

Appearance

Communication and Domain Expertise
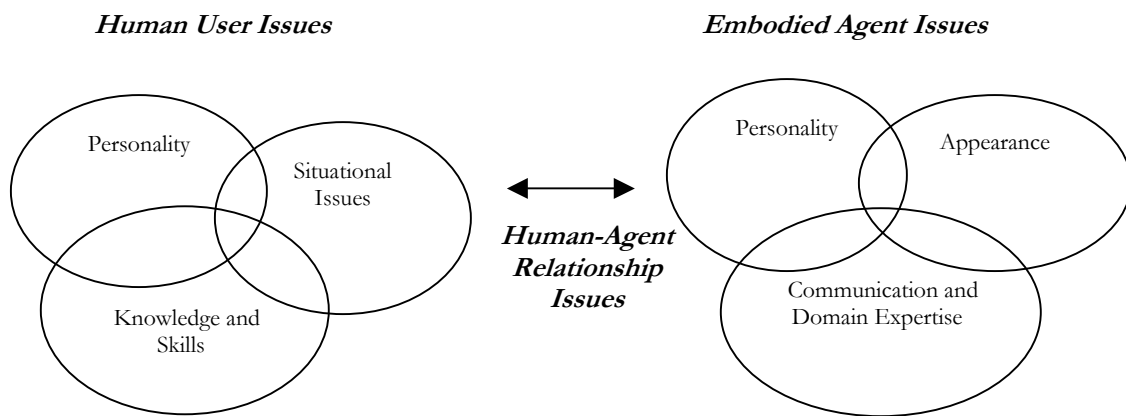
Figure 1-2. Issues in the Design of Embodied Conversational Agents
(Adapted from Churchill et al. 2000, p.70)

Conceptual Framework

Trust

The importance of trust in interpersonal relationships as well as in society was highlighted when Golembiewski and McConkie (1975) stated that "perhaps there is no single variable which so thoroughly influences interpersonal and group behaviour as does trust...". Trust is the fundamental driver of interpersonal relationships and social order (and disorder) and has been extensively studied in literatures to include sociology (Bok 1978; Gambetta 1988; Heimer 1976; Luhmann 1988; Sellerberg 1982), economics (Dasgupta 1988; Deutsch 1962; Humphrey and Schmitz 1988; Moore 1999), communication (Pearce 1974), social psychology (Cook and Wall 1980; Rempel, Holmes, and Zanna 1985; Rotter 1967, 1980), biology (Bateson 1988), child development (Erikson 1950), intimate relationships (Larzelere and Huston 1980), political science (Pagden 1988), philosophy (Horsburgh 1960), management (Bhattacharya, Devinney, Pillutla 1998; Das and Teng 1988; McAllister 1995; McKnight, Cummings, and Chervany 1998; Nooteboom, Berger, and Noorderhaven 1997; Rousseau, Denise, Sitkin, Burt, and Camerer 1998; Zand

1972), and marketing (Crosby, Evans, and Cowles 1990; Doney and Cannon 1997; Ganesan 1994; Moorman, Zaltman, and Deshpande 1992; Morgan and Hunt 1994; Schurr and Ozanne 1988; Zaltman and Moorman 1988). Luhmann (1979) has argued that without trust we would have to face an insurmountable amount of complexities and uncertainties in the world. Without it we would arguably go insane, because trust enables us to reason appropriately and predict the future behavior of others and the possibilities of everyday life.

It has even been suggested that society would collapse if trust were not present (Bok 1978). In the channels literature, trust has been found to enhance cooperation, performance, and long-term relationships (Smith and Barclay 1997). In the sales literature, dependability of a retail salesperson is among the buyer's most critical concern, and trustworthiness is found to be of greatest importance among the many salesperson characteristics (e.g., friendly relationship, personable style, patient buying assistance, and quick service) (Hawes, Rao, and Baker 1993). Proposed benefits of trust include better performance and relationship satisfaction, (Golembiewski and McConkie 1975) and greater personal development and enhanced ability to cooperate (Argyle 1991; Deutsch 1962).

Factors That Enhance Trust in Human-Computer Interaction

Interface Factors

People like to interact with trustworthy partners. The key point in successful human-computer interaction in a persuasive marketing context may be how marketers can create a computer interface that conveys trustworthiness, one that is similar to a trustworthy human partner. Technically, creating a trustworthy computer personality may involve developing graphical user interfaces (GUI) and/or voice user interfaces (VUI) that are capable of engaging in multimodal face-to-face interaction by utilizing verbal and/or nonverbal modalities such as speech, gesture, gaze, intonation, and posture (Cassell and Bickmore 2000; Oviatt and Cohen 2000). Such multimodal interfaces may have an appearance similar to a trustworthy human character that can elicit honest interaction. Building such interface-driven consumer trust may be possible utilizing human-like and socially present computer interfaces.

Andaleeb and Anwar (1996) found that people give credibility to knowledgeable, expert salespeople. The information richness, or expertise, of an interface can also contribute to the enhancement of consumer trust in HCI. A trustworthy computer interface could also take the form of a competent, knowledgeable expert that offers information rich shopping environments.

Taken together, the first proposition discusses the interface-driven factors as potential enhancers of consumer trust in HCI.

Proposition 1: Trust in human-computer interaction (HCI) can be enhanced by embedding particular interface factors in user interface design, such as creating human-like and socially present interfaces (Social Interface), and/or information-rich and expert interfaces (Information Interface).

Cognitive and Affective Bases for Trust

Trust is often defined as the perception of "confidence in the exchange partner's integrity and reliability" (Morgan and Hunt 1994, p.23). Trust also refers to the "emotional security" toward the exchange partner (Doney and Cannon 1994; McAllister 1995).

Conceptualizing individuals' evaluative judgment (e.g., attitude) as having a cognitive (belief) and affective (emotion) basis is a commonly used approach (Petty, Wegener, and Fabrigar 1997). Likewise, trust can have both the cognitive and affective bases (Lewis and Weigart 1985; McAllister 1995). The cognitive basis for trust refers to the rational, objective dimensions of one's decision to trust, based on the evaluation of others' dependability, credibility, and competence (Lewis and Weigart 1985). The affective basis for trust, on the other hand, refers to the subjective elements of the decision to trust others, based on the emotional bond and on the care and concern that emerges from interacting with others (McAllister 1995).

In HCI, user trust could reflect the user's confidence in the competence and ability of a computer agent (cognition). It is expected that an information interface that offers information rich environments and expertise may likely operate upon the cognitive basis for user trust. On the other hand, trust in HCI can also reflect users' positive feelings and emotional security (affect) toward the computer interface. Social Interface that offers warm and friendly interactions may likely operate upon the affective basis for consumer trust in HCI. Therefore:

Proposition 2: Trust in human-computer interaction (HCI) can have both cognitive and affective bases. An information interface will likely operate upon the cognitive basis for consumer trust whereas a social interface will likely operate upon the affective basis for consumer trust.

Individual Difference Factors

For some consumers, human-computer interactions provide convenience, timesavings, and fun; yet for others, dealing with computer interfaces instead of human employees can cause stress and anxiety (Mick and Fournier 1998). Such a wide variation of consumer reactions results, in part, from individual difference factors. Previous research suggests that individual differences factors, such as individual personality (e.g., psychological gender orientation, need for association, and need for cognition), may influence the extent to which users trust and embrace technologies. The third proposition discusses the potential link between user personalities and consumer trust in HCI.

Proposition 3: Consumers' perception of trustworthiness of and preferences for a particular computer interface is likely to be moderated by individual difference factors including an individual's personality (e.g., psychological gender orientation, need for association, need for cognition).

Situational Factors

Online shoppers may have experiential and instrumental goals depending on the type of a particular shopping task. Experiential goals are driven by hedonic motivations to "enjoy" the experience (Holbrook and Hirschman 1982). Individuals' pursuit of entertaining value and emotional arousal, and fantasy fulfillment indicate their experiential goals (Bloch and Richins 1983; Hirschman 1983). On the other hand, instrumental goals are primary driven by utilitarian motives that are task-oriented and rational-decision-based (Batra and Ahtola 1991). Utilitarian motive relates shopping with a "work" mentality (Hirschman and Holbrook 1982). Consumers with instrumental goals are usually happy to "get though it all" relatively quickly (Babin, Darden, and Griffin 1994, p.646).

Media selection theory (Daft and Lengel 1986) and social presence theory (Carlson and Davis 1998; Short et al. 1976) suggest that interaction tasks differ in their requirements for social presence or information intensity. That is, people will likely recognize that interfaces differ in the amounts of social presence the interfaces provide. Also, different interfaces represent varying levels of information richness. Depending on the degree to which social presence or information richness is appropriate in accomplishing a situationally salient goal, individuals' preference for a particular interface may change. Individuals are likely to select an interface that is conducive to the accomplishment of a particular shopping goal (e.g., experiential or instrumental goals). Thus:

Proposition 4: User perception of trustworthiness, and preferences for, a particular computer interface is likely to be moderated by a situational factor such as situational goal salience (e.g., experiential vs. instrumental shopping goals).

Consequences of Consumer Trust in Human-Computer Interaction

This section outlines potential outcomes of trust in HCI, with an emphasis on consumer responses to persuasion attempts made by interface agents. The consequences of enhanced consumer trust in HCI can be summarized as communication effectiveness, persuasion effectiveness and relationship effectiveness.

Self-disclosure is defined as the verbal communication that includes information exchange that reveals personal states, dispositions, events, and plans (Cozby 1973; Falk and Wagner 1985; Worthy, Gary, and Kahn 1969). The governing rule of any social relation is the principle of reciprocity (Kenny, Mohr, and Levesque 2001); people's response to their partners reflects the partners' prior action. Thus, the key to successful persuasion is "give and take" between human partners (Caldini 1998).

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The biggest problem in current e-commerce might be that consumers hesitate to give: they search for and receive free information from various Web sites, but do not give their share of information in return. Many factors contribute to this asymmetric communication pattern, one of which might be that the Internet lacks physical reality. Rules governing social interaction and social relationships may begin to apply to only when the participating party recognizes the other party's social reality. Thus, if consumers recognize social reality when engaging in communication with computers, the principle of reciprocity will apply. Consumers will likely respond favorably to computer interfaces that act in a trustworthy manner with increased self-disclosure just as consumers are more likely to associate and listen to trustworthy and credible salespeople. Studies suggest that individuals are likely to disclose personal information to trustworthy partners. Trust in interpersonal as well as human-computer relationships is likely to increases self-disclosure behavior.

Proposition 5: Enhanced consumer trust in HCI will increase communication effectiveness (e.g., increased self-disclosure behavior).

Persuasion effectiveness can be measured by positive attitude toward persuasive communicators leading to increased and purchase behavior (Doney and Cannon 1997; Mitchell, Davies, Mutinho, and Vasso 1999) in the persuasive marketing context. It is expected that consumer trust in computer interfaces will also lead to increased purchase behavior.

Proposition 6: Enhanced consumer trust in HCI will increase persuasion effectiveness (e.g., increased purchase behavior).

Finally, relationship effectiveness can be represented by satisfaction and loyalty (retention). In order to successfully complete a task that involves HCI, people and computers must collaborate. Lack of trust in (and insufficient understanding of) computer partners in HCI can cause process failure (Federal Aviation Association Report 1996). In contrast, establishing a cooperative, trusting relationship in HCI is likely to result in user satisfaction (Andaleeb 1996) and retention (Chow and Holden 1997, Ganesan 1994; Morgan and Hunt 1994). Therefore:

Proposition 7: Enhanced consumer trust in HCI will increase relationship effectiveness (i.e., user satisfaction and retention).

Purpose of This Dissertation

In discussing consumer trust in e-commerce, it is important to note that consumers' lack of trust reflects problems in various areas including the structures and processes of the online environment. For example, trust may include users' confidence in the Internet medium, integrity of the Web providers, credibility of the information available on a particular Web site, security of transaction, and reliability of

service delivery and fulfillment (Urban, Sultan, and Qualls 2000). Trust in each aspect of e-commerce is consistently important in enhancing consumer satisfaction with, and loyalty to, the companies. While consumer privacy and security concerns on the Internet, among others, have been discussed fervently in a variety of forums (Brown 2001; Forno and Feinbloom 2001; Matthews, Nix, and Berlack 2001), the importance of designing trustworthy interfaces as a means to enhance trust have received relatively little research attention (Cassell and Bickmore 2000). This paucity of marketing research into trustworthy computer interfaces is unfortunate because interfaces can fundamentally alter consumer online experiences (User Interface Engineering 2001).

In spite of prominent concerns regarding the Internet, it is important to note that e-commerce is consistently evolving in the positive way that it has become a vital business model in a large number of companies. A number of Internet-based companies, such as Amazon and eBay, have successfully established strong online presence.

However, despite the phenomenal growth of wired populations and daily online shoppers (PCWorld 2001), the conversion rate - the number of visitors who come to a particular retail site divided by the number of actual buyers - was only 1.8 percent (Boston Consulting Group and Shop.org 1999). That is slightly lower than the conversion rate of 5% at real-world department stores, but much lower than 40% at specialty stores (Rewick 2000). Almost two-thirds of online shoppers fill their electronic shopping carts but exit at the checkout point without making a purchase (Gurley 2000; Rewick 2000). These statistics clearly suggest many Internet marketers' failures to generate sustainable profits might not be simply because their Web sites had failed to receive enough online traffic, but because marketers failed to turn prospective shoppers into actual online buyers through pleasant and engaging interactions *via* trustworthy computer interfaces. Compared to offline stores where salespeople greet prospective shoppers and constantly attempt to offer services and information that will reassure consumers' purchase decisions, Web sites tend to primarily offer price comparisons and do not explore a full range of shopping values.[9] Scanty interfaces that only compare prices might be appropriate for those consumers who already know what they want. However, lower prices alone cannot attract most prospective online shoppers who value enjoyable shopping experiences as well.

Because interfaces mediate communication between buyers and sellers and shape the nature and quality of relationships in human-computer interaction, understanding the role of different interface strategies in enhancing consumer trust in HCI can provide useful information regarding how to

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[9] Retail stores are especially potent in offering a point-of-purchase assistance including face-to-face service, social experience -- connecting with people, merchandise, and unique shopping atmosphere, all of which the current Internet retailers cannot provide (Achenbaum 1999, p.64).

implement effective Internet communication that can lead to positive outcomes such as communication effectiveness, persuasion effectiveness, and relationship satisfaction and loyalty (Pavlou and Stewart 2000).

The rapid technological developments in artificial intelligence and multimedia technologies prestage interface revolutions in consumer technology products in the near future (Myers, Hudson, and Pausch 2000). A scholarly investigation into electronic interfaces is extremely timely not only because it is now possible to realize technically advanced interfaces, but also because after decades of the quickly evolving computer cultures, the society "has learned to take things at interface value" (Turkle 1995, p.23).[10]

Organization of the Dissertation

This dissertation examines potential interface strategies that can enhance consumer trust in human-computer interaction and the moderating influences such as individual difference and situational factors. The interaction of the computer interface, individual personality, and situational goal is investigated through experimentation.

In Chapter 1, a brief introduction to the impetus for studying the phenomenon of trust in human-computer interaction was presented. An overview of the dissertation was offered with a conceptual model, which identified the relationships among consumer trust constructs, the antecedents, and consequences of consumer trust.

Chapter 2 serves as a theoretical framework for this dissertation. In chapter 2, existing literature on trust and online consumer behavior is reviewed. Based on the review of literature, consumer trust in HCI is redefined and the antecedents and the consequences of consumer trust in the HCI context are identified. In addition, individual personality and situational factors are examined in their relations to consumer trust and preferences, leading to the research hypotheses.

Chapter 3 describes the methodology for this dissertation study. In this chapter, two research experiments are designed to test the research hypotheses developed in the previous chapter. Specifically, within the context of Internet shopping, different interface prototypes that represent varying levels of face human-likeliness, script social presence, and information richness are tested for their effectiveness in enhancing consumer trust and increasing favorable perceptual and behavioral responses. In addition, the two research studies seek to demonstrate the moderating influences of individual differences and situational factors. For example, consumers could be attracted to a computer interface agent that manifests trustworthiness in a way that matches the their personality types (i.e., need for cognition, need

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[10] In her book *Life on the Screen*, Turkle (1995) notes that we are moving toward "a culture of simulation" where people are increasingly comfortable with substituting virtual experiences for real ones (p. 23).

for association, and psychological gender orientation) and the situational goal that is salient to the consumer (i.e., experiential vs. instrumental shopping goals).

Chapter 4 reports the results of statistical analyses for hypotheses testing. The appropriateness of the newly developed trust scale is discussed and its psychometric properties are examined. A test of trust theory is conducted using confirmatory factor analysis and structural equation modeling. The collected experimental data are analyzed using a number of univariate and multivariate statistical techniques and each research hypothesis is tested.

Chapter 5 presents discussions on the research findings presented in Chapter 4. Theoretical contributions, managerial implications, as well as limitations of the current research are also discussed. Suggestions for future research will conclude this dissertation.

CHAPTER 2

THEORETICAL FRAMEWORK FOR CONSUMER TRUST IN HUMAN-COMPUTER INTERACTION

> "In so far as I trust … there will be no limits"
> - Herzberg, *On the Attitude of Trust*

> "Trust no agent."
> - Count Claudio in Shakespeare's *Much Ado About Nothing* Act II Scene I

Trust

Internet marketers have learned that moving Internet users along to the purchasing click is extremely difficult. Numerous obstacles exist. First, the first-generation Internet marketers provided only price comparisons instead of exploring a full range of values desired by consumers (Guttman and Maes 1998) including salesperson service assistance. Although the Internet can create higher efficiency with reduced transaction and search costs (Alba et al. 1997; Deloitte Research 2000), sales assistance has not been the vital part of the Internet business model. In addition, currently the bandwidth that will allow friction-free, high-intensity multimedia experiences is not widely accessible.

At its core, however, the reason why many online consumers do not make commitments - as manifested by low click-through and conversion rates - could be the lack of consumer trust in the electronic interface (Hoffman, Novak, and Peralta 1998). Consumers do not consider the Internet-based computer interface trustworthy enough to disclose financial or personal information although they may enjoy free information available on the Internet. Therefore, Hoffman et al. (1998) state "ultimately, the most effective way for a commercial Web provider to develop a profitable exchange relationship with online customers is to earn consumer *trust* [emphasis added]." Similarly, Urban, Sultan, and Qualls (2000) note "For the Internet, trust-based marketing is the key to success." (p. 40) (see also Camp 2000).

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Definitions of Trust

Diego Gambetta, in the foreword of his book, *Trust: Making and Breaking Cooperative Relationships*, notes that trust is an elusive and complex notion (1988, p. i). Complexity resides in the fact that (1) different scholars have assumed different meanings for trust typically as having more than one dimensions; and that (2) trust could also be defined at multiple levels of analysis (e.g., individual, dyad, group, corporate entity) or relationship (e.g., formal and informal).

Hence, researchers in various fields have defined trust in a variety of fashions, each emphasizing a unique aspect. Table 2-1 displays the definitions of trust found across a number of disciplines. In developmental child psychology, trust is the fundamental relationship between Mother and an infant based on consistency and regularities. For example, Erikson (1950) wrote:

> The first demonstration of social trust in the baby is the ease of his feeding, the depth of his sleep, the relaxation of his bowels … The infant's first social achievement … is his willingness to let the Mother out of sight without undue anxiety or rage, because she has become an inner certainty as well as an outer predictability. Such consistency, continuity, and sameness of experience provide a rudimentary sense of ego identity which depends on the recognition that there is an inner population of remembered and anticipated sensations and images which are firmly correlated with the other population of familiar and predictable things and people (p.9).

Economists conceptualize trust as one's cooperating behavior with a partner with whom the benefits of associating are likely to exceed the costs. This view suggests that people are constantly making calculated judgments about whether (and how far) to trust in every particular case. For example, Gambetta (1990) and Nooteboom, Berger and Noorderhaven (1997) use probabilistic values to represent levels of trust. Gambetta (1988) wrote:

> Trust (or, symmetrically, distrust) is a particular level of the *subjective probability* [emphasis added] with which an agent assesses that another agent or group of agents will perform a particular action …... When we say we trust someone or that someone is trustworthy, we implicitly mean that the probability that he will perform an action that is beneficial or at least not detrimental to us is high enough for us to consider engaging in some form of cooperation with him (p.217).

For researchers who conceptualize trust to be based on past evidence of reliability, consistency and on the anticipation of future benefits from the relationship, trust is a rational prediction and expectation (Zaltman and Moorman 1988) that the other party can be relied upon with respect to role performance and fiduciary responsibility (Young and Wilkinson 1989). Note that this type of trust is more likely to be found in professional relationships rather than in close interpersonal relationships.

However, it should also be noted that trust is "the willingness of a party to be vulnerable to the actions of another party … *irrespective of their ability to monitor or control* the other party [emphasis added]" (Mayer, Davis, and Schoorman 1995, p. 711).

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Table 2-1. Definitions of Trust

Authors	Base Discipline	Definitions
Morgan and Hunt (1994)	Marketing	Trust is the perception of confidence in the exchange partner's integrity and reliability (p.23)
Crosby, Evans, and Cowles (1990)	Marketing	Customer's confident belief that the salesperson can be relied upon to behave in a manner that serves long-term customer interests.
Doney and Cannon (1997)	Marketing	The customer's perception of the salesperson's credibility (expectancy that the salesperson's statement can be relied on) and benevolence (extent to which the salesperson is interested in the customer's welfare).
Ganesan (1994)	Marketing	Willingness to rely on an exchange partner in whom one has confidence. Two components: (1) objective credibility, belief that the other has the expertise to perform the job, and (2) benevolence, belief that the other has motives beneficial to the target when new conditions arise for which a commitment was not made.
Hawes, Mast, and Swan (1989)	Marketing	Reliance upon information from another person about uncertain environment states and outcomes in a risky situation.
Legace and Gassenheimer (1991)	Marketing	An attitude that leads someone to commit to a possible loss contingent on the future behavior of the other person.
Schurr and Ozanne (1985)	Marketing	The belief that a party's word or promise is reliable and that a party will fulfill its obligations in an exchange relationship.
Swan et al. (1988)	Marketing	The emotion or affect of a buyer feeling secure or insecure about relying on the salesperson; and beliefs about the trustworthiness of a salesperson in a situation where the buyer faces some risk if the salesperson is not trustworthy.
Baier (1986)	Philosophy	Trust is a reliance on others' competence and willingness to look after, rather than harm, things one cares about which are entrusted to their care.
Barber (1983)	Sociology	Functions of trust are two: trust has the general function of social ordering, of providing cognitive and moral expectational maps for actors and systems as they continuously interact. A second and more dynamic function of trust, especially with regard to its meanings of expectations of technically competent performance and of fiduciary responsibility, is social control.
Bateson (1988)	Biological Evolution	Trust is required for effective cooperation. To maintain such a position it would be necessary to argue that, for example, honeybees trust each other (p.15).
Bhattacharya, Devinney, and Pillutla (1998)	Management	Trust is an expectancy of positive (or nonnegative) outcomes that one can receive based on the expected action of another party in an interaction characterized by uncertainty (p.462) Trust exists in an uncertain and risky environment Trust reflects an aspect of predictability Trust exists in an environment of mutuality – that is it is situation and person specific (p.461-2)
Bok (1978)	Sociology	Trust is a social good. When it is destroyed, societies falter and collapse (p.25).
Coleman (1990)	Sociology	Trust includes voluntarily placing resources at the disposal of another or transferring control over resources to another (p.100).
Cook and Wall (1980)	Social Psychology	The extent to which one is willing to ascribe good intentions to and have confidence in the words and actions of other people
Das and Teng (1996)	Management	Trust is the degree to which the trustor holds a positive attitude toward the trustee's goodwill and reliability in a risky exchange situation.

Table 2-1. Continued

Authors	Base Discipline	Definitions
Dasgupta (1988)	Economics	In defining trust, Dasgupta considers (1) the significance of others' unobservable actions for choosing one's own course of action (p.51), (2) one's expectations regarding others' choice of actions that have a bearing on one's own choice of action (p.53).
Deutsch (1962)	Experimental Psychology	In laboratory situations, trust was operationally defined as making a cooperative choice in the game (1960) Trust are actions that increase one's vulnerability to another (1962)
Gabarro (1978)	Organization Behavior	The level of openness that exists between two people, the degree to which on person feels assured that another will not take malevolent or arbitrary actions, and the extent to which one person can expected predictability in the other's behavior in terms of what is "normally" expected of a person acting in good faith.
Gambetta (1988)	Sociology	Trust (or, symmetrically, distrust) is a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action, both before he can monitor such action (or independently of his capacity ever to be able to monitor it) and in a context in which it affects his own action. When we say we trust or someone or that someone is trustworthy, we implicitly mean that the probability that he will perform an action that is beneficial or at least not detrimental to us is high enough for us to consider engaging in some form of cooperation with him (p.217).
Govier (1997)	Sociology	Trust is fundamentally an attitude, based on beliefs and feelings and implying expectations and dispositions (p.4). Trust has the following features (p.6): 1. Expectations of benign, not harmful, behavior based on beliefs about the trusted person's motivation and competence 2. An attribution or assumption of general integrity on the part of the other, a sense that the trusted person is a good person 3. A willingness to rely or depend on the trusted person, an acceptance of risk and vulnerability 4. A general disposition to interpret the trusted person's actions favorably.
Heimer (1976)	Sociology	Trust is one way in which actors in social relationships can cope with uncertainty and vulnerability that exist in all such relationships (p.1-4).
Hobbes [1640]	Philosophy	Trust is a passion preceding from the belief of him from we accept or hope for God, so free from doubt that upon the same we pursue no other way to attain the same God: as distrust or diffidence is doubt that maketh him endeavour to provide himself by other means. And that this is the meaning of the worlds trust and distrust, is manifest from this, that a man never provideth himself by a second way. But when he mistrusteth that the first will not hold. (1750, p.19) as referred to in Dunn (1988, p.74)
Holmes and Rempel (1989)	Social Psychology	People's abstract positive expectations that they can count on partners to care for them and be responsible to their needs, now and in the future (p.188).
Horsburgh (1960)	Philosophy	Horsburgh distinguishes trust in the sense of perfectly general confidence in another with trust in a person as regards specific acts. Therapeutic trust is a deliberate act of placing one's trust in someone known to be untrustworthy with the intent of bring out the best in him.

Table 2-1. Continued

Authors	Base Discipline	Definitions
Hosmer (1995)	Sociology	Trust is the optimistic expectation by one person, group, or firm of the behavior of another person, group, or firm in a common endeavor or economic exchange, under conditions of vulnerability and dependent on the part of the trusting party, for the purpose of facilitating cooperation between both parties that will result in an ultimate joint gain but, given the lack of effective contractual, hierarchical, legal, or social enforcement methods, with reliance upon a voluntarily accepted duty by the trusted party to protect the rights and interests of all other engaged in the endeavor or exchange (p.32-3)
Humphrey and Schmitz (1998)	Economics	Expectations and mental states, willingness to expose oneself to the possibility of opportunistic behavior in the belief that this opportunity will not be availed of. (As referred to by Moore 1999, p.76)
Isaacs, Alexander, and Haggard (1967)	Psychoanalysis	The entire world appears differently to those who are able to trust, as opposed to those who are characteristically distrustful. Faith is undoubting, unconditional belief in which data for proof or refutation are ignored. Trust is different from faith because it connotates an affective attitude primarily directed outward, involving a sense of comfort, confidence, and reliance that certain acts and behavior will or will nor occur. Trust need not imply gullibility. People can perfectly sensitive to context and evidence and they may be thoughtful, reflective, and careful.
Larzelere and Huston (1980)	Intimate Relationship	A belief by a person in integrity of another individual (p.595).
Lewicki and Bunker (1995)	Management	A state involving confident positive expectations about another's motives regarding oneself in situations of risk. These expectations may be based on the rewards of punishments that guide the other's behavior (i.e., calculus-based trust), the predictability of the other's behavior (i.e., knowledge-based trust), or a full internalization of the other's desires and intentions (i.e., identification-based trust).
Lewis and Weigert (1985)	Sociology	Trust is a chosen attitude, one that is to some degree warranted, based on definition on some relevant experience with the person or institution trusted. Trust is cognitive, having to do with evidence, interpretation, belief, and confidence. Trust is also emotional; we feel secure with, often close to, those we trust. Finally, trust has behavioral implications; we are more willing to co-operate and to rely on others when we trust.
Luhmann (1979)	Sociology	Trust, in the broadest sense of confidence in one's expectations, is a basic fact of social life. The function of trust for individual and system actors is reduction of complexity in the social worlds they confront. It is essentially concerned with coping with uncertainty over time. Although personal trust fundamental in the family and with colleagues and friends, personal trust yields to system trust in the modern world. To live in a complex society without going mad, we must have trust in systems.
Luhmann (1988)	Sociology	Trust is an attitude which allows for risk-taking decisions
Mayer, Davis, and Schoorman (1995)	Management	The willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party

Table 2-1. Continued

Authors	Base Discipline	Definitions
McAllister (1995)	Management	Trust has both cognition- and affect-based dimensions. Cognition-based trust reflects technical competency and a fiduciary obligation to perform and is based on predictability, past behavior, dependability, and fairness/ It relies on a rational evaluation of another's ability to carry out obligations. Affect-based trust is rooted in emotional attachment and care and concern for the other party's welfare. There is an intrinsic value to the relationship itself and a belief that the other party feels the same way.
McKnight, Cummings, and Chervany (1998)	Management	Trust means that one believes in and is willing to depend on, another party. High-level trust can be broken into two constructs; (1) trusting intention – meaning that one is willing to depend on the other person in a given situation, and (2) trusting beliefs, meaning that one believes the other person is benevolent, competent, honest, and predictable in a situation (p.474).
Moore (1999)	Economics	Trust us a predisposition to act in a certain way. A trusting individual is one who makes a low personal investment in monitoring and enforcing the compliance of the individuals with whom she has made a compact from which she believes she will benefit (p.76).
Moorman, Zaltman, and Deshpande (1992)	Marketing	Trust is defined as a willingness to rely on an exchange partner in whom one has confidence
Nooteboom, Berger and Noorderhaven (1997)	Management	Intentional trust is defined as follows. X trusts Y to the extent that X chooses to cooperate with Y on the basis of a subjective probability that Y will choose not to employ opportunities for defection that X considers damaging, even if it is in the interest of Y to do so (p.315).
Pagden (1988)	Political Economy	Trust - *fede pubblica* - depends upon security of expectation (p.130). Lack of information destroys trust (p.134)
Pearce (1974)	Communication	An assumption that another person will not harm us, based on our perception of the other person as knowledgeable, competent, and well-intentioned towards us.
Rempel, Holmes, and Zanna (1985)	Social Psychology	First, trust is seen to evolve out of past experience and prior interaction: thus it develops as the relationship matures. Second, dispositional attributions are made to the partner, such that he or she is regarded as reliable, dependable, and concerned with providing expected rewards. Third, .. trust involves a willingness to put oneself at risk, be it through intimate disclosure, reliance on another's promises, sacrificing present rewards for future gains, and so on. Finally, trust is defined by the feelings of confidence and security in the caring responses of the partner and the strength of the relationship
Rotter (1967, 1980)	Social Psychology	"A generalized expectancy held by an individual or group that the work, promise, verbal, or written statement of another individual or group can be relied on" (1980, p.1) Willingness to Trust an Unknown Person. One's tendency to trust a generalized other – a person or group with whom one has not had a great deal of personal experience.
Rousseau, Denise, Sitkin, Burt, and Camerer (1998)	Management	"Trust is a psychological state comprising the intention to accept vulnerability based on positive expectations of the intentions or behaviors of another" (p.395).
Schlenker, Helm, and Tedeschi (1973)	Social Psychology	The need for trust arises in a risky situation; what happens to use depends on what another person does. We have some information from that other person that bears on our willingness to go ahead as though he or she will act appropriately.

Table 2-1. Continued

Authors	Base Discipline	Definitions
Sellerberg (1982)	Sociology	Farmers from rural Sweden describe their pleasure in buying from dealers they knew personally and who knew them, even if the goods were not better or cheaper than what they could buy elsewhere. In urban life, confidence is rarely based on personal knowledge. Urban-dwellers base their attitude on consumer legislation, declarations about content on package, and a self-service system of merchandising that gives the impression nothing is hidden. Urban people, instead of trusting individuals, they trust institutions, expressing confidence in the operations of law and bureaucracy.
Zaltman and Moorman (1988)	Advertising	Trust is defined as interpersonal or interorganizational state that reflects the extent to which the parties can predict one another's behavior; can depend on one another when it counts; and have faith that the other will continue to act in a responsive manner despite an uncertain future (p.17)
Zand (1972)	Management	Trust can be defined as increasing one's vulnerability to the risk of opportunistic behavior of one's transaction partner, whose behavior is not under one's control in a situation in which the costs of violating the trust are greater than the benefits of upholding the trust

After some extensive review of definitions of trust, Rousseau et al. (1998) summarize the common theme that runs across many disciplines as the following: "trust is a psychological state comprising the intention to accept vulnerability based on positive expectations of the intentions or behaviors of another" (p.395).

Trust can be based on the voluntary faith in the partner's integrity (Sonnenberg 1994) that the other party will not take advantage of the trustor's vulnerability (Zand 1972). This type of trust is often manifested by the trustor's willingness (and intention) to give control and become vulnerable to the actions of others (see Boss 1978; Zand 1972). For example, Rempel, Holmes, and Zanna (1985) describes trust in intimate relationships as follows:

> Trust involves a willingness to put oneself at risk, be it through intimate disclosure, reliance on another's promises, sacrificing present rewards for future gains, and so on… trust is defined by the feelings of confidence and security in the caring responses of the partner and the strength of the relationship

Thin and Thick Trust

Govier (1997) refers to *thin* trust when trust is solely based on rational calculation of costs and benefits from the relationship, considering only what the evidence reflects. In most cases, however, trust is not purely based on rational decisions and calculations of costs and benefits. According to Deutsch

(1962), trust increases ones' vulnerability to another with the assumption that another person will not harm us (Pearce 1974). In close interpersonal relationships, trust is conceptualized as attributions concerning the partner's *benevolence* (Deutsch 1962; Ganesan 1994; Giffin 1967; Mayer, David, and Schoorman 1995; Pearce 1974). Benevolence does not necessarily come after calculating the probability of the other party's betrayal or defect. Benevolence refers to genuine interest in the other party's welfare (Rempel and Holmes 1986), aside from an egocentric motive (Mayer, David, and Schoorman 1995).

Trust as benevolence - as opposed to rational assessment of competence - is not necessarily conditional. It is a "genuine responsiveness" to the needs of the other party (Friedland 1990). For example, Philosopher Herzberg (1988) notes, "If I trust someone, I cannot at the same time reserve myself the judgment concerning the purposes for which he is to be trusted… When I trust someone, it is him I trust; I do not trust certain things about him." When there is trust, expectations may "go beyond what evidence proves" with rich emotions developed toward the trustee. This kind of trust is called *thick* trust (Govier 1997). Sometimes, people deliberately act in a trustworthy manner toward other people even though the evidence proves otherwise and they do so with the anticipation that placing one's trust will bring the best from him or her. This kind of deliberate trust is called *therapeutic* trust (Horsburgh 1960).

Need for Trust

Let's suppose a couple who leaves their child to the hands of a babysitter's care. They are trusting the babysitter with their child in spite of potential risks. The babysitter may neglect his or her duty and ignore the child's needs. It is even possible, although unlikely, that the babysitter will put the child in danger. Deutsch (1958) used this example to emphasize the nature of trust. Trust becomes prominent in situations where the costs of violating trust exceed benefits of trusting behavior (Zand 1972).

Likewise, scholars studying trust have emphasized that risk is an indispensable notion in defining trust (Bhattacharya, Devinney, and Pillutla 1998; Deutsch 1958; Sheppard and Sherman 1998; Zand 1972). Trust lead to actions that increase one's vulnerability to the other partner (Deutsch 1962). Hence the true need for trust arises only in risky situations (Bhattacharya, Devinney, and Pillutla 1998; Das and Teng 1998; Deutsch 1962). One may voluntarily place valuable resources at the disposal of another or transfer control over resources to another (Coleman 1990, p.100). Thomas (1978) noted that it would be reasonable to fear the fact that the other party could harm one's personal security. Gambetta (1988) states that trust may not be relevant without the possibility of exit, betrayal, and deflection" (p.219). Trust allows for risk-taking decisions (Luhmann 1988), irrespective of the ability to monitor or control that other party (Mayer, Davis, and Schoorman 1995).

Why do people take the risk of trusting? Heimer (1976) and Luhmann (1979) suggest that trust is one way that individuals can cope with uncertainty and vulnerability that exist in the world. Without trust, people cannot walk on a street, eat at a restaurant, deposit money in the bank, or shop online. Virtually everything people do in society is built on the basis of trust. Hence, without trust, the society will "falter and collapse" (Bok 1978, p.25).

Individuals who do not trust each other do not learn from each other, nor do they make financial or emotional transactions involving the other party (Cassell and Bickmore 2000). The communication between two parties who do not trust each other is unsustainable. For example, in Schurr and Ozanne's (1986) study, there were hardly any collaborative actions between non-trusting partners. Prentice (1974) found frequent pauses, dropped words, and incoherent sounds between the two non-trusting communicators.

The need for consumer trust in the seller (Price and Arnould 1999) is well established in the sales literature. A salesperson's effectiveness depends on an ability to earn trust and develop relationships with their customers (Crosby, Evans, and Cowles 1990; Dwyer, Schurr, and Oh 1987; Hawes, Mast, and Swan 1989; Oakes 1990; Price and Arnould 1999). Andaleeb and Anwar (1996) note that the need to trust a salesperson arises in retail settings because consumers generally do not have sufficient knowledge about the products. The lack of consumer knowledge increases dependence on the salesperson as an information source and in doing so also increases consumer vulnerability due to information asymmetry.[11] In addition, consumers face substantial price variations and searching information is costly (Becker 1961); the transaction processes are not always clear, especially where return policy or legal recourse systems are not established.

The need for trusting the seller discussed by Andaleeb and Anwar (1996) may equally applicable to the online shopping context. Further, because the Internet still presents a complex and risky environment, the need for trust is even higher (Keen et al. 2000, p. 9).

Antecedents of Trust

Table 2-2 presents antecedents of trust identified from existing literatures. After a review of literatures, categories of trust antecedents, including technical competency, integrity, impression/similarities, and reputation, is developed below. These groupings represent the attributes that are relevant to the topic of this dissertation: consumer trust in human-computer interaction.

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[11] Information asymmetry reflects the uneven distribution of information between the buyer and the seller. In general, sellers tend to have more information that is imporrtant to judge quality than buyers do (Akerlof 1970).

Table 2-2. Previous Findings of Trust Antecedents

Source	Antecedents
Barbarino and Johnson (1999)	Actor Satisfaction, Actor Familiarity Attitudes, Play Attitudes, Theater Facility Attitudes
Barber (1983)	Technical Competence, Fiduciary Responsibility
Butler (1991)	Consistency, Integrity, Fairness
Butler and Cantrell (1984)	Integrity, Competence, Consistency Loyalty, Openness
Cook and Wall (1980)	Trustworthy Intentions, Ability
Crosby, Evans, and Cowles (1990)	Similarity, Service Domain Expertise, Relational Selling Behavior
Deutsch (1960)	Ability, Intention to Produce
Doney and Cannon (1997)	Salesperson Expertise, Power, Similarity, Likeability, Frequent Contact
Gabarro (1978)	Character-Based (Integrity, Motive and Intentions, Consistency, Openness Discreteness) Competence-Based (Functional Competence, Interpersonal Competence, General Business Sense) Judgment (Ability to Make Good Judgments)
Ganesan (1994)	Reputation of the Vendor, Perception of Specific Investments by Vendor, Retailer's Experience with the Vendor, Satisfaction with Previous Outcomes
Garfinkel (1967)	Persistence, Regularity, Order, Stability
Giffin (1967)	Expertness, Reliability as Information Source, Intentions, Dynamism, Personal Attraction, Reputation
Hovland, Janis, and Kelley (1953)	Expertise, Motivation to Lie
Jones, James, and Bruni (1975)	Ability, Behavior is Relevant to the Individual's Needs and Desires
Mayer, Davis, and Schoorman (1995)	Ability, Benevolence, Integrity
McKnight, Cummings, and Chervany (1998)	Personality-Based, Institution-Based, Cognition-Based
Moorman, Deshpande, and Zaltman (1993)	Perceived Integrity, Willingness to Reduce Search Uncertainty, Confidentiality, Expertise, Tactfulness, Sincerity, Congeniality, Timeliness
Morgan and Hunt (1994)	Shared Values, Communication, Non-Opportunistic Behavior,
Nicholson, Compeau, and Sethi (2001)	Similarities of Business Values, Frequency of Interaction
Shapiro, Sheppard, and Cherakin (1992)	Calculus-Based, Knowledge-Based, Identification-Based
Sheppard and Sherman (1998)	Discretion, Reliability, Competence, Integrity Concern, Benevolence, Predictability, Consistency, Forethought, Intuition, Empathy
Sitkin and Roth (1993)	Ability, Value Congruence
Smith and Barclay (1997)	Character, Motives and Intentions, Role Competence, Judgment
Swan, Trawick, and Silva (1985)	Dependability, Honesty, Competency, Customer Orientation, Friendliness (Likeability)
Whitener, Brodt, Korsgaard, and Werner (1998)	Behavioral Consistency, Behavioral Integrity, Sharing and Delegation of Control, Communication (e.g., accuracy, explanations, and openness), Demonstration of Concern
Zucker (1986)	Process-Based, Person-Based, Institution-Based

(Adapted from Mayer, Davis, and Schoorman 1995, p.718)

Technical competency (ability, reliability, and expertise) is a commonly found antecedent of trust (Zucker 1986). Integrity (loyalty, character) is the antecedent of trust that is primarily related to individuals' dispositions (Gabarro 1978). Likable impressions and similarity-based social interactions also lead to trust (Nicholson, Compeau, and Sethi 1992). Finally, reputation (Giffin 1967) signals trustworthiness.

Cognitive and Affective Bases for Trust

Conceptualizing individuals' evaluative judgment (e.g., attitude) as having cognitive (belief) and affective (emotion) bases is a commonly used approach (Petty, Wegener, and Fabrrigar 1997). Lewis and Weigart (1985) and McAllister (1995) have identified both cognitive and affective basis of trust. Cognitive trust refers to the rational, objective dimensions of one's decision to trust. Cognitive trust is based on the evaluation of the others' dependability, credibility, and competence (Lewis and Weigart 1985). Affective trust, on the other hand, refers to the subjective elements of the decision to trust others based on the emotional bond and the care and the concern for others (McAllister 1995).

Similarly, a study in social psychology by Johnson-George and Swap (1982) distinguished between "reliableness - cognitive trust" and "emotional trust." In their study, each factor had a reliably unique dimension. Rempel and his colleagues (1985) also identified "dependability" as cognitive confidence and "faith" as emotional assurance, which comprised two distinct psychological dimensions. Likewise, Ganesan (1994) and Siguaw, Simpson, and Baker (1998) measured trust with "credibility" and "benevolence," which correspond to cognition-based and affect-based trust, respectively (McAllister 1995).

The Interplay of Cognition and Affect

While the thought that cognition and affect are separate bases for psychological constructs (e.g., attitude) has been a popular approach, researchers debate over whether they *are* separate constructs (Gray 1990; Parrott and Schulkin 1993).

In the psychology literature, there is a significant research stream on the "mere exposure effect," which argued for affect primacy. That is, affective responses (or preferences) can occur after perception but before cognition (Zajonc 1980, 1984; Zajonc and Markus 1982, 1985). In mere exposure experiments, individuals who were shown certain objects repeatedly (e.g, polygons, Chinese characters or other non-sense words) formed affective preferences although they did not have conscious memory of what they had seen. This line of research concluded that affect directly leads to automatic neural responses which did not necessarily involve conscious cognition.

On the other hand, cognitive psychologists advocate cognition primacy. Cognitive processes include "appraisals, interpretations, attributions, and processing strategies"(Berkowitz 1993, p.12). According to Boyd (1999), cognition is " the inferential simulation of the environment based on perceptual information, preferences, and memory that allows adaptation to distal threats" (p.17). Lazarus (1982) posits that appraisal, or "a complex cognitive appraisal of the significance of events for one's well-being"(p.1019), precedes emotion; thus emotion occurs as "a result of an anticipated, experience, or imagined outcome of an adaptationally relevant transaction between organism and environment" (p.1024).

The third position on this matter is the integration approach, which proposes that emotion is fundamentally important to cognition and the two are inseparable. Parrot and Schulkin (1993) argue that emotion and cognition cannot be separated because one cannot occur without the other. With evidence from neuroscience and brain anatomy, Parrot and Schulkin (1993) demonstrate that proper function of emotion requires incorporating cognitive processes, such as interpretation, anticipation, and problem-solving. The brain systems mediating emotion largely overlap with the physiological systems that mediate cognition, so it is almost impossible to anatomically differentiate the two (Damasio 1994). Damasio (1994) argues that emotions (affect) "occurs as a dynamic, newly instantiated, 'on-line' representation of what is happening in the body now" (p.144). Sensing (or perceiving) potential dangers or unpleasantness in the environment can evoke emotional responses. Then, affect is utilized to cognitively determine the immediacy and importance of threats in the environment to the perceiver and adapt appropriately to the potential danger.

The integration approach assumes that emotion is essential to make an appropriate cognitive decision-making. Since emotion and cognition physically share many brain systems (Gray 1990), reduction in emotional capability can have equally cognitively dysfunctional consequences (Damasio 1994, p. 53). Drawing on the integration approach, it would be reasonable to assume that when one makes an assessment of the trustworthiness of the other party, affective and cognitive processes will work interdependently. One may first (cognitively) *learn* about his or her capability and then (affectively) *feel* good about that the trustee. McAllister (1995) suggests that in organizational relationship, cognitive trust is the necessary ingredient to develop affective trust. He also characterizes emotional trustworthiness and faith with greater investment of time and emotion than the prediction of the job-related competency (p.30). If both feeling and cognitive assessment attest equally to the other party's trustworthiness, the trustor will place even higher confidence. Therefore, high correspondence between affect and cognition within individual systems could be commonly observed.

Consumer Trust on the Internet

The Internet has swiftly changed the way people interact with the world. It started as a restricted medium for military (i.e., ARPA net) and academic researchers, it now sustains many human communication/exchange activities including sending and receiving messages, searching information, and shopping products and services. In fact, the Internet has exploded so rapidly over the past five years that we have not had time to step back and carefully examine this new medium in a systematic way to understand its potential effects (Wallace 1999).

The Internet is a medium that has potential to unite the world into a global village beyond geographical and national borders (McLuhan 1964). However, the Internet also happens to be the world's "largest (and the messiest) library mankind has ever had ... with most chaotic structures devised my man" (Lennon 1997, p.10).

Considering the vast number of morphologies that the Internet can take, It would be useful to find a taxonomy for the Internet environment. Wallace (1999) identifies different types of communication channels such as the World Wide Web, electronic mail (or email), asynchronous discussion forum, synchronous chats, and multi-user dungeons (MUD).

First, the World Wide Web is one of the most common places in the Internet environment. Although it has a long way to go to realize its full-fledged hypermedia potential, the World Wide Web provides a good multimedia environment where users can find information they are looking for easily and quickly. For example, a simple key word search in www.yahoo.com or www.google.com can return millions of hits. Individual users can publish their own Web sites containing text, graphic, and audio information.

Second, electronic mail (email) has become the most popular Internet use. People use email to communicate with friends, family, and colleagues. It is widely used by business organizations, government agencies, universities, as well as individuals.

Another space on the Internet is the asynchronous discussion forum and newsgroup. There are ongoing conferences on the Internet where users start a topic of their interests, so-called thread, and post opinions and replies to each other. Since users can participate in the conference anytime of the day, it is asynchronous. Newsgroup is the collection of such conferences. Examples of newsgroup include soc. culture.british, alt.conspiracies, or it could be a group of people who share common interests, such as k12.ed.math, or comp.soft-sys.sas.

Synchronous chats are the most dynamic online environment. People log on to the Internet at the same time, enter a chat room to engage in a real-time conversation with the others in the chat room. Chat rooms are used for different purposes. Faculty and students can create a chat room for distant

education, or a chat room can be formed to socialize with unknown others from all over the world most of whom use nicknames instead of real names.

MUD is an acronym for multi-user dungeons. The name stems from its origin associated with the adventure game, Dungeons and Dragons. It is a kind of text-based virtual reality environment where users are called players. When players enter a room on a MUD environment, they receive a vivid description of the location. Players can move different places inside a MUD by typing "go north" or "go down." Players can chat, whisper, yell, or page in a MUD room. Similar kinds are MOO (MUD Object-Oriented) and MUSH (Multi-user Shared Hallucination).

A particular attribute of Internet-based multimedia systems is non-linear networking of information units. Users of the Internet-based systems can build their own path of information search, instead of looking at a predefined sequence of texts or graphics. They can also organize the information relevant to their own needs or search objectives (Rouet and Levonen 1996, p.9).

Problems of the Internet

Lennon (1997, p.50) has explained a number of the current Internet medium limitations, which include:

- Poor search hit rates - It is hard to know where to look or what search terms to use.

- Easy to get lost - It is easy to get lost between the hypertext links. If the user takes a "side track," it is hard to get back to where he or she began. Many dangling links on the Web annoy users.

- Delays - It is still very slow to retrieve information from the Internet, especially the transmission involves any graphic files.

- Advertising and unsolicited emails - Not many Internet users have the patience to put up with endless flash advertising or junk mails.

- Poor support for collaborative work - The current email does not allow interactive discussion or systematic collaboration particularly between more than two participants.

In addition to these problems, It should be noted that the Internet-based marketing systems typically do not generate much profit (*The Economist* 2001), marketers are setting up their sites to offer detailed product information, entertainment, samples, and rewards rather than profit generating platforms. They can also use email to inform customers about new offerings. Hansell (2001) notes that:

> The Internet is in many ways the opposite of TV. Television is good to build
> awareness of products, but the Internet is useful for communicating with people
> who are already interested in a product … Car manufacturers have found that TV
> commercials deal more in moods, while the best approach online is to offer tools
> and information.
> [*New York Times*, March 26, 2001, p. C1]

Risks Involved in Internet-Based Human-Computer Interaction

Prior research on risk identifies four types of risk that are relevant to the general consumption context: financial, time, physical, and psychological risk. While this taxonomy of risk is applicable to most generic products and services, particular types of risk salient in the Internet-based communication warrant a closer look.

Metaphorically, navigating the Web might be similar to the experience of drifting in the ocean (of information) without a clear sense of direction. Consumers navigating the Web may feel as if they were drifting over the sea of information. Several factors including the lack of regulatory system, complexity, hidden process, privacy and security concerns may accrue this risk on the Internet, and the fundamental differences between human processing ad machine processing.

First, there are no written (or implicit) rules regulating the interactions (and transactions) occurring on the Web for the basic trust to operate. A protective and regulatory system to produce fundamental trust within the cyber world has yet to be developed. Despite some self-regulatory efforts such as TRUSTe and BBBOnline and the World Wide Web Consortium's Platform for Privacy Preferences (P3P) developed to reduce user concerns, public fear for cyber-crime is still substantial (Reagle and Cranor 1999).

Second, Keen et al. (2000) note that the more complex and newer the environment, the higher the need for trust. Many consumers perceive telecommunication networks and the Internet in particular to be new, complex, and unfamiliar environments. Only by trusting may consumers reduce the complexities in a new multifaceted network environment.

Third, the programming code of the Internet is not always visible or understandable to users, so even though consumers see computers working, they are not quite sure whether the computer is accessing personal information on the hard drive, or simply saving a file (executing commands ordered by users). In other words, one cannot see "the engine under the hood." An extreme case would be a computer virus. Users may not knowingly activate a virus, because the actual computer function is hidden under the machine languages and users only see the external interfaces designed by the virus programmer.

Fourth, privacy and security are dominant concerns about the Internet. Users may be unwilling to reveal some personal data that are necessary to complete a transaction. Revealing personal information can make consumers vulnerable to invasion of privacy, if not cyber crimes. Not knowing how the information is encoded, transmitted, stored, and reused later in the future, consumers may be reluctant to provide personal information over the Internet (Ackerman, Cranor, and Reagle 1999). Furthermore, security is another impediment to widespread diffusion of e-commerce, which increased public concern about the Internet transactions. Ghosh (1998) notes that "The number one rated concern for both

businesses and consumers in establishing and participating in e-commerce is the potential for loss of assets and privacy due to breaches in the security of commercial transaction and corporate computer systems" (p.9). Oftentimes, ensuring data security goes beyond the seller's capability. Although some users may be sure of the seller's integrity - that the marketers themselves will not abuse their personal information - there is a possibility that some unknown hackers may intercept the information during the transfer or have illegal access to the databases.[12]

Finally, there are fundamental differences between the ways humans and computers perceive and process information. In his book *The Invisible Computer* (1998), Norman notes that humans are flexible, adaptable, compliant, and tolerable whereas machines are rigid, inflexible, fixed in their ways, and intolerant of ambiguities and uncertainties. Humans are biological and analog (meaning analogous to the real, fuzzy, noisy world) whereas machines are mechanical and digital. Thus the current digital society does not match the natural "people" way of thinking. This fundamental mismatch between the human and the computer processing may be one profound source of resistance to technology. Norman (1998) notes that:

> The real problem with being digital is that it implies a kind of slavery to accuracy, a requirement that is most unlike the natural workings of the person. People are analog, insensitive to noise, insensitive to error. People extract meanings, and as long as the meanings are unchanged, the details of the signals do not matter… Machines do better with digital encoding. The problem comes about in the form of interaction between people and machines…. So when the two have to meet, which side should dominate? [Chapter 7. Being Analog]

Diffusion of Innovations

Drawing on Rogers' (1995) theory of diffusion of innovations, consumers can be classified into five categories based on the timing of adoption since a technology is introduced in the marketplace: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%). Given the current status of diffusion of Internet commerce, it can be said that most innovators and early adopters have already adopted the Internet and some have purchased heavily *via* the Internet. However, the critical mass of consumers has yet to embrace the Internet as a purchasing medium. It can be said

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[12] A technical solution to secure the integrity of the data is encryption. Encryption is the process of changing a message into an entirely different and unrecognizable, so that the original messages cannot be understood by strangers (Lennon 1997, p.61). Using some encoding and decoding algorithms that are known only to the marketers, they can protect consumers' personal information from hackers. However, even though consumers do not know the details of encryption, they are aware that such technical mechanisms and cryptographic capabilities have limitations (Ackerman, Cranor, and Reagle 1999; Huberman, Franklin, and Hogg 1999).

that currently we are at the transition point where the product focus has to change from impersonal technology-based design to consumer-driven, human-centered design ([Figure 2-1](#)).

Donald Norman (1998) argues that innovators and early adopters want technology and performance whereas the critical mass of consumers including early majority pragmatists, late majority conservatives, and laggards want simple solutions and convenience. Although the small number of innovators early adopters may initially drive the market, the big market is with the vast majority of consumers who insist upon good user experience and convenience holding off until the technology has proven itself. And user interfaces that can provide good experience become the most effective factor to facilitate the adoption of the vast majority of consumers.

Trust in Human-Computer Interaction

Researchers agree that it is not appropriate to conflate trust over a wide variety of social contexts and domains (Barber 1983; Humphrey and Schmitz 1998; Moore 1999). This dissertation acknowledges trust as a meta-construct to include both the perceptual (cognitive and affective) and intentional components.

Trust as Cognitive and Affective Perceptions

Mayer, Davis, and Schoorman (1995) and Ganesan (1994), defined trust as trustor's confidence in the trustee's competence, credibility, and benevolence. First, the user's confident beliefs in the <u>competence</u> and technical capability of the computer may likely be based on the users' cognitive assessment. For example, we believe that a computer is accurate in its calculations, careful in dealing with our information, and works for us by reducing complexities of the Web. To the extent that we (cognitively) trust the computer, we are confident that the computer's competence to perform its job.

Trust in HCI could also refer to the <u>credibility</u> of the information provided by a particular Web site or a computer interface agent (Hawes, Mast, and Swan 1989). The Internet offers consumers the opportunity to find a great deal of information from all over the world. Because a wide variety of information is available, and also because most information appears anonymously, the Internet "epitomizes the concept of *Caveat lector: Let the reader beware*" (Kirk 2001). Making decisions (such as purchase decisions) based on information provided by an interface agent implies that the user believes the provided information is credible.

Product Performance

Excess Technology

Level of performance
required by users

User Experience Dominates

Technology
Dominates

High Technology:
Tech-Driven

Consumer Commodity:
Human-Centered

Relative % of
Cus omers

Early Adopters

Late Adopters
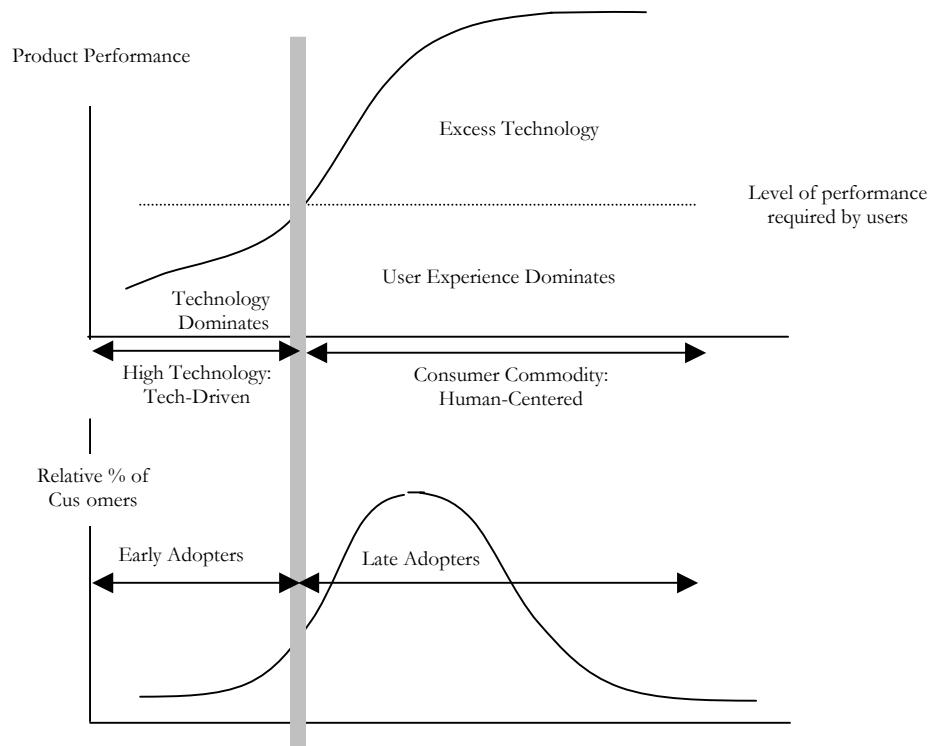
Figure 2-1. Diffusion of Consumer Technology
(Norman 1990, p. 35)

Trust in HCI can also mean <u>benevolence</u>, i.e., the emotional security and bond users may develop for a particular computer interface agent. For example, if we (affectively) trust the computer, we will believe that the computer will honestly work for us with good heart. If we do not trust a computer interface, we simply will not entrust any valuable resources with the computer agent, because that may put us at risk.

When examined closely, competence (McAllister 1995) and credibility (Ganesan 1994; Siguaw, Simpson, and Baker 1998) comprise the cognitive basis for trust whereas benevolence (McAllister 1995) consists of the affective basis for trust.

Trust as Intention

According to Rousseau et al. (1998), trust is better understood as <u>intention</u> - a psychological state to accept vulnerability based on positive feelings (affective basis) and expectations (cognitive basis) of the intentions or behaviors of the transaction partner (Rousseau et al. 1998, p. 395). If one truly trusts another, one must be willing to rely on an exchange partner (Moorman, Zaltman, and Deshpande 1992), and be willingly ready to place one's resources at the disposal of another (Coleman 1990; Legase and Gassenheimer 1991; Rempel, Holmes, and Zanna 1985; Zand 1972). This view of trust indicates that, emotional security (affective trust suggested by Lewis and Weigert 1985) and positive expectation and prediction (cognitive trust suggested by Dasgupta 1988; Govier 1997; Hosmer 1995; Pearce 1984), could be the two antecedent perceptions leading to trust (trusting intention). While perception and intention are not necessarily very different from each other, it is generally believed (in the social psychology and the attitude literature) that perceptions can lead to intentions.

This dissertation takes a rather integrative perspective of trust and acknowledges that individuals' affective and cognitive perceptions about a trustee may likely influence their intentions to trust. In other words, trust is thought as a meta-construct where the affective (benevolence) and the cognitive (competence, information credibility) components influence one's intentions to trust.

Antecedents of Consumer Trust in the HCI context

We all have experiences that when we first meet people, some people appear more trustworthy than others. What are the factors that let us believe that one individual is more or less trustworthy than another? Previous studies on interpersonal trust have specified a number of antecedents of trust. For example, Butler and Cantrell (1984) and Schinder and Thomas (1993) find that trust can be built through integrity (defined as honesty and truthfulness), competence (technical and interpersonal skill), loyalty

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(benevolent motives toward another), consistency (reliability, predictability, good judgment), and openness (willingness to share information and mental accessibility). Swan, Trawick, and Silva (1985) and Gabarro (1978) conceptualize trust as having facets of honesty/integrity, reliability/dependability, responsibility, competence, likeability, judgment, and motives/intentions.

What are the antecedents that affect consumer trust in human-computer interaction? Here, four antecedents are proposed. Those are enhancing consumer trust (1) through human-like interfaces (interface-based trust), (2) through demonstrated integrity (integrity-based trust), (3) through competence and knowledge (expertise-based trust), and (4) through system dependability (rule-based trust) (See Table 2-3). In the next subsections, each strategy is discussed in detail.

Interface-Based Trust

The approach/avoid principle in psychology suggests that people give open and positive responses to those who appear similar to themselves and share a common ground (Berscheid and Walster 1978; Byrne 1971). Similarity leads to interpersonal attraction and consequently, social integration and cohesion (Baron and Pfeffer 1994). Likeability and similarity are found to be two determinants of trust in a salesperson (Doney and Cannon 1997). Interpersonal liking plays an important role in developing buyer trust (Nicholson, Compeau, and Sethi 2001). In organizational settings, people trust those who are ethnically and culturally similar to themselves (McAllister 1995). The similarity-attraction was found to be a powerful principle guiding human-computer interactions (Moon 1996) as well as interpersonal relationships.

According to Clark (1996), a successful communication starts from building a common ground. A common ground is a shared knowledge, beliefs, expectations, and other information presupposed by participants. The greater the common ground, the more effective the communication. When people meet someone about whom they have little knowledge, people use small talks, a harmless conversation regarding weather or sports.[13] Building common ground and rapport in a conversation is an important way of building trust.

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[13] Clark (1996) suggests that language, especially conversation, is in a way similar to dancing. It is a joint action where two communicators share the same physical environment (copresence), see each other (visibility), perceive each other's actions at no perceptible delay (instantaneity), and the participants can produce and receive at once and simultaneously (p.9).

Table 2-3. Potential Antecedents of Consumer trust in HCI

Antecedents	Definitions	How Can Trust Be Enhanced?
Interface-Based Trust	Trust enhanced by anthropomorphized, friendly interface software	• Use Graphic or Voice User Interface (GUI or VUI) that can convey friendly and warm impressions.
Integrity-Based Trust	Trust enhanced by exhibited Integrity and honesty	• Provide unbiased and honest information • Establish honest reputation for the sponsor
Expertise-Based Trust	Trust enhanced by expertise, depth of knowledge	• Exhibit expertise and a good amount of knowledge • Develop a large database to support an agent's knowledge base
Rule-Based Trust	Trust established based on the underlining rules and control governance.	• Establish policing system that monitors the system security, applies punishment or demands indemnification • Develop a legal/ control system that ensures the safe online environment.

During a face-to-face conversation, people also adopt a variety of signals, e.g., face expression, eye gaze, body gestures, etc., that signal their attitudes and emotions. This is a constant processing that requires sensing the affective climate and understanding the hidden meanings of language and adapting to the unfolding changes. Human conversation is much more than a mere exchange of ideas and involves both cognitive and emotional and social intelligence (Goleman 1995).

Kiesler, Sproull, and Waters (1996) conducted an experiment where people interacted with one of three interface agents varying in degree of human likeness: a text interface (least human-like), a voice interface agent, and a talking human-face interface agent (most human-like). Their hypothesis was that people would be more likely to identify and behaved more cooperatively with a computer that had more human features and whose conversation was more human-like than with a computer that was more like a machine. They found that cooperation increased after participants "talked" to the interface agent and discussed their common situation. In a subsequent study (Parise et al. 1998) using a more improved computer interfaces, results revealed that subjects made and kept promises to cooperate with human-like computer as much as a real person (confederate).[14] Burgoon et al. (2000) also examined whether

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[14] Note that in Prisoner's Dilemma games, cooperation is often equated with trust. By cooperating, partners voluntarily increase their vulnerability to each other. Cooperation is unlikely to happen unless each partner is convinced that he or she will not be taken advantage of by the other partner. In game theory (e.g.,

increased richness in human-likeness (face human-likeliness) in computer interfaces could lead to computers being more influential in their decision-making in the Desert Survival Games. They tested text-only, text and voice, text, voice and image, voice and animation, text, voice, and animation and face-to-face human interactions. They found user assessment of utility and feeling understood was enhanced with the augmentation of human-like features to the computer interface.

Moon's (2000) study suggests that people are able to distinguish the computer interface that verbally demonstrates social intelligence from socially unintelligent ones. In her study that examined the reciprocal nature of self-disclosure between the human user and the computer, Moon found that people are likely to disclose about themselves when the computer was socially intelligent and first reveal the computer's personal feelings and then politely ask personal questions (reciprocity); and to ask unobtrusive questions first and then proceeded to more personal areas (gradual increase). [15] The findings of this study indicate two things: (1) people can engage in social interaction with computers and (2) people will form first impressions and unconsciously make attributions to the computer interface agents as they would evaluate real people. If interface agents appear likable, have trustworthy appearances and natural verbal behaviors, people will more be likely to trust the interface.

Expertise-Based Trust

Expertise is defined as depth of knowledge or "the ability to perform product-related tasks successfully" (Alba and Hutchinson 1987, p.411). Expertise (competence) is a cognitive antecedent of trust (McAllister 1995). Expertise-based trust is parallel to the notion of trust based on the other party's knowledge and competence (Deutsch 1960; Kee and Knox 1970; Jones, James, and Bruni 1975; Gabarro 1978; Cook and Wall 1980; Baier 1986; Barber 1983; Butler and Cantrell 1984; Moorman, Deshpande, and Zaltman 1993; Sitkin and Roth 1993; Mayer, Davis, and Schoorman 1995; Smith and Barclay 1997). Although expertise alone may not sufficient to inspire trust (Bashein and Markus 1997), it is the key

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Parkhe 1993) cooperation results from the fact that both parties trust each other not to take self-serving incentives. See Gambetta (1988) and Deutsch (1960) for more details.

[15] For example, Moon (2000) created two experimental conditions for the second factor. In the gradual situation, the computer asks subjects to talk about their private information with the gradually increasing degree of intimacy. For example, the computer first asks basic and objective information such as age, gender, hometown and then proceed to personal thoughts and feelings, ranging from characteristics of oneself that one is most proud of, things that make one furious, to things that hurt one's feelings and sexual fantasy. In the abrupt situation, the computer asks personally intimate questions first. Moon found that people are more likely to disclose about themselves when the computer was socially intelligent enough to ask unobtrusive questions first and then proceeded to more personal areas.

building block to engender trust, especially in professional and technical settings (Ravindranath and Grover 1998).

We trust those who are knowledgeable and competent. Conversely, lack of information and knowledge can destroy trust (Pagden 1988, p.134). Expertise of a salesperson was found to positively influence consumer trust in the salesperson (Doney and Cannon 1997). When there is trust in the partner's expertise, we can be confident that he or she will be competent to handle complex and unknown challenges that might appear in the future (Ravindranath and Grover 1998). When applied to the HCI context, expertise of a computer interface agent will increase the user's trust in the agent.

Integrity-Based Trust

Integrity is a person's characteristic that signals his or her trustworthiness (Zucker 1986). To date, the construct of integrity remains vague and its definition has not been well-defined (Rieke and Guastello 1995).[16] Butler and Cantrell (1984) and Mayer, Davis, and Schoorman (1995) view integrity as an individual's commitment to some kind of principles. However, they are not clear about individuals with high integrity would follow what kind of principles. This definition leaves room for moral relativism and subjectivism (Becker 1998). Similarly, Sitkin and Roth (1993) emphasize the value congruence aspect of integrity, i.e., match or mismatch between the trustee's values with those of an organizational referent, rather than a judgment of the acceptability of the values. That is, in organizational contexts, as long as individuals follow the values of the organization, they can be deemed as having integrity.

Becker (1998) argues that integrity should be defined with the philosophy of "Objectivism." Borrowing Rand's (1957, 1989) theory of Objectivist ethics, he argues that integrity should be loyal to rational principles and values. He notes "integrity is the principle of being principled, practicing what one preaches regardless of emotional and social pressure, and not allowing any irrational considerations to overwhelm one's rational convictions" (p.157). Integrity involves acting in accordance with morally justifiable value system that goes beyond this immediate environment. Thus, the moral values upheld by a person with integrity do not necessarily have to match with his or her organizational values, but should be in line with higher value systems.

We trust people with integrity and honesty. Integrity (Butler and Cantrell 1984; Gabarro 1978; Mayer, Davis, and Schoorman 1995; Moorman, Deshpande, and Zaltman 1993; Sheppard and Sherman

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[16] In an comprehensive review, Ones, Viswesvaran, and Schmidt (1993), lists a number of dimensions in "integrity tests," which include acceptance of convention, dependability, depression, drug avoidance, energy level, honesty, hostility, job commitment, moral reasoning, proneness to violence, self-restraint, sociability, thrill seeking, vocational identity, wayward impulses, and work ethics. Note how broadly integrity is defined thereby confusing its core meaning.

1998; Whitener, Brodt, Korsgaard, and Werner 1998), and honesty (Larzelere and Huston 1980; Pearce 1974; Rotter 1971) are found to enhance trust from others in the human relationship context.[17] In the sales context, integrity would be related to the intention to provide unbiased and complete information beyond self-interest. Information coming from people with no integrity is deemed not credible. In the human-computer interaction context, human users will likely trust computer interfaces that appear to have integrity. Recently, integrity of some of the Internet auction sites was questioned when it was found that they searched not all possible suppliers, but only those allied suppliers (Guttman and Maes 1998) and still claimed the lowest price.

Rule-Based Trust

Trust, specifically generalized trust (Rotter 1967), reflects the implicit rules and expectancies we hold about unknown others. According to Keen et al. (2000), trust is the foundation of commerce. Sometimes "it is law, contract, or regulation that generate the trust" (p.1). In order for the society to sustain and prosper, there must be a degree of rational cooperation (Gambetta 1988). Adam Smith ([1759], 1976, p.86) wrote - "if there is any society among robbers and murders, they must at least … abstain from robbing and from murdering one another." Even animals (e.g., honeybees) cooperate each other for survival (Bateson 1988). Bok says "trust is a social good, when it is destroyed, societies falter and collapse" (p.25).

Barber (1983) specifies that trust can involve expectations about the persistence of social order and system in which the relationship between two or more parties is formed. The general trust that is necessary to maintain social order and market efficiency goes beyond the trust that is formed on the basis of party trust, or personal relationships within a narrow and specific social network (Moore 1999; Humphrey and Schmitz 1998). Institution-based trust researchers (Humphrey and Schmitz 1998; Shapiro 1987; Zucker 1986) argue that individual trust is affected by how much one perceives that a particular environment is under guarantees, safety nets, and other legal or regulatory protection, which is also called control trust (Das and Teng 2001). Here, trust is based on institutionally produced control systems (or so-called control trust) and not on the specific interacting parties (or so-called party trust). Importantly,

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[17] While some researchers use "integrity" and "honesty" interchangeably (Butler and Cantrell 1984; Hosmer 1985), Rand (1957) distinguishes integrity from honesty. "Honesty is the recognition of the fact that you cannot fake existence," whereas "integrity is the recognition that you cannot fake your consciousness" (p.1019).

Individuals' trusting or distrusting attitude created through systematic protections will reflect the level of trust in a society.[18]

Trust in the social order and governance, or institution-based trust, is believed to foster freer flows of information and prosperity (Humphrey and Schmitz 1998). For example, Max Weber (1948, p.302-313) argued that membership of Protestant sects in American was critical to business success not because members helped one another, but because the process of acquiring and maintaining the membership was such a rigorous evaluation of each candidate, so the membership signaled as a guarantee of fair dealing and honesty and fostered business transactions. If a particular system is reckoned to be the most tightly regulated system by a powerfully enforced, and reasonable law, members of the system believe in one another and there will be freer exchanges of information and resources (Moore 1994).

Summary of Literature Review on Trust in HCI

1. Human-computer interaction can include a variety of modalities. Typically the Internet-based human-computer interactions include e-mail, usenet groups, MUD, MOOS, and the World Wide Web.

2. Currently, the intelligent agent interfaces are being developed and adopted by an increasing number of Internet-based companies with the potential to create a trustworthy computer interface for various purposes including online consumer shopping.

3. The risky online environment epitomizes the need for consumer trust in HCI. The particular risks that are relevant to HCI include the lack of regulatory/policing system, complexity, hidden process, privacy and security concerns, and the fundamental differences between human processing and machine processing.

4. Trust is characterized as having cognitive and affective bases. Cognitive trust is based on rational, objective decision to trust, drawing on the evaluation of the others' dependability, responsibility, and competence. Affective trust, on the other hand, refers to the subjective elements of the decision to trust others based on the emotional bond, the care and concern that emerge from interacting with the other party.

5. Consumer trust in HCI can be defined as the user's confidence in the computer agent's competence and benevolence. Also, when users trust a computer interface, he or she is more likely to consider the information provided by the computer interface as credible.

6. Trust in a computer interface can also be conceptualized as having both cognitive and affective bases. Cognitive trust in human-computer interaction (HCI) can be defined as

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[18] For example, Fukuyama (1995) contrasts "high trust" societies with "low trust" societies. According to Fukuyama, Japan and Germany are high-trust societies where people readily form relationships with unknown people and are able to associate with them in a comfortable manner. In low trust societies, such as France, people are not willing to trust others outside the family. Since high trust facilitates more enduring and productive worker-management relations, Fukuyama argues that trust pays off from an economic standpoint.

users' confidence in the competence and reliability of a computer interface. Affective trust in human-computer interaction refers to the emotional security about a computer interface, and it is likely to be formed through warm and pleasant social interactions with the computer interface.

7. Antecedents of consumer trust in HCI include interface-based trust, expertise-based trust, integrity-based trust, and rule-based trust. Consumer trust in HCI may be enhanced by operating these antecedents adequately.

Interface-Driven Trust Antecedents: Research Hypotheses

This section focuses specific interface-driven trust antecedents including face human-likeliness, script social presence, and information richness. The relationships among the interface-driven antecedents and consumer trust, communication effectiveness, persuasion effectiveness, and relationship effectiveness are discussed leading to research hypotheses.

Computer as a Partner

A significant portion of the social cognition literature suggests that the initial exposure (e.g., first impression) may be enough for people to make an evaluative judgment. Research on impression formation suggests that people infer a number of characteristics from a person's appearance and behavior. All observed behaviors are translated into traits and subsequently serve as a basis for social judgments (Wyer and Srull 1989). Gathering information during the interaction process, people would form a general evaluation of the other person, and determine the level of similarity between themselves and the interacting party. A multitude of cues, both verbal and nonverbal, are used in making evaluative judgments. It is interesting to note that even handwriting of a person may be enough to guess the person's personality or emotional state (Warner and Sugarman 1986). In a dyadic interaction between a consumer and a salesperson (or the electronic interface of a company), the initial contact is also an important time for the consumer to make dispositional attributions and evaluate the salesperson's dependability.

Relationship researchers have applied certain relationship principles not only to consumers and organizations, but also to an inanimate object. For example, Fournier (1998) and Aaker (1998) suggest that it is possible for consumers to have a relationship with their brands, and when they do, they tend to humanize and personify brands. Marketers often use complete anthropomorphization of brand object for their brands (e.g., the Pillsbury Doughboy), endowing human-like qualities (Fournier 1998; p.345). Mick

and Fournier (1998) report instances of consumers' having heartfelt partnering relationships with their technological possessions.

CASA researchers have found that people tend to treat computers as if they were human, applying the same rules governing human relationships. People were found to be polite to computers: when a voice on a computer (computer A) asks about its performance, people gave more positive and less honest answers than when they were questioned by a different computer (computer B) about computer A's performance. People liked computers that flattered, and thought the computer was better when it praised them than when it criticized them. People also treated female-voiced computers differently than male-voiced computers.

Rules guiding interpersonal distance have also been applied to human computer interaction: close faces on the computer screen were evaluated more intensely than far away faces and attention and memory enhanced when faces seem close. People change how they present themselves when interacting with human-like computer interfaces as compared to interacting with simple text interfaces (Sproull, Subramani, Kiesler, Walker and Waters, 1996).

The aforementioned empirical reports are in line with the theory of animism (Gilmore 1919; McDougall 1911; Nida and Smelly 1959; Tylor 1874) that noted people feel the need to anthropomorphize inanimate objects to facilitate a relationship. The possibility for a humanized computer interface to become a trustworthy partner is now being explored by interface designers. These perspectives allow a prediction that people may likely regard a human-like computer interface as a relationship partner when the interface has humanlike features, and they interpret its manifested expressions and behaviors as if they were human expressions.

Face Human-likeliness and Anthropomorphism

In this section, a definition of anthropomorphism is provided and the general theory of animism is outlined. The effect of face human-likeliness, a particular way to facilitate anthropomorphism, on the enhancement of consumer trust is based on the theory of animism.

In order to understand a subject that is abstract and complicated, we often ground the phenomenon in other things we know. Traverse (1996) notes that "it is instinctively natural to think of anything really complex as 'like a person' rather than 'like a thing' "(Chapter 3.3. Animacy and Computation). The metaphor is a necessary tool for this understanding. Interfaces hide the machine languages and implementation details that users can't understand, and control the functions based upon the user's understanding, without having to know the mechanical details. The role of metaphor, describing (overtly or implicitly) objects in terms of another object, is heavily used in interface designs. Specifically, anthropomorphism is a recurring metaphor for computer interfaces (Traverse 1996).

Anthropomorphism is the attribution of human characteristics to non-living objects. Similar to anthropomorphism, the concept of animism was developed in early days of anthropology in Tylor's 1871 masterpiece *Primitive Culture*. Animism is "the belief that inside ordinary visible tangible bodies there is normally invisible, normally intangible being, the soul ….. each culture having its own distinctive animistic beings and its own specific elaboration of the soul concept" (Harris 1983, p. 186).

In developmental psychology, animism refers to a child's tendency to believe inanimate objects as alive and conscious (Bird-David 1999). Sherry Turkle in her book, *The Second Self,* discusses children's animistic beliefs about computers. Children playing with computer toys that could talk back often believed that the toys were smart and alive (For more detailed discussion, see Chapter 1 Child Philosophers: Are Smart Machines Alive?).

However, the contemporary discourse on animism centered on criticisms about its naïve beliefs suggesting that animism may be appropriate only in primitive ages. Tylor (1874), more than a century ago, noted that animism existed in a "child" and "erroneous" state of society and predicted its obsolescence in modern times. He stated that "the primitive endowed all things including inanimate ones, with nature analogous to his own" and that animism would have no room in the age of science and technology. Yet, animism, or anthropomorphism, still exists in this postmodern era. Reeves and Nass (1996) suggest that animistic beliefs in this advanced era of science and technology may be possible because human brains have not yet evolved to state-of-the-art technology. They note that "the human brain evolved in a world in which only humans exhibited rich social behaviors, and a world in which all perceived objects were real physical objects" (p.12). Thus things that seem smart and alive appear real to people.

Sherry Turkle notes (1984, p.31) that computers are "marginal" and "evocative" objects "on the boundary between the psychological and the physical" and children use them to build naïve theories about the animate and the inanimate. The metaphor of animism and anthropomorphism signifies that in human-computer interaction, once a human user perceives (consciously or unconsciously) the computer as social being, it stops being "the machine *that* thinks" and transforms to "the machine *who* thinks." The entire social rules and meanings that govern human relationship including social cognition regarding the other party's trustworthiness including perceptions and stereotypes become highly relevant in the human-computer interaction context.

Currently, whether computer agents should be personified or not is still an open question (c.f., see the debate between Reeves and Nass (1996) and Schneideman (1997)). Over the years, personified agents have become increasingly available. For example, in Apple computer's Navigator video, there is an agent named "Phil." The Microsoft Office products include characters Genie, Robby, Merlin, and the Genius (See http://msdn.microsoft.com/workshop/imedia/agent/agentdl.asp#character for the list of agents publicly available). Ananova.com and mysimon.com present cartoon-like characters in the upper left corner of the opening Web page.

How beneficial are human face figures in human-computer interaction? Schlenker, Helm, and Tedeschi (1973) suggested that communication between the trustor and the trustee could be implicit and subtle, based on a behavior or gesture or facial expressions. If this also applies to HCI, having a human face in the computer screen could invite all kinds of social implications to the HCI context.

Psychologists suggest that infants are born with information about the structure of faces; even at birth infants prefer face-like patterns to other patterns (Bond 1972), at the age of two months, infants can face emotional expressions (Carey 1992). Numerous studies report that facial features and expressions influence attributions about the attractiveness, pleasantness, intellect, sociability, and mental health of a target person (Adams 1977; Burns and Beier 1973; Dion, Berscheild and Walster 1972; Guise, Pollans, and Turkat 1982; Jones, Hannson, and Phillips 1978; Unger, Hilderbrand, Madar 1982; Warner and Sugarman 1986).

Having a human face may likely facilitate anthropomorphism. It also may help users better understand and easily predict the computer agent's personalities and behaviors (Koda and Maes 1996). Parise et al. (1999) report that life-like interface agents engendered trust and cooperation from human users. People generally trusted human-like interfaces more than dog-like interfaces (except dog owners). Koda and Maes also found that human-like agents were perceived more intelligent than dog-like agents. Importantly, agents that have a human face were considered more likable, engaging, and comfortable to interact by users that agents with no faces.

As mentioned previously, visual information including face is a powerful cue in social judgments. Burns and Beier (1973) assessed the relative effectiveness of the nonverbal, vocal, and visual channels in influencing subjects' judgments of various portrayals of feeling state on film, for which certain cue components had been systematically removed. Interestingly, judgments from visual cues were found to be more accurate than were judgments from vocal cues. As the level of face human-likeliness of a computer interface increases, there will be more visual cues and facial expressions that can convey warmth and friendliness of the interface agent. Thus, the level of face human-likeliness of a computer agent will positively affect user attitude and trust perceptions.

Hypothesis 1a: As the level of face human-likeliness of a computer agent increases, consumer attitudes toward the computer interface will become more positive.

Hypothesis 1b: As the level of face human-likeliness of a computer agent increases, consumer trust perceptions about the computer agent will become more positive.

Warm and Cold Scripts: An Application of Social Presence Theory to Agent Script

Social presence is defined originally in human interaction as the extent to which an individual perceives other people to be *physically* present when interacting with them (Carlson and Davis 1998; Short

et al. 1976). Physical proximity, interpersonal distance, eye contact, and verbal conversation, therefore, enhance perceived social presence of a person.

Allport's (1924) early study also showed the connection between subject performance and the presence of others. Allport concluded that the presence of collaborating others facilitated overt and easy processes but hindered reasoning ability and decreased the performance of difficult tasks. According to Zajonc's (1965) drive theory of social facilitation, the presence of others increases arousal. Chapman's (1973) study provided support for Zajonc's social presence-arousal hypothesis. In his study, children listened to a recorded humorous material in public or alone. The children who heard the humor in the presence of another child laughed more than did the children who listened alone.

When this theory is applied to the media context, social presence of a medium can be defined with the varying intensities of *psychological presence* providing social and emphatic interactions. It is the degree to which a medium conveys psychological presence of the communicating participants (King and Xia 1997). Reeves and Nass (1996, Chapter 17) suggest that image size can affect the perception of psychological presence, which then affects viewer arousal, memory, and attitude. Karahanna and Straub's (1999) study showed that individuals' use of a medium was affected by perceived usefulness, which in turn, was influenced by the perceptions of the level of social presence a medium affords. Perceived social presence appears to be facilitated by multimodality (e.g., audiovisual) cues rather than single (e.g., audio or text) modality. For example, Westley and Severin (1964) found that people tend to trust TV news more than newspapers. Given previous findings about the effects of social presence, it is expected that interfaces that have strong social presence will positively affect arousal, user memory, attitudes, and perceived trustworthiness.

One way to increase social presence of a computer interface might be through friendly social interaction with the interface agent. The process factors relevant to computer agents may reflect the characteristics of effective salespeople, such as learning matching user needs, and responding to affective needs of consumers through social and emphatic interactions. Ramsey and Sohi (1997) examined the relationship between salesperson listening behavior and trust. Salesperson listening, defined as "the cognitive process of actively sensing, interpreting, evaluating, and responding to the verbal and nonverbal messages of present or potential customers" (Castleberry and Shepherd 1993, p.36) had a positive impact on customers' trust in the salesperson, leading to anticipation of future interaction. In other words, emotional intelligence (Goleman 1995) is an effective characteristic of a persuasive computer agent (Dormann 1997). Interface agents that can adapt to users' affective needs are proposed to solve the inherent problems of classical artificial intelligence such as insensitivity (Picard 1997).

Socially present interfaces that are consistently friendly and agreeable, which greet and guide users by actively learning and matching their needs, will likely result in more positive user experience and

increased perceived trust. Social presence of pleasantly collaborating interface agents will also likely to induce greater user involvement, leading to positive trust perceptions and attitudes. Thus:

Hypothesis 2a: As the level of social presence of a computer interface increases, consumer attitudes toward the interface will become more positive.

Hypothesis 2b: As the level of social presence of a computer interface increases, consumer trust perceptions will increase.

Information Rich Environment

Economists and consumer researchers have long studied consumer information search (Beatty and Smith 1987; Johnson, Lohse, and Mandel 1998; Moorthy, Ratchford, and Talukdar 1997). The biggest advantage of the Internet is the cross-merchant search capability powered by low search costs – the time and money spent locating the best product at the best price – (Kwak 2001), Internet-based sales advisors can provide information about a wide variety of products. Alba and his colleagues (1997) speculated that if Internet retailing reduces search costs for price information, online shoppers would become more price sensitive. Surprisingly, Lynch and Ariely (1998) found that when search costs for product quality information were lowered, consumers were less price sensitive whereas reduced search costs for product price information increased price sensitivity.

It has been demonstrated that some systematic variation of the method of presenting information online can influence user perceptions of search costs and the likelihood that the information will be used in decision-making. Hoque and Lohse (1999) systematically varied serial positions, travel distance, and display characteristics of a certain advertisement in their design of user interface for online stores, and found that respondents' choice of business in the electronic directories were significantly decreased with increasing search costs.

Information rich environment of Web agents can be characterized as the amount of quality information available from the Web site, affected by the size of the knowledge database embedded in the Web agent design. Computer agents can perform a variety of tasks including searching information and making recommendations based on the target user's preferences or tastes. Agents present consumers with information on which to base their decisions (Ariely 2000, p.233). Perhaps the most credible purchase advice can be obtained from those agents who have a broad knowledge basis of product expertise. Upon user request, agents can search for a multitude of alternatives to find alternatives that will potentially match the customer's preferences (West 1996, p.68). Ability to provide complete and unbiased information is an important source of trust. Thus, it is hypothesized that information richness of interface agents will positively affect user perceptions of trust creating positive attitudes toward the interface agent.

Hypothesis 3a: As the level of information richness of a computer interface increases, consumer attitudes toward the interface will become more positive.

Hypothesis 3b: As the level of information richness of a computer interface increases, consumer trust perceptions will increase.

Interface Types and Cognitive and Affective Bases for Trust

The distinction between affective and cognitive basis of consumer evaluation has been a popular approach in the consumer behavior literature (Zajonc 1980). While the interplay of affect and cognition was being widely recognized, the Elaboration Likelihood Model suggests that antecedents of affectively and cognitively based attitudes could be different. This view allows a prediction that equally favorable attitudes could be created through either the affective means or the cognitive means (Haugtvedt and Wegener 1994).

Researchers in social psychology have investigated the relationship between affectively and cognitively induced attitudes. Edwards and her colleague (Edwards 1990; Edwards and von Hippel 1995), for example, assumed that although two people appear to hold the same attitude, their attitudes may demonstrate differential susceptibility to persuasion efforts to challenge their attitudes cognitively or affectively (p.204). Edwards thought that basic perceptual experiences, such as taste and smell, are primarily affective in nature whereas processing verbal information about attributes of an object are primarily cognitive in nature. The schema involved with primarily affective attitudes are hedonic in nature, and have a rather unidimensional cognitive structure indicating favorableness-unfavorableness. On the contrary, cognitive based attitudes are processed in a piecemeal fashion (Fiske and Pavelchak 1986) processing attributes, the emerging impression of like or dislike is integration of the components of piecemeal information.

Fabrigar and Petty (1999, Study 1) found a matching effect. That is, affective means were better at affective based attitudes than cognitive based attitudes. Because affective based attitudes were obtained through direct experience (tasting and smelling) and cognitive based attitudes were obtained through indirect experiences (verbal processing), this finding should be interpreted with caution. In study 2, they found partial evidence for the matching effect even when controlling for direct/indirect experience. That is, affective persuasion was found to be a more effective means of influencing the affective basis than the cognitive basis of attitude.[19]

Earlier in this chapter, the affective and cognitive basis for trust was discussed. As a genuine concern for the other party, benevolence is affect-based trust whereas competence is based on cognitive

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[19] While attitude and trust are two different concepts, both reflects one's social judgments. In addition, the benevolence dimension of trust is conceptually close; both are affective based social judgments.

assessment of the other party's capability. Sensory, affective stimulation of a given interface agent, such as face human-likeliness and the overall feeling about the agent from the warm or cold script used by the agent, are likely to operate primarily upon the affective basis for trust, thus the benevolence dimension of trust. Conversely, product feature information or comparisons of alternatives primarily evokes schemas, evaluation, and cognitive responses and information rich environment of interface agents will likely operate upon the cognitive basis for trust, thus the competence and credibility dimensions of trust.

Hypothesis 4a: Social interface enhancers (e.g., face human-likeliness, script social presence) will likely operate upon the affective basis for trust. Social interfaces will likely enhance benevolence perception.

Hypothesis 4b: Information interface enhancers (e.g., information richness) will likely operate upon the cognitive basis for trust. Information interfaces will likely enhance competence and information credibility perceptions.

The interdependent relationship between affect and cognition was discussed earlier in this chapter. For example, although McAllister (1995) found that trustworthiness of business colleagues could be measured along two unique dimensions of the extent of affect-based trust and the extent of cognition-based trust, levels of cognition-based trust were highly correlated with levels of affect-based trust. Likewise, it is expected that there will be high correlations between the cognitive and affective dimensions of trust in HCI.

Trust as Intention

Rousseau et al. (1998) note trust is better understood as intention - a psychological state to accept vulnerability based on positive feelings (affective basis) and expectations (cognitive basis) of the intentions or behaviors of the transaction partner (Rousseau et al. 1998, p. 395).

This view of trust as intention has not been the prevalent view in marketing. In the marketing literature, Morgan and Hunt (1994) note trust as confidence in an exchange partner's reliability and integrity. Likewise, Doney and Cannon (1997) define trust as "the perceived credibility and benevolence of a target of trust" (p.36) and Ganesan (1994) note that trust is a belief, sentiment, and expectation, thereby defining trust as "credibility" and "benevolence." Note that the behavioral intention or willingness to rely on is absent from these definitions. Smith and Barclay (1997), on the other hand, proposed trustworthiness (Role Competence, Character, Motives and Intentions, Judgment) and trusting behavior (Relationship Investment, Influence Acceptance, Communication Openness, Control Reduction, Forbearance Opportunism) as to be related yet separate from each other.

In the management literature, McKnight, Cummings, Chervany (MCC) (1998) and Mayer, David, and Schoorman (MDS) (1995), Benevolence, Competence, Predictability (MCC), Honesty, Ability, Integrity, Benevolence (MDS) as trusting beliefs. However, trust is defined as an intentional construct that has behavioral implication, relating to specific targets and situations (Johnson-George and Swap, 1982).

In this dissertation, trust is defined as the willingness to rely on (Moorman, Zaltman, and Deshpande 1992), cooperate (Deutsch 1962; Govier 1997), place one's resources at the disposal of (Coleman 1990, p.100; Humphrey and Schumitz 1998; Rempel, Holmes, and Zanna 1985), or transfer control over resources to (Coleman 1990), the partner (i.e., computer in HCI). This dissertation takes an integrative approach and views trust as a meta-construct where the affective trust perception (benevolence) and the cognitive trust perceptions (competence, information credibility) positively influence one's intention to trust.

Hypothesis 5: Affective trust (benevolence) and cognitive trust (competence and information credibility) perceptions will positively influence trusting intentions.

Individual Difference Factors Moderating Trust Perceptions

While the importance of human factors in designing computer interfaces have been recognized in technology literatures, there has been a paucity of research connecting the individual difference factors as studied in psychology and the notion of human factors as a designing principle used in technology contexts. Individual difference factors such as user personalities may determine the interface types that are liked and trusted more by a particular individual. Here, the focus is on individual differences including psychological gender orientation, need for association, and need for cognition, and their moderating influences on user responses to different interface types.

Psychological Gender Orientation

The gender research conducted by Sandra Bem (1974, 1981) identifies the differences in masculine and feminine sex role identity. Measures for masculine and feminine personality are available from Bem's Sex Role Inventory (BSRI). The basic premise of Bem's sex role inventory is that children, when learning sex-roles, use cultural, rather than biological, definitions of masculinity and femininity: the two dimensions of psychological gender orientation.

Researchers in the area of technophobia commonly report that female identity individuals have more anxieties related to computing and tend to have more negative attitudes toward computers than male identity individuals do (Rosen, Sears, and Weil 1987). Psychologists as early as the 1950s have

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proposed that women are more socially oriented (Parsons and Bales 1955) whereas men are more task-oriented (Strodtbeck and Mann 1956). In addition, science is often associated with "hard rather than soft, things rather than people, and thinking rather than feeling" (Brosnan 1994, 1998, p.48), where all of which are the stereotypes for males. Such social prescription may motivate male identity individuals to develop computer skills and seek the "hard" style of interaction with the computer.[20] Likewise, androgynous females (those who are high in both masculinity and femininity) tend not to experience computer as gender inappropriate. Soft masters, or female identity individuals, were shown to prefer conversation-based programming than a monologue. Females also tend to greater involvement with relationships. Therefore, it is expected that social interfaces will have greater influence on high female individuals than low feminine individuals.

Hypothesis 6: The degree to which individuals have feminine or masculine gender orientations is expected to moderate the relationship between a social interface and resultant consumer trust perceptions and preferences. The relationship between a social interface and consumer trust perceptions will be stronger for individuals high in psychological gender orientation than individuals low in feminine orientation.

Need for Association

Association/disassociation is a fundamental psychological dimension that can be applied to almost every social behavior (Triandis 1978). Personality theorists have developed measures for individual differences in terms of their preference for human association and sociability, so-called extraversion. In fact, extraversion is a broad and general level in the hierarchy of individual dispositions, and has often been conceptualized as a higher-order factor that includes trait components such as venturesomeness, affiliation, positive affectivity, energy, ascendance, and ambition (See a schematic model of extraversion in Watson and Lee 1997, p.775).

There are many lower-level personality traits under the extraversion factor. For example, certain lower level personality traits, such as warmth, friendliness, and gregariousness (Goldberg 1999), are expected to have some interesting implications for user responses to anthropomorphized and socially present computer interfaces. High affiliative individuals tend to have warm and friendly feelings toward others and value close interpersonal relationships. Highly affiliative individuals also enjoy companionship, and are strongly in favor of frequent social interaction (Watson and Lee, p.776). Individuals high in

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[20] Sherry Turkle (1984) proposed two styles of thinking in general life that may also be applicable to human-computer interaction: hard mastery and soft-mastery. Hard masters tend to see the world as something to be analyzed and controlled. On the other hand, soft masters are more likely to see things as eomthing to be acommodated to and beyond their control. She proposes that girls tend to be soft masters, whereas males tend to be hard masters.

gregariousness tend to like large groups and gatherings, be outgoing and social. They have strong social needs, and may have trouble being alone (Wiggins 1996).

What would be the relationship between individuals' need for association and their attitudes toward computer technologies? Many computer technologies replace interaction with human employees with the interaction with machines. Dabholkar (1996) notes that the need for human interaction is relevant to understanding perception of service quality. In addition, a consumer's inclination to use a service technology often reduces his/her need to interact with human employees (Prendergast and Marr 1994). Consumers have different tolerance levels for electronic interfaces. For some consumers, the preference for personal interaction is strong, and as a result, the loss of human contact may outshadow the increased benefits of technology-based service innovations (Ledinghan 1984). Therefore, preference for human interaction negatively influences user acceptance of the technology that replaces a human. Likewise, consumers who desire for human association will likely respond positively to computer agents that provide humanized social interaction experiences.

Hypothesis 7: The degree to which individuals have need for association is expected to moderate the relationship between a social interface and resultant consumer trust perceptions and preferences. The influence of a social interface on trust perceptions and preferences will be greater for individuals high in need for association than individuals low in need for association.

Need for Cognition

Cacioppo and Petty (1982) developed a personality scale that distinguishes individuals depending on the extents to which they "enjoy and engage in thinking." High need for cognition individuals as opposed to low need for cognition individuals process and evaluate information more carefully and thoroughly. They tend to be influenced by message-relevant thoughts rather than peripheral cues (such as endorser attractiveness) (Haugtvedt, Petty, and Cacioppo 1992), spokesperson credibility (Petty and Cacioppo 1986a), or the sheer number of arguments presented (Cacioppo, Petty, and Morris 1983).

Priester and Petty (1995) demonstrated that perceiving a source as low in trustworthiness increases message processing for low need for cognition individuals whereas high need for cognition individuals process messages deeply, regardless of source credibility. Mantel and Kardes (1999) implied that because high need for cognition individuals make more carefully thought-out judgments by paying attention to specific details of message arguments, they may be less likely to fall prey to a host of judgment and decision biases. Haugtvedt and Wegener (1994) demonstrated that high need for cognition individuals pay attention and elaborate each message that is presented to them regardless of message order, and do not show recency effect, as low need for cognition individuals do. Individuals high need for cognition, because they process information effortfully, were better able to recall specific information

after a time delay (Srull, Lichtenstein and Rothbart 1985). Individuals with high need for cognition stored information in memory and used that information in making judgments later.

Information interfaces may likely provide information rich environments where users cognitively process and evaluate alternative products on a number of product features, and read product ratings by a number of information sources. The processes in general are cognitively effortful, and thus individuals high in need for cognition are likely to respond to information interfaces to a greater extent than individuals low in need for cognition are.

Hypothesis 8: The degree to which individuals have need for cognition is expected to moderate the relationship between an information interface and resultant consumer trust perceptions and preferences. The influence of an information interface on trust perceptions and preferences will be greater for individuals high in need for cognition than individuals low in need for cognition.

Situational Salience of Shopping Goals Moderating Consumer trust Perceptions

Goal-Interface Congruency Framework

Goals are defined as "representational structures that guide the system in its pursuit of an end state or reference state" (Markman and Brendl 2000, p.98). The goal compatibility framework focuses on individuals' active goals. That is, individuals evaluate objects relative to an active goal. An object will receive a given value relative an active goal, and "the value of an object is a function of the compatibility of that object to the active goal" (p.107). Some goals are chronically active whereas other goals can become situationally salient. Particularly, advocates of situated action suggest that goals activated by situations will be stronger than goals that are chronically active (Hutchins 1995; Patalano and Seiffert 1997). Likewise, situationally driven shopping goals may also determine the interface types that are liked and trusted more.

The importance of goals (or situational salience of a certain goal, see Belk 1975) in consumer behavior has been recognized by consumer researchers (see Huffman, Ratneshwar, and Mick 2000 for a review of how different goals guide consumer behavior). For example, Aaker and Lee (2001) suggest that goals associated with approach and avoidance regulatory focus (Higgins 1997) influence how people evaluate online advertising messages and brand affinity. Persuasion effectiveness of a specific message increased when it matched individuals' goals. Petty and Cacioppo (1979) suggested that individuals spend more effort to process an appeal that is compatible with their goal leading to more favorable attitudes toward persuasive messages. Ratneshwar, Pechman, and Shocker (1996) note that when a certain goal is salient, consumers tend to impose restrictions on their information search, and general problem solving

process (Barsalou 1991; Miller, Galanter, and Pribram 1960). Thus goal-compatibity is an underlying determinant of advertising effectiveness.

Studies in social psychology also find evidence for the affect-cognition congruency principle in persuasion. As noted earlier, Edwards and her colleague (Edwards 1990; Edwards and von Hippel 1995) assumed that although two people appear to hold the same attitude, their attitudes may demonstrate differential susceptibility to persuasion efforts challenging their attitudes cognitively or affectively (p.204). Edwards thought that basic perceptual experiences, such as taste and smell, are primarily affective in nature whereas processing verbal information about attributes of an object are primarily cognitive in nature. Through a set of experiments that involved inducing primarily affective and primarily cognitive attitudes and subsequently challenging those attitudes with affective and cognitive means of persuasion, Edwards found that affectively induced attitudes changed more when persuasion was based on affect than on cognition.

Experiential and Instrumental Goals in Internet shopping

Cyberspace is often equated with a place for electronic storage and transmission of information (Hafner and Markoff 1992; Sterling 1992). At the same time, it could well be a virtual place for simulated fun and social interaction (Foner 1993; Strate, Jacobson, and Gibson 1996; Strate 1999). Online shoppers may have both experiential and instrumental goals depending on situational salience of a given goal. Experiential goals are driven by hedonic motivations to "enjoy" the experience (Holbrook and Hirschman 1982). Individuals' pursuit of entertaining value and emotional arousal, perceived freedom, and fantasy fulfillment indicate their experiential goals (Bloch and Richins 1983; Hirschman 1983). Recreational shoppers do not have to make any purchase in order to fulfill their experiential goals (MacInnis and Price 1987). Kempf (1999) found that for products that primarily evoke experiential goals (e.g., computer game), felt arousal during the product trial and emotional responses were significant determinants of consumers' evaluations of the experience.

On the other hand, instrumental goals are primary driven by utilitarian motives that tend to be task-oriented and rational (Batra and Ahtola 1991). Utilitarian motives relate shopping with a work mentality (Hirschman and Holbrook 1982). Consumers with instrumental goals are usually happy to "get through it all" relatively quickly (Babin, Darden, and Griffin 1994, p.646). A shopping trip with instrumental goals would be evaluated with work performance and not with enjoyment. To summarize, shopping with utilitarian goals can be described as "shopping with a goal" whereas shopping with hedonic goals can be characterized as "shopping as a goal" (Babin, Darden, and Griffin 1994, p.647).

Media selection theory (Bodensteiner 1970; Daft and Lengel 1984, 1986) is useful in understanding the goal and interface match. Communication tasks differ in their requirements for social presence and information. People recognize that media differ in the amount of social presence and

information intensity they afford and choose a medium based on the degree to which social presence or information richness is necessary for the particular communication goal. That is, individuals' selection of a particular interface may depend on the amount of social presence or information richness that is conducive to the goal accomplishment.

Typically, when consumers are under shopping situations where affective (experiential) goals are salient, they will be likely to view social interfaces more favorably whereas consumers with active cognitive (instrumental) goals will be likely to prefer information interface to social interface.

Hypothesis 9: The situational salience of shopping goals will moderate the relationship between specific interface types and resultant consumer trust perceptions and preferences. The relationship between a social interface and consumer trust perceptions and preferences will be more positive when the experiential shopping goals, as opposed to the instrumental shopping goals, are salient (9a). On the other hand, the relationship between an information interface and consumer trust perceptions and preferences will be more positive when the instrumental shopping goals, as opposed to the experiential shopping goals, are salient (9b).

Consequences of Trust in Human-Computer Interaction

Potential outcomes of trust can be summarized in three ways: communication effectiveness, persuasion effectiveness, and relationship effectiveness. In Hypothesis 5, the relationships between trust perceptions and trusting intention is conceptually established. Here, we focus the relationship between trusting intention and self-disclosure behavior, conversion behavior, and satisfaction/retention.

Communication Effectiveness

Communications between two parties who do not trust each other is hard to sustain. Prentice (1974) found less verbal fluency, and more pauses, dropped words, and incoherent sounds in communications between non-trusting parties compared to the communication between trusting partners. Research demonstrates that consumers tend not to provide personal information over the Internet. Ackerman, Cranor, and Reagle (1999) found that only 13% of respondents reported they were not concerned about privacy on the Internet. Hoffman and Novak (1998) report that virtually all Internet users have declined to provide personal information at one time or another. While consumers did not respond positively to the idea of selling their personal information for monetary incentives, consumers seemed to want an experience of social exchange based on trust. People are also likely to disclose personal information to the trustworthy partner (Altman and Taylor 1973). This suggests a social exchange

process based on the interpersonal trust between parties can facilitate individuals' self-disclosure in HCI. Therefore, enhanced trusting intention will increase individuals' self-disclosure behavior.

Hypothesis 10: Heightened trusting intention will likely lead to increased self-disclosure behavior.

Persuasion Effectiveness

Persuasion refers to the attempts to change people's attitudes (Petty and Cacioppo, 1981, p. 4). In the persuasive marketing context, trust may be equated with credibility (Ganesan 1994). Research on persuasion and social psychology suggests that source credibility has important links to trustworthiness. For example, early Yale persuasion researchers Hovland, Janis, and Kelley (1953), suggested that credibility was affected by two factors: expertise and trustworthiness. Consumer researchers including Dholakia and Sternthal (1977) concurred with the Yale researchers and found expertise effects in a consumer context. Parasuraman, Zeithaml, and Berry (1985) viewed trustworthiness as a part of credibility, which determines perceptions of service quality. Source credibility is the extent to which a communicator is perceived to be a source of reliable and trustworthy information. It also represents the audience's confidence that the communicator's intention is to give accurate and valid information.

When consumers are presented with a message in a relatively new and unfamiliar area, they naturally make an effort to assess whether the message is accurate and the source is credible. Unless consumers are convinced the credibility of given information, consumers discount the claims made in the message (Eagly, Wood, and Chaiken 1978). Alternatively, when the source is believed to be trustworthy, consumers tend to make less counter arguments. Hence consumers are easily persuaded by the messages advocated by trustworthy sources (Grewal, Gotlieb, and Marmorstein 1994). Instead of engaging in counter argumentative thinking, consumers tend to accept the information provided by experts and make decisions based on the expert endorsement (Sternthal, Dholakia, and Leavitt 1978). Priester and Petty (1995) found that trustworthiness of the source led to a reduction of message elaboration, especially those low in need for cognition. Studies demonstrate that trust leads to positive attitudes toward buying (Harmon and Coney 1987), high product ratings (Sharma 1990), and increased purchase intentions (Harmon and Coney 1982). Therefore, enhanced trusting intention will likely lead to heightened intentions to purchase products that are endorsed by a trustworthy interface.

Hypothesis 11: Heightened trusting intention will likely lead to increased purchase (conversion) behavior.

Relationship Effectiveness

As Golembiewski and McConkie (1975) note, no single variable has influenced interpersonal and group behavior as much as trust. In the marriage literature, trust is considered a prerequisite to positive

relationship outcomes and interpersonal growth (O'Neill and O'Neill 1972). Larzelere and Huston (1980) found that dyadic trust is positively associated with love, intimacy, self-disclosure, and commitment. Trust increases security in relationship, reduces defensiveness, and allows people to share their feelings and dreams (Stinnet and Walters 1977).

The centrality of trust in facilitating effective interorganizational and interpersonal relationships is theoretically established (e.g., Ring and Van de Ven 1992, 1994; Morgan and Hunt 1994). Trust is a necessary precondition for cooperative activity. Jones and George (1998) agreed that trust leads to interpersonal cooperation and teamwork. For instance, trust determines the effectiveness of social interactions (Gambetta 1988), and relationships (Golembiewski and McConkie 1975). Cook and Wall (1980, p.39) conclude that "trust between individuals and groups between organizations is a highly important ingredient in the long term stability of the organization and the well being of its members." From a social exchange theory perspective, trust is essential for ongoing interpersonal relationships since exchange entails unspecified obligations, and human parties have no way to ensure appropriate reciprocation (Blau 1964).

A high level of trust among people facilitate effective problem solving (Barnes 1981), improve customer loyalty (Sonnenberg 1994), enhance productivity of teamwork (Schindler and Thomas 1993) and managerial and organizational effectiveness in general (Blanchard 1995; Miles and Snow 1995; also see Hosmer 1995). Therefore, developing a culture of trust within organizations and within people is strongly advocated (Ghoshal and Bartlett 1995; also see Blanchard 1995; Clawson 1989; Covey 1991; Handy 1995).

Previous studies of trust have also specified trust as having a high impact on dependence, satisfaction, and commitment (Andaleeb 1996; Geyskens et al. 1996). Empirically, positive relationships between trust and cooperation have been consistently found in channel relationships (Morgan and Hunt 1994) and in buyer-seller relationships (Schurr and Ozanne 1985; Selnes 1998).

In a meta analysis of studies on trust in salespeople, Swan, Bowers, and Richardson (1999) report that trust leads to satisfaction with the salesperson (Crosby, Evans, and Cowles 1990), satisfaction with the salesperson's company, products recommended by the salesperson (Legace and Marshall 1994; Schurr and Ozanne 1985), positive attitudes toward product and sales presentation (Busch and Wilson 1976), and long-term orientation (Ganesan 1994). In summary, trust between the interaction partners will likely lead to relationship effectiveness with heightened relationship satisfaction and loyalty. Therefore:

Hypothesis 12: Heightened consumer trust will likely lead to heightened satisfaction and retention.

CHAPTER 3

RESEARCH METHODOLOGY

Two experiments were conducted to examine the effects of certain interface factors and the individual and situational moderating influences upon consumer trust. The context for the experiment was an agent-assisted shopping simulation where an interface agent ("Agent *John*")[21] functioned as a sales expert, greeting and providing information and assistance to online shoppers. Agent *John* demonstrated a certain level of knowledge about a given product category (digital camera)[22]. After asking some questions regarding shopper preference, Agent *John* provided a number of products that could suit each shopper's needs. Agent *John* also made a product recommendation to the shopper. All experimental materials including subject instruction, stimuli, and survey can be found in Appendix A.

Research Design

Sample

Two experiments were conducted among a population of young adults (undergraduate college students). Undergraduate college students were deemed appropriate for these experiments, because they generally spend considerable time on the Internet. Respondents were recruited in undergraduate business classes at the University of Tennessee during February through April of 2002. Participation was voluntary, and participants received extra course credit and a chance to enter a drawing for two gift certificates (each $250). A total of 156 students participated in study 1 and a total of 213 students participated in Study 2.

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[21] A common male name, *John*, was chosen after a discussion with undergraduate students. The purpose of using a common name was to reduce any confounding effect from such background variables.

[22] A digital camera was chosen as the experiment product because (1) it had quantifiable features such as zoom size, picture resolution, LCD screen size. User preferences for these quantifiable features could be ealisy programmed; (2) A pretest also revealed that digital cameras was a product category that potential respondents (i.e., undergraduate students) were highly interested in and yet most did not own one at the time of experiment.

Study 1

Study 1 sought to provide evidence that face human-likeliness (H1) and script social presence (H2) could enhance consumer trust perceptions and preferences. It was expected that increased face human-likeliness and script social presence would likely operate upon affective and cognitive mechanisms (H4) leading to trusting intentions (H5). In addition, the effects of social interface on consumer trust could be moderated by individual difference factors including user psychological gender orientation (H6) and need for association (H7). The relationships between consumer trust and its consequences, i.e., disclosure behavior (H10), conversion behavior (H11), and satisfaction/retention (H12), were also investigated.

Study 1 employed a 4 (face human-likeliness) *2 (script social presence) between subject design with three individual difference moderating factors (feminine orientation, masculine orientation, and need for association). Specifically, four face conditions of differing levels of human-likeliness (4: no face, less human-like face, more human-like face, and a real face) and two script conditions of varying levels of social presence (2: warm and cold scripts) were created, resulting in a total of eight (4*2) different interface conditions Study 1.

Procedure

Two to three weeks before the actual laboratory experiment, potential respondents were given an online personality survey. Two to three weeks later, respondents were brought to a computer laboratory, which housed eleven computers with 19" monitors. Respondents were assigned to a specific treatment condition based on the results from the initial personality survey.[23] After being assigned to a specific computer, a respondent would read an instruction about the simulation experiment and the incentive written on paper. For example, everyone was told that he or she was in the market to shop for a digital camera and Agent *John* would help their shopping to find the best camera that would suit their needs. In order to increase realism of the experiment, participants were also told that they would be entered into a drawing for two $250 gift certificates, which could be used toward the actual purchase of the camera they might choose during the shopping simulation. The computer simulation took about 10 to 15 minutes for most of the participants. After interacting with Agent *John* on the computer screen, respondents were

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[23] Each cell included individuals with 2 or more high and low feminine orientation-, high and low masculine orientation-, and high and low need for association for an even distribution of individuals having different personalities across the treatment cells.

provided with a survey booklet to be completed containing questionnaire items measuring trust and satisfaction.

Study 2

Study 2 sought to compare the two interface factors (social interface factors and information richness) in their effectiveness in enhancing the affective and cognitive bases for trust. Study 2 also examined how a situational factor (salience of experiential vs. instrumental shopping goals) could influence consumer trust perceptions about and preferences for specific types of interfaces. Study 2 employed a 3 (social interface factors: no face+cold script; less human-like face+warm script; real face+warm script) * 2 (information factor: high and low information richness) * 2 (situation: experiential and instrumental shopping goals) between subject design involving two individual difference moderating factors (psychological orientation and need for cognition).

Three face/script combinations from Study 1 representing differing levels of social presence were adopted in Study 2. Information richness was manipulated by (1) the number of camera attributes reviewed (3 features vs. 5 features) and the number of cameras that Agent *John* initially showed to shoppers (4. vs. 8). In order to examine the moderating effect of shopping goal salience, two conditions of situational goal salience, i.e., experiential versus instrumental shopping goals, were employed (see Appendix for the two shopping goal scenarios).

Procedure

The procedure of Study 2 was identical to Study 1 except for one added point in the instructions. Participants of Study 2 received a shopping scenario that described in detail a specific shopping goal (experiential or instrumental) for their purchase of digital cameras (see Appendix A). In the experiential setting, respondents were told to imagine that they had an upcoming family reunion in two weeks and that they think it would be nice to capture the best family moments and upload those pictures on their web sites. Respondents were then told that they were going to consult a computer-simulated shopping agent, *John*, to select and perhaps purchase a digital camera. At the end of the scenario, a bold faced sentence described their goal in this shopping trip as to enjoy the shopping experience with Agent *John* as they would enjoy the upcoming family reunion. In the instrumental setting, respondents were told that they were a professional photographer and they had a job interview for a photographer position in the Online Encyclopedia of Botany and Minerals in two weeks. For the job interview, they would need a digital camera to create a picture portfolio fo demonstrate their abilities. The second part of the scenario - they were going to consult a computer-simulated shopping agent, *John*, to select and perhaps purchase a digital camera - was identical to the experiential condition. At the end of the scenario, a bold faced sentence

described their goal in this shopping trip as to find a camera that would help them to create a good portfolio and be successful in the job interview. For both shopping goal conditions, respondents were asked to read the scenario carefully and to remember the shopping goal instruction and then continue shopping with the given goal being active in their minds.

A summary of research design for two experimental studies is found in .

Interface Development

This examination of the relevant interface factors on consumer trust in HCI required some computer-programming skills to enable different characteristics of a computer agent. Macromedia's Authorware 5.2 was utilized to create the prototype of Agent *John*. Faces and scripts of Agent *John* were later added to the prototype to fit each interface manipulation condition.

The base protocol of the shopping simulation included a number of sections including (1) a brief introduction of Agent *John*; (2) provision of information about important features of digital cameras (e.g., resolution, screen size, and zoom size (Study 1), internal memory and PC connection (later added in Study 2 in information-rich conditions); (3) Agent *John*'s request for user input regarding the importance of each feature when purchasing a digital camera; (4) Agent *John*'s presentation of four (Study 1) or eight (Study 2 in information-rich conditions) cameras that could match the respondent's preferences revealed from the preference inquiry in section #3; (5) user choice of one camera among the four (or eight) cameras shown in section #4; (6) Agent *John*'s recommendation of another camera that had two levels of upgraded features and was more expensive by 30% (Study 1) or 10% (Study 2) than the respondent's earlier choice of camera in section #5; (7) final choice between the respondent's own camera choice (section #5) and Agent *John*'s upgrade recommendation (section 6); (8) a wrap-up of the purchase transaction where the respondent had a choice whether or not to purchase the camera the respondent finally chose in section #7; and finally (9) Agent *John*'s inquiry of personal information (i.e., age, major, place of birth, number of siblings, favorite memory)[24].

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[24] These five questions were adopted and modified from Moon (2000)'s study. The sequence in which these questions were asked reflected an increasing level of intimacy.

Table 3-1. Research Design for Two Experimental Studies

STUDY 1 (4*2)

Independent Variables	Individual Moderators	Dependent Variables

Face Human-Likeliness
  -No Face
  -Less Human-Like Face
  -More Human-Like Face
  -Real Face
Social Presence
  -Cold Script
  -Warm Script
	Psychological Gender Orientation
	
	Feminine Orientation
	Masculine Orientation
	
	Need for Association
		Trust Perceptions
		-Cognitive Trust (Competency, Information Credibility)
		-Benevolence
		
		Trusting Intention
		
		Communication Effectiveness
		-Self-Disclosure Behavior
		
		Persuasion Effectiveness
		-Conversion Behavior
		
		Relationship Effectiveness
		-Satisfaction and Retention

STUDY 2 (3*2*2)

Independent Variables	Individual Moderators	Dependent Variables

Social Interface Factor
  -No Face/Cold Script
  -Less Human-Like Face/Warm Script
  -Real Face/Warm Script
 	
Information Richness
  -Information Non-Rich
  -Information Rich
 	
Shopping Situation
  -Experiential Situation
  -Instrumental Situation
	Psychological Gender Orientation
	Feminine Orientation
	
	Need for Cognition
		Trust
		-Cognitive Trust (Competency, Information Credibility)
		-Benevolence
		
		Trusting Intention
		
		Communication Effectiveness
		-Self-Disclosure Behavior
		
		Persuasion Effectiveness
		-Conversion Behavior
		
		Relationship Effectiveness
		-Satisfaction and Retention

Manipulation

Face Human-likeliness

The process to manipulate differing levels of face human-likeliness of Agent *John* was as follows. First, the researcher chose ten male[25] faces from trade magazines such as *Fortune* and *Business Week*. The researcher then conducted a pretest where undergraduate students evaluated the ten male faces presented in a random order. A particular male face that received appropriately neutral evaluations (Mean 4.69, 7-point scale ranging from "Untrustworthy" (=1) to "Trustworthy" (=7)) from the students was selected and the image (see) was graphically processed to reduce the level of face human-likeliness (Figure 3-1).

Specifically, the "post edge" filter effect in graphic software Photoshop 6.0 was applied to create a so-called "More Human-Like Face"(Figure 3-1b) that contained key features similar to the "Real Face" (Figure 3-1a). Next, key facial features from Figure 3-1b including eyes, nose, and mouth were cropped and a crude outline was added to create a so-called "Less Human-Like Face" (Figure 3-1c). The last face condition represented the "No Face" condition.

Script Social Presence

The level of social presence of Agent *John* was manipulated through two different kinds of text scripts. As Agent *John* used primarily text-based communication to guide users throughout the shopping trip, a particular tone of language consistently used by Agent *John* could convey the warmth or the coldness of his personality. Both scripts were composed line-by-line, contrasting the warmth and the coldness of Agent *John*'s while keeping the content and overall length relatively equal between the two scripts (Scripts are available in Appendix A).

In a pretest involving 17 undergraduate students, the levels of social presence of both scripts were measured using the following eight seven-point semantic differential scales originally proposed by Lombard (1999) and Short et al. (1976): (1) Insensitive – Sensitive (SP1); (2) Cold – Warm (SP2); (3) Unsociable – Sociable (SP3); (4) Unfriendly – Friendly (SP4); (5) Unemotional –Emotional (SP5); (6) Unresponsive – Responsive (SP6); (7) Impersonal –Personal (SP7); (8) Dull – Vivid (SP8). The warm script (N=8) received significantly higher marks in social presence (SP2, SP3, SP4, SP7, and SP8) than the cold script (see Table 3-2). The warm script received significantly higher evaluations in five of the eight social presence items (SP2, SP3, SP4, SP7, and SP8). Directional support was found in SP1 and SP5.

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[25] Only male faces were used to control for any potential confounding effect of agent gender on consumer trust.

(a) Real Face

(b) More Human-Like Face

(c) Less Human-Like Face

Figure 3-1. Faces of Varying Levels of Human-Likeliness

Table 3-2. Pretest of Warm and Cold Scripts on Social Presence

	Scripts	Mean	t	df	Sig. (1-tailed)
SP1	Cold	3.333	-1.265	15	.117
	Warm	4.125			
SP2	Cold	2.889	-2.389	15	.015
	Warm	4.500			
SP3	Cold	3.111	-2.351	15	.016
	Warm	4.875			
SP4	Cold	3.889	-3.285	15	.003
	Warm	5.750			
SP5	Cold	3.000	-.208	15	.209
	Warm	3.125			
SP6	Cold	5.333	.889	15	.195
	Warm	4.875			
SP7	Cold	3.556	-1.474	15	.008
	Warm	4.750			
SP8	Cold	2.778	-2.516	15	.012
	Warm	4.625			

Shopping Goal Situation

Two shopping goals, each representing the experiential and the instrumental shopping goals for digital camera, were presented to participants in Study 2 before their interactions with Agent *John* on the computer. In the experiential situation, respondents were told that the goal for this shopping is for fun whereas in the instrumental situation, respondents focused on a more professional goal for their camera shopping (see Appendix).

A pretest was conducted in an undergraduate class (N=41). The results from *t*-tests (Table 3-3) showed that individuals saw significant differences between the situations on the following items ("Fun," "Enjoyable," "Professional") and marginal significances on the following items ("Happy," "Exciting"), but not on the other items ("Useful," "Functional," "Effcient," "Pleasant," "Practical," "Delightful," "Necessary"). Directional support was found in "Useful," "Pleasant," "Delightful," and "Necessary."

Table 3-3. Pretest of Shopping Goal Situations

Items	Situation	Mean	t	df	Sig. (1-tailed)
Useful	Experiential	5.783	-0.134	39	0.447
	Instrumental	5.833			
Functional	Experiential	5.609	0.144	39	0.443
	Instrumental	5.556			
Fun	Experiential	6.609	2.127	39	0.020
	Instrumental	5.944			
Enjoyable	Experiential	6.652	2.606	39	0.006
	Instrumental	5.778			
Efficient	Experiential	5.652	0.091	39	0.464
	Instrumental	5.611			
Happy	Experiential	6.348	1.379	38	0.088
	Instrumental	5.824			
Professional	Experiential	4.826	-2.314	39	0.013
	Instrumental	5.889			
Pleasant	Experiential	6.261	1.287	38	0.103
	Instrumental	5.824			
Exciting	Experiential	6.174	1.337	39	0.094
	Instrumental	5.722			
Practical	Experiential	5.435	0.369	39	0.357
	Instrumental	5.278			
Delightful	Experiential	6.217	0.869	39	0.195
	Instrumental	5.944			
Necessary	Experiential	5.000	-1.182	39	0.122
	Instrumental	5.500			

Measurement

Existing measures were used for the personality trait dimensions including the psychological gender orientation, need for association, and need for cognition. This trust measure included newly developed items and items modified from previous studies. Adaptation of the trust measure was deemed necessary to accurately reflect the agent-assisted shopping context and also to calibrate the measures to the specific experimental product.

The timeframe for all the measurements was as follows. An online personality questionnaire was given to potential respondents two to three weeks prior to the lab experiment (T1). Respondents were later brought to a computer lab at their desired times. Respondents' self-disclosure and purchase (conversion) behavior were measured during the online shopping simulation (T2). During the shopping simulation, the computer program also recorded user behavior and choices (e.g., page view, time spent in each section, user input for attribute preferences, product choices) as well as disclosure contents. After the computer simulation, respondents filled out a paper survey, which measured their attitudes, trust perceptions, trusting intention, satisfaction, and retention regarding Agent *John* (T3).

Psychological Gender Orientation (T1)

Bem's (1974) Sex Role Inventory (BRSI) was employed to measure respondents' masculine orientation and feminine orientation. The responses were recorded on a five-point Likert scale ranging from "strongly disagree"(1) to "strongly agree" (5).

Masculine Orientation

I see myself as someone who (is):

- Acts as a leader
- Aggressive
- Ambitious
- Analytical
- Assertive
- Athletic
- Competitive
- Defends own beliefs
- Dominant
- Forceful
- Has leadership abilities
- Independent
- Makes decision easily
- Masculine
- Self-Reliant

- Self-Sufficient
- Strong personality
- Willing to take a stand
- Willing to take risks

Feminine Orientation

I see myself as someone who (is):

- Affectionate
- Cheerful
- Childlike
- Compassionate
- Does not use harsh language
- Eager to soothe hurt feelings
- Feminine
- Flatterable
- Gentle
- Gullible
- Loves Children
- Loyal
- Sensitive to the needs of others
- Shy
- Soft spoken
- Sympathetic
- Tender
- Understanding
- Warm
- Yielding

Need for Association (T1)

The three lower-level facets of the extraversion factor in Big Five Factor model (McCrae and Costa 1992), i.e., warmth, friendliness, and gregariousness, were deemed appropriate to measure individuals' need for association. The following items are borrowed from the International Personality Item Pool (IPIP) (Goldberg 1999, International Personality Item Pool 2001). A five-point Likert scale was used. Respondents were asked to indicate the extent to which they agreed to the following: "I see myself as someone who…"

Gregariousness

- Loves large parties
- Talks to a lot of different people at parties.
- Loves surprise parties.
- Prefers to be alone.
- Wants to be left alone.
- Doesn't like crowded events.

- Avoids crowds.
- Seeks quiet.

Friendliness

- Makes friends easily.
- Warms up quickly to others.
- Feels comfortable around people.
- Acts comfortably with others.
- Cheers people up.
- Is hard to get to know.
- Often feels uncomfortable around others.
- Avoids contacts with others.
- Is not really interested in others.
- Keeps others at a distance.

Warmth

- Is interested in people.
- Makes people feel at ease.
- Inquires about others' well being.
- Takes time out for others.
- Makes people feel welcome.
- Shows my gratitude.
- Makes others feel good.
- Feels others' emotions.
- Is not really interested in others.
- Rarely smiles.

Need for Cognition (T1)

Respondents' need for cognition was measured using Cacioppo and Petty's (1982) scale as presented below. The responses were recorded on a five-point Likert scale.

- I would prefer complex to simple problems.
- I like to have the responsibility of handling a situation that requires a lot of thinking.
- Thinking is not my idea of fun.
- I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.
- I try to anticipate and avoid situations where there is likely chance I will have to think in depth about something.
- I find satisfaction in deliberating hard and for long hours.
- I only think as hard as I have to.
- I prefer to think about small, daily projects to long-term ones.
- I like tasks that require little thought once I've learned them.
- The idea of relying on thought to make my way to the top appeals to me.
- I really enjoy a task that involves coming up with new solutions to problems.

- Learning new ways to think doesn't excite me very much.
- I prefer my life to be filled with puzzles that I must solve.
- The notion of thinking abstractly is appealing to me.
- I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.
- I feel relief rather than satisfaction after completing a task that required a lot of mental effort.
- It's enough for me that something gets the job done; I don't care how or why it works.
- I usually end up deliberating about issues even when they do not affect me personally.

Trusting Personality

Respondents' disposition to trust as a personality trait was also measured using a five-point Likert scale. The measures were borrowed from the International Personality Item Pool (IPIP) (Goldberg 1999; International Personality Item Pool 2001). Respondents were asked to evaluate their trusting personality with the following items.

I see myself as someone who:

- Trusts others
- Believes that others have good intentions
- Trusts what people say
- Believes that people are basically moral
- Believes in human goodness
- Thinks that all will be well
- Distrusts people
- Suspects hidden motives in others
- Is wary of others
- Believes that people are essentially evil

Trust Perceptions (T3)

Respondents' trust perceptions regarding Agent *John* was assessed on three dimensions: benevolence, competence, and credibility of information provided by Agent *John*. A five-point Liket-scale was used ranging from "strongly disagree" (1) to "strongly agree" (5).

Benevolence

First, benevolence refers to genuine interest in the other party's welfare (Rempel and Holmes 1986), and a "genuine responsiveness" to the needs of the other party (Friedland 1990). The following measurement items, originally proposed by Ganesan (1994) (Ga hereafter), McAllister (1995) (M hereafter), Hawes, Rao, and Baker (1993) (HRB hereafter), and Price and Arnould (1999) (PA hereafter) were modified, to fit the current agent-assisted shopping context.

- Agent *John* seemed to care about me (PA).
- Agent *John* made me feel good (HRB).

- Agent *John* was like a friend during the shopping experience (Ga).
- I felt close to Agent *John* during the shopping (PA).
- Agent *John* responded to my needs in a caring way (new item).

Competence

Competence is the confidence in the agent's capability regarding the role performance. Competence is "the degree to which partners perceive each other as having the skills, abilities, and knowledge necessary for effective task performance" (Smith and Barclay 1997). The following measurement items were slightly modified from what had been originally proposed by Smith and Barclay (1997) (SB hereafter), Geller (1999) (G hereafter), and Moorman, Zaltman, and Deshpande (1992) (MZD hereafter) to include Agent *John* and the product category of camera.

- When it came to cameras, Agent *John* knew enough to give me a good advice (SB & G).
- I trusted Agent *John*'s expertise in cameras (MZD).
- I had confidence in Agent *John*'s expertise in cameras (G).
- I was confident in Agent *John*'s knowledge about cameras (new item).

Information Credibility

Credibility of information reflects user confidence in the trustworthiness of information provided by the agent. The following items were developed based on Ganesan (1994).

- I believed Agent *John* was honest with me (Ga).
- I believed Agent *John* did not make false claims (Ga).
- I believed the information provided Agent *John* was accurate (new item).
- I believed Agent *John* provided trustworthy information (new item).

Trusting Intentions (T3)

The following items measured consumers' trusting intention. Items used by Moorman, Zaltman, and Deshpande (1992) to measure trust were adapted to focus on the intentional aspect of consumer trust.

- I was willing to let Agent *John* make important choice decisions for me (MZD).
- I was willing to trust Agent *John* to make camera purchases even I was unable to monitor his activities (MZD).
- I would be comfortable giving Agent *John* responsibility to make camera purchase decisions for me.

In addition, the researcher conducted several preliminary personal interviews with online shoppers. These interviews revealed some other aspects of online shopping. Several items relating to doubt and privacy/securitys were derived from the personal interviews and the following items were included in the final survey.

- I would be suspicious of Agent *John*'s recommendations.

- I believed Agent *John* would be capable of deceiving me if it was in his best interests.
- I felt that Agent *John* hid important information from me.
- I will have to be cautious in my dealings with Agent *John*.
- I could trust that Agent *John* would not reveal my personal information to others.
- Agent *John* would not misplace my purchase order.
- I had faith that Agent *John* would respect my privacy.

Attitude (T3)

Attitude toward the interface agent was asked using the following items. A five-point Likert scale was used.

- I liked Agent *John*.
- I had a favorable attitude toward Agent *John*.

Satisfaction (T3)

Satisfaction with the interface agent was measured using the following items on a seven-point semantic differential scale.

Displeased ____:____:____:____:____:____:____ Pleased

Dissatisfied ____:____:____:____:____:____:____ Satisfied

Unhappy ____:____:____:____:____:____:____ Happy

Retention (T3)

Retention was measured with the following item that indicates individuals' intention to shop with Agent *John* again using a five-point Likert scale.

- I would shop with Agent *John* again.

CHAPTER 4

RESULTS

This chapter reports results of statistical analyses and tests each research hypothesis developed in Chapter 2.

Trust Model Identification

Measurement Scale

As discussed in Chapters 2 and 3, consumer trust in Agent *John* had to be measured on perceptual and intentional dimensions in order to be able to conduct a test of trust theory. Specifically, trust perceptions included the cognitive (competence and information credibility) and the affective bases (benevolence) for trust. Trusting intention was measured separately from trust perceptions. The same measurement scale of trust was used for both Studies 1 and 2.

Items for each construct are as follows.

Competence

CO1. When it came to buying cameras, Agent *John* knew enough to give me a good advice.
CO2. I was confident about Agent *John*'s expertise in camera.
CO3. I trusted Agent *John*'s expertise in camera.
CO4. I had faith in Agent *John*'s knowledge about cameras.

Information Credibility

IC1. I believed Agent *John* was honest with me.
IC2. I believed Agent *John* did not make false claims.
IC3. I believed the information provided by Agent *John* was accurate.
IC4. I believed Agent *John* provided trustworthy information.

Benevolence

BE1. Agent *John* responded to my needs in a caring way.
BE2. I felt close to Agent *John*.
BE3. Agent *John* made me feel good.
BE4. Agent *John* was like a friend during the shopping experience.
BE5. Agent *John* seemed to care about me.

Trusting Intention

TI1. I was willing to trust Agent *John* to make camera purchases even if I was unable to monitor his activities.

TI2. I would be comfortable giving Agent *John* responsibility to make camera purchase decisions for me.

TI3. I was willing to let Agent *John* make important choice decisions for me.

Additional items relating to doubt and privacy/security were as follows. [26]

Doubt

DO1. I would be suspicious of Agent *John*'s recommendations.

DO2. I believed Agent *John* would be capable of deceiving me if it was in his best interests.

DO3. I felt that Agent *John* hid important information from me.

DO4. I will have to be cautious in my dealings with Agent *John*.

Privacy/security

PS1. I could trust that Agent *John* would not reveal my personal information to others.

PS2. Agent *John* would not misplace my purchase order.

PS3. I had faith that Agent *John* would respect my privacy.

Exploratory Factor Analysis

Results of three sets of principal factor analysis with Varimax rotation are found in Table 4-1. While theory and intuition suggested four trust-related factors, i.e., competence, information credibility, benevolence, and trusting intention, only three factors emerged from the exploratory factor analyses. Competence and information credibility consistently loaded on the same factor.[27] Therefore, these two factors were combined and labeled as cognitive trust. Both competence and information credibility had been identified as the cognitive basis for trust in Chapter 2.

In Table 4-1, the factor scores highlighted in bold face indicate the items that loaded on each factor. Factor loadings were consistent throughout Study 1, Study 2, and the data set combining both studies. Reliability for each factor was computed using Chonbach's α. Reliability statistics for cognitive trust, benevolence, and trusting intention were satisfactory (>0.7) except the benevolence factor in Study 1 (0.6284). Reliability of benevolence for the combined data set was 0.8228.

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[26] Because personal interviews rather than theory primarily guided the development of these items, no hypothesis had been proposed relating to doubt or privavy/security concern. Further analysis will focus on the competence, information credibility, benevolence, and trusting intention.

[27] Conceptually, information credibility and competence taps into different dimensions of cognitive trust. For example, one can have a great deal of knowledge and yet may not provide accurate or enough information to his or her transaction partner. However, exploratory factor analysis failed to differentiate between information credibility and competence.

Table 4-1. Principal Component Analysis of Trust Factors

	Study 1			Study 2			Combined		
	Cognitive Trust	Benevolence	Trusting Intention	Cognitive Trust	Benevolence	Trusting Intention	Cognitive Trust	Benevolence	Trusting Intention
IC2	**0.677**	0.047	0.136	**0.700**	0.202	0.032	**0.690**	0.101	0.116
IC3	**0.739**	-0.009	0.059	**0.762**	-0.014	0.069	**0.756**	-0.003	0.062
IC4	**0.777**	0.113	0.075	**0.646**	0.418	0.114	**0.702**	0.270	0.118
IC1	**0.723**	0.312	0.149	**0.714**	0.216	0.241	**0.726**	0.269	0.168
CO1	**0.500**	0.050	0.384	**0.649**	0.277	0.085	**0.573**	0.144	0.307
CO2	**0.717**	0.218	0.236	**0.798**	0.085	0.204	**0.763**	0.147	0.215
CO4	**0.774**	0.246	0.046	**0.801**	0.179	0.199	**0.794**	0.217	0.129
CO3	**0.802**	0.211	0.118	**0.802**	0.108	0.227	**0.803**	0.167	0.173
BE1	0.275	**0.564**	0.028	0.238	**0.669**	0.167	0.264	**0.622**	0.138
BE2	0.187	**0.654**	0.284	0.124	**0.735**	0.301	0.159	**0.703**	0.312
BE3	0.156	**0.747**	-0.033	0.215	**0.721**	0.022	0.197	**0.724**	0.034
BE4	0.039	**0.833**	0.092	0.122	**0.755**	0.299	0.094	**0.803**	0.202
BE5	0.072	**0.830**	0.122	0.093	**0.754**	0.144	0.099	**0.796**	0.109
TI1	0.272	0.082	**0.717**	0.511	0.214	**0.539**	0.401	0.135	**0.669**
TI2	0.163	0.170	**0.824**	0.200	0.245	**0.823**	0.194	0.229	**0.806**
TI3	0.027	0.067	**0.822**	0.193	0.327	**0.770**	0.132	0.222	**0.820**
Eigen Value	5.839	2.110	1.667	6.951	2.139	0.990	6.584	2.071	1.228
Variance Explained (%)	27.37	18.71	14.01	30.13	20.31	12.55	28.89	19.21	13.66
Reliability (Chronbach's α)	0.8844	0.6284	0.7570	0.9049	0.8274	0.7812	0.8977	0.8228	0.7844
Information Credibility	0.8107			0.8148			0.8141		
Competence	0.8308			0.8757			0.8610		

* Rotation Method: VariMax Rotation

Trust Model Confirmation

Since Internet agent is a relatively new concept, trust in computer agents has rarely been measured or even conceptualized in the previous marketing literature. This dissertation conceptualizes that trust is a meta-construct consisting of cognitive and affective trust perceptions and also an intentional component. The conceptual model depicted in Figure 1-1 is empirically tested in this section. Confirmatory factor analyses were conducted to examine the psychometric properties of the trust measure and structural equation models were identified to test the conceptual ramification of trust as proposed in Figure 1-1.

The Measurement Model

First, a measurement model including the four theoretically-derived trust constructs, i.e., competence, information credibility, benevolence, and trusting intention, was identified and the psychometric properties of these trust measures were examined. A measurement model does not typically specify theoretical relationships among constructs. Thus, no causal relationships were specified. All possible pairs of correlations among the latent constructs were identified in the Measurement Model. AMOS software was used for this confirmatory factor analysis (CFA).[28]

The results of confirmatory factor analysis for the Measurement Model are found in Table 4-2. This CFA model in general showed an acceptable fit (Chi-Square=289.239, df=98, p=0.000[29], GFI=0.915, AGFI=0.883, CFI=0.934, RMSEA=0.071) and the paths were uniquely identified and the t-values were all significant at the p=0.01 level. A high correlation between the competence and the information credibility (r=0.8610) was observed.

The Trust Perception Second-Order Confirmatory Factor Analysis (CFA)

Theoretically, competence and information credibility both constitute the cognitive basis for trust. This theoretical notion, when applied to empirical modeling, suggests that cognitive trust could be a second-order latent construct that encompasses competence and information credibility. In fact, due to the strong correlation between the competence and information credibility constructs as shown in the Measurement Model, discriminant validity between these two could be questionable.

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[28] Since CFA and structural equation modeling (SEM) generally require a sample size greater than 200, data sets from both studies were combined resulting in a total sample sample size of 387.

[29] Likelihood Chi-square is highly sensitive to sample size. When sample size is greater than 200, this measure has a great tendency to indicate a bad fit. Thus, Hair et al. (1998) suggest that the rejection of any model based solely on this statistic might be inappropriate.

Table 4-2. Test of Trust Models

Parameter	Measurement Model CFA		Trust Perception Second-Order CFA		Intention SEM		Satisfaction /Retention SEM	
	Standardized Coefficient	t	Standardized Coefficient	t	Standardized Coefficient	t	Standardized Coefficient	t
IC1 ← IC	0.795	15.280	0.793	15.021	0.793	15.039	0.799	15.160
IC2 ← IC	0.669	12.742	0.667	12.595	0.668	12.614	0.667	12.599
IC3 ← IC	0.666	12.694	0.669	12.636	0.669	12.644	0.669	12.638
IC4 ← IC	0.765		0.754		0.752		0.747	
BE1 ← BE	0.594	10.583	0.603	10.789	0.603		0.604	10.804
BE2 ← BE	0.718	12.659	0.712	12.620	0.725	10.792	0.719	12.732
BE3 ← BE	0.657	11.665	0.656	11.707	0.648	12.830	0.653	11.650
BE4 ← BE	0.775	13.513	0.769	13.480	0.769	11.562	0.775	13.578
BE5 ← BE	0.726		0.734		0.727	13.475	0.722	
CO1 ← CO	0.603	12.569	0.596	12.476	0.600		0.605	12.699
CO2 ← CO	0.844	19.984	0.837	19.941	0.838	12.570	0.842	20.039
CO3 ← CO	0.845	20.006	0.844	20.199	0.844	19.920	0.841	20.002
CO4 ← CO	0.848		0.854		0.850	20.124	0.848	
TI1 ← TI	0.685				0.698		0.649	
TI2 ← TI	0.806	12.255			0.793	12.477	0.630	10.634
TI3 ← TI	0.741	11.816			0.736	12.008	0.586	10.001
COGTRUST ← CO			0.958	9.653	0.603		0.906	
COGTRUST ← IC			0.899		0.725	11.338	0.951	13.014
SA1 ← SAT							0.918	22.972
SA2 ← SAT							0.836	20.246
SA3 ← SAT							0.849	
RE1 ← RET							0.957	
TI ← BE					0.372	5.356	0.637	9.242
TI ← COGTRUST					0.416	5.920	0.372	6.371
SAT ← TI							0.793	11.540
RET ← TI							0.786	12.257
CORRELATIONS								
CO ↔ IC	0.861	10.049						
CO ↔ BE	0.469	6.814						
IC ↔ BE	0.499	6.775						
CO ↔ TI	0.207	7.012						
IC ↔ TI	0.169	6.826						
BE ↔ TI	0.218	7.095						
COGTRUST ↔ BE			0.517	6.944	0.523	6.814	0.522	7.048
Model Fit								
Chi-Square	289.239		175.472		279.238		499.237	
df	98		62		99		164	
P value	0.000		0.000		0.000		0.000	
GFI	0.915		0.935		0.919		0.885	
AGFI	0.883		0.905		0.888		0.852	
TLI	0.920		0.940		0.925		0.908	
CFI	0.934		0.952		0.938		0.920	
NFI	0.905		0.928		0.908		0.886	
IFI	0.935		0.952		0.939		0.921	
RMSEA	0.071		0.069		0.069		0.073	

Note: p <.05 when t >1.96 p<.01 when t >2.576

One solution to this problem, which is consistent with the theoretical ramification of the proposed trust model, is to identify a second-order construct in a new CFA involving the trust perception constructs.

This second-order CFA was identified and the results are presented in Table 4-2. The model had an excellent fit (Chi-Square=175.472, df=62, p=0.000, GFI=0.935, AGFI=0.905, CFI=0.952, RMSEA=0.069). All the paths were uniquely identified with the appropriate latent factors and *t*-values for all the path estimates were found to be significant at the p=0.01 level. It was also found that benevolence and cognitive trust were highly correlated (r=0.517, *t*=6.944, p<0.01), but not to the extent to which discriminant validity was threatened. The successful identification of this model supports the proposed conceptual model such that that competence and information credibility constitute the cognitive trust.

The Trust Intention Structural Equation Model (SEM)

Cognitive and affective trust perceptions are conceptualized to lead to trusting intention in the proposed trust model (Figure 1-1). The Intention SEM identifies two causal paths that are important in testing trust theory: (1) Path1 from cognition trust to trusting intention; (2) Path2 from benevolence to trusting intention. Figure 4-1 depicts the theoretical relationships among these latent constructs.

The identified model indicated an acceptable overall fit (Chi-Square=279.238, df=99, p=0.000, GFI=0.919, AGFI=0.888, CFI=0.938, RMSEA=0.069). Both Path1 (β=0.416) and Path2 (β =0.372) were positively significant at the p=0.01 level, thereby indicating the positive and significant effects of cognitive and affective trust perceptions on trusting intention. Cognitive trust and benevolence were again highly correlated (r=0.523, *t*=6.814, p<0.01) however not to the extent to threaten discriminant validity.

This Intention SEM confirmed trust theory in an important way: Cognitive and affective trust perceptions could be antecedents to trusting intention. That is, heightened cognitive trust (Path1) and benevolence (Path2) lead to increased trusting intention. Therefore, Hypothesis 5 was supported.

The Trust Satisfaction/Retention SEM

The Trust Satisfaction/Retention SEM differs from the Trust Intention Model with two additional consequence constructs, user satisfaction and retention (Figure 4-2). This model builds upon the Intention SEM also by identifying two additional causal paths: (1) Path3 from trusting intention to satisfaction; and (2) Path4 from trusting intention to retention (Hypothesis 12).

The Satisfaction/Retention SEM indicated an acceptable, while not excellent, overall fit (Chi-Square=299.237, df=164, p=0.000, GFI=0.885, AGFI=0.882, CFI=0.920, RMSEA=0.073). Both Path3 (β=0.793, *t*=11.540, p<0.01) and Path4 (β=0.786, *t*=12.257, p<0.01) were found to be positive and significant. Therefore, Hypothesis 12 was supported.
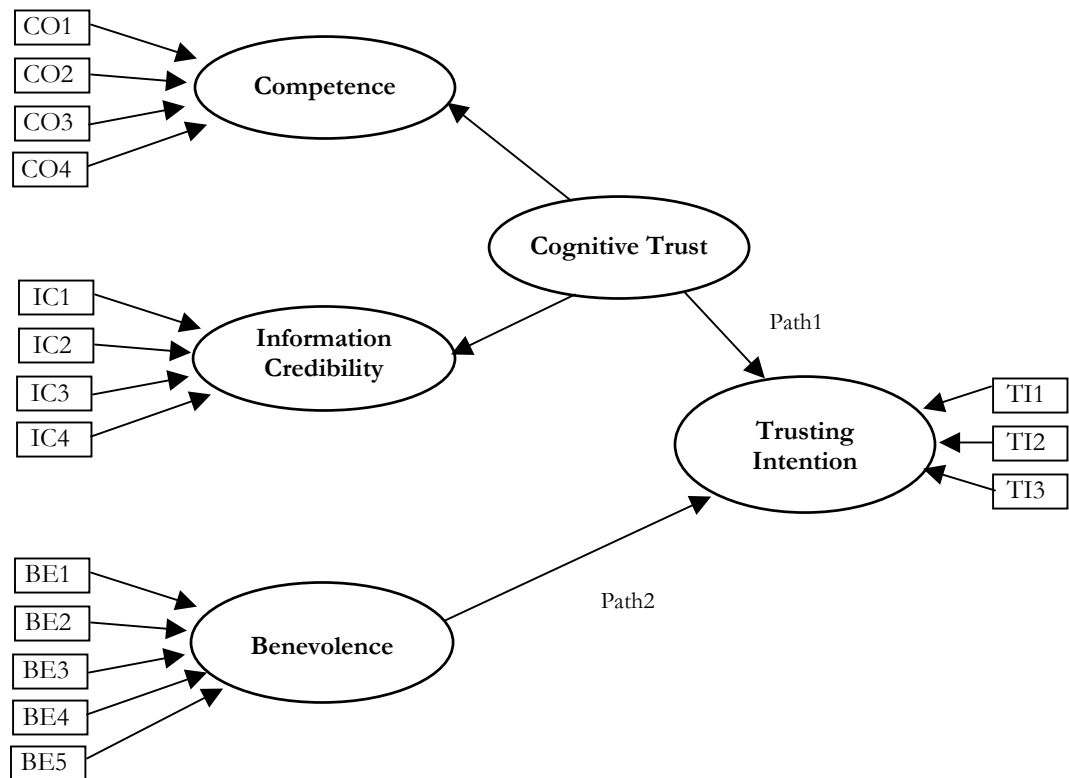
Figure 4-1. The Trust Intention Structural Equation Model
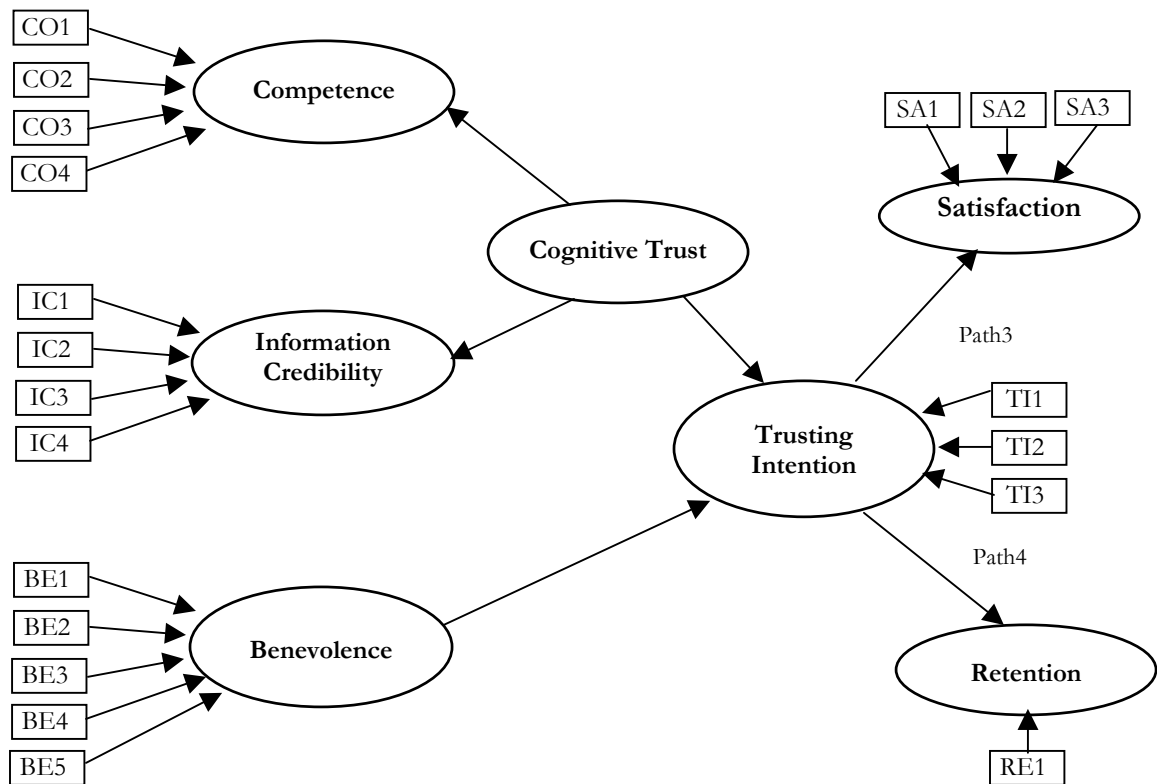
Figure 4-2. The Trust Satisfaction/Retention Structural Equation Model

Study 1 Experiment Manipulation Check

Face Human-Likeliness

The manipulation of face human-likeliness was examined using a seven-point semantic differential scale ranging from "not at all closely" (1) to "very closely" (7). The following two questions were asked: (1) how closely do you think Agent *John*'s face resembles an actual person? (FA1); and (2) how close do you think Agent *John*'s face resembles a picture of a real person's head? (FA2).

Respondents saw significant differences in human-likeliness in the three face conditions excluding the no face condition (FA1: $F_{2, 117}$ = 32.782, p=0.000; FA2: $F_{2, 117}$ = 37.904, p=0.000). Mean values for each face condition are presented in . Planned multivariate contrast tests indicated that among the three faces, there were significant differences between the more human-like face ("More") and the real face ("Real") conditions (Wilks' Lambda=0.756, $F_{2, 151}$=24.430, p=0.000) and between the less human like face ("Less") and "Real" (Wilks' Lambda=0.707, $F_{2, 151}$=31.341, p=0.000). Although directional support was found to exist between "Less" and "More," the differences were not significant (Wilks' Lambda=0.994, $F_{2, 151}$=0.461, p=0.641).

Script Social Presence

Social presence of each script was measured using the following eight semantic differential scale items (Lombard 1999; Short et al. 1976): (1) Insensitive – Sensitive (SP1); (2) Cold – Warm (SP2); (3) Unsociable – Sociable (SP3); (4) Unfriendly – Friendly (SP4); (5) Unemotional –Emotional (SP5); (6) Unresponsive – Responsive (SP6); (7) Impersonal –Personal (SP7); (8) Dull – Vivid (SP8). The warm script received higher evaluation on social presence in the following items: SP1, SP2, SP3, SP4, SP5, and SP7 (). A summed score of these six items was created to evaluate each interface in terms of the level of social presence.

Since an agent's face may have also indicated warmth and friendliness, Multivariate Analysis of Variance (MANOVA) was conducted employing both face and script as independent variables. The effect of script on the eight social presence items was significant (Pillai's trace= 0.140, df=8, p=0.006; Wilks' Lambda=0.860, df=8, p=0.006) whereas the face and script interaction (Pillai's trace= 0.185, df=24, p=0.275; Wilks' Lambda=0.825, df=24, p=0.280) and the face main effect (Pillai's trace= 0.112, df=24, p=0.869; Wilks' Lambda=0.891, df=24, p=0.871) were insignificant.
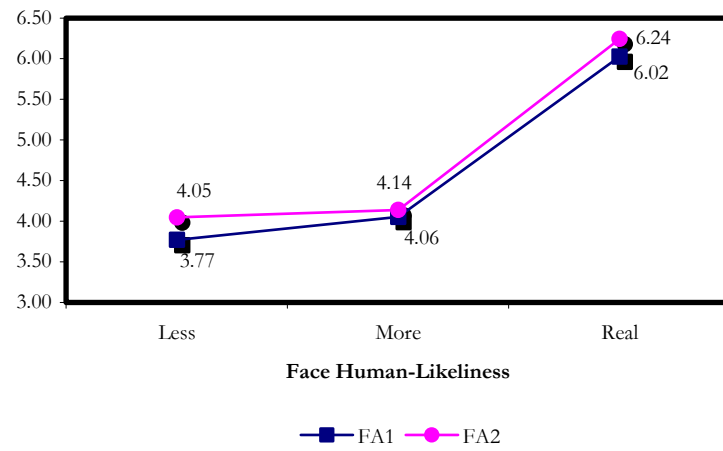
Figure 4-3. Face Manipulation Check

Table 4-3. Script Manipulation Check

	Script	Mean	*t*	Sig. (1-tailed)
SP1	Cold	4.21	-2.406	0.009
	Warm	4.21		
SP2	Cold	4.63	-2.198	0.015
	Warm	4.42		
SP3	Cold	4.86	-2.723	0.004
	Warm	4.58		
SP4	Cold	5.19	-3.868	0.000
	Warm	5.03		
SP5	Cold	5.66	-1.856	0.033
	Warm	3.20		
SP6	Cold	3.60	-0.868	0.193
	Warm	4.85		
SP7	Cold	5.04	-2.934	0.002
	Warm	3.90		
SP8	Cold	4.65	-0.969	0.167
	Warm	3.80		

Study 1 Analysis

Analysis of Variance (ANOVA) and Multivariate Analysis of Variance (MANOVA), Analysis Covariance (ANCOVA) and Multivariate Analysis of Covariance (MANCOVA) were employed to test effects of face human-likeliness, script social presence, and the individual moderating influences. When testing for the effects of individual difference moderators, the relevant personality traits were entered into a model as covariates. Generally, covariates are included in general linear models (GLM) when there is theoretical support for the inclusion of the variable or when a covariate is significantly correlated with the dependent variable but not with the independent variables (Hair et al., 1998, p.346).

Attitude

The effects of face human-likeliness and script social presence on attitude were examined using ANOVA. The summed score of two attitude measures was used as the dependent variable. Face and script were the two independent variables. The results of ANOVA are found in Table 4-4. The overall model was significant ($F_{7,148} = 2.215$, p=0.036). However, the main effect of face human-likeliness ($F_{3,148} = 1.353$, p=0.260) and the main effect of script social presence ($F_{1,148} = 2.313$, p=0.130) on attitude were found to be insignificant. A marginal significance was found for the interaction of the two manipulated variables on attitude ($F_{3,148} = 2.609$, p=0.054).

Figure 4-4 displays mean values for the eight face and script combinations in the 2-way interaction. Overall, respondents showed the most favorable attitude toward Agent John in the "Less/Warm" condition (LS mean=7.38). The least liked interface was Agent *John* with the cold script and no face ("None/Cold" LS mean=6.11). The attitude difference between these most and least liked interfaces was highly significant (p=0.001).

Further contrast tests using estimated marginal means (Least Square Means) revealed that attitude differences between the cold and warm scripts in the"None" (p=0.097) and the "Less" (p=0.016) face conditions were significant, as the warm script created more favorable attitudes than the cold script did. However, no siginificant differences in attitudes were found between the cold and the warm scripts in the "More" (p=0.300) and "Real" (p=0.891) conditions. Thus, H2a was only partially supported.

In the cold script conditions, some improvement in attitude was found as face human-likeliness increased. While there were no significant differences between "None" and "Less" (p=0.286) and between "Less" and "More" face conditions (p=0.238), there were significant and marginally significant differences in attitude between "None" and "More" (p=0.040) and between "None" and "Real" (p=0.058) respectively.

Table 4-4. Face Human-Likeliness and Script Social Presence on Attitude

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model [a]	20.242	7	2.892	2.215	.036
Intercept	7089.298	1	7089.298	5430.659	.000
FACE1	5.297	3	1.766	1.353	.260
SCRIPT1	3.020	1	3.020	2.313	.130
FACE1 * SCRIPT1	10.218	3	3.406	2.609	.054
Error	193.202	148	1.305		
Total	7508.076	156			
Corrected Total	213.445	155			

[a] $R^2 = .095$ (Adjusted $R^2 = .052$)
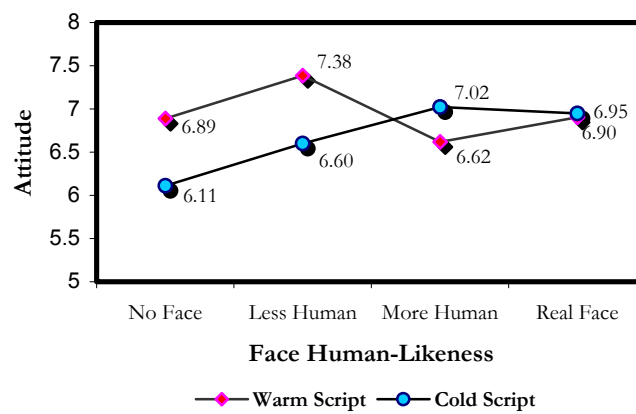
Figure 4-4. Interaction of Face and Script on Attitude

That is, respondents' attitudes appeared to improve with the increasing level of face human-likeliness in the cold script conditions, thereby lending partial support for H1a. Under the warm script conditions, the attitude difference between "None" and "Less" was insignificant (p=0.146). However, a significant difference between "Less" and "More" (p=0.024) and a marginally significant difference between "Less" and "Real" (p=0.082) were found, as respondents in the "Less" face human-likeness condition recorded a more positive attitude than the "More" or the "Real" face conditions did. It seems that, contrary to H1a, the increase of face human-likeliness from "Less" to the more human-like faces ("More" and "Real") negatively affected attitudes under the warm script conditions. Respondents' attitudes in the "More" and "Real" face conditions did not differ from those in the no face condition (p=0.699), thereby failing to support H1a in the warm script conditions.

Trust Perceptions

MANCOVA was utilized to examine the effects of face human-likeliness and script social presence on cognitive trust and benevolence. Individuals' general tendency to trust (as a personality trait) was used as a covariate in the MANCOVA model primarily to reduce error variance of the estimated model. Dependent variables in this model included a sum score of the competence and information credibility items and another sum score of the benevolence items.[30] When testing multivariate effects of independent variables on trust perceptions (two dependent variables – benevolence, cognitive trust), Pillai's Trace and Wilks' Lambda were used (see Hair et al., 1998, p.351 for more information about multivariate fit indicators).

From the MANCOVA analysis, it was found that individuals' trusting personality as a covariate had a significant effect on trust perceptions (Pillai's Trace=0.086, $F_{2,143}$ =6.729, ,p=0.002; Wilks' Lambda=0.914, $F_{2,143}$ =6.729, p=0.002) and the direction of the parameter estimates was positive (see Appendix for parameter estimates in MANCOVA or ANCOVA models. That is, the more trusting an individual is, the more he or she is likely to perceive Agent *John* to be competent/credible and benevolent as reflected in Table 4-5.

In addition, the effect of script social presence on trust perceptions (combining cognitive trust and benevolence) was found to be highly significant (Pillai's Trace =0.092, $F_{2,143}$ =7.244, p=0.001; Wilks' Lambda=0.908, $F_{2,143}$ =7.244, p=0.001) thereby supporting Hypothesis 2b.

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[30] The number of dependent variable in MANOVA was limited to two (cognitive and affective trust perceptions) with the purpose of increasing statistical power (Hair et al. 1998, p.353), which also prevented undesirable multicollinearity among dependent variables (p.349, 354). In addition, number of covariates was controlled to comply Hair et al (p.347)'s rule of thumb suggesting that the number of covariates should be less than (.10*sample size) – (number of groups-1).

Table 4-5. Univariate ANOVA - Trust Perceptions

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	COGTRUST[a]	373.260	8	46.657	2.758	.007
	BENE[b]	207.203	8	25.900	3.344	.002
Intercept	COGTRUST	65033.046	1	65033.046	3844.229	.000
	BENE	13981.423	1	13981.423	1804.901	.000
SCRIPT1	COGTRUST	23.298	1	23.298	1.377	.243
	BENE	63.418	1	63.418	8.187	.005
FACE1	COGTRUST	32.414	3	10.805	.639	.591
	BENE	21.270	3	7.090	.915	.435
SCRIPT1 * FACE1	COGTRUST	123.346	3	41.115	2.430	.068
	BENE	43.370	3	14.457	1.866	.138
TSUM	COGTRUST	171.780	1	171.780	10.154	.002
	BENE	68.100	1	68.100	8.791	.004
Error	COGTRUST	2436.056	144	16.917		
	BENE	1115.477	144	7.746		
Total	COGTRUST	136340.199	153			
	BENE	31115.000	153			
Corrected Total	COGTRUST	2809.316	152			
	BENE	1322.680	152			

[a] $R^2 = .133$ (Adjusted $R^2 = .085$) [b] $R^2 = .157$ (Adjusted $R^2 = .110$)
* Paremeter estimates for this model are found in Appendix E, E-1.

However, the face main effect (Pillai's Trace =0.024, $F_{6,288}$ 5=0.586, p=0.741; Wilks' Lambda=0.976, $F_{6,286}$ =0.585, p=0.742) was found to be insignificant. Marginal significance was found for the interaction effect of face and script (Pillai's Trace =0.077, $F_{6,288}$ 5=1.914, p=0.078; Wilks' Lambda=0.925, $F_{6,286}$ =1.905, p=0.080).

Table 4-5 displays the univariate results for the MANOVA analysis. Importantly, Table 4-5 indicates that the effect of script social presence was significant only on benevolence ($F_{1,144}$ = 8.187, p=0.005) but not on cognitive trust ($F_{1,144}$ = 1.377, p=0.243) thereby supporting Hypothesis 4.

Figure 4-5 illustrates the marginally significant interaction effect between face and script on cognitive trust (p=0.068). Individuals appeared to perceive Agent *John* using the cold script, compared to Agent *John* using the warn script, to be more competent/credible in the "More" (p=0.031) and the "Real" (p=0.027) face conditions (Figure 4-5a). However, there were no significant differences between the cold and the warm scripts in the "None" (p=0.681) and the "Less" (p=0.376) face conditions.

Agent*John* was perceived to be more benevolent when he used the warm script as opposed to the cold script in the "None" (p=0.017) and "Less" (p=0.039) face conditions. No differences in benevolence were found between the cold and the warm scripts in "More" (p=0.173) and "Real" (p=0.763) (Figure 4-5b).

(a) Cognitive Trust
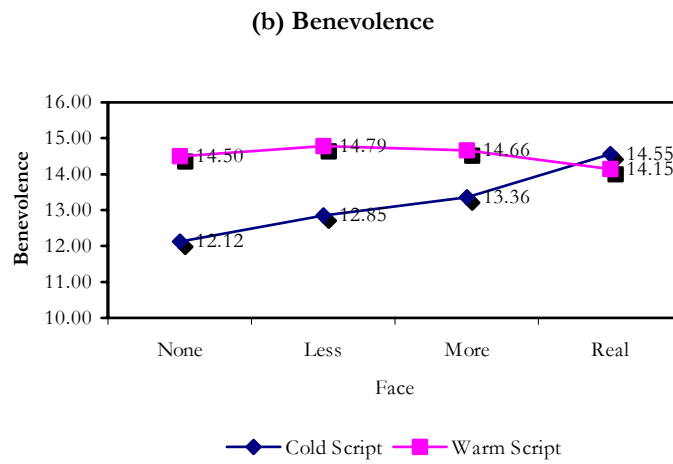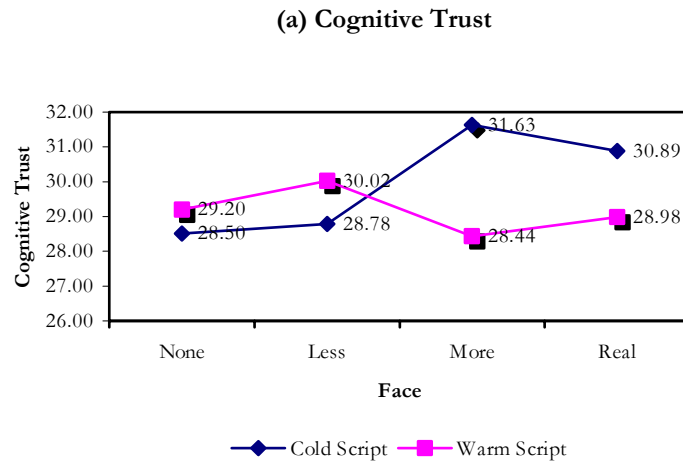
(b) Benevolence

Figure 4-5. Interaction of Face and Script on Cognitive Trust and Benevolence

In addition, in the cold script conditions, cognitive trust was significantly higher in the "More" and the "Real" face conditions than the "None" and the "Less" face conditions (p=0.006). It appeared that individuals perceived Agent *John* to be more competent/credible as his face approached a real human face, but only under the cold script conditions.

Individuals also perceived Agent *John* to be more benevolent with increasing face human-likeliness in the cold script conditions. The differences in benevolence perception between "None" and "Real" (p=0.008) and between "Less" and "Real" (p=0.080) were significant and marginally significant respectively, as the real face was perceived to be more benevolent than "None" and "Less" in the cold script conditions. Taken together, H1b seemed to be again partially supported under the cold script conditions.

Moderating Influences: Psychological Gender Orientation

Feminine Orientation and Attitude

The moderating effect of feminine orientation on attitude was tested (Table 4-6). The overall model was only marginally significant ($F_{15,137}$=2.127, p=0.075). A contrast test using the high and low feminine orientation dichotomy indicated that high feminine individuals were likely to have more positive attitudes (LS Means = 7.079) toward Agent *John* than low feminine individuals did (LS Means = 7.08(HF) vs. 6.56(LF), $F_{1, 137}$=8.239, p=0.005). However, no interaction effect involving feminine orientation had significant effects on attitude.

Feminine Orientation and Trust Perceptions

For the examination of the moderating influences of feminine orientation on trust perceptions (combining cognitive trust and benevolence), individuals' feminine orientation was used as a covariate variable in a MANCOVA model. The twenty items measuring feminine orientation were summed. Centering the overall sum score on its mean was deemed necessary to reduce potential multicollinearity in estimating a MANOVA model. Moderating influences of feminine orientation on consumer trust perceptions were tested by including the three interaction terms to include the manipulation factors and the mean-centered feminine orientation sum score (fecenter), i.e., face*fecenter, script*fecenter, face*script*fecenter. The results of the main effects were consistent with the earlier analysis without the feminine orientation moderator.

Table 4-6. ANOVA Results - Feminine Orientation on Attitude

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model [a]	31.906	15	2.127	1.624	.075
Intercept	6909.318	1	6909.318	5274.619	.000
FACE1	5.385	3	1.795	1.370	.255
SCRIPT1	2.972	1	2.972	2.269	.134
FACE1 * SCRIPT1	9.900	3	3.300	2.519	.061
FECENTER	5.716	1	5.716	4.364	.039
FACE1 * FECENTER	2.508	3	.836	.638	.592
SCRIPT1 * FECENTER	.585	1	.585	.446	.505
FACE1 * SCRIPT1 * FECENTER	3.716	3	1.239	.946	.421
Error	179.459	137	1.310		
Total	7359.076	153			
Corrected Total	211.364	152			

[a] $R^2 = .151$ (Adjusted $R^2 = .058$)

The face main effect on trust perceptions (combining cognitive trust and benevolence) was insignificant (Pillai's Trace=0.036, $F_{6,274}$ =0.827, p=0.550; Wilks' Lambda=0.965, $F_{6,272}$ =0.826, ,p=0.550) and the script main effect was again significant (Pillai's Trace=0.094, $F_{2,136}$ =7.033, p=0.001; Wilks' Lambda=0.906, $F_{2,136}$ =7.033, ,p=0.001). One difference from the prior analysis was that the interaction effect of face and script became statistically significant with the addition of this feminine orientation moderator (Pillai's Trace =0.095, $F_{6,274}$ =2.271, p=0.037; Wilks' Lambda=0.907, $F_{6,272}$=2.262, p=0.038)

While the interaction effect of face and feminine orientation was insignificant (Pillai's Trace =0.055, $F_{6,274}$ =1.300, p=0.257; Wilks' Lambda=0.945, $F_{6,272}$=1.303, p=0.256), both the interaction of script and feminine orientation (Pillai's Trace =0.058, $F_{2,136}$ =4.198, p=0.017; Wilks' Lambda=0.942, $F_{2,136}$=4.198, p=0.017) and the three-way interaction of face, script, and feminine orientation (Pillai's Trace =0.151, $F_{6,274}$ =3.734, p=0.001; Wilks' Lambda=0.853, $F_{6,272}$=3.742, p=0.001) were found to be significant.

Univariate results are found in Table 4-7. In Table 4-7, the higher-order interaction effects involving feminine orientation were found to be significant primarily on cognitive trust. Specifically, the interaction between script and feminine orientation was significant ($F_{1,137}$ = 6.135, p=0.014), and the interaction between face and feminine orientation was marginally significant ($F_{1,137}$ = 2.376, p=0.073).

Table 4-7. Univariate ANOVA- Feminine Orientation, Face, and Script on Trust Perceptions

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	BENE [a]	215.435	15	14.362	1.777	.044
	COGTRUST [b]	591.785	15	39.452	2.437	.004
Intercept	BENE	28627.060	1	28627.060	3542.042	.000
	COGTRUST	129875.388	1	129875.388	8023.758	.000
FACE1	BENE	31.310	3	10.437	1.291	.280
	COGTRUST	49.115	3	16.372	1.011	.390
SCRIPT1	BENE	64.890	1	64.890	8.029	.005
	COGTRUST	14.768	1	14.768	.912	.341
FACE1 * SCRIPT1	BENE	48.662	3	16.221	2.007	.116
	COGTRUST	151.461	3	50.487	3.119	.028
FECENTER	BENE	5.780	1	5.780	.715	.399
	COGTRUST	116.103	1	116.103	7.173	.008
FACE1 * FECENTER	BENE	17.043	3	5.681	.703	.552
	COGTRUST	115.399	3	38.466	2.376	.073
SCRIPT1 * FECENTER	BENE	.547	1	.547	.068	.795
	COGTRUST	99.306	1	99.306	6.135	.014
FACE1 * SCRIPT1 * FECENTER	BENE	47.769	3	15.923	1.970	.121
	COGTRUST	225.462	3	75.154	4.643	.004
Error	BENE	1107.245	137	8.082		
	COGTRUST	2217.531	137	16.186		
Total	BENE	31115.000	153			
	COGTRUST	136340.199	153			
Corrected Total	BENE	1322.680	152			
	COGTRUST	2809.316	152			

[a] $R^2 = .163$ (Adjusted $R^2 = .071$) [b] $R^2 = .211$ (Adjusted $R^2 = .124$)

The effect of feminine orientation on cognitive trust was also significant ($F_{1,137}$ = 7.173, p=0.008). A contrast analysis using the high and low feminine dichotomy revealed that high feminine individuals (LS Mean=30.39) in general, were more likely to perceive Agent *John* to be competent/credible than low feminine individuals were (LS Mean = 28.77) and the difference was statistically significant (p=0.016). More importantly, the simple main effect and 2-way interactions must be viewed in light of a significant three-way interaction (face * script * feminine orientation) on cognitive trust ($F_{1,137}$ = 4.643, p=0.004). The three-way interaction is depicted in below.

In the "None" face conditions, high feminine individuals indicated a higher trust for the warm script than low feminine individuals did (LS Means 31.67 (H) vs. 26.22 (L), p=0.007). For high feminine individuals, the warm script also created higher cognitive trust than the cold script did (LS Means 31.67 (W) vs. 27.67 (C), p=0.053). Interestingly, under the "Less" face conditions, the patten of effects were reversed. This time the high feminine individuals indicated a higher trust for the cold than low feminine individuals (LS Means 31.86 (H) vs. 26.44 (L), p=0.048); for the low feminine individuals, the warm script created higher cognitive trust than the cold script (LS Means 31.20 (W) vs. 26.44 (C), p=0.034).

Under the "More" face condition, high feminine individuals indicated significantly different cognitive trust perceptions between the cold and the warm scripts (LS Means 33.33 (C) vs. 28.40 (W), p=0.043). However, low feminine individuals did not show significant diffences between the two scripts (p=0.507). In addition, no differences were found in the "Real" face conditions between high and low feminine individuals or between the scripts.

Interestingly, under the three face human-likness conditions, high feminine individuals in general indicated a higher cognitive trust when Agent *John* used the cold script as compared to the warm script (LS Means 31.13 (C) vs. 29.66 (W), p=0.027). Moreover, under these conditions, the warm script received similar evaluations regardless of the respondents' feminine orientations (p=0.373).

Earlier, a part of Hypothesis 6 proposed that the relationship between a social interface and consumer trust perceptions would be greater for individuals high in feminine orientation than individuals low in feminine orientation. The results seemed to support H6 in that high feminine individuals indicated a greater responsiveness to the cold script than low feminine individuals did under the face human-likeness conditions, but not under the no-face condition. It seems that similarity attraction may have guided individual responses when text was the primary communication vehicle. That is, if we could assume that high feminine individuals are more likely to use friendly, warm language, individuals perceived higher cognitive trust when the agent's language style resembled their own when there was no face. On the other hand, an opposite attraction effect might be operating when Agent *John* was depicted with had the "Less" face illustration. Under this condition, individuals appeared to think that Agent *John* was more competent/credible when he used a particular tone of language that was likely different from their own (i.e., cold, mechanical).

None

Less
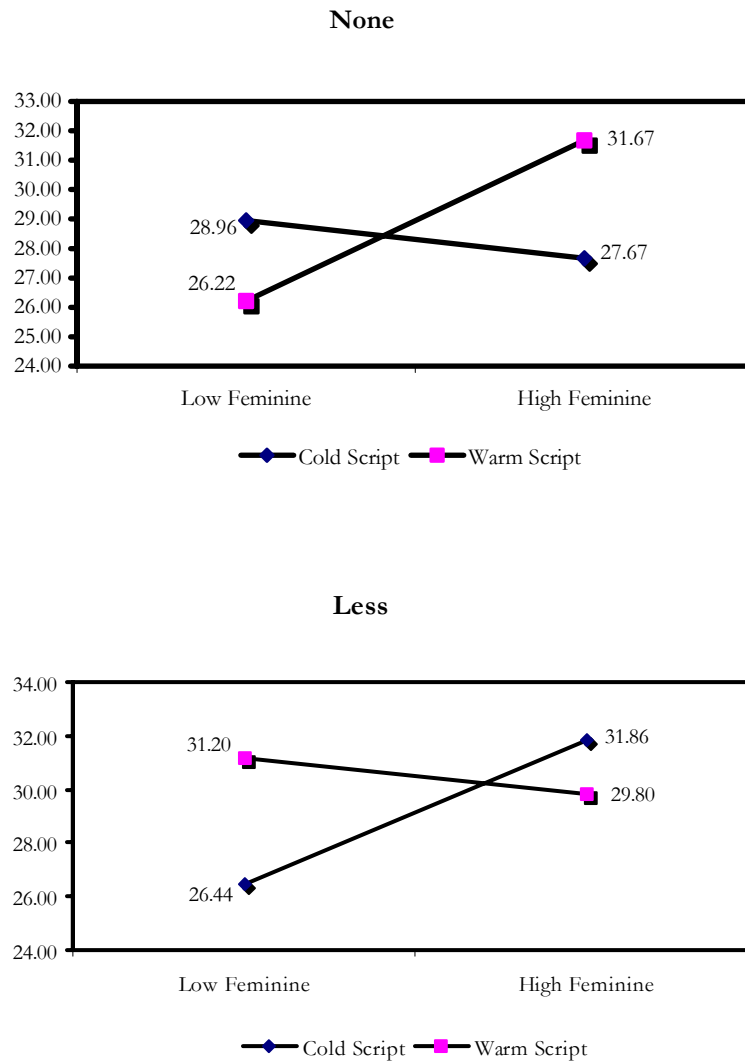
Figure 4-6. Three-Way Interaction of Face, Script, and Feminine Orientation on Cognitive Trust (Segmented by Face)

More
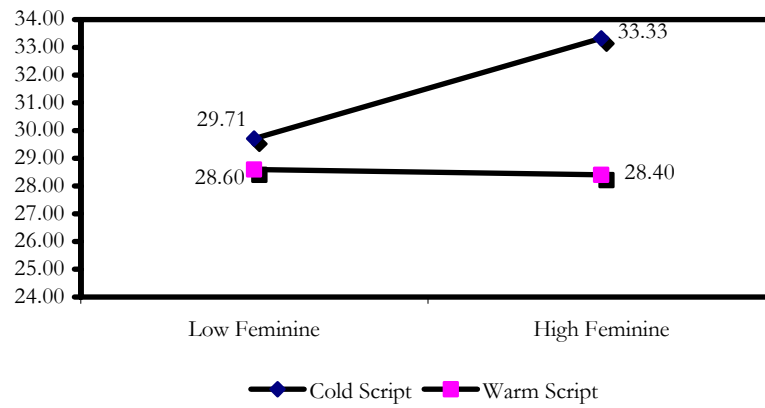
Real
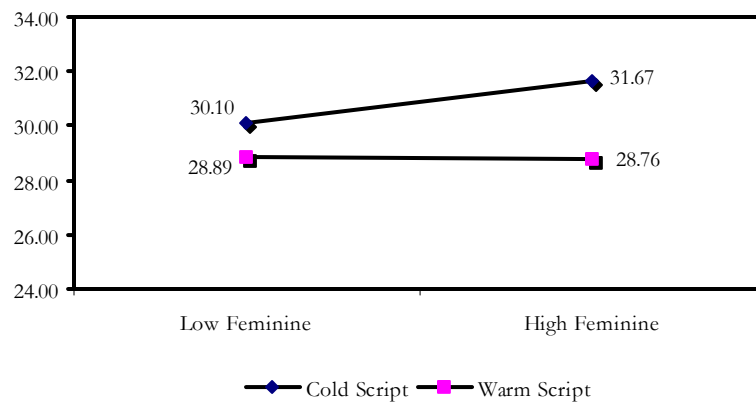
Figure 4-6. Continued.

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Masculine Orientation and Attitude

The effect of masculine orientation on attitude was tested (Table 4-8). The model was largely insignificant (p=0.161) and the all the interaction terms involving masculine orientation were found insignificant.

Masculine Orientation and Trust Perceptions

A mean-centered sum score of masculine orientation was used as a covariate and was crossed with the manipulation factors in a MANCOVA model. The results of the manipulation effects were again consistent with the earlier analysis without any moderator. The face main effect on trust perceptions (combining cognitive trust and benevolence) was insignificant (Pillai's Trace=0.029, $F_{6,274}$ =0.663, p=0.680; Wilks' Lambda=0.971, $F_{6,272}$ =0.661, p=0.681) and the main effect of script social presence was again significant (Pillai's Trace=0.091, $F_{2,136}$ =6.771, p=0.002; Wilks' Lambda=0.909, $F_{2,136}$ =6.771, ,p=0.002). The interaction effect of face and script was marginally significant (Pillai's Trace =0.086, $F_{6,274}$ =2.050, p=0.059; Wilks' Lambda=0.916, $F_{6,272}$=2.043, p=0.060).

No effect involving masculine orientation was found to be significant on trust perceptions. The interaction effect of face and masculine orientation was insignificant (Pillai's Trace =0.019, $F_{6,274}$ =0.431, p=0.858; Wilks' Lambda=0.981, $F_{6,272}$=0.428, p=0.860), and the interaction of script and masculine orientation (Pillai's Trace =0.005, $F_{2,136}$ =0.346, p=0.708; Wilks' Lambda=0.995, $F_{2,136}$=0.346, p=0.708) and the three-way interaction of face, script, and masculine orientation (Pillai's Trace =0.050, $F_{6,274}$ =1.180, p=0.317; Wilks' Lambda=0.950, $F_{6,272}$=1.186, p=0.314) were not significant. Univariate ANOVA results for this MANCOVA analysis are found in Table 4-9.

The three-way interaction effect of face, script, and masculine orientation was only marginally significant ($F_{3,\,137}$=2.365, p=0.074). This three-way interaction is shown in Figure 4-7.

First, no significant differences were found in both the "None" and the "Less" face conditions, either between the two scripts or between the high and low masculine orientation individuals. However, in the "More" face conditions, high masculine individuals revealed a slightly higher cognitive trust in the cold script condition than in the warm script condition (LS Means 31.86 (H) vs. 27.60 (L), p=0.084) whereas low masculine individuals did not show any difference between the two scripts (p=0.244). This fan effect was observed also in the "Real" face condition. Similar to the "More" face condition, high masculine individuals indicated a significantly higher cognitive trust in the cold script condition than in the warm script condition (LS Means 31.88 (C) vs. 27.07 (W), p=0.018) whereas low masculine individuals did not respond differently to the two scripts (p=0.950).

Table 4-8. ANOVA Table - Masculine Orientation on Attitude

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	27.881	15	1.859	1.388	.161
Intercept	6903.958	1	6903.958	5154.915	.000
FACE1	5.353	3	1.784	1.332	.266
SCRIPT1	3.265	1	3.265	2.438	.121
FACE1 * SCRIPT1	9.688	3	3.229	2.411	.070
MACENTER	1.569	1	1.569	1.172	.281
FACE1 * MACENTER	8.231E-02	3	2.744E-02	.020	.996
SCRIPT1 * MACENTER	1.325	1	1.325	.989	.322
FACE1 * SCRIPT1 * MACENTER	4.506	3	1.502	1.121	.343
Error	183.484	137	1.339		
Total	7359.076	153			
Corrected Total	211.364	152			

[a] R^2 = .132 (Adjusted R^2 = .037)

Table 4-9. Univariate ANOVA - Masculine Orientation on Trust Perceptions

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	BENE [a]	167.991	15	11.199	1.329	.193
	COGTRUST [b]	394.172	15	26.278	1.491	.117
Intercept	BENE	28656.829	1	28656.829	3400.038	.000
	COGTRUST	130052.996	1	130052.996	7377.309	.000
FACE1	BENE	24.654	3	8.218	.975	.407
	COGTRUST	42.943	3	14.314	.812	.489
SCRIPT1	BENE	61.058	1	61.058	7.244	.008
	COGTRUST	23.136	1	23.136	1.312	.254
FACE1 * SCRIPT1	BENE	50.350	3	16.783	1.991	.118
	COGTRUST	147.096	3	49.032	2.781	.043
MACENTER	BENE	8.819	1	8.819	1.046	.308
	COGTRUST	28.089	1	28.089	1.593	.209
FACE1 * MACENTER	BENE	7.682	3	2.561	.304	.823
	COGTRUST	25.443	3	8.481	.481	.696
SCRIPT1 * MACENTER	BENE	.919	1	.919	.109	.742
	COGTRUST	12.275	1	12.275	.696	.405
FACE1 * SCRIPT1 * MACENTER	BENE	12.267	3	4.089	.485	.693
	COGTRUST	125.060	3	41.687	2.365	.074
Error	BENE	1154.689	137	8.428		
	COGTRUST	2415.144	137	17.629		
Total	BENE	31115.000	153			
	COGTRUST	136340.199	153			
Corrected Total	BENE	1322.680	152			
	COGTRUST	2809.316	152			

[a] R^2 = .127 (Adjusted R^2 = .031) [b] R^2 = .140 (Adjusted R^2 = .046)

None

Less
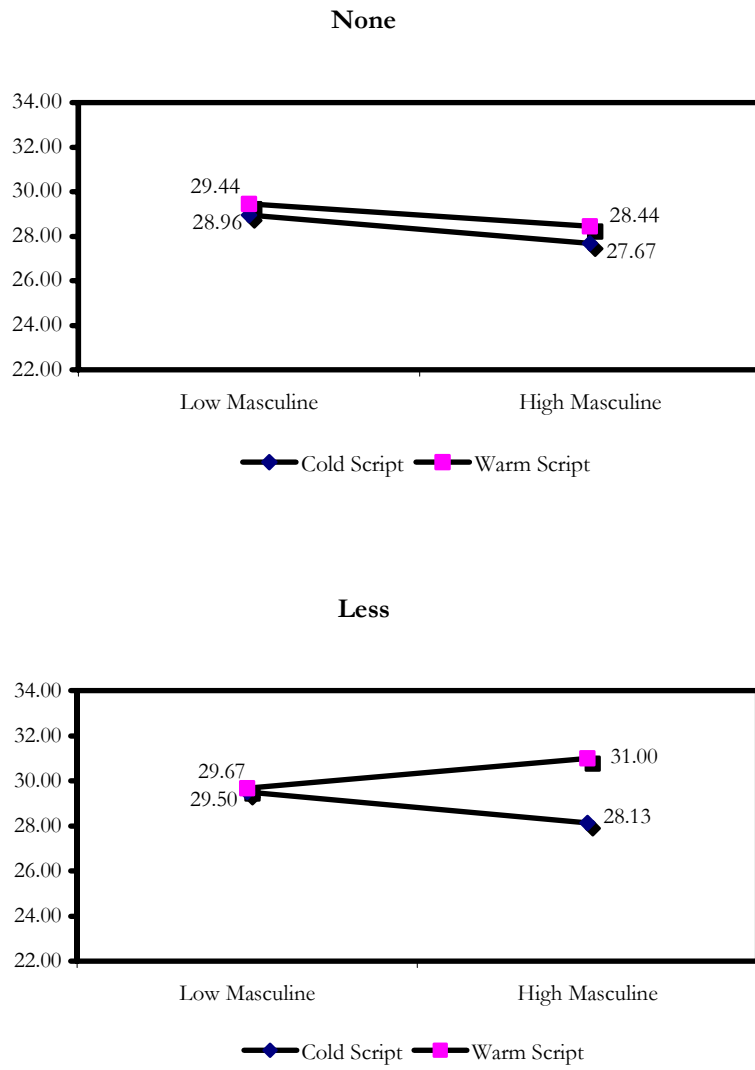
Figure 4-7. Three-Way Interaction of Face, Script, and Masculine Orientation on Cognitive Trust (Segmented by Face)
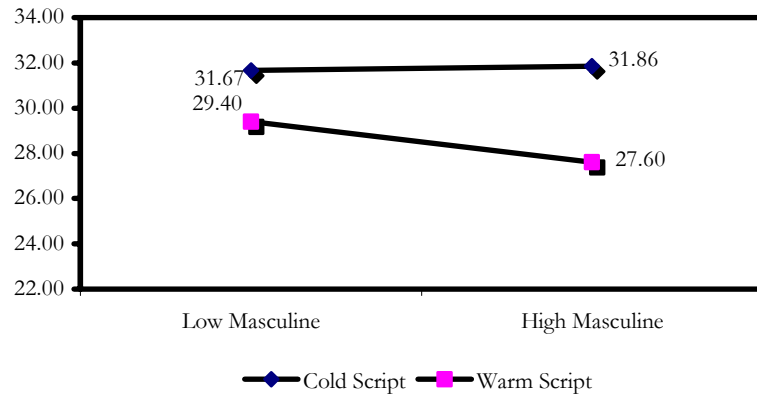
More

Real
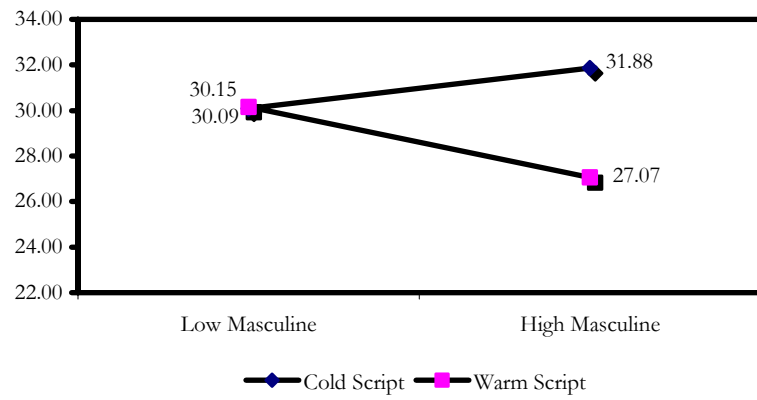
Figure 4-7. Continued.

In addition, compared to the low masculine individuals, high masculine individuals showed a slightly lower cognitive trust for the warm script (LS Means 30.15 (L) vs. 27.07 (H), p=0.054). Given the similar fan effects in the "More" and "Real" face conditions, it appeared that high masculine individuals were more sensitive to the script manipulation than were low masculine individuals.

Summary of the Moderating Influence of Psychological Gender Orientation

Given the results of several MANCOVA analyses shown above, it can be said that psychological gender orientation, specifically feminine orientation, seemed to moderate individuals' trust perceptions in relation to certain interface design factors. First, the moderating effect of feminine orientation was found primarily on cognitive trust but not on benevolence. Second, under the three face human-likeness conditions, high feminine individuals, compared to low feminine individuals, tended to perceive Agent *John* as more competent/credible when the script used was cold and mechanical sounding. Third, high feminine individuals, compared to low feminine individuals, also tend to tend to have more positive attitude toward Agent *John*. Fourth, high and low feminine individuals showed an opposite direction in their cognitive trust perceptions under certain face/script conditions. Finally, the extent to which script social presence affected cognitive trust was greater for high masculine individuals than for low masculine individuals as the face conditions became more realistic. Given the summary findings above, Hypothesis 6 was partially supported. Feminine orientation seemed to moderate the relationship between a social interface and individuals cognitive trust perceptions about the interface. In addition, the moderating effect of masculine orientation on consumer trust and attitude was minimal.

Moderating Influences: Need for Association

Need for Association and Attitude

The effect of need for association on attitude was tested () and the model was significant (p=0.027). The moderating influence of individuals' need for association was found from the interaction between face and need for association ($F_{3, 137}$=2.962, p=0.034). illustrates this interaction effect. While no significant differences among the four face conditions were found for those individuals low in need for association, individuals high in need for association indicated significantly different attitudes by face.

Table 4-10. ANOVA Results - Need for Association on Attitude

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	36.541	15	2.436	1.909	.027
Intercept	6915.686	1	6915.686	5419.472	.000
FACE1	5.009	3	1.670	1.309	.274
SCRIPT1	3.551	1	3.551	2.783	.098
FACE1 * SCRIPT1	8.981	3	2.994	2.346	.076
NACENTER	1.692	1	1.692	1.326	.252
FACE1 * NACENTER	11.340	3	3.780	2.962	.034
SCRIPT1 * NACENTER	.186	1	.186	.146	.703
FACE1 * SCRIPT1 * NACENTER	1.338	3	.446	.350	.789
Error	174.823	137	1.276		
Total	7359.076	153			
Corrected Total	211.364	152			

[a] $R^2 = .173$ (Adjusted $R^2 = .082$)
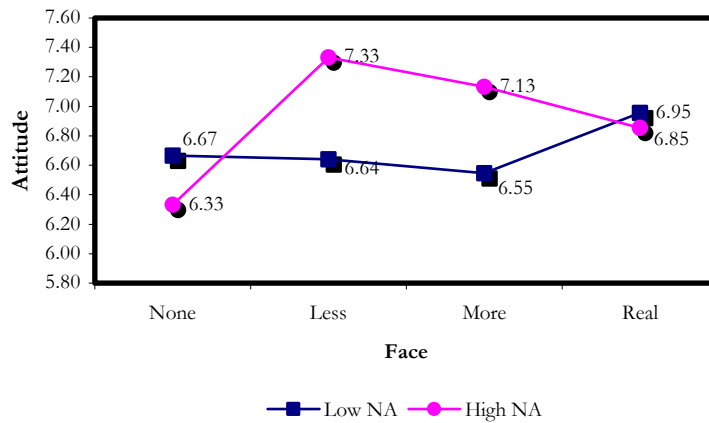
Figure 4-8. Interaction of Face and Need for Association (NA) on Attitude

For example, individuals high in need for association expressed a more positive attitude toward the "Less" face (LS Mean 7.33) than both the "None" (LS Mean 6.33, p=0.004) and the "Real" (LS Mean 6.95, p=0.063) faces. Also, with a marginal significance, they liked the "More" (LS Mean 7.13) face better than "None" (p=0.065).

This greater responsiveness to the different faces shown by those individuals high in need for association compared to those low in need for association under the contrived face human-likeness conditions seemed to lend some support for H7 which suggested that the influence of a social interface factor would be greater for individuals high in need for association than individuals low in need for association.

Need for Association and Trust Perceptions

In order to test the moderating influence of need for association on trust perceptions (combining cognitive trust and benevolence), the summed score of warmth, friendliness, and gregariousness was used as a covariate in a MANCOVA analysis and was crossed with the manipulation factors. The results of the manipulation effects were once again consistent with the prior analysis without any moderator.

The face main effect on trust perceptions (combining cognitive trust and benevolence) was insignificant (Pillai's Trace=0.031, $F_{6,274}$ =0.726, p=0.629; Wilks' Lambda=0.969, $F_{6,272}$ =0.725, ,p=0.630) and the main effect of script social presence was significant (Pillai's Trace=0.099, $F_{2,136}$ =7.511, p=0.001; Wilks' Lambda=0.901, $F_{2,136}$ =7.511, ,p=0.001).

The interaction effect of face and script was marginally significant (Pillai's Trace =0.088, $F_{6,274}$ =2.103, p=0.053; Wilks' Lambda=0.914, $F_{6,272}$=2.093, p=0.054). While the multivariate interaction effect of face and need for association was significant (Pillai's Trace =0.102, $F_{6,274}$ =2.457, p=0.025; Wilks' Lambda=0.899, $F_{6,272}$=2.487, p=0.023), both the interaction of script and need for association (Pillai's Trace =0.013, $F_{2,136}$ =0.887, p=0.414; Wilks' Lambda=0.987, $F_{2,136}$=0.887, p=0.414) and the three-way interaction of face, script, and need for association (Pillai's Trace =0.035, $F_{6,274}$ =0.802, p=0.569; Wilks' Lambda=0.966, $F_{6,272}$=0.800, p=0.570) were found to be insignificant.

Univariate ANOVA results are found in . Table 4-11 shows that the interaction effect of face and need for association was significant on cognitive trust perceptions ($F_{3,137}$ =4.294, p=0.006). This significant two-way interaction effect of face and need for association is depicted in and resembles the 2-way interaction found above for attitudes. In the two contrived face conditions, individuals high in need for association showed more positive cognitive trust perceptions than individuals low in need for association did ("Less," p=0.007; "More," p=0.066). For individuals high in need for association, cognitive trust improved significantly in both the "Less" face (LS Mean 31.20) or the "More" face (LS Mean 31.33) conditions, compared to both the no face condition (LS Mean 29.00) ("Less," p=0.007; "More," p=0.041).

Table 4-11. Univariate ANOVA Table – Need for Association on Trust Perceptions

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	BENE [a]	221.792	15	14.786	1.840	.035
	COGTRUST [b]	513.097	15	34.206	2.041	.017
Intercept	BENE	28711.566	1	28711.566	3573.010	.000
	COGTRUST	130077.496	1	130077.496	7760.851	.000
FACE1	BENE	27.077	3	9.026	1.123	.342
	COGTRUST	43.696	3	14.565	.869	.459
SCRIPT1	BENE	66.066	1	66.066	8.222	.005
	COGTRUST	22.824	1	22.824	1.362	.245
FACE1 * SCRIPT1	BENE	47.656	3	15.885	1.977	.120
	COGTRUST	136.908	3	45.636	2.723	.047
NACENTER	BENE	9.515	1	9.515	1.184	.278
	COGTRUST	26.983	1	26.983	1.610	.207
FACE1 * NACENTER	BENE	10.973	3	3.658	.455	.714
	COGTRUST	215.927	3	71.976	4.294	.006
SCRIPT1 * NACENTER	BENE	10.567	1	10.567	1.315	.253
	COGTRUST	.311	1	.311	.019	.892
FACE1 * SCRIPT1 * NACENTER	BENE	32.808	3	10.936	1.361	.257
	COGTRUST	33.787	3	11.262	.672	.571
Error	BENE	1100.888	137	8.036		
	COGTRUST	2296.219	137	16.761		
Total	BENE	31115.000	153			
	COGTRUST	136340.199	153			
Corrected Total	BENE	1322.680	152			
	COGTRUST	2809.316	152			

[a] $R^2 = .168$ (Adjusted $R^2 = .077$)   [b] $R^2 = .183$ (Adjusted $R^2 = .093$)
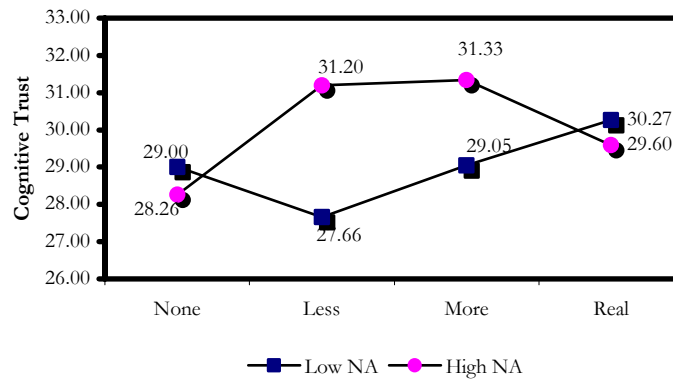
Figure 4-9. Interaction of Face and Need for Association (NA) on Cognitive Trust

Individuals high in need for association also perceived a lower level of cognitive trust in the "Real" face condition (LS Mean 29.60) than the "Less" face condition (LS Mean 31.20) (p=0.041). For individuals low in need for association, the "Real" face condition elicited a marginally higher level of cognitive trust than the "Less" face condition (LS Means 30.27 (R) vs. 27.66 (L), p=0.055) reflecting that, from the "Less" face condition to the "Real" face condition, these individual report somewhat increasingly higher cognitive trust.

Summary of the Moderating Influence of Need for Association

Need for association seemed to have some moderating influence on cognitive trust perception and attitude in relation to the face manipulation. Individuals high in need for association appeared to perceive Agent *John* with computer-processed images more competent/credible than individuals low in need for association. Since individuals high in need for association may likely enjoy association with new people, they also seem to accept computer agents with computer-processed face images as shopping partners and enjoy associations with those computer agents. However, the responses to the real face or no face conditions between individuals high and low need for association did not show any significant differences. Thus, Hypothesis 7 was only partially supported.

Study 2 Manipulation Check

Social Interface as Combination of Face and Script

In Study1, two interface design factors, agent face human-likeliness (4 levels) and script (2 levels), were manipulated resulting in eight different Agent appearances. How respondents perceived the levels of social presence for the eight different interfaces was analyzed in Table 4-12. The purpose of this analysis was to select the interfaces that received the highest and the lowest evaluations on social presence; based on the respondents' evaluation of social presence for each interface, the best and worst social interfaces were selected.

Overall, it appeared that the worst social interface in Study 1 was the condition where Agent *John* had no face and used the cold script ("None/Cold," SP Sum=23.28). On the other hand, two interfaces received high evaluations on social presence: (1) Agent *John* with a less human-like face and the warm script ("Less/Warm," SP Sum=30.38) and (2) Agent *John* with a real human face and the warm script ("Real/Warm," SP Sum=29.90).

Table 4-12. Social Presence Sum Score for Face/Script Combinations

	No Face	Less Human-Like Face	More Human-Like Face	Real Face
Cold Script	**23.28**	25.25	26.56	26.35
Warm Script	27.00	**30.38**	26.44	**29.90**

Because of the interest in testing a contrived agent face against a real face, both the "Less/Warm" and the "Real/Warm" conditions were included in the study design. These three interfaces were chosen as the worst and the best social interfaces for Study 2 and represented varying levels of social interface.

When the level of social presence for each of the three social interfaces ("None/Cold," "Less/Warm," and "Real/Warm) was measured and analyzed in Study 2, there was an overall significant difference among the three social interfaces ($F_{2, 210} = 6.385$, p=0.002). The summed score of social presence for the Agent *John* with no face and the cold script ("None/Cold") was 25.80. The Agent *John* with a less human-like face and the warm script ("Less/Warm") scored 29.31, and the Agent *John* with the real human face and the warm script ("Real/Warm") scored 29.45. Subsequent constrast tests showed that the difference between "None/Cold" and "Real/Warm" was significant (p=0.001); the difference between "None/Cold" and "Less/Warm" was also significant (p=0.001); however, the difference between "Less/Warm" and "Real/Warm" was not significant (p=0.893).[31]

Shopping Goal Situation

The manipulation of individuals' shopping goals (experiential vs. instrumental) in Study 2 was examined by nine items presented in Table 4-13.

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[31] Given the significant moderating influence of personality in Study 1, it was suspected that the best and worst social interfaces might not be the same for those individuals having different personality traits, e.g., high and low feminine orientation individuals. A further analysis of social presence by feminine orientation is presented in Appendix C (Figure C-1). For both high and low feminine individuals, "Less/Warm" and "Real/Warm" received the highest evaluations. The lowest social presence for high feminine individuals was "None/Cold." For low feminine individuals, all of the four cold script conditions received similarly low evaluations on social presence ($F_{3,31}$=0.043, p=0.988). However, the differences between "None/Cold" and "Less/Warm" were significant for both high and low feminine individuals (p=0.000 (H); p=0.003 (L)); the differences between "None/Cold" and "Real/Warm" were also significant for both high and low individuals (p=0.000 (H); p=0.012 (L)). There were no significant differences between "Less/Warm" and "Real/Warm" for both high and low feminine individuals (p= 0.328 (H); p=0.679 (L)).

Table 4-13. Situation Manipulation Check

Items	Situation	Mean	t	Sig. (1-tailed)
Fun	Experiential	6.064	4.305	0.053
	Instrumental	5.327		
Professional	Experiential	4.697	-6.838	0.000
	Instrumental	6.096		
Enjoyable	Experiential	6.211	1.254	0.205
	Instrumental	6.029		
Functional	Experiential	5.661	-1.096	0.087
	Instrumental	5.846		
Happy	Experiential	6.376	4.700	0.052
	Instrumental	5.692		
Exciting	Experiential	6.220	2.258	0.043
	Instrumental	5.846		
Informative	Experiential	5.248	-4.187	0.001
	Instrumental	5.981		
Effective	Experiential	5.908	-2.845	0.056
	Instrumental	6.298		
Practical	Experiential	5.569	0.119	0.344
	Instrumental	5.548		

Respondents in the experiential situation saw their shopping goal to be more exciting (p=0.043), fun and happy (marginally, p=0.053, and p=0.052, respectively) than those in the instrumental situation did.

Respondents in the instrumental situation thought their shopping task to be more professional (p=0.000) and informative (p=0.001), and marginally to be more functional (p=0.087) and effective (p=0.056) than the respondents in the experiential situation did. No differences were found in respondents' perceptions of the two situations in the following: being enjoyable (p=0.205) or being practical (p=0.344).

Information Richness

Information richness was manipulated with two variables: the number of attributes (3 vs. 5) and the number of cameras shown (4 vs. 8). A post-hoc manipulation check was conducted employing 20 individuals. Two "None/Cold" interfaces with information variations (rich and non-rich) were employed.

In order to check the manipulation, the following questions were asked: (1) How many camera features (attributes) did Agent *John* show you during this shopping trip? (2) How many different cameras did Agent *John* show you? (3) What did you think about the amount of information provided by Agent *John*? (9-point Likert scale: Not Enough (1); Adequate (5); Too Much (9)); (4) What did you think about the detail of information offered by Agent John? (9-point Likert scale: Not at all detailed (1); Extremely detailed (9)); (5) What did you think about the depth of information you received from Agent John (9-point Likert scale: No depth of information at all (1); A very high level of depth of information (9)). (Note to the committee: The results of this measure will be added to the document before the final defense).

Personality Traits Examined in Study 2

The analysis of the moderating influences of personality traits in Study 1 revealed that a feminine orientation had a very strong moderating influence on trust perceptions. In study 2, both the feminine and masculine orientations were retained as potential moderators. In addition to gender orientation, a personality trait relating to the cognitive route of trust perception, need for cognition (NFC), was included.

Study 2 Analysis

Attitude

The effect of social interface (3: face human-likeliness and script social presence combined as explained above) x information richness (2: rich and non-rich information) x situation (2: experiential and instrumental situations) on attitude was examined using ANOVA. The results of this ANOVA are found in Table 4-14.

The overall model was insignificant ($F_{11, 200}$ =0.961, p=0.483). None of the manipulation effects including the face/script effect were found to be significant at the p=0.05 level. Only a marginal significance was found for the information main effect on attitude ($F_{1, 200}$ =3.642, p=0.058). Contrast analysis using LS Means showed that with marginal significance (p=0.073) individuals indicated a more favorable attitude toward Agent *John* when he provided more information (LS Means 7.367(R) vs. 7.078(NR)), hence Hypothesis 3a was marginally supported.

<div align="center">**Table 4-14. ANOVA Results – Attitude**</div>

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model [a]	14.615	11	1.329	.961	.483
Intercept	10936.732	1	10936.732	7910.358	.000
SOCINT	.259	2	.130	.094	.911
INFO1	5.036	1	5.036	3.642	.058
SITU1	2.736E-02	1	2.736E-02	.020	.888
SOCINT * INFO1	3.688	2	1.844	1.334	.266
SOCINT * SITU1	3.353	2	1.676	1.213	.300
INFO1 * SITU1	.438	1	.438	.317	.574
SOCINT * INFO1 * SITU1	2.863	2	1.432	1.035	.357
Error	276.517	200	1.383		
Total	11362.000	212			
Corrected Total	291.132	211			

[a] R^2 = .050 (Adjusted R^2 = -.002)

Trust Perceptions

Individuals' trusting personality as a covariate variable had a significant effect on trust perceptions (Pillai's Trace=0.051, $F_{2,199}$ =5.395, p=0.005; Wilks' Lambda=0.956, $F_{2,199}$ =5.395, ,p=0.005) and the direction of the parameter estimate cognitive trust was positive (see Appendix). More specifically, Table 4-15 shows that the more trusting an individual is, the more he or she is likely to perceive Agent *John* as competent/credible (p=0.004), but not as benevolent (p=0.886).

The effect of social interface (a factor combining face and script) on trust perceptions was found to be marginally significant (Pillai's Trace =0.044, $F_{4,400}$ =2.250, p=0.063; Wilks' Lambda=0.956, $F_{4,398}$ =2.260, p=0.062) thereby lending partial support for Hypothesis 1b and 2b (partial because face and script were confounded). However, the information main effect (Pillai's Trace =0.004, $F_{2,199}$ =0.361586, p=0.698; Wilks' Lambda=0.996, $F_{2,199}$ =0.361, p=0.698) was found to be insignificant, thus Hypothesis 3b was not supported. The situation main effect (Pillai's Trace =0.009, $F_{2,199}$ =0.895, p=0.410; Wilks' Lambda=0.991, $F_{2,199}$ =0.895, p=0.410) was also insignificant.

Table 4-15 shows the univariate results associated with the MANCOVA presented above. There was a significant main effect of the social interface factor on benevolence ($F_{2,200}$ =3.201, p=0.043).

Estimated models for both dependent variables were not significant. Contrast tests were conducted on benevolence for the social interface main effect (face/script combination). The Agent *John* with the less human-like face and the warm script ("Less/Warm") was perceived to be the most benevolent (LS Mean = 15.39) followed by the real face with the warm script (LS Mean= 14.73) and the cold script only ("None/Cold") (LS Mean = 14.90). A significant difference in benevolence perception is found (p=0.013) between 'Less/Warm" and "None/Cold," but not between "Less/Warm" and "Real/Warm" or (0.207) between "None/Cold" and "Real/Warm" (p=0.241).

Table 4-15. Univariate ANOVA – Trust Perceptions

Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	COGTRUST[a]	264.199	12	22.017	1.367	.184
	BENE[b]	142.748	12	11.896	1.206	.281
Intercept	COGTRUST	76045.961	1	76045.961	4721.891	.000
	BENE	18299.232	1	18299.232	1855.484	.000
SOCINT	COGTRUST	6.418	2	3.209	.199	.820
	BENE	63.133	2	31.566	3.201	.043
INFO1	COGTRUST	8.700	1	8.700	.540	.463
	BENE	5.383	1	5.383	.546	.461
SITU1	COGTRUST	2.546	1	2.546	.158	.691
	BENE	8.209	1	8.209	.832	.363
SOCINT * INFO1	COGTRUST	13.385	2	6.693	.416	.661
	BENE	24.353	2	12.177	1.235	.293
SOCINT * SITU1	COGTRUST	47.010	2	23.505	1.460	.235
	BENE	40.511	2	20.256	2.054	.131
INFO1 * SITU1	COGTRUST	5.585	1	5.585	.347	.557
	BENE	1.543	1	1.543	.156	.693
SOCINT * INFO1 * SITU1	COGTRUST	36.741	2	18.371	1.141	.322
	BENE	.808	2	.404	.041	.960
TSUM	COGTRUST	137.600	1	137.600	8.544	.004
	BENE	.202	1	.202	.020	.886
Error	COGTRUST	3220.996	200	16.105		
	BENE	1972.448	200	9.862		
Total	COGTRUST	207067.478	213			
	BENE	48396.024	213			
Corrected Total	COGTRUST	3485.195	212			
	BENE	2115.196	212			

[a] $R^2 = .076$ (Adjusted $R^2 = .020$) [b] $R^2 = .067$ (Adjusted $R^2 = .012$)

Since the interaction effect of situation and the social interface factor (H9a) and the interaction of situation and information richness (H9b) on trust perceptions and attitude were found to be insignificant, Hypothesis 9 was not supported.

Moderating Influences: Psychological Gender Orientation

Feminine Orientation and Attitude

The moderating effect of feminine orientation on attitude was tested (Table 4-16). The model was largely insignificant ($F_{16,195}=0.846$, $p=0.633$). And no moderating effect involving individuals' feminine orientation on attitude was found significant rejecting the moderating influence of feminine orientation on attitude (partial rejection of H6).

Table 4-16. ANOVA Results – Feminine Orientation and Attitude

Source	Type III SS	df	Mean Square	F	Sig.
Corrected Model [a]	18.889	16	1.181	.846	.633
Intercept	10719.043	1	10719.043	7677.735	.000
FACE1	.617	2	.309	.221	.802
SITU1	.254	1	.254	.182	.670
INFO1	3.579	1	3.579	2.564	.111
FECENTER	2.324	1	2.324	1.665	.198
FACE1 * FECENTER	.749	2	.375	.268	.765
SITU1 * FECENTER	.952	1	.952	.682	.410
INFO1 * FECENTER	3.333	1	3.333	2.387	.124
FACE1 * INFO1 * FECENTER	2.885	2	1.442	1.033	.358
FACE1 * SITU1 * FECENTER	.823	2	.411	.295	.745
SITU1 * INFO1 * FECENTER	.120	1	.120	.086	.770
FACE1 * SITU1 * INFO1 * FECENTER	2.271	2	1.136	.813	.445
Error	272.243	195	1.396		
Total	11362.000	212			
Corrected Total	291.132	211			

[a] $R^2 = .065$ (Adjusted $R^2 = -.012$)

Feminine Orientation and Trust Perceptions

The moderating influence of feminine orientation was tested by including a covariate in a MANCOVA model and crossing the covariate with the manipulation factors. The results of the main effects were consistent with the earlier analysis without the feminine orientation moderator. The social interrface main effect on trust perceptions (combining cognitive trust and benevolence) was marginally significant (Pillai's Trace=0.043, $F_{4,392}$ =2.139, p=0.075; Wilks' Lambda=0.957, $F_{4,390}$ =2.148, p=0.074) and the main effect of information richness (Pillai's Trace=0.006, $F_{2,195}$ =0.570, p=0.567; Wilks' Lambda=0.994, $F_{2,195}$ =0.570, ,p=0.567) and the main effect of situation (Pillai's Trace=0.004, $F_{2,195}$ =0.392, p=0.677; Wilks' Lambda=0.996, $F_{2,195}$ =0.392, p=0.677) were non-significant.

While none of the main effects were found to be significant, several two-way interactions involving feminine orientation were either significant or approached significance. The interaction effect between face/script and feminine orientation on trust perceptions (Pillai's Trace =0.054, $F_{4,392}$ =2.704, p=0.030; Wilks' Lambda=0.946, $F_{4,390}$=2.725, p=0.029), the interaction of information and feminine orientation (Pillai's Trace =0.055, $F_{2,195}$ =5.682, p=0.004; Wilks' Lambda=0.945, $F_{2,195}$=5.682, p=0.004) had significant influences upon trust perceptions. The interaction of situation and feminine orientation (Pillai's Trace =0.029, $F_{2,195}$ =2.909, p=0.057; Wilks' Lambda=0.973, $F_{2,195}$=2.909, p=0.057) was marginally significant.

Univariate ANOVA results are found in Table 4-17. Specifically, the interaction of the social interface factor and feminine orientation had significant effects on both benevolence ($F_{2,196}$ =4.283, p=0.015) and marginally[32] on cognitive trust ($F_{2,196}$ =3.634, p=0.028). Figure 4-10 illustrates the interaction of the social interface factor and feminine orientation on cognitive trust.

In the "None/Cold" condition, high feminine individuals perceived Agent *John* to be more competent/credible than low feminine individuals did (LS Means 32.00 (H) vs. 29.92 (L), p=0.047). There were no significant differences in cognitive trust between high and low feminine individuals in the other two social interface conditions ("Less/Warm" and "Real/Warm"). However, high feminine individuals perceived Agent *John* to be less competent/credible in the "Real/Warm" condition compared to the "None/Cold" condition (p=0.035).

In Table 4-17, a significant four-way interaction effect surfaced. The interaction of social interface x situation x information x feminine orientation had a significant effect on benevolence ($F_{2,196}$ =5.966, p=0.003). Due to the complexity of the high-order interaction, the findings are elaborated upon by situation.

Figure 4-11 and Figure 4-12 display this four-way interaction segmented on the experiential goal and the instrumental goal, respectively.

In the experiential situation, with one exception, high feminine individuals in general appeared to have more positive perceptions about Agent *John*'s benevolence regardless of information richness than low feminine individuals. Under the "Less/Warm" condition, high feminine individuals preferred an information non-rich interface to an information- rich interface (LS Means 17.80 (NR) vs. 15.21 (R)) (p=0.063), whereas low feminine individuals had more positive responses to an information-rich interface than to an information non-rich interface (LS Mean 16.38 (R) vs. 13.84 (NR). High feminine individuals had a significantly higher benevolence perception for the non-rich interface than low feminine individuals did in the "Less/Warm" condition (LS Means 17.80 (HF) vs. 13.84 (LF), p=0.033).

In the instrumental situation, high and low feminine perceptions about Agent *John*'s benevolence appeared to be affected by the social interface factor. High feminine individuals perceived "None/Cold" to be more benevolent than low feminine individuals did (LS Means 15.23 (HF) vs. 12.78 (LF), p=0.039). In this condition, the non-rich information interface was perceived to be slightly more benevolent by high feminine individuals than by low feminine individuals (p=0.087). Under the "Real/Warm" condition, a disordinal interaction was found. High and low feminine individuals with a professionally oriented goal situation, did not perceive agent benevolence differently when Agent *John* provided non-rich information (LS Means 14.33 (HF) vs. 14.11 (LF)).

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[32] Significance criteria p-value = 0.05/2 (number of dependent variables)

Table 4-17. Univariate ANOVA Results of Feminine Orientation, Social Interface, Situation, and Information Richness

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	BENE [a]	394.570	16	24.661	2.809	.000
	COGTRUST [b]	376.326	16	23.520	1.483	.109
Intercept	BENE	45182.892	1	45182.892	5146.873	.000
	COGTRUST	196642.781	1	196642.781	12397.429	.000
SOCINT	BENE	53.970	2	26.985	3.074	.048
	COGTRUST	6.494	2	3.247	.205	.815
SITU1	BENE	.748	1	.748	.085	.771
	COGTRUST	6.036	1	6.036	.381	.538
INFO1	BENE	7.201	1	7.201	.820	.366
	COGTRUST	13.323	1	13.323	.840	.361
FECENTER	BENE	1.810	1	1.810	.206	.650
	COGTRUST	13.087	1	13.087	.825	.365
SOCINT * FECENTER	BENE	75.204	2	37.602	4.283	.015
	COGTRUST	115.292	2	57.646	3.634	.028
SITU1 * FECENTER	BENE	47.448	1	47.448	5.405	.021
	COGTRUST	3.232	1	3.232	.204	.652
INFO1 * FECENTER	BENE	100.223	1	100.223	11.417	.001
	COGTRUST	33.562	1	33.562	2.116	.147
SOCINT * INFO1 * FECENTER	BENE	22.753	2	11.377	1.296	.276
	COGTRUST	56.934	2	28.467	1.795	.169
SOCINT * SITU1 * FECENTER	BENE	45.076	2	22.538	2.567	.079
	COGTRUST	48.342	2	24.171	1.524	.220
SITU1 * INFO1 * FECENTER	BENE	2.223	1	2.223	.253	.615
	COGTRUST	1.274	1	1.274	.080	.777
SOCINT * SITU1 * INFO1 * FECENTER	BENE	104.746	2	52.373	5.966	.003
	COGTRUST	44.112	2	22.056	1.391	.251
Error	BENE	1720.627	196	8.779		
	COGTRUST	3108.869	196	15.862		
Total	BENE	48396.024	213			
	COGTRUST	207067.478	213			
Corrected Total	BENE	2115.196	212			
	COGTRUST	3485.195	212			

[a] $R^2 = .187$ (Adjusted $R^2 = .120$) [b] $R^2 = .108$ (Adjusted $R^2 = .035$)
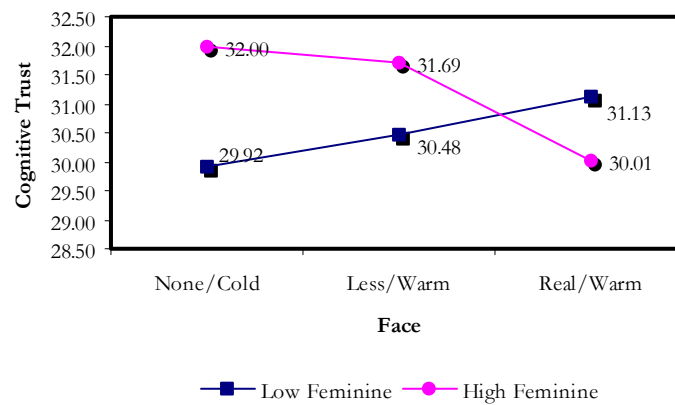
Figure 4-10. Interaction of Social Interface and Feminine Orientation on Cognitive Trust

None/Cold

17.00
16.00
15.00 — 15.47
14.00
13.38
13.00 — 13.78
12.00 — 12.1
11.00

Low Feminine   High Feminine

◆ Non-Rich   ■ Rich

Less/Warm

18.00
17.00 — 17.80
16.00
16.38
15.00 — 15.21
14.00
13.84
13.00
12.00
11.00

Low Feminine   High Feminine

◆ Non-Rich   ■ Rich

Real/Warm

18.00
17.00
16.00 — 15.67
15.25
15.00 — 15.50
14.59
14.00
13.00
12.00
11.00

Low Feminine   High Feminine

◆ Non-Rich   ■ Rich

Figure 4-11. Four-Way Interaction of Information Richness, Feminine Orientation, Social Interface, and Situation on Benevolence Segmented on the Experiential Goal

None/Cold

Less/Warm

Real/Warm
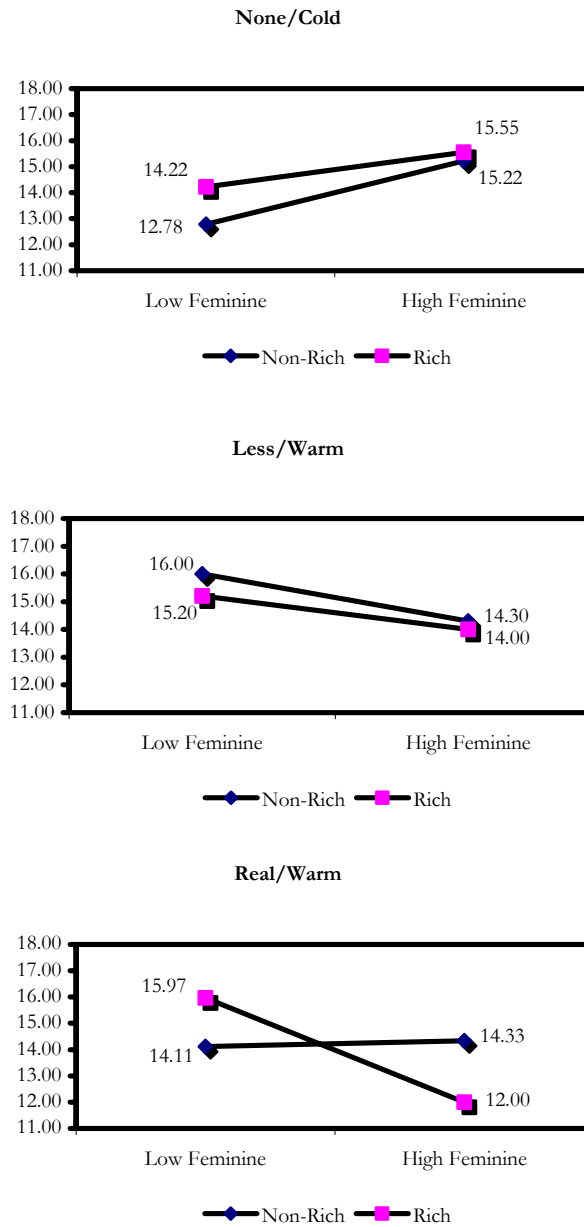
Figure 4-12. Four-Way Interaction of Information Richness, Feminine Orientation, Social Interface, and Situation on Benevolence Segmented on the Instrumental Goal

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However, under the high information-rich environment, low feminine individuals perceived Agent *John*'s benevolence more positively than the high feminine individuals did (LS Means 15.97 (LF) vs. 12.00 (HF), p=0.040). Finally, under the "None/Cold" and "Less/Warm" social interfaces, no differences were found for feminine orientation across the information rich conditions.

When one compares across goal scenarios, two interesting significant effects emerge. First, under the "Less/Warm" interface, low feminine orientation individuals differ across goals when exposed to non-rich information.

Those given an instumental goal rated benevolent trust higher than those provided with the experiential goal (instrumental goal "Less/Warm" Means 16.00 vs. experiential goal "Less/Warm" Means 13.84, p<0.088). Second, under the "Real/Warm" interface, the goal orientation once again differed for those with a high feminine orientation, but this time under the information rich conditions. Those given the instrumental goal rated benevolent trust significantly lower than those provided with the experiential goal (instrumental goal "Real/Warm" Means 12.00 vs. experiential goal "Real/Warm Means 15.67, p<0.044).

Masculine Orientation and Attitude

The moderating effect of masculine orientation on attitude was tested. The model was largely insignificant ($F_{16,195}$=0.376, p=0.986) ([Table 4-18](#)). And no moderating effect involving individuals' masculine orientation on attitude was found significant rejecting the moderating influence of masculine orientation on attitude (partial rejection of H6).

Masculine Orientation and Trust Perceptions

The moderating influence of masculine orientation was tested by including a covariate in a MANCOVA model and crossing the covariate with the manipulation factors. The results of the main effects were consistent with the earlier analysis without the masculine orientation moderator. The social interrface main effect on trust perceptions (combining cognitive trust and benevolence) was marginally significant (Pillai's Trace=0.044, $F_{4,392}$ =2.180, p=0.071; Wilks' Lambda=0.957, $F_{4,390}$ =2.187, p=0.070) and the main effect of information richness (Pillai's Trace=0.004, $F_{2,195}$ =0.346, p=0.708; Wilks' Lambda=0.996, $F_{2,195}$ =0.346, p=0.708) and the main effect of situation (Pillai's Trace=0.007, $F_{2,195}$ =0.685, p=0.506; Wilks' Lambda=0.993, $F_{2,195}$ =0.685, p=0.506) were non-significant. None of the interaction effects involving and masculine orientation on trust perceptions were significant. Univariate ANOVA results are found in [Table 4-19](#).

Table 4-18. ANOVA Results – Masculine Orientation and Attitude

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model [a]	8.783	16	.549	.379	.986
Intercept	10525.242	1	10525.242	7269.096	.000
SOCINT	.451	2	.225	.156	.856
SITU1	5.299E-02	1	5.299E-02	.037	.848
INFO1	3.920	1	3.920	2.707	.102
MACENTER	.292	1	.292	.202	.654
SOCINT * MACENTER	.688	2	.344	.238	.789
SITU1 * MACENTER	.501	1	.501	.346	.557
INFO1 * MACENTER	.208	1	.208	.144	.705
SOCINT * INFO1 * MACENTER	.969	2	.485	.335	.716
SOCINT * SITU1 * MACENTER	.541	2	.270	.187	.830
SITU1 * INFO1 * MACENTER	.177	1	.177	.123	.727
SOCINT * SITU1 * INFO1 * MACENTER	1.016	2	.508	.351	.705
Error	282.349	195	1.448		
Total	11362.000	212			
Corrected Total	291.132	211			

[a] R^2 = .030 (Adjusted R^2 = -.049)

Table 4-19. Univariate ANOVA Results of Masculine Orientation, Social Interface, Situation, and Information Richness

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	BENE [a]	133.732	16	8.358	.827	.654
	COGTRUST [b]	142.898	16	8.931	.524	.933
Intercept	BENE	43959.426	1	43959.426	4348.323	.000
	COGTRUST	193396.056	1	193396.056	11341.189	.000
SOCINT	BENE	73.409	2	36.705	3.631	.028
	COGTRUST	13.521	2	6.761	.396	.673
SITU1	BENE	10.546	1	10.546	1.043	.308
	COGTRUST	6.440E-04	1	6.440E-04	.000	.995
INFO1	BENE	5.033	1	5.033	.498	.481
	COGTRUST	9.156	1	9.156	.537	.465
MACENTER	BENE	.636	1	.636	.063	.802
	COGTRUST	4.188	1	4.188	.246	.621
SOCINT * MACENTER	BENE	5.938	2	2.969	.294	.746
	COGTRUST	4.443	2	2.222	.130	.878
SITU1 * MACENTER	BENE	9.237	1	9.237	.914	.340
	COGTRUST	22.658	1	22.658	1.329	.250
INFO1 * MACENTER	BENE	3.833	1	3.833	.379	.539
	COGTRUST	17.500	1	17.500	1.026	.312
SOCINT * INFO1 * MACENTER	BENE	7.670	2	3.835	.379	.685
	COGTRUST	19.747	2	9.873	.579	.561
SOCINT * SITU1 * MACENTER	BENE	.265	2	.133	.013	.987
	COGTRUST	4.142	2	2.071	.121	.886
SITU1 * INFO1 * MACENTER	BENE	.955	1	.955	.094	.759
	COGTRUST	15.039	1	15.039	.882	.349
SOCINT * SITU1 * INFO1 * MACENTER	BENE	21.002	2	10.501	1.039	.356
	COGTRUST	3.790	2	1.895	.111	.895
Error	BENE	1981.465	196	10.110		
	COGTRUST	3342.298	196	17.053		
Total	BENE	48396.024	213			
	COGTRUST	207067.478	213			
Corrected Total	BENE	2115.196	212			
	COGTRUST	3485.195	212			

[a] R^2 = .063 (Adjusted R^2 = -.013) [b] R^2 = .041 (Adjusted R^2 = -.037)

Moderating Influences: Need for Cognition (NFC)

Need for Cognition and Attitude

The moderating influence of need for cognition on attitude was examined in a MANCOVA model. The overall model was not significant ($F_{16,195}$=1.306, p=0.196). However, marginal significance was found for the interaction of the social interface factor and need for cognition (p=0.065) and a significant three-way interaction between social interface x situation x need for cognition also emerged (p=0.042). Finally, as shown in an earlier model without any moderator, the marginally significant main effect of information richness was found. Table 4-20 shows the univariate results.

Figure 4-13 illustrates the significant three-way interaction. In the experiential shopping goal situation, low need for cognition (NFC) individuals had a more positive attitude toward "Less/Warm" (p=0.026) and "Real/Warm" (p=.030) social interfaces. However, high NFC individuals did not show significant differences toward the different social interface conditions. Directionally, low NFC individuals had a higher attitude for the "Real/Warm" social interface compared to high NFC individuals (LNFC Means 7.67 vs HNFC Means 6.81, p=0.110). Furthermore, low NFC individuals liked the "Real/Warm" social interface marginally better than the "Less/Warm" social interface (p=0.099).

Need for Cognition and Trust Perceptions

The moderating influence of need for cognition on trust perceptions (combining cognitive trust and benevolence) was tested using MANCOVA. It was found that need for cognition in general had little effect upon trust perceptions. As found earlier, the effect of face/script on trust perceptions was found to be marginally significant (Pillai's Trace =0.043, $F_{4,392}$ =2.170, p=0.072; Wilks' Lambda=0.957, $F_{4,390}$ =2.178, p=0.071) thereby supporting Hypothesis 1b and 2b partially (because face and script were confounded) and with marginal results.

Neither the situation main effect (Pillai's Trace =0.007, $F_{2,195}$ =0.656, p=0.520; Wilks' Lambda=0.993, $F_{2,195}$ =0.656, p=0.520) nor the information main effect (Pillai's Trace =0.006, $F_{2,195}$ =0.615, p=0.542; Wilks' Lambda=0.994, $F_{2,195}$ =0.615, p=0.542) were found to be significant. In addition, none of the multivariate effects involving need for cognition were significant nor was there a significant interaction between situation and need for cognition (Pillai's Trace =0.001, $F_{2,195}$ =0.108, p=0.898; Wilks' Lambda=0.999, $F_{2,195}$ =0.108, p=0.898). Importantly, the interaction between information richness and need for cognition was not statistically significant (Pillai's Trace =0.008, $F_{2,195}$ =0.808, p=0.447; Wilks' Lambda=0.992, $F_{2,195}$ =0.808, p=0.447) thereby partially rejecting Hypothesis 8.

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Table 4-20. ANCOVA Results - Need for Cognition and Attitude

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	28.177	16	1.761	1.306	.196
Intercept	10782.277	1	10782.277	7995.824	.000
SOCINT	.563	2	.281	.209	.812
SITU1	.254	1	.254	.189	.665
INFO1	5.046	1	5.046	3.742	.055
NCCENTER	1.504	1	1.504	1.115	.292
SOCINT * NCCENTER	7.495	2	3.748	2.779	.065
SITU1 * NCCENTER	2.159	1	2.159	1.601	.207
INFO1 * NCCENTER	.387	1	.387	.287	.593
SOCINT * INFO1 * NCCENTER	3.079	2	1.540	1.142	.321
SOCINT * SITU1 * NCCENTER	8.673	2	4.337	3.216	.042
SITU1 * INFO1 * NCCENTER	4.259E-02	1	4.259E-02	.032	.859
SOCINT * SITU1 * INFO1 * NCCENTER	.848	2	.424	.314	.731
Error	262.955	195	1.348		
Total	11362.000	212			
Corrected Total	291.132	211			

[a] $R^2 = .097$ (Adjusted $R^2 = .023$)

Univariate ANCOVA results are found in Table 4-21. In Table 4-28, the main effect of NFC on benevolence was marginally significant ($F_{1, 196}$=3.326, p=0.070). Also, a marginal interaction effect of face and need for cognition on cognitive trust was found ($F_{2, 196}$=2.430, p=0.091). Figure 4-14 illustrates the marginally significant interaction effect of the social interface factor and need for cognition on cognitive trust. With a marginal significance, low NFC individuals perceived the "None/Cold" condition to be less competent/credible than did the high NFC individuals (p=0.074). For high NFC individuals, the "Real/Warm" condition was perceived to be slightly less competent/credible than the "None/Cold" condition was (p=0.074).

Behavioral Consequences of Trust

This section focuses on the behavioral consequences of trusting intention; (1) the link between trusting intention and self-disclosure behavior (Hypothesis 10); and (2) the link between trusting intention and persuasion (conversion behavior) (Hypothesis 11).

Experiential Shopping Goal
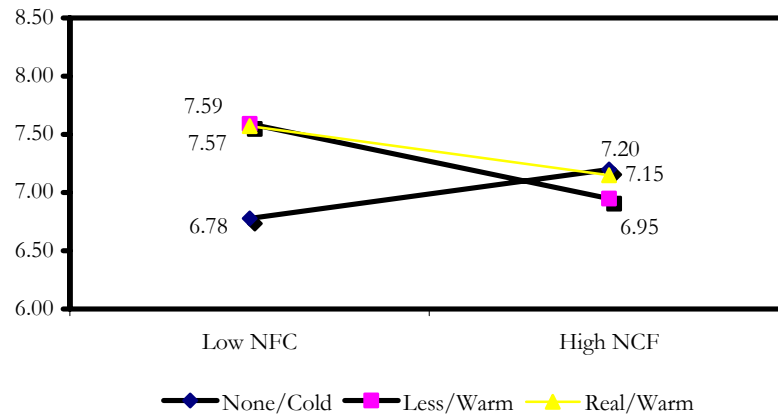
Instrumental Shopping Goal
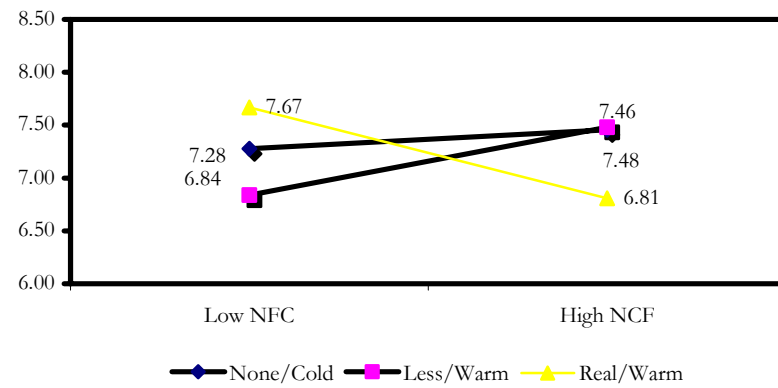
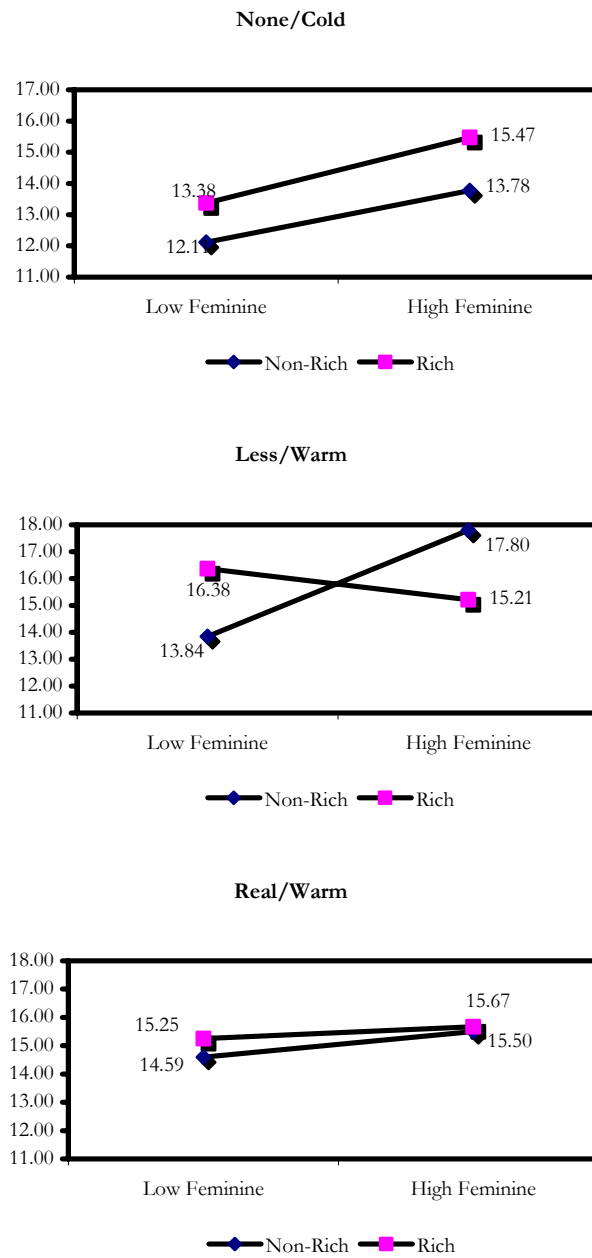**Figure 4-13. Three-Way Interaction of Social Interface, Need for Cognition, and Situation on Attitude (Segmented by Situation)**

Table 4-21. Univariate ANOVA Results of Need for Cognition, Social Interface, Situation, and Information Richness

| Source	DV	Type III SS	df	Mean Square	F	Sig.
Corrected Model	BENE [a]	211.312	16	13.207	1.360	.165
	COGTRUST [b]	225.615	16	14.101	.848	.630
Intercept	BENE	45284.245	1	45284.245	4661.896	.000
	COGTRUST	198469.962	1	198469.962	11934.086	.000
SOCINT	BENE	59.193	2	29.597	3.047	.050
	COGTRUST	8.582	2	4.291	.258	.773
SITU1	BENE	6.155	1	6.155	.634	.427
	COGTRUST	1.922	1	1.922	.116	.734
INFO1	BENE	6.096	1	6.096	.628	.429
	COGTRUST	18.902	1	18.902	1.137	.288
NCCENTER	BENE	32.309	1	32.309	3.326	.070
	COGTRUST	.721	1	.721	.043	.835
SOCINT * NCCENTER	BENE	44.069	2	22.035	2.268	.106
	COGTRUST	80.823	2	40.411	2.430	.091
SITU1 * NCCENTER	BENE	2.037	1	2.037	.210	.648
	COGTRUST	.350	1	.350	.021	.885
INFO1 * NCCENTER	BENE	15.583	1	15.583	1.604	.207
	COGTRUST	4.006	1	4.006	.241	.624
SOCINT * INFO1 * NCCENTER	BENE	4.937	2	2.468	.254	.776
	COGTRUST	32.608	2	16.304	.980	.377
SOCINT * SITU1 * NCCENTER	BENE	27.096	2	13.548	1.395	.250
	COGTRUST	49.398	2	24.699	1.485	.229
SITU1 * INFO1 * NCCENTER	BENE	21.311	1	21.311	2.194	.140
	COGTRUST	15.116	1	15.116	.909	.342
SOCINT * SITU1 * INFO1 * NCCENTER	BENE	14.477	2	7.239	.745	.476
	COGTRUST	25.824	2	12.912	.776	.461
Error	BENE	1903.884	196	9.714		
	COGTRUST	3259.580	196	16.631		
Total	BENE	48396.024	213			
	COGTRUST	207067.478	213			
Corrected Total	BENE	2115.196	212			
	COGTRUST	3485.195	212			

[a] $R^2 = .100$ (Adjusted $R^2 = .026$)   [b] $R^2 = .065$ (Adjusted $R^2 = -.012$)
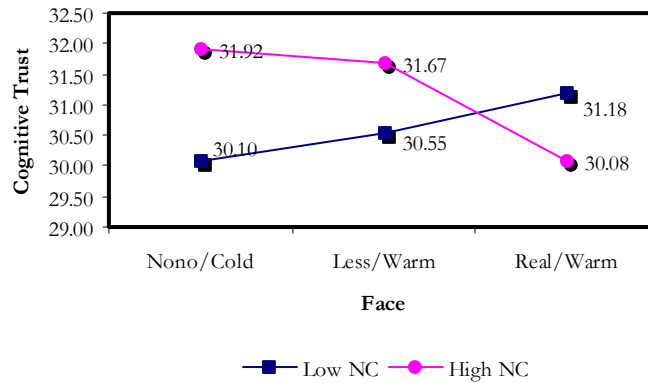
Figure 4-14. Interaction of Social Interface and Need for Cognition on Cognitive Trust

Self-Disclosure Behavior

In both Study 1 and Study 2, more than 95%[33] of the respondents answered the first four disclosure questions (age, major, place of birth, and number of siblings) that Agent *John* asked after the camera shopping and purchase The fifth question was more personal (What is your favorite memory? (Warm Script) / State your favorite memory (Cold Script)) and a number of respondents did not answer the fifth question/request. Forty-six out of 156 respondents in Study 1 (29.5%) and 64 out of 218 (29.4%) opted not to respond to this question. Respondents' self-disclosure behavior was tested employing logistic regression and whether or not the respondent answered this fifth question served as the binary dependent variable. Disclosure contents are found in Appendix D.

Data sets from Studies 1 & 2 were combined to examine the relationship between trusting intention and self-disclosure behavior. The purpose of this analysis was to test Hypothesis 10. Only one independent variable (trusting intention) entered the model. While Hosmer and Lemeshow Test indicated an acceptable fit (p=0.406), Table 4-22 showed that trusting intention is not a good predictor of self-disclosure behavior, thereby rejecting Hypothesis 10.

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[33] For example, in Study 1, only 3 respondents out of 156 respondents chose not to answer their age; 4 did not answer major; 7 did not answer hometown, and 6 did not anwer the number of siblings. In Study 2 out of 218 respondents did not answer answer age; 4 did not answer major; 18 did not answer hometown; and 2 did not answer the number of siblings.

Table 4-22. Logistic Regression - Trusting Intention on Self-Disclosure

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	TINT	-.002	.039	.004	1	.953	.998
	Constant	.932	.457	4.156	1	.041	2.538

Further analyses with other five trust-related factors showed that doubt, privacy/security, and information credibility might be significant predictors of disclosure behavior. Each model had an acceptable fit.[34] Hosmer and Lemeshow test for both the doubt model (p=0.338) (Table 4-23) and the information credibility model (p=0.178) (Table 4-24) were satisfactory. The fit of the privacy/security model was not good (Hosmer and Lemeshow Test, p=0.033) (Table 4-25). The effect of doubt on disclosure behavior was significantly negative (β= -0.136, p=0.003). The effect of information credibility on disclosure (β =0.111, p=0.038) and the effect of privacy/security on disclosure (β =0.133, p=0.030) were positively significant.

The effects of benevolence, and competence on disclosure were largely insignificant. These results suggest that individuals' perceptions related to doubt, information credibility, and primary/security concerns might directly influence disclosure behavior without being mediated by trusting intention.

Conversion Behavior

During the computer shopping simulation Agent *John* recommended a camera more expensive than the respondent's own earlier choice and advised the shopper to choose his recommendation over the shopper's choice. This recommended camera had two upgraded features and was more expensive by 30% in Study 1 and by 10% in Study 2. In Study 1, only twelve out of 156 people (7.7%) adopted Agent *John*'s recommendation in Study 1. In Study 2, Agent *John* recommended the same upgraded features but the price increase was reduced to 10%. With this change, respondents' conversion increased up to 50.9%. One hundred eleven respondents out of 218 switched to Agent *John*'s recommendation.

In order to test Hypothesis 11, the link between trusting intention and persuasion (measured by conversion behavior), logistic regression was used. The dependent variable was whether or not the respondent gave up own choice to choose Agent *John*'s recommendation. The model had an acceptable fit (Hosmer and Lemeshow Test p=0.441).

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[34] Regression analysis was fit with one independent variable at a time, because these six trust-related factors were highly correlated (Table C-2) causing multicollinearity.

Table 4-23. Logistic Regression - Doubt on Self-Disclosure

	B	S.E.	Wald	df	Sig.	Exp(B)
DOUBT	-.136	.045	8.975	1	.003	.873
Constant	2.503	.553	20.486	1	.000	12.220

Table 4-24. Logistic Regression - Information Credibility on Self-Disclosure

	B	S.E.	Wald	df	Sig.	Exp(B)
INFOCRE	.111	.054	4.306	1	.038	1.117
Constant	-.770	.811	.903	1	.342	.463

Table 4-25. Logistic Regression - Privacy/Security on Self-Disclosure

	B	S.E.	Wald	Df	Sig.	Exp(B)
PRIVACY	.133	.061	4.713	1	.030	1.142
Constant	-.368	.600	.376	1	.540	.692

[Table 4-26](#) showed that the effect of trusting intention on conversion behavior was significantly positive (β =0.370, p=0.000). Therefore, Hypothesis 11 was supported.

Integration of Studies 1 and 2

The similarities and differences of Study 1 and Study 2 were as follows. Study 2 inherited three social interface conditions from Study 1. Study 2 also inherited the information prototype of Study 1 and used it for the information non-rich conditions. An important difference between these two studies was Agent *John*'s recommendation. As discussed earlier, the conversion rate in Study 1 was low and it was suspected that respondents were value-conscious shoppers so they were responding very sensitively to the 30% price increase if they were to switch to the Agent *John*'s recommendation. For this reason, the price increase of Agent *John*'s recommended camera was reduced to 10% in Study 2. This price difference between Studies 1 and 2 created an interesting manipulation factor, i.e., price upgrade (2: 30%, 10%).

It should be noted that the three social interface conditions (3: No Face/Cold Script; Less Face/Warm Script; Real Face/Warm Script) were kept constant throughout the two studies. By combining the data sets from Study 1 and Study 2, a complete 2 (price upgrade) * 3 (social interface) between subject design emerged. When merging the data sets from both studies, the unnecessary five face/script conditions in Study 1 as well as information rich condition in Study 2 are removed, resulting in a total of 167 respondents (See [Appendix A](#) for the breakdown of respondents for each manipulation condition).

However, interpreting the results combining both studies, caution should be used. Not only the price upgrade percentage, but also the date/time of experimentation, subject pool, and other factors varied across both studies. While the most significant variation was the price upgrade, the other factors may have confounded the price factor as well.

Price Upgrade and Social Interface Factors and Trust Perceptions

The multivariate effect of the social interface factor on trust perceptions was significant (Pillai's Trace=0.098, $F_{4,320}$ = 0.098, p=0.003; Wilks' Lambda=0.902, $F_{4, 318}$ =4.203, p=0.003) and the effect of price upgrade was also marginally significant (Pillai's Trace=0.029, $F_{2,159}$ = 0.096, p=2.376; Wilks' Lambda=0.971, $F_{2,159}$ =0.029, p=0.096).

Table 4-26. Logistic Regression: Trusting Intention on Conversion Behavior

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	TINT	.370	.049	58.221	1	.000	1.448
	Constant	-5.227	.611	73.172	1	.000	.005

However, the interaction of the social interface factor and price upgrade was not significant (Pillai's Trace=0.010, $F_{4,320}$= 0.405, p=0.805; Wilks' Lambda=0.990, $F_{4,\ 318}$ =0.402, p=0.807). In addition, the trusting personality control variable had only a marginally significant effect on individuals' trust perceptions about Agent *John* (Pillai's Trace=0.034, $F_{2,159}$= 2.774, p=0.065; Wilks' Lambda=0.966, $F_{2,159}$ =2.744, p=0.065).

The univariate ANCOVA results are found in Table 4-27. It should noted that the social interface factor (face/script combined) affected the benevolence perception ($F_{2,160}$=7.726, p=0.001), but not cognitive trust ($F_{2,160}$=0.642, p=0.528). On the other hand, price upgrade influenced cognitive trust ($F_{1,160}$=4.572, p=0.034), but not the benevolence perception ($F_{1,160}$=2.393, p=0.124). Importantly, these results demonstrate that cognitive and affective routes of enhancing consumer trust may exist separately from each other. Thus Hypothesis 4 was supported.

Figure 4-15 illustrates the two main effects using LS means that were evaluated at the point where the covariate tsum was set to 6.0875. The main effect of price upgrade was demonstrated in both figures. Individuals perceived Agent *John* to be more competent and more benevolent, regardless of face/script conditions, when he recommended a product with a 10% price increase than he recommended the same upgrade with a 30% price increase (p=0.034). Among the three social interface conditions, respondents' perception of Agent *John*'s benevolence was most positive when he appeared with the less human-like face using the warm script (Figure 4-15). Both pricing conditions under the "Less/Warm" condition were significantly different from the "None/Cold" condition (30%, p= 0.004; 10% p=0.012).

In Figure 4-15, the differences of individual perceptions about Agent *John*'s competence/ credibility between the 30% and the 10% conditions seemed to be greater in the no face/cold script condition (p=0.067) and the real face/warm script condition (p=0.073) than the less human-like face/warm script condition (p=0.594). Note that this middle face condition ("Less/Warm") was perceived to be the most benevolent among the three. The 30% price increase could have made respondents suspect Agent *John*'s motives. However, when Agent *John* instilled a higher level of benevolent trust under the "Less/Warm" conditions, respondents might be able to overcome their doubts about Agent *John*'s competence.

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Table 4-27. Univariate ANCOVA Results on Trust perceptions

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	COGTRUST[a]	209.271	6	34.878	2.171	.048
	BENE[b]	227.728	6	37.955	3.669	.002
Intercept	COGTRUST	66313.118	1	66313.118	4127.399	.000
	BENE	14528.712	1	14528.712	1404.354	.000
SOCIAL	COGTRUST	20.634	2	10.317	.642	.528
	BENE	159.865	2	79.933	7.726	.001
UPGRADE	COGTRUST	73.453	1	73.453	4.572	.034
	BENE	24.754	1	24.754	2.393	.124
SOCIAL*UPGRADE	COGTRUST	20.607	2	10.303	.641	.528
	BENE	3.952	2	1.976	.191	.826
TSUM	COGTRUST	82.966	1	82.966	5.164	.024
	BENE	32.663	1	32.663	3.157	.077
Error	COGTRUST	2570.650	160	16.067		
	BENE	1655.276	160	10.345		
Total	COGTRUST	154381.776	167			
	BENE	35943.675	167			
Corrected Total	COGTRUST	2779.920	166			
	BENE	1883.004	166			

[a] $R^2 = .075$ (Adjusted $R^2 = .041$) [b] $R^2 = .121$ (Adjusted $R^2 = .088$)
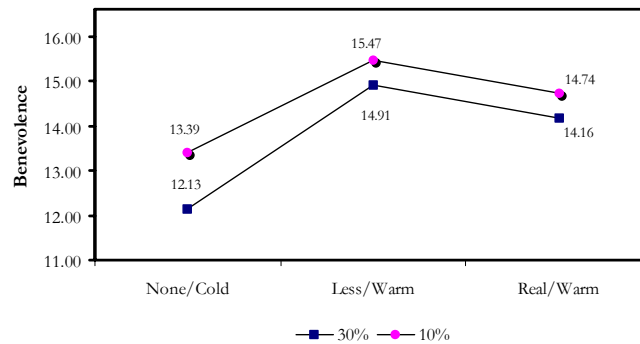
Figure 4-15. Main Effects of Social Interface Factor and Price Upgrade

Feminine Orientation and Trust Perceptions

The moderating influence of feminine orientation was tested employing MANCOVA. The multivariate effect of the social interface factor on trust perceptions was again significant (Pillai's Trace=0.105, $F_{4,310}$ = 4.293, p=0.002; Wilks' Lambda=0.895, $F_{4, 308}$ =4.375, p=0.002) and the effect of price upgrade was also marginally significant (Pillai's Trace=0.038, $F_{2,154}$ = 3.017, p=0.052; Wilks' Lambda=0.962, $F_{2,154}$ =3.017, p=0.052). The interaction of the social interface factor and price upgrade was not significant (Pillai's Trace=0.018, $F_{4,310}$= 0.714, p=0.583; Wilks' Lambda=0.990, $F_{4, 318}$ =0.402, p=0.807).

One two-way interaction, the interaction between price upgrade and feminine orientation, was found marginally significant (Pillai's Trace=0.038, $F_{2,154}$= 3.013, p=0.052; Wilks' Lambda=0.962, $F_{2,154}$ =3.013, p=0.052). The interaction of the social interface factor and feminine orientation (Pillai's Trace=0.0226 $F_{4,310}$= 1.004, p=0.406; Wilks' Lambda=0.974, $F_{4,308}$ =1.004, p=0.406) and the three way interaction (Pillai's Trace=0.025, $F_{4,310}$= 0.974, p=0.422; Wilks' Lambda=0.975, $F_{4,308}$ =0.973, p=0.422) were found to be insignificant. Table 4-28 presents the univariate ANCOVA results.

Contrast analysis was conducted and a significant difference in benevolence was found between the no face/cold script condition and the less human-like face/warm script condition (p=0.000) but not between the two face conditions with varying face human-likeliness (p=0.428). The differences among the three social faces on cognitive trust were all insignificant (p=0.196, p=0.700). On the other hand, there was a significant difference between the 30% price upgrade and the 10% price upgrade in cognitive trust (p=0.019). In addition, there was a marginal difference between the two price conditions in benevolence perception (p=0.064).

The significant interactions between price upgrade and feminine orientation on benevolent and cognitive trust are illustrated in Figure 4-16. Regarding cognitive trust, individuals with high feminine orientation responded more negatively to the price increase than low feminine individuals did. That is, when Agent *John* recommended a 30% more expensive alternative, high feminine individuals' perceptions about Agent *John* deteriorated to a greater extent than when Agent *John* recommended a 10% more expensive camera (LS Means 31.09 (10%) vs. 28.56 (30%), p=0.027). For low feminine individuals the difference in cognitive trust perception due to price was not significant (LS Means 30.23 (10%) vs. 29.78 (30%), p=0.560).

High feminine individuals also responded more sensitively to the price increase than low feminine individuals did regarding benevolent trust. The price difference was significant for the high feminine individuals (p=0.042), but not for the low feminine individuals (p=0.579).

Table 4-28. Univariate ANCOVA Results – Feminine Orientation and Trust perceptions

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	COGTRUST	243.463	11	22.133	1.353	.201
	BENE	349.584	11	31.780	3.212	.001
Intercept	COGTRUST	136809.442	1	136809.442	8360.268	.000
	BENE	30448.849	1	30448.849	3077.807	.000
SOCIAL	COGTRUST	31.295	2	15.647	.956	.387
	BENE	160.184	2	80.092	8.096	.000
UPGRADE	COGTRUST	91.523	1	91.523	5.593	.019
	BENE	34.333	1	34.333	3.470	.064
SOCIAL * UPGRADE	COGTRUST	39.284	2	19.642	1.200	.304
	BENE	12.940	2	6.470	.654	.521
FECENTER	COGTRUST	.246	1	.246	.015	.903
	BENE	21.808	1	21.808	2.204	.140
UPGRADE * FECENTER	COGTRUST	87.588	1	87.588	5.352	.022
	BENE	38.064	1	38.064	3.848	.052
SOCIAL * FECENTER	COGTRUST	2.326	2	1.163	.071	.931
	BENE	33.501	2	16.750	1.693	.187
SOCIAL * UPGRADE * FECENTER	COGTRUST	8.128	2	4.064	.248	.780
	BENE	34.103	2	17.052	1.724	.182
Error	COGTRUST	2536.458	155	16.364		
	BENE	1533.420	155	9.893		
Total	COGTRUST	154381.776	167			
	BENE	35943.675	167			
Corrected Total	COGTRUST	2779.920	166			
	BENE	1883.004	166			

[a] R^2 = .088 (Adjusted R^2 = .023) [b] R^2 = .186 (Adjusted R Squared = .128)

Cognitive Trust
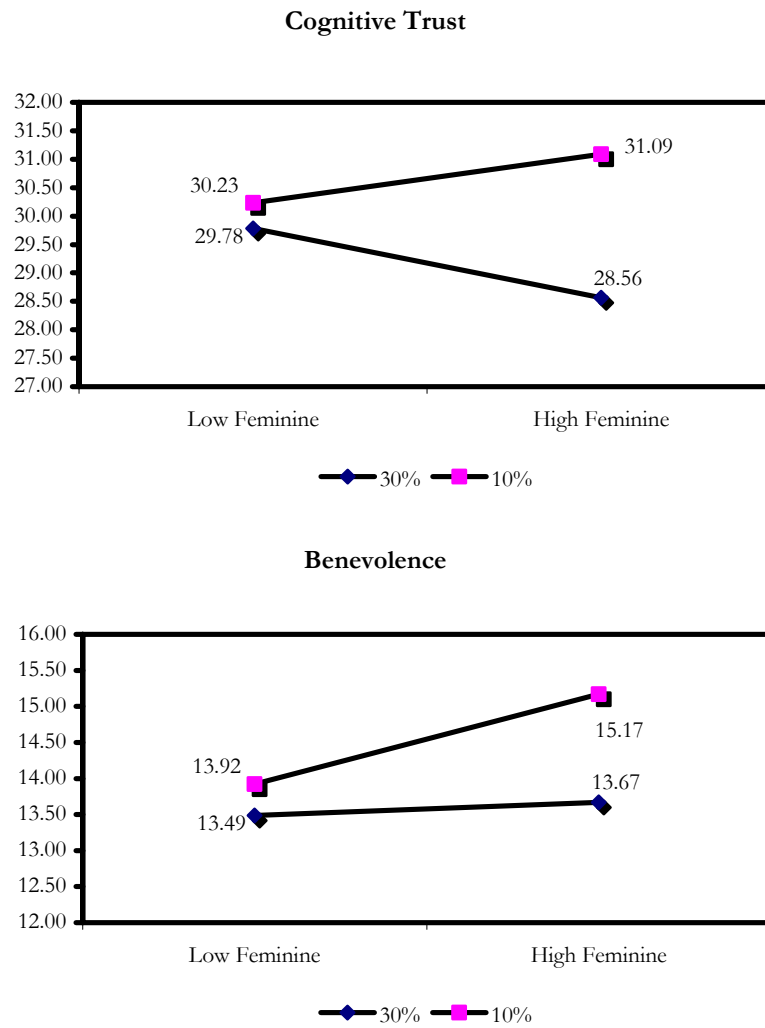
Benevolence

Figure 4-16. Interaction Effect of Upgrade Percentage and Feminine orientation on Cognitive Trust and Benevolence

Interface Factors and Behavioral Consequences

Self-Disclosure Behavior

Study 1

Logistic regression was used in order to investigate which manipulation condition was the most effective in enhancing respondents' self-disclosure behavior in Study 1. The coding scheme for categorical variables in Study 1 is found in Table 4-29. The dependent variable was whether the respondents did not answer (=0) or answered (=1) a question about their favorite memory.

The estimated model had little explanatory power. Table 4-30 showed that the warm script, compared to the cold script, more likely to cause non-response, i.e., is less likely to induce respondents' self-disclosure (p=0.035).

Study 2

Logistic regression was run employing the social interface factor, information richness, and situation as the three independent variables in Study 2 (See Table 4-31 for categorical variable coding scheme). The model had little explanatory power. Table 4-32 showed that compared to the respondents in "None/Cold", those in "Less/Warm" (p=0.035) and "Real/Warm" (p=0.045) were less likely to disclose their memory to Agent *John*.

Studies 1 & 2 Combined

Logistic regression combining both data sets was used in order to investigate which manipulation condition was effective in enhancing respondents' self-disclosure behavior. The coding scheme for the independent variables is found in Table 4-33.

The logistic regression model explained less than 5% of total variance. None of the independent variables had a significant effect on disclosure behavior. Interestingly, a marginal significance was found (p=0.069) for the real face/warm script condition (Table 4-34). It appeared that respondents were less likely to disclose their favorite memory when Agent *John* had a real face and used the warm script that he had no face and used the cold script. Interestingly, individuals' trusting personality did not affect their disclosure behavior at all (p=0.996). See Appendix D for disclosure contents.

Table 4-29. Categorical Variables Codings (Study 1)

		N	Parameter coding		
FACE1	None (Base)	36	.000	.000	.000
	Less	43	1.000	.000	.000
	More	36	.000	1.000	.000
	Real	41	.000	.000	1.000
SCRIPT1	Cold (Base)	71	.000		
	Warm	85	1.000		

Table 4-30. Logistics Regression Results – Self-Disclosure (Study 1)

	B	S.E.	Wald	df	Sig.	Exp(B)
FACE1			1.623	3	.654	
FACE1(1)	-.073	.522	.019	1	.889	.930
FACE1(2)	-.104	.543	.036	1	.849	.901
FACE1(3)	-.557	.511	1.185	1	.276	.573
SCRIPT1(1)	-.785	.372	4.463	1	.035	.456
Constant	1.530	.449	11.593	1	.001	4.617

*-2 Log likelihood = 83.152, Cox & Snell R Square=.038 Hosmer and Lemeshow test p=0.935

Table 4-31. Categorical Variables Codings (Study 2)

		N	Parameter coding	
FACE1	None/Cold (Base)	75	.000	.000
	Less/Warm	76	1.000	.000
	Real/Warm	62	.000	1.000
SITU1	Experiential (Base)	109	.000	
	Instrumental	104	1.000	
INFO1	Non-Rich	103	.000	
	Rich	110	1.000	

Table 4-32. Logistic Regression Results – Self-Disclosure (Study 2)

	B	S.E.	Wald	df	Sig.	Exp(B)
FACE1			5.406	2	.067	
FACE1(1)	-.790	.376	4.422	1	.035	.454
FACE1(2)	-.789	.393	4.034	1	.045	.454
INFO1(1)	-.180	.304	.350	1	.554	.835
SITU1(1)	.089	.304	.085	1	.771	1.093
Constant	1.438	.368	15.270	1	.000	4.212

*–2 Log Likelihood=254.158, Cox & Snell R Square=.029, Hosmer and Lemeshow test p=0.627

Table 4-33. Categorical Variables Codings (Combined)

		N	Parameter coding	
			(1)	(2)
SOCIAL	None/Cold (Base)	54	.000	.000
	Less/Warm	62	1.000	.000
	Real/Warm	51	.000	1.000
UPGRADE	30% (Base)	64	.000	
	10%	103	1.000	

Table 4-34. Logistics Regression Results – Self-Disclosure (Combined)

	B	S.E.	Wald	df	Sig.	Exp(B)
SOCIAL			3.326	2	.190	
SOCIAL(1)	-.486	.428	1.287	1	.257	.615
SOCIAL(2)	-.799	.439	3.309	1	.069	.450
UPGRADE(1)	.325	.345	.888	1	.346	1.384
TSUM	-.004	.030	.017	1	.896	.996
Constant	1.066	.429	6.190	1	.013	2.905

*-2 Log Likelihood=202.598, Cox and Snell R^2=0.027, Hosmer and Lemeshow test p=0.979

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Conversion Behavior

Study 1

Conversion behavior here refers to switching to Agent *John*'s recommendation. The frequencies for conversion behavior are presented in Appendix C Table C-15. Logistic regression was used to examine most effective condition in inducing individuals' conversion behavior. The coding scheme for categorical variables in Study 1 is found in Table 4-29. The dependent variable was whether the respondent switched (=1) to the Agent *John*'s recommended camera or remained with own early choice of camera (=0). Table 4-35 showed that respondents were less likely to be persuaded by the warm script than by the cold script (p=0.041).

Study 2

The frequencies for conversion behavior are presented in Appendix C Table C-16. Logistic regression was fit to investigate the respective effect of each manipulation variable in Study 2. The coding scheme for categorical variables in Study 2 is found in Table 4-31. Table 4-36 showed no significant effect. Only marginally p=0.098), respondents in "Less/Warm" were less likely to switch to Agent *John*'s advice than respondents in "None/Cold."

Studies 1 & 2 Combined

The frequencies for conversion behavior are presented in Appendix C Table C-17. The coding scheme for the disclosure behavior (Table 4-33) was used for the analysis of persuasion. This model had a better fit than the disclosure model. Trusting personality had no significant effect upon individuals' conversion behavior. Price upgrade of 10% was approximately much more likely to result in conversion behavior than the 30% upgrade was (β=2.764, p=0.000) (Table 4-37).

Contrary to conventional wisdom, both the "Less/Warm" (β=-1.170, p=0.010) and "Real/Warm" (β=-0.999, p=0.038) interfaces were less likely to induce conversion behavior, compared to the no face/cold script condition. Considering the fact that respondents perceived the interfaces employing the warm script as having a higher level of social presence than those with the cold script, this finding indicates a clear disconnect between respondents' benevolence perception and their actual conversion behavior.

Table 4-35. Logistic Regression Results - Conversion (Study 1)

	B	S.E.	Wald	df	Sig.	Exp(B)
FACE1			.366	3	.947	
FACE1(1)	-.009	.870	.000	1	.992	.991
FACE1(2)	-.436	.961	.206	1	.650	.647
FACE1(3)	.104	.817	.016	1	.899	1.110
SCRIPT1(1)	-1.421	.695	4.184	1	.041	.242
Constant	-1.785	.640	7.775	1	.005	.168

*-2 Log Likelihood=77.845, Cox & Snell R Square=0.035, Hosmer and Lemeshow Test=0.738

Table 4-36. Logistic Regression Results - Conversion (Study 2)

	B	S.E.	Wald	Df	Sig.	Exp(B)
FACE1			10.921	2	.004	
FACE1(1)	-1.119	.339	10.919	1	.001	.327
FACE1(2)	-.579	.350	2.731	1	.098	.561
INFO1(1)	.049	.282	.031	1	.861	1.051
SITU1(1)	-.124	.282	.194	1	.660	.883
Constant	.613	.319	3.700	1	.054	1.846

*-2 Log Likelihood=283.766, Cox & Snell R Square =0.053, Hosmer and Lemeshow Test p=0.726

Table 4-37. Logistics Regression Results - Conversion (Combined)

	B	S.E.	Wald	df	Sig.	Exp(B)
SOCIAL			7.554	2	.023	
SOCIAL(1)	-1.170	.457	6.568	1	.010	.310
SOCIAL(2)	-.999	.481	4.321	1	.038	.368
UPGRADE(1)	2.764	.568	23.718	1	.000	15.869
TSUM	-.019	.034	.325	1	.569	.981
Constant	-1.946	.585	11.073	1	.001	.143

*-2 Log Likelihood=161.641, Cox and Snell R^2=0.245, Hosmer and Lemeshow Test p=0.726

Summary of Hypotheses Testing

A summary of hypotheses testing is presented in Table 4-38. Discussions of the test results are offered in the next chapter as they relate to the research questions.

Table 4-38. Summary of Hypotheses Testing

	Independent (Antecedent) Variables	Dependent Variables	Result	Analysis
H1a	Face Human-Likeliness	Attitude	Partial (+, Cold Script) (S1) Not Supported (S2)	ANOVA
H1b	Face Human-Likeliness	Trust Perceptions	Partial (+, Cold Script) (S1) Partial (Confounded), (+, Marginal) (S2)	MANCOVA
H2a	Script Social Presence	Attitude	Partial (+) (S1) Not Supported (S2)	ANOVA
H2b	Script Social Presence	Trust Perceptions	Supported (+) (S1) Partial (Confounded), (+, Marginal) (S2)	MANCOVA
*	Face * Script	Attitude	Marginal (S1)	ANOVA
*	Face * Script	Trust Perceptions	Partial (Cog Trust), Marginal (S1)	MANCOVA
H3a	Information Richness	Attitude	Supported (+, Marginal) (S2)	ANOVA
H3b	Information Richness	Trust Perceptions	Not Supported (S2)	MANCOVA
*	Price Upgrade	Trust Perceptions	Significant (-, Marginal) (C)	MANCOVA
H4	Face, Script	Benevolence	Supported (+) (S1, S2)	ANCOVA
H4	Information Richness	Cognitive Trust	Not Supported (S2)	ANCOVA
*	Price Upgrade	Cognitive Trust	Significant (-) (C)	ANCOVA
H5	Benevolence	Trusting Intention	Supported (+) (C)	Second-Order CFA
	Cognitive Trust	Trusting Intention	Supported (+) (C)	Second-Order CFA
H6	Psychological Gender Orientation Feminine Orientation (FO) Moderation	Trust Perceptions	Partially Supported (Feminine Orientation) Generally Supported	MANCOVA
	FO * Face		Not Significant (S1)	
	FO * Script		Significant, Partial (Cog Trust) (S1)	
	FO * Face * Script		Significant, Partial (Cog Trust) (S1)	
	FO * Social Interface		Significant, Partial (Cog Trust) (S1)	
*	FO * Information Richness		Significant, Partial (Benevolence) (S2)	
*	FO * Situation		Marginal, Partial (Benevolence) (S2)	
*	FO * Price Upgrade		Marginal (C)	
	Feminine Orientation Moderation	Attitude	Not Supported (S1, S2)	ANCOVA
	Masculine Orientation (MO) Moderation	Trust Perceptions	Generally Not Supported	MANCOVA
	MO * Face		Not Significant (S1)	
	MO * Script		Not Significant (S1)	
	MO * Face * Script		Marginal, Partial (Cognitive Trust) (S1)	
	Masculine Orientation Moderation	Attitude	Not Supported (S1)	ANCOVA
H7	Need for Association(NA) Moderation	Trust Perceptions	Partially Supported	MANCOVA
	NA * Face		Significant, Partial (Cog Trust) (S1)	
	NA * Script		Not Significant (S1)	
	NA * Face * Script		Not Significant (S1)	
	Need for Association Moderation	Attitude	Partially Supported	ANCOVA
	NA * Face		Supported (S1)	
	NA * Script		Not Supported (S1)	
	NA * Face * Script		Not Supported (S1)	

Table 4-38. Continued

	Independent (Antecedent) Variables	Dependent Variables	Result	Analysis
H8	Need for Cognition (NFC) Moderation	Trust Perceptions	Generally Not Supported	MANCOVA
	*NFC * Information Richness*		Not Supported (S2)	
*	NFC * Social Interface		Marginal (S2), Partial (Cog Trust)	
	Need for Cognition	Attitude	Generally Not Supported	
	*NFC * Information Richness*		Not Supported (S2)	
*	NFC * Social Interface		Marginal (S2)	
*	NFC * Social * Situation		Marginal (S2)	
*	Trusting Personality	Trust Perceptions	(+) Cog Trust, Benevolence (S1) (+) Cog Trust (S2)	MANCOVA
H 9	Situation Moderation		Generally Not Supported	
	*Situation * Social Interface*	Trust Perceptions	Not Supported (S2)	MANCOVA
	*Situation * Social Interface*	Attitude	Not Supported (S2)	ANCOVA
	*Situation * Information Richness*	Trust Perception	Not Supported (S2)	MANCOVA
	*Situation * Information Richness*	Attitude	Not Supported (S2)	ANCOVA
H10	Trusting Intention	Self-Disclosure	Not Supported (C)	Logistic Regression
*	Information Credibility	Self-Disclosure	Significance (+) (C)	Logistic Regression
*	Doubt	Self-Disclosure	Significance (+) (C)	Logistic Regression
*	Privacy/security	Self-Disclosure	Significance (+) (C)	Logistic Regression
H11	Trusting Intention	Persuasion (Conversion)	Supported (+) (C)	Logistic Regression
H12	Trusting Intention	Satisfaction	Supported (+) (C)	SEM
	Trusting Intention	Retention	Supported (+) (C)	SEM

*	indicates that this particular effect was tested but no hypothesis had been developed.
(+)	a positive relationship
(-)	a negative relationship
(S1)	Study 1
(S2)	Study 2
(C)	Studies 1 & 2 Combined

CHAPTER 5

DISCUSSION AND CONCLUSION

Discussion on Research Findings

While the proposed hypotheses predicted primarily main effects and simple moderating relationships based on the existing literature, the overall findings from Chapter 4 revealed that the relations between variables were far more complicated than what was originally predicted in the research hypotheses. The significant complexity found in the two experiments indeed reflects the multiplicity of the online environment and consumption goals which consumers face everyday. This complexity discovered in the two experiments sheds light on the research questions presented in Chapter 1 regarding the effects of certain interface factors and the moderating influences of individual and situational factors on consumer trust. The discussions on the research findings are offered in relation to the research questions.

Question 1. Trust-Enhancing Interface Design Factors

Q1-1. What interface strategies can be used to enhance consumers' trust in HCI? Is it possible to enhance consumer trust using human-like faces and warm scripts? (Social Interface) Will greater consumer trust be engendered by information richness? (Information Interface)

Social Interface Strategy

Consumer's trust was hypothesized to have both an affective and a cognitive basis. Thus two interface strategies to enhance consumer trust were proposed primarily influencing the affective, and the cognitive trust perceptions, respectively. The first interface strategy was aimed at enhancing the affective basis for trust by employing a social interface that had a human-like face coupled with warm, friendly language. The second strategy attempted to enhance the cognitive basis for trust by creating an information rich environment for shopping.

Overall, the first social interface strategy was successful in enhancing respondents' benevolence perception about a computer agent (Agent *John*). Specifically, an agent face low in human-likeliness (the

"Less" face condition) created a better attitude than the agent with no face. Also, a warm script created a marginally more positive attitude than the cold script.

It was found that script was a better means to enhance the benevolence perception about a computer agent than face was. The superiority of script over face in enhancing the benevolence perception may be caused by the fact that a still image of agent face was continuously projected on the upper-left corner of a computer screen whereas script constantly changed to provide new information to the respondents. While the effect of face on trust perceptions was generally insignificant, face did affect respondents' trust perceptions about agent competence/credibility through the interaction with the script. Interestingly, when the cold script was used, individuals saw the more human like face and the real face to be more competent/credible than the less human-like face or the no face. However, when the warm script was used, potentially positive effect of the warm script on cognitive trust seemed to decrease as the agent's face approached a human face.

Why does the real human face/warm script, at its highest level of human-likeliness and social presence, not create more positive trust perceptions? One explanation might be that respondents might develop a higher expectation about the agent's performance when the agent appeared /spoke similar to a real human agent. Given that the technical capability of agents in the current experimental setting was rather limited, respondents might have realized the mismatch between the human face and the machine behavior (as one respondent notes, "he was just a computer program"). Furthermore, consumers could typically have a deep-routed distrust in salespeople. When a computer agent looked like a human salesperson, the negative perceptions associated with salesman in general could have automatically triggered doubts in consumers' mind. This generic distrust in the salesperson could have been reinforced when Agent *John* suggested a product that was more expensive than the respondent's earlier choice. The warm script might have further led the respondent to suspect of the agent's motives.

Interestingly, it should be noted that in Study 1 the real human face coupled with the cold script was found to be the most effective in persuading respondents into changing their final decision to adopt Agent *John*'s recommendation (highest conversion rate). Four out of twelve people who adopted Agent *John*'s advice came from the "Real/Cold" condition (one of the eight interface variations); nine out of twelve came from the cold script conditions (Appendix C Table C-15). In addition, when the computer agent had a human or a somewhat human-like face trying to talk in a friendly manner, people were less likely to disclose their personal information, compared to when they faced the computer agent without any face. In Study 2, the highest conversion rate was observed in the "None/Cold" condition (one of the three interface variations). Forty-eight out of 107 converters came from the "None/Cold" conditions (Appendix C Table C-16). This reinforces the potential skeptical reaction as previously mentioned. One explanation might be that people typically hesitate to talk about their personal experience to strangers. When there was a no face and the script was basically mechanistic, individuals might have thought that

they were revealing their personal information only to a machine. On the other hand, having a face on the computer screen that looked and talked like a human being might have made the respondents realize the social reality of the conversation and stop revealing their intimate memory to a virtual stranger.

These results should be understood as a manifestation of the general rule in HCI: the more human-like a computer agent appears and talks, the stronger consumers' social responses to the agent will be. Because of this social reality of human-computer interaction, human-like agents may not always be the best interface strategy. After all, our impression of another social being can be both positive and negative. Thus, the more strongly a computer agent claims its human-like identity, the easier it gets for the agent to be subject to both positive *and* negative social cognitions associated with typical human relationships.

Information Interface Strategy

The second interface strategy was designed to create an information-rich environment so that the cognitive basis for trust could be enhanced. Since information processing is primarily a cognitive activity, it was naturally proposed that an enhancement of information richness would result in the enhancement of cognitive trust. It should be noted that in Study 2, information richness was manipulated primarily by information quantity, i.e., the number product attributes reviewed and the number of alternative products presented. The results of Study 2 found no significant main effect for information richness indicating that information richness as manipulated in Study 2 did not succeed in enhancing the cognitive basis for consumer trust.

Two things should be discussed regarding this non-significance. First, the failure to enhance cognitive trust through information richness in Study 2 could be a manipulation problem. Information richness could in fact be manipulated by varying information quality instead of quantity. That is, agents' product expertise/competence might be better exhibited if the agent had demonstrated the depth rather than the breadth of knowledge on a product category. Second, perhaps a more fundamental question is what really constitutes consumers' perceptions about a computer agent's competence? Perhaps a computer agent's competence could be better defined by carefully considering the primary role the agent plays.[35] Depending on the primary role required for a computer agent, definitions of agent competence could vary widely. Related to this, the integration of Studies 1 & 2 revealed a new fact. Perhaps a more effective way to have enhanced the cognitive basis for consumer trust in the current experimental settings

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[35] As discussed in Chapter 1, computer agents can be categorized into expert system, search agent, recommendation agent, negotiation agent, conversation agents, etc. If a user has a learning task, the level of expertise shown by the depth of information provided by agents may define the competence of expert agent system. For a search agent, the ability to search through a great number of sources (breadth) to provide information relevant to the user will be important. For a recommendation agent, the ability to find a product that not only matches user preference but also provides a good price deal could be important.

was for the agent to have recommended a product that could provide a better price-deal instead of showing more features or more cameras.

This suggests that information richness (i.e., more product choices) may not likely enhance trust for those consumers who are looking to reduce instead of increase their consideration set in arriving at a purchase decision. Agent *John* played various roles during the simulation, the last significant role being (hence salient in the respondents' mind) a product recommender. In sum, information richness, as manipulated in Study 2, may not have been the best strategy to enhance the cognitive basis for trusting Agent *John,* although it succeeded (marginally) in enhancing individuals' attitudes.

Q1-2. How will interface types differ in their relative weightings on the affective and cognitive trust? In other words, will interface types influence affective and cognitive trust perceptions differently?

It was earlier proposed that social interface design factors, such as face and script, affect the affective trust perception (benevolence) and that information interface design factors, such as information richness, affect the cognitive trust perceptions (competence, information credibility). Both studies revealed that the social interface factors did influence the benevolence perception, but it had no significant influence on cognitive trust. While information richness did not significantly affect any trust perception, the extent of price upgrade recommended by Agent *John* significantly influenced the cognitive trust perception and conversion behavior; however, price upgrade did not significantly affect the benevolence perception. Therefore, it was concluded that cognitive and affective routes to enhance consumer trust could exist separately. Interface-types did in fact differ in their relative weightings on the cognitive and the affective bases for consumer trust.

Interestingly, these findings offer a different view from Damasio (1994)'s assertation that emotion and cognition could be inseparable. Parrot and Schulkin (1993) had argued that emotion and cognition could not be separated physiologically because it is almost impossible to anatomically differentiate the two brain areas (Damasio 1994). This "integration" approach would suggest that when one would make an assessment of the trustworthiness of the other party, affective and cognitive processes would be activated interdependently. This dissertation found that at least in the agent-assisted online shopping environment, affective and cognitive assessment of trustworthiness could be separated. However, this is not to deny the potential synergy effect between affective and cognitive trust, i.e., if both feeling and cognitive assessment attest equally to an agent's trustworthiness, consumers will place even higher trust. Indeed, a significantly positive correlation ($\rho > 0.5$, $p < 0.001$) between benevolence and cognitive trust was found through the structural equation modeling analysis . It should be noted that one of the purposes of this dissertation was to identify two separate (cognitive and affective) routes to enhance consumer trust and the two routes were uniquely identified.

Question 2. Individual and Situational Moderators

Q2-1. How do individual difference factors, such as individual personality (e.g., feminine orientation, masculine orientation, need for cognition, need for association) moderate the types of computer interfaces that are preferred and trusted more?

One of the biggest contributions of this dissertation research is that it sheds light on the moderating influence of consumer personality on their trust perceptions. For an examination of the moderating influences of individual differences, psychological gender orientation including feminine orientation and masculine orientation, need for association, and need for cognition were measured and analyzed as they relate to the social and the information interface design factors employed in this research.

Psychological gender orientation was originally proposed by Sandra Bem (1974). She suggested that an individual's gender identity is culturally and psychologically defined. Because society defines the female identity with being soft, gentle, compassionate, affectionate, gullible, warm, and tender, individuals high in female orientation are believed to have such characteristics. On the other hand, society defines the male identity with characteristics such as being aggressive, dominant, forceful, independent, self-reliant, and willing to take risks. Naturally, a correlation analysis found the two personality traits, feminine orientation and masculine orientation, were negatively correlated (r= -0.183, p=0.000). However, it should also be noted that the correlation coefficient was rather low suggesting that feminine and masculine orientations did not have to be two conflicting forces and that there could be individuals who are high (or low) in both feminine and masculine orientations.

The manipulation of agent scripts in conveying benevolence was overall effective. It seemed that there was little ambiguity for the respondents to figure out how warm and friendly the agent was. However, because there was no real strong cue that signaled how competent or credible Agent *John* was, it seemed that respondents made cognitive inferences about Agent *John*'s competence/credibility. In doing so, their personality, more than anything else, seemed to determine the direction of their cognitive evaluation of Agent *John*.

For example, the results from Study 1 showed that respondents high in feminine orientation, compared to those low in feminine orientation, were more likely to perceive Agent *John* to be competent/credible, although Agent *John* provided a threat to trust by recommending a 30% more expensive alternative than their earlier choice.[36] A more prevalent tendency was the moderating influence of feminine orientation through interacting with the interface design factors. For example, individuals high in feminine orientation had a more positive evaluation of Agent *John* when he used the cold script than he used the warm script (except when there was no face). The positive effect of the cold script was

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[36] This positive main effect of feminine orientation was not found in Study 2 where Agent *John* recommended a 10% more expensive camera.

not as extensive for individuals low in feminine orientation as it was for individuals high in feminine orientation. Therefore, it can be said that scripts had differential impacts on a respondent's assessment of agent competence/information credibility. In addition, the significant three-way interaction of face, script, and feminine orientation revealed more detailed information on the relationship between feminine orientation and the interface design factors. High feminine individuals' preference for the cold script was observed, directionally, when Agent *John* had a face (including "Less," "More," and "Real") and it became significant when Agent *John* had a face where it was more human-like. When there was no face and the communication was solely based on text script, high feminine individuals preferred the warm script to the cold script.

When examined closely, the warmth or the coldness of agent script manipulation could also have been the manipulation of agent personality as being high or low in feminine orientation. For example, Agent *John* in the warm script would introduce himself "I am your personal shopping agent," and lead the shopper into the next section by saying "Let's learn about digital camera together." On the other hand, Agent *John* in the cold script would say "I am a computer-simulated shopping agent," and then projected the following line on the screen "Beginning the dialogue Protocol #0095. Topic-Digital Camera." When the user entered credit card information the warm Agent *John* said "Thank you," whereas the cold Agent *John* simply uttered "User Input Recorded" (See Appendix A Table A-4). When recommending another camera to the user, the warm Agent *John* tried to be considerate of the user's choice and said, "I really think you might enjoy this camera (*his recommendation*) better than VL-WD111 which is currently in your shopping cart." The cold Agent *John* simply told the user that "VQ-PL450 is recommended as a superior camera choice over VL-WD111 which is currently in your shopping cart."

Related to the discussion on agent script as an indicator of agent personality, the match and mismatch between the respondent personality and the agent personality and the positive (similarity attraction effect) and the negative (opposite attraction effect) effects of personality match should be of interest to CASA researchers. Moon (1996) had found a matching effect (similarity attraction effect) in her dissertation.

Individual preferences for a particular agent script that was similar to one's own personality was found in the no face, text-only condition in Study 1. When there was no significant cue, such as face, to help users overcome the ontological differences between the user and the computer, the similarity found in agent script seemed to help the user to evaluate the competence of the computer agent in a more favorable fashion.[37] With the inclusion of a human-like face, this similarity effect seemed to wash away.

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[37] This similarity attraction effect had been reported in Moon's (1996) dissertation. In her dissertation, the computer did not have human-like faces.

A face could help in establishing the social identity of a computer agent. Once the ontological similarity was established resulting from the face human-likeliness of a computer agent, interesting opposite attractions seemed to be operating. For example, low feminine individuals thought the agent with the warm script as being more competent/credible than the agent with the cold script (difference significant in the less human-like face condition). When there was a human-like face on the screen, high feminine individuals preferred the agent with the cold script to the agent with the warm script.

In Study 2, feminine orientation moderated the effect of the social interface factor, situation, and information richness upon consumer trust. Note that in Study 2, the agent's recommendation was within a more reasonable price range, thus presenting a reduced potential threat to consumer trust. High feminine individuals in Study 2 evaluated agent benevolence (only directional evidence) and competence/credibility (directional and significant evidence) more positively in the "None/Cold" condition than low feminine individuals did (opposite attraction even in the no face condition with reduced threat). The divergent findings regarding the main effect of feminine orientation in Studies 1 and 2 suggest the level of threat to trust (hence consumer risk perceptions) might be connected to the extent individuals would select an agent whose personality was similar or different from their own personality.

Interestingly, in Study 1 with potential threat (30% price upgrade) to trust, the best agents (among the eight interfaces) in terms of enhancing cognitive trust were "More/Cold"(33.33) for high feminine individuals and "Less/Warm"(31.20) for low feminine individuals. The worst interfaces were "None/Cold"(27.67) for high feminine individuals and "None/Warm"(26.22) for low feminine individuals. In Study 2 with a reduced threat to trust (10% price upgrade), the best agents (among the three interfaces) were "None/Cold/Rich Info"(32.59) for high feminine individuals and "Real/Warm/Rich Info"(32.06) for low feminine individuals. The worst agents were "Real/Warm/Rich Info"(29.13) for high feminine individuals and "None/Cold/Non-Rich" (29.89) for low feminine individuals. That is, with some exceptions, high feminine individuals seemed to respond negatively to the increasing level of human-likeliness and social presence. On the other hand, low feminine individuals' trust was enhanced with the increasing level of human-likeliness and information richness.

High feminine individuals also evaluated agent benevolence more positively in the experiential shopping situation than in the instrumental shopping situation. For individuals low in feminine orientation, an agent that provided more information was seen as being more benevolent than its counterpart that provided less information. This positive effect of information richness on benevolence was not found for individuals high in feminine orientation. These findings suggest that high feminine individuals could be more sensitive to affect-based priming. For individuals low in feminine orientation, information richness, a cognition-based priming, seemed to help their confidence in agent benevolence.

The moderating influence of masculine orientation on consumer trust was rather limited. Relative to the influence of feminine orientation, the effect of masculine orientation was meager at best in

both Studies 1 and 2. However, in Study 1 it was found that in the more human-like face conditions including "More" and "Real," high masculine individuals showed a higher level of cognitive trust for the cold script than the warm script, whereas low masculine individuals did not show any differences to the cold and warm scripts. Thus, it could be said that high masculine individuals were in general more sensitive response to the script manipulation.

The moderating influence of need for association (NA) was found from the interaction of face and need for association in Study 1. Individuals high and low in need for association showed differences in their inferences about agent competence in two face image conditions: "Less" and "More." These two face conditions projected computer-processed agent faces throughout the shopping simulation. It seemed that individuals high in need for association were more likely to accept these computer-generated agent faces as a competent shopping partner than individuals low in need for association were. The general tendency of high NA individuals to draw pleasure from associating with other people in a social setting might have transferred to the HCI setting involving the computer agents with graphically processed face images.

Need for cognition (NFC) was employed as a relevant personality variable in Study 2 as this study sought to examine the relationship between information richness and individuals responses to the information enhancement of a computer agent interface. Since previous research in consumer psychology consistently found that need for cognition guided the way individuals responded to augmented verbal information, it was expected that high NFC individuals would respond to the increase of information richness in a more positive fashion than low NFC individuals would. However, the results from Study 2 found no significant interaction between NFC and information richness. Rather, it was found that NFC moderated individuals' responses to the social interface factor and the pattern of effect was similar to feminine orientation.[38] High NFC individuals had a more positive evaluation of agent competence/credibility then low NFC individuals did in the "None/Cold" condition (31.92 vs. 30.10, p=0.074). However, perception about agent competence appeared to decrease (p=0.079) as agent human-likeliness and social presence were enhenced from "None/Cold" (31.92) to "Real/Warm" (30.08) whereas low NFC individuals perceived Agent *John*'s competence not to be significantly different with increasing human-likeliness and social presence. The best interfaces in terms of enhancing cognitive trust were "Less/Warm/Rich Info" (32.37) closely followed by "None/Cold/Rich Info" (32.34) for high NFC individuals and "Real/Warm/Rich Info" (31.76) for low NFC individuals. The worst interfaces were "Real/Warm/Rich Info" (29.79) for high HFC individuals and "None/Cold/Non-Rich" (29.89) for low NFC individuals.

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[38] It is interesting because a correlation analysis found no significant relationship between these two personality traits (r=0.065, p=0.208) (See Appendix C).

In the experiential shopping goal situation, low NFC individuals had a more positive attitude toward "Less/Warm" than toward "None/Cold" (p=0.026). The "Real/Warm" interface was also better liked than the "None/Cold" interface by low NFC individuals (p=0.030). However, high NFC individuals did not show significant differences toward the different social interface conditions. In the instrumental shopping goal situation, the "Real/Warm" condition was better liked than the "Less/Warm" conditions by low NFC individuals with a marginal significance (p=0.099).

In sum, it could be generally said that whether or not a consumer perceives a computer agent to be competent or not could be dependent upon the consumer's own personality. The significant interactions between individuals' personalities and the interface design variables suggest that there might be no single best way to enhance every consumer's trust perceptions. Because consumers are so diverse in their personalities, there is no guarantee that one particular interface design perceived positively by a particular individual with a certain personality trait would be evaluated equally positive by individuals with different personality traits.

Q2-2. How does a situational factor (e.g., salience of experiential vs. instrumental shopping goals) moderate the types of computer interfaces that are preferred and trusted more?

It was suggested that online shoppers could have distinct goals. In study 2 two goal situations were examined: experiential and instrumental. The salience of these shopping goals was manipulated through different shopping scenarios. Respondents were asked to read and imagine themselves in a situation described in a particular scenario. The results from Study 2 showed that the hypothesized relationships (i.e., a positive synergy between the experiential situation and the social interface and another positive relationship between the instrumental situation and information richness) in enhancing trust perceptions did not turn out to be significant. However, the expected interaction between information richness and situation was found in enhancing individuals' trusting intentions. Although marginally significant, information richness had more positive effect upon trusting intention in the instrumental goal condition than in experiential goal condition.

The indirect influence of the situation was evident only through the interaction between respondents' personality. For example, Study 2 found that high feminine individuals in general perceived agent benevolence more positively in the experiential situation than in the instrumental situation. A significant four-way interaction of situation, face/script, information richness, and feminine orientation was found in Study 2. The clear differences by situation were found at two places (Figure 4-15). When helped by the "Less/Warm" agent shopping with an experiential goal, high feminine individuals' perceptions about benevolence of the agent who provided relatively non-rich information were higher than low feminine individuals' benevolence perceptions about the particular agent (LS Means 17.80 (HF)

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vs.13.84 (LF)). The opposite effect emerged for the same interface with the instrumental shopping goal. Low feminine individuals' benevolence perceptions were more positive than high feminine individuals' benevolence perceptions were (LS Means 16.00 (LF) vs. 14.30 (HF)). Another difference was with the "Real/Warm" agent providing relatively more information. High and low feminine individuals were not different in their perceptions about Agent *John* in the experiential shopping situation. However, in the instrumental situation, high feminine individuals' benevolence perceptions were less positive than low feminine individuals' (15.97 (LF) vs. 12.00 (HF)).

In sum, it was concluded that the moderating influence of situation on consumer trust perception was secondary to the influence of consumer personality, at least in this experimental setting. A relatively weak scenario-based manipulation of situation might have contributed to this problem.[39] Again, the situational effect was found primarily in relation to feminine orientation.

Question 3. Trust Consequences

Q3. What are the consequences of trust? Does heightened trust facilitate consumer self-disclosure, purchase (conversion), satisfaction, and retention?

Potential consequences of trust were conceptualized in three major areas: (1) communication effectives (measured by self-disclosure behavior), (2) persuasion effectives (measured by conversion behavior), and (3) relationship effectiveness (measured by satisfaction/retention). In the conceptual model, trust perceptions (affected by interface manipulation) were thought to lead to trusting intention. Trusting intention would then affect self-disclosure behavior, conversion behavior, and satisfaction retention.

It was found that trusting intention was a significant predictor of conversion behavior, satisfaction and retention. That is, if consumers can develop trusting intention for a computer agent - based on the cognitive and affective trust perceptions, they are more likely to adopt the agent's upgrade advice (even if the advice involved price increase), be satisfied with the agent and come back to shop with the agent again.

However, no significant relationship was found between trusting intention and self-disclosure behavior. Instead, certain trust perceptions, such as information credibility, doubt, and privacy/security,

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[39] The scenario-based manipulation of situation might not have been consistent respondents' personal goals during the simulation experience (e.g., choosing the best-value digital camera for the prize money). There are chances for the respondents' personal goals may have confounded the prescribed situational goal. For example, respondents were told to "imagine" that they had an upcoming event (family gathering or job interview), or that they were a photographer, which in fact was a made-up scenario.

were found to be more powerful predictors of consumers' self-disclosure behavior. This suggests that disclosure behavior can be directly influenced by individuals' trust perceptions and that trusting intention does not necessarily mediate the relationship between trust perceptions and self-disclosure behavior.

Other Findings

Respondents' tendency to trust others, as a general personality trait, was used as a covariate in the MANCOVA analyses in both studies. The motivation to use this personality variable as a covariate was to ensure that any enhancement of trust perceptions was an outcome of the interface variations rather than respondents' inherent tendency to trust others, thereby establishing a causal relationship between the interface manipulation factors and the resultant trust perceptions. In the MANCOVA analyses, individuals' trusting tendency was found to be a siginificant predictor of their trust perceptions and this effect was highly significant in both studies.

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Contributions of This Dissertation Research

Theoretical Contribution

The foremost theoretical contribution of this dissertation research is the development of trust theory and the testing of the trust theory in a highly relevant marketing context. First, this research identified the cognitive, affective, and intentional aspects of consumer trust. This conceptualization of trust is a more integrative approach than the previous studies in marketing where primarily the cognitive aspect, i.e., confidence in Morgan and Hunt (1994), promise in Schurr and Ozanne (1985); or only the affective and cognitive aspects, i.e., credibility and benevolence (Doney and Cannon 1997, Ganesan 1994; Swan et al. 1988); or only the intentional aspect, i.e., willingness to rely on (Moorman, Zaltman, and Deshpande 1992) were considered.

The confirmatory factor analyses and structural equation models indicated that (1) all three aspects of trust (cognition, affect, and intention) could be uniquely identified; (2) cognitive trust consisted of competence and information credibility; (3) cognitive (cognitive trust) and affective trust (benevolence) perceptions were correlated; (4) positively and significantly leading to individuals' trusting intentions.

The examination of interface-driven antecedents and consequences (communication, persuasion, and relationship effectiveness) of consumer trust in the HCI context also extended the trust theory and provided useful information to marketers regarding how to go about enhancing consumer trust in order to harvest the desired consequences of enhanced consumer trust including consumer satisfaction, retention, and purchase. While the empirical examination of the trust theory focused on the

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computerized sales agent context, the author believes that the trust constructs are generic in nature and thus could be used in other exchange contexts.

This dissertation research tapped into the possibility of using a computer-simulated agent as an expert system to help consumers in their decision making and purchasing processes. How to design a computer agent that could evoke the perception of trustworthiness was another focal interest of this dissertation research. A computer-simulated agent, Agent *John*, was created and different faces/scripts were tried in order to discover a means to enhance consumer trust such that buyers could confidently believe that they were dealing with a reliable and friendly transaction partner. In doing so, this dissertation research also explored a new methodological possibility in advancing our knowledge about e-commerce and online consumer behavior. Computer-based simulation could add realism in examining consumer decision-making in the e-commerce environment. In the current study, respondents' online behavior could be automatically recorded and by combining behavioral measures with certain psychometric instruments, a more complete story about online consumer behavior could be told.

Managerial Implications

Recently, the Internet has created fertile ground for the commercial application of intelligent technologies such as shopping agents, or so-called "bots."(Kuchinskas 1999; Wilder 1998). Although the software agents currently found on the Internet are rather primitive, many (including the author) believe that computer agents have potential to grow to be a fully developed autonomous, artificial intelligence form having human-like personalities and social characteristics.

The application possibilities of humanized computer agents in marketing are many. The first application possibility is the use of computer agents to enhance customer relationship management. Marketing practitioners have long been aware of the need to build a good relationship with customers to ensure future business and profitability. The popular press frequently discusses CRM (customer relationship management) as a revolutionary concept for the future of marketing (Peppers and Rogers 1993; Brown 2000). However, the cost of cultivating and maintaining a good relationship with customers is not always inexpensive. The dynamic environmental changes in the business world and high turn over of human employees would financially justify the investment in computer agents as a respresentative of a company for a variety of marketing and customer service purposes.

Specific knowledge about how to design an agent interface as employed in this research can provide managerially useful information. Based on the results from the two experiments conducted as part of this dissertation, one general recommendation for agent interface design is customization. Human-like agent might not always be the best interface strategy to enhance consumer trust. Because of the social reality that a human-like agent face and script might bring to human-computer interaction,

caution should be used to choose the right face and script to facilitate positive social cognition about the computer agent. On a different note, emphasizing a computer agent's machine identity could also be a good strategy, because individuals tend to be less defensive and cautious about the machine's hidden motives. Another consideration is individual personality. It appeared that when there was not enough information to assess a computer agent's competence, individuals made inferences to fill the void and in doing so their own personality seemed to moderate how they perceived the particular agent's benevolence and competence/credibility.

Also, the insignificant role of information richness in enhancing consumer trust raised an interesting concern about the traditional approach of Internet marketing. Some popular analysts advise to "shower people with information" for effective marketing (Blanchard 1995). In fact, the results from Study 2 indicated that the agents that provided more information were not necessarily perceived to be more competent. Given the complexity of information generally found in the Internet, it would be important for computer agents to reduce (not exacerbate) information overload experienced by many online shoppers.

Future development of computer interfaces should aim at flexible adaptation of agents to meet the unique individual needs customizing for situational idiosyncrasies, and thus provide high performance and enjoyable experiences to consumers. While designing an adaptable agent interface could be a complicated process due to the diversity of consumer personality and the different consumption goals found in the market, practitioners can be assured that once they succeed in creating a trustworthy agent interface, conversion rate as well as customer satisfaction and retention will increase.

Limitations

Several issues had to be considered in designing experiments in HCI. First, it must be demonstrated that it was possible to enhance the perceived trustworthiness of computer interfaces by operating certain interface design factors to influence the affective and cognitive trust perceptions. Second, the affective (social interface) and the cognitive (information interface) antecedents of trust embedded in the interface design must be shown to correlate primarily with the affective, and cognitive, bases for trust, respectively. Third, respondents must recognize the relevant interface factors and make the psychological connection between the characteristics of the agent and their own personalities. Fourth, it must be shown that users assess the appropriateness of a particular interface type by considering its conduciveness to the accomplishment of an active goal.

While the two research experiments succeeded in general in enhancing the affective trust perception through the face and script manipulations, neither the hypothesized relationship between information richness and cognitive trust perception, nor the connection between the situation and the

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specific types of interface were found. Perhaps the manipulation of information richness as increasing number of attributes and alternatives may not have been the best way to positively affect the cognitive basis for trust. Perhaps a better manipulation of information richness could be a variation of the depth of information rather than the quantity of information. Integration of Studies 1 and 2 revealed that the percentage of price increase associated with the agent's upgrade recommendation might have been a better means to influence respondents' cognitive trust perceptions. Likewise, the scenario-based manipulation of situation employed in Study 2 may not have been strong enough to see the hypothesized interaction effect.

In addition, many effects in both studies were found to be only marginally significant. These marginally significant effects were enough to provide directional support for some of the research hypotheses. However, if there were more participants (thus increasing the statistical power), these marginally significant effects might have come out as statistically significant.

The technical limitation of Agent *John* should also be noted. While Agent *John* provided some interactivity, respondents did not have much control over Agent *John*'s behavior. The sequence or amount of information provided Agent *John* was predetermined and respondents had to follow his lead when looking at product information. Agent *John* also could not understand natural language, all user input was made by clicking on a button among a number of choices provided by Agent *John*.

The examination of consumer trust in this dissertation research focused on the interface antecedents of consumer trust in a computer agent. Consumer trust was only measured as it related to the specific computer agent. However, in the real setting, computer agents represent a brand or a company, thus individuals' prior experiences with a particular brand or the company and trust in those business entities are expected to influnce their trust and the decision to buy from a particular Web site.

Finally, this research examined the formation of initial trust; however, general trust is developed over considerable time. A follow-up study should consider the effect of the proposed trust antecedents and their effects on consumer trust in a longitudinal setting.

Future Research Directions

This dissertation research is among the first attempts in marketing to understand the potential role of human-like agents in enhancing consumer trust. There are many possibilities to extend the findings of the current studies and enrich our knowledge about agent-based marketing. In this section, a number of directions for future research are discussed.

One future research direction is to find an appropriate means to reinforce the cognitive route of building trust. Because computer agents can perform various tasks to meet diverse consumer needs, what interface factors influence consumers' perceptions about agent competence may vary. Future

research should investigate the foundations for agent competence considering the type of task an agent performs.

The second direction to be examined is determining the appropriate level of personification of agent as related to the level of authority required to be effective in a particular role. The research findings from this research warned against the use of a real human face in some cases. In fact, agents do not always require personification. Sometimes information transfer using a Web browser, dialog box, or a text document is enough to meet user needs (Johnson 1999, p.177). At any rate, social cognition is a cognitively effortful process and human-like agents can be cognitively expensive to process. On the other hand, there might be some cases where personification may be necessary for the agent to be effective. For example, highly specialized Internet sites providing professional or educational information such as Web MD or an Internet-based education site might need a "doctor" or "teacher" agents that appear similar to a human doctor or human teacher. For example, imagine a teacher agent assigning homework to students, or a doctor agent advising patients to exercise daily or to quit smoking. It would be intereating to see how much personification is necessary to facilitate desired behavioral changes from the users.

The third direction for future research is to further investigate the social responses of consumers to specific human-like characteristics of a computer agent. For example, how will agent gender or ethnicity affect consumer trust? Will individuals be more likely to trust the agents that are similar to themselves in social characteristics (e.g., age, ethnicity, gender, language, style, etc.)? In terms of defining similarity, will consumers use actual self-image or desired self-image as the standard for their evaluation and judgment?

The fourth direction is the comparison of biological gender and psychological gender orientations in relative influences on user responses to a specific computer agent. In this research, only psychological gender orientations were considered. However, earlier research in computer users reported significant differences by biological gender. Which gender divider has the greater explanatory power in HCI should be an interesting question also for gender researchers.

The fifth direction is the examination of trusting personality as a moderator of consumer trust decision and choice behavior. Although this dissertation employed trusting personality as a covariate in analyzing the date from both studies, it would be reasonable to assume that individuals' attitudes toward and their trust perceptions might also be moderated by their trusting personality. Those individuals high in trusting tendency may be likely to perceive a new partner to be trustworthy initially and give the benefit of doubt even when there is some negative information. Perhaps, it is easier to for individuals low in trusting tendency to activate the negative thoughts regarding a trustee even with some small evidence against the trustee. Perhaps those individuals high in trusting personality can inhibit such negative processing and hold their judgments until there is enough evidence to do so. In fact, the biggest challenge

facing online marketers today is how to change the negative perceptions of those individuals who are distrustful of online transactions. Discovering potential trust-enhancing strategies for those low in trusting tendency could be very beneficial in overcoming such public distrust in e-commerce.

The sixth direction is related to the appropriate level of media richness when designing computer agents. Agents could adopt a multitude or rich media. The agent used in the current study used only text-based communication and a still face image. It will be interesting to see how media richness, such as face animation and voice, affects consumers' social responses to computer agents.

The sixth direction is related to trust theory. While individuals' trusting intentions were significantly correlated with conversion behavior, the particular agent design that induced the highest conversion behavior did not exactly match the agent design that was perceived most benevolent or competent. Future research needs to investigate why there was such a disconnect between trust perceptions and actual behavior.

Finally, while the overall effectiveness of agent-based marketing will improve in the future as the technology advances rather rapidly, an important philosophical question to be asked is the potentially negative aspects of the extensive use of agents. Agents, in the name of efficiency, will filter out a significant amount of unnecessary information (unnecessary defined by the computer program) restricting our exposure to diversity (see Schumann 2002). By relying entirely on computer agents, could we be giving up our unique right as consumers (e.g., decision-making power)?

Conclusion

Summary

Trust is considered an essential ingredient in the development of the social and economic system. The lack of trust can cause problems in exchange relationships because people will hesitate to place their resources in the hands of an exchange partner who is deemed untrustworthy. Trust fosters effective cooperation (Lee and Moray 1994; Smith and Barclay 1997), increases future purchase intentions (Doney and Cannon 1997), and leads to satisfaction (Andaleeb 1996; Anderson and Narus 1990) and long-term orientation (Anderson and Weitz 1989; Ganesan 1994; Morgan and Hunt 1994).

Consumers' need to find a reliable trustworthy transaction partner increases when the level of product complexity and risk involved in purchase is high (De Ruyter, Moorman, and Lemmink 2001). Because trust is behaviorally manifested by "the willingness to increase one's vulnerability to another whose behavior is not under one's control (Zand, 1972, p. 230), Dasgupta (1988) notes that some degree of risk must be present so that there is a test of trust. The Internet and agent technology presents a

unique setting to examine consumer trust. Since the Internet is a relatively new, technically complex environment where human-computer interaction is the basic communication modality, there is a greater perception of risk facing consumers and hence a greater need for trust.

In this dissertation research, the notion of consumer trust was revisited and conceptually redefined by adopting an integrative perspective. A critical test of trust theory revealed its cognitive, affective, and intentional constructs. The theoretical relationships among these constructs were confirmed through confirmatory factor analysis and structural equation modeling.

The primary purpose of this dissertation was to investigate antecedent and moderating factors affecting consumer trust in human-computer interaction. Interface design factors including face human-likeliness, script social presence, and information richness, and upgrade recommendation were examined for their usefulness in enhancing the affective and cognitive bases for consumer trust in HCI. In addition, the role of individual difference and situational factors in moderating the relationship between specific types of computer interfaces and consumer trust was examined. Certain consequences of consumer trust were also investigated.

For empirical investigation, a computer agent, Agent *John*, was created using MacroMedia Authorware. The results of the two experiments showed that certain interface factors including face and script could affect individuals' affective trust perceptions. Information richness did not enhance consumers' cognitive trust perceptions. Instead, the percentage of price increase associated with the upgrade recommendation appeared to affect individuals' cognitive trust perceptions. Interestingly, the moderating influences of individual personality, especially feminine orientation, on trust perceptions were noteworthy. The consequences of enhanced consumer trust included increased conversion behavior, satisfaction and retention, and to a lesser extent, self-disclosure behavior.

Concluding Remarks

Count Claudio, a character in Shakespeare's play, *Much Ado About Nothing*, sighs to himself "trust no agent," when he mistakenly thought his friend was betraying him. Are consumers better off by not trusting the Internet and e-commerce technologies? Individual consumers' enduring distrust in the Internet can cause future underdevelopment of e-commerce, and many consumers may ultimately miss out on all the wonderful benefits that e-commerce technology can offer. In this dissertation research, computer agents are identified as a means to enhance consumer trust in HCI, and the effectiveness of certain agent characteristics were tested for their effectiveness in enhancing consumers' cognitive and affective trust perceptions.

Should consumers trust computer agents? The author finds the answer in the continuous endeavor of the e-commerce community, including researchers, scientists, and practitioners, to improve

the agent technology developing its technical, social, and moral intelligence to the extent to earn the full and wholesome (cognitive, affective, and intentional) trust from consumers. Then, consumer trust in computer agents can be truly well-placed.

BIBLIOGRAPHY

BIBLIOGRAPHY

Aaker, Jennifer (1997), "Dimensions of Brand Personality," *Journal of Marketing Research*, 34 (August), 347-357.

Aaker, Jennifer and Angela Lee (2001), ""I" Seek Pleasures and "We" Avoid Pains: The Role of Self-Regulatory Goals in Information Processing and Persuasion," *Journal of Consumer Research*, 28 (1), 33-49.

Achenbaum, Alvin A. (1999), "Retail Stores, not E-Commerce, Will Dominate," *Marketing Management*, Winter, 64.

Ackerman, Mark S., Lorrie Faith Cranor, and Joseph Reagle (1999), "Privacy in E-Commerce: Examining User Scenarios and Privacy Preferences," in *Proceedings of the ACM Conference on E-commerce*, Michael Wellman and Stuart Feldman Eds., pp. 1-8.

Adams, Gerald R. (1977), "Physical Attractiveness Research: Toward A Developmental Social Psychology of Beauty," *Human-Development*, 20(4), 217-239.

Akerlof, George (1970), "The Market for 'Lemons': Qualitative Uncertainty and the Market Mechanism," *Quarterly Journal of Economics,* 84, 488-500.

Alba, Joseph, John Lynch, Barton Weitz, Chris Janiszewski, Richard Lutz, Alan Sawyer, and Stacy Wood (1997), "Interactive Home Shopping: Consumer, Retailer, and Manufacturer Incentives to Participate in Electronic Marketplaces," *Journal of Marketing*, 61 (July), 38-53.

Allport, F. H. (1924), *Social Psychology*. Boston, MA: Houghton Mifflin.

Altman, Irwin and Dalmas A. Taylor (1973), *Social Penetration: The Development of Interpersonal Relationship*. New York, NY: Holt, Rinehart and Winston.

Andaleeb, Syed Saad (1996), "An Experimental Investigation of Satisfaction and Commitment in Marketing Channels: The Role of Dependence and Trust," *Journal of Retailing*, 72 (1), 77-93.

Andaleeb, Syed Saad and Syed Ferhat Anwar (1996), "Factors Influencing Customer Trust in Salespersons in a Developing Country," *Journal of International Marketing,* 4 (4), 35-52.

Anderson, Erin and Barton Weitz (1989), "Determinants of Continuity in Conventional Industrial Channel Dyads," *Marketing Science,* 8 (Fall), 310-323.

Anderson, James C. and James A. Narus (1990), "A Model of Distributor Firm and Manufacturer Firm Working Partnership," *Journal of Marketing*, 54 (January), 42-58.

Ansari, Asim, Skandar Essegaier, and Rajeev Kohli (2000), "Internet Recommendation Systems," *Journal of Marketing Research,* 37 (3), 363-375.

Argyle, M. (1991). *Cooperation; the Basis of Sociability*. Routledge, London.

Asimov, Isaac (1950), *I, Robot*. New York, Grosset & Dunlap.

Atkinson, B. et al. (1995), "IBM Intelligent Agents," Paper Presented at Unicom Seminar on Agent Software. London, UK, May 25.

Babin, Barry J., William R. Darden, and Mitch Griffin (1994), "Work and/or Fun: Measuring Hedonic and Utilitarian Shopping Value," *Journal of Consumer Research*, 20 (March), 644-656.

Baier, Annette (1986), "Trust and Antitrust," *Ethics,* 96, 231-260.

Barber, Bernard (1983), *The Logic and Limits of Trust.* Rutgers University Press. New Brunswick, New Jersey.

Barnes, Louis B. (1981), "Managing the Paradox of Organizational Trust," *Harvard Business Review,* 59, 107-117.

Barsalou, Lawrence W. (1991), "Deriving Categories to Achieve Goals," in *The Psychology of Learning and Motivation,* Vol. 27, ed. Gordon H. Bower, New York: Academic Press, 1-64.

Batra, Rajeev and Olli T. Ahtola (1990), "Measuring the Hedonic and Utilitarian Sources of Consumer Attitudes," *Marketing Letters,* 2 (2), 159-170.

Becker, Thomas (1998), "Integrity in Organizations: Beyond Honesty and Conscientiousness," *Academy of Management Journal*, 23 (1), 154-161.

Belk, Russell W. (1975), "Situational Variables and Consumer Behavior," *Journal of Consumer Research,* 2 (December), 157-174.

Bem, Sandra L. (1974), "The Measurement of Psychological Androgyny," *Journal of Counseling and Clinical Psychology,* 42 (2), 155-162.

Bem, Sandra L. (1981), "Gender Schema Theory: A Cognitive Account of Sex Typing," *Psychological Review*, 88 (4), 354-364.

Berkowitz, Leonard (1993), "Toward a General Theory of Anger and Emotional Aggression: Implications of the Cognitive Neoassociationistic Perspective for the Analysis of Anger and Other Emotions," in *Advances in Social Cognition*, Vol, 6, ed. Robert S. Wyer and Thomas K. Srull, Hillsdale, NJ:Erlbaum, 1-46.

Berscheid, Ellen and Elaine Hatfield Walster (1978), *Interpersonal Attraction*, Reading, MA: Addison-Wesley.

Bhattacharya, Rajeev, Timothy M. Devinney, and Madan M. Pillutla (1998), "A Formal Model of Trust Based on Outcomes," *Academy of Management Review,* 23 (3), 458-472.

Bird-David, Burit (1999), "Animism Revisited: Personhood, Environment, and Relational Epistemology," *Current Anthropology*, 40, S67-S91.

Bitner, Mary Jo, Stephen W. Brown, and Matthew L. Meuter (2000), "Technology Infusion in Service Encounters," *Journal of the Academy of Marketing Science*, 28 (Winter), 128-137.

Blanchard, Ken (1995), "Shower People With Information," *Executive Excellence*, 12, 11-12.

Blau, Peter (1964), *Exchange and Power in Social Life,* New York: John Wiley & Sons.

Bloch, Peter H. and Marsha L. Richins (1983), "A Theoretical Model for the Study of Product Importance Perceptions," *Journal of Marketing,* 47 (Summer), 69-81.

Bok, Sissela (1978), *Lying: Moral Choice in Public and Private Life.* New York: Pantheon Books.

Bond, Elizabeth K. (1972), "Perception of Form by the Human Infant," *Psychological Bulletin*, 77 (4), 225-245.

Boyd, John N. (1999), *A Theory of the Interaction of Affect and Cognition: It's About Time.* Unpublished Doctoral Dissertation. Stanford University.

Brosnan, M. and M. Davidson (1994), "Computerphobia: Is It a Particular Female Phenomenon," *The Psychologist,* 7, 73-38.

Brosnan, Mark J. (1998), *Technophobia: The Psychological Impact of Information Technology.* New York: Routledge.

Brown, Clark D. (2000), "Is CRM in Your Company's Future?" Trusts & Estates, June, 20-22, 58.

Brown, Dick (2001), "Trust in Job No. 1 in Growing the Digital Economy," *Computerworld*, 5 (4),

Burgoon, J. K., J. A. Bonito, B. Bengtsson, C. Cederberg, M. Lundeburg, and L. Allapach (2000), "Interactivity in Human-Computer Interaction: A Study of Credibility, Understanding, and Influence," *Computers in Human Behavior*, 16, 553-574.

Burns, Kenton L., and Ernst G. Beier (1973), "Significance of Vocal and Visual Channels in the Decoding of Emotional Meaning," *Journal of Communication,* 23 (1), 118-130.

Busch, Paul and David T. Wilson (1976), "An Experimental Analysis of a Salesman's Expert and Referent Bases of Social Power in the Buyer-Seller Dyad," *Journal of Marketing Research*, 13 (February), 3-11.

Business Week (2001), "Robots," March 19, 42-48.

Butler, J. K. (1991), "Toward Understanding and Measuring Conditions of Trust: Evolution of a Condition of Trust Inventory," *Journal of Management,* 17, 643-663.

Butler, John Jr. and Stephen R. Cantrell (1984), "A Behavioral Decision Theory Approach to Modeling Dyadic Trust in Superior and Subordinates," *Psychological Reports,* 55, 19-28.

Byrne, D. (1971), *The Attraction Paradigm*, New York: Academic Press.

Cacioppo, John T. and Richard E. Petty (1982), "The Need for Cognition," *Journal of Personality and Social Psychology,* 42 (January), 116-131.

Cacioppo, John T., Richard E. Petty, and C. Kao (1984), "The Efficient Assessment of Need for Cognition," *Journal of Personality Assessment,* 48, 306-307.

Cacioppo, John T., Richard E. Petty, and Katherine J. Morris (1983), "Effects of Need for Cognition on Message Evaluation, Recall, and Persuasion," *Journal of Personality and Social Psychology*, 45(October), 805-818.

Caldini, Robert B. (1988), *Influence: The Psychology of Persuasion.* Morrow, William & Co.

Camp, L. Jean (2000), *Trust and Risk in Internet Commerce.* Cambridge, MA: The MIT Press.

Carey, Susan (1992), "Becoming a Face Expert," in *Processing the Facial Image.* Bruce, Vicki and Cowey, A. et al., Eds. Oxford, UK: Cladendon Press, 95-103.

Carlson, Patricia and Gordon Davis (1998), "An Investigation of Media Selection among Directors and Managers: From "Self" to "Other" Orientation," *MIS Quarterly*, 22 (3), 335-362.

Cassell, Justine (2000), "Nudge Nudge Wink Wink: Elements of Face-to-Face Conversation for Embodied Conversational Agents," In *Embodied Conversational Agents*, Justine Cassells, Joseph Sullivan, Scott Prevost, and Elizabeth Churchill Eds., Cambridge, MA: MIT Press, 1-28.

Cassell, Justine and Timothy Bickmore (2000), "External Manifestations of Trustworthiness in the Interface," *Communications of the ACM* (Association for Computing Machinery), 43(12), 50-56.

Cassell, Justine, Tim Bickmore, Lee Campbell, Hannes Vilhjalmsson, and Hao Yan (2000), "Human Conversation as a System Framework: Designing Embodied Conversational Agents," In *Embodied Conversational Agents*, Justine Cassells, Joseph Sullivan, Scott Prevost, and Elizabeth Churchill Eds., Cambridge, MA: MIT Press, 29-63.

Castleverry, Stephen B. and C. David Shepherd (1993), "Effective Interpersonal Listening and Personal Selling," *Journal of Personal Selling and Sales Management*, 13 (Winter), 35-49.

Chapman, A. J. (1973), "Social Facilitation of Laughter in Children," *Journal of Experimental Social Psychology*, 9, 528-541.

Chow, Simeon and Reed Holden (1997), "Toward an Understanding of Loyalty: The Moderating Role of Trust," *Journal of Managerial Issues,* 9 (3), 275-298.

Churchill, Elizabeth, Linda Cook, Peter Hodgson, Scott Prevost, and Joseph W. Sullivan (2000), "May I Help You?: Designing Embodied Conversational Agent Allies," In *Embodied Conversational Agents*, Justine Cassells, Joseph Sullivan, Scott Prevost, and Elizabeth Churchill Eds., Cambridge, MA: MIT Press, 64-94.

Clark, Herbert H. (1996), *Using Language.* New York, NY: Cambridge University Press.

Coleman, James S. (1990), *Foundations of Social Theory.* Cambridge, MA: The Belknap Press.

Cook, John and Toby Wall (1980). New Work Attitude Measures of Trust, Organizational Commitment and Personal Need Nonfulfillment. *Journal* of *Occupational Psychology*, 53, 39-52.

Cozby, Paul C. (1973), "Self-Disclosure: A Literature Review," *Psychological Bulletin,* 79 (March), 73-91.

Crosby, Lawrence A., Kenneth R. Evans and Deborah Cowles (1990), "Relationship Quality in Services Selling: An Interpersonal Influence Perspective," *Journal of Marketing*, 54 (July), 68-81.

Dabholkar, Pratibha (1996),"Consumer evaluations of new-technology-based self service options: An investigation of alternative models of service quality," *International Journal of Research in Marketing,* 13 (1), 29-51.

Daft, Richard L. and Robert H. Lengel (1984), "Information Richness: A New Approach to Managerial Behavior and Organization Design," *in Research in Organizational Behavior*, B. Staw and L.L. Cummings, Eds, 6, 191-233.

Daft, Richard L. and Robert H. Lengel (1986), "Organizational Information Requirements, Media Richness, and Structural Design," *Management Science*, 32 (5), 554-571.

Damagio, Antonio R. (1994), *Descartes' Error: Emotion, Reason, and the Human Brain.* New York, NY: Grosse/Putnam Books.

Das, T. K. and Bing-Sheng Teng (1998). "Between Trust and Control: Developing Confidence in Partner Cooperation in Alliances," *Academy of Management Review,* 23 (3), 491-512.

De Ruyter, Ko, Luci Moorman, and Jos Lemmink (2001), "Antecedents of Commitment and Trust in Customer-Supplier Relationships in High Technology Markets," *Industrial Marketing Management, 30 (3), 271-286.*

De Ruyter, Ko and Martin G. M. Wetzels (2000), "The Impact of Perceived Listening Behavior in Voice-to-Voice Service Encounters," *Journal of Services Research,* 2 (3), 276-284.

Deci, Edward L. and Richard M. Ryan (1987), "The Support of Autonomy and the Control of Behavior," *Journal of Personality and Social Psychology*, 53, 1024-1037.

Deloitte Research (2000), "The New Economics of Transactions: Evolutions of Unique e-Business Internet Market Spaces," [Online]. Available http://www.dc.com/research.

Deutsch, M. (1958), "Trust and Suspicion," *Journal of Conflict Resolution*, 2, 265-279.

Deutsch, Morten (1958), "Trust and Suspicion," *Journal of Conflict Resolution*, 2 (September), 265-279.

Deutsch, Morten (1962), "Cooperation and Trust: Some Theoretical Notes," In *Nebraska Symposium on Motivation,* Marshall R. Jones ed. Lincoln, NE: University of Nebraska Press, 275-320.

Deutsch, Morton (1960), "The Effect of Motivational Orientation Upon Trust and Suspicion," *Human Relations,* 13, 123-139.

Dholakia, Ruby Roy and Brian Sternthal (1977), "Highly Credible Sources: Persuasive Facilitators or Persuasive Liabilities?" *Journal of Consumer Research,* 3 (March), 223-232.

Dickerson, Mary D. and James W. Gentry (1983), "Characteristics of Adopters and Non-Adopters of Home Computers," *Journal of Consumer Research*, 10 (September), 225-235.

Dion, Karen, Ellen Berscheild, and Elaine Walster (1972), "What is Beautiful is Good," *Journal of Personality and Social Psychology,* 24 (3), 285-290.

Doney, Patricia M. and Joseph P. Cannon (1997), "An Examination of the Nature of Trust in Buyer-Seller Relationships," *Journal of Marketing,* 61 (April), 35-51.

Doney, Patricia M., Joseph P. Cannon, and Michael R. Muller (1998), "Understanding the Influence of National Culture on the Development of Trust," *Academy of Management Review,* 23 (3), 601-620.

Dunn, John (1988), "Trust and Political Agency," in *Trust: Making and Breaking Cooperative Relations,* Diego Gambetta Ed., pp. 73-93. New York: Basil Blackwell Ltd.

Dwyer, F. Robert, Paul H. Schurr, and Sejo Oh (1987), "Developing Buyer-Seller Relationships," *Journal of Marketing,* 51 (April), 11-27.

Eagly, Alice H., Jovanovich Wendy Wood and Shelly Chaiken (1978), "Causal Inferences About Communicators and Their Effect on Opinion Change," *Journal of Personality and Social Psychology*, 36 (4), 424-443.

Edwards (1990), "The Interplay of Affect and Cognition in Attitude Formation and Change," *Journal of Personality and Social Psychology*, 59, 202-216.

Edwards and von Hippel (1995), "Hearts and Minds: The Priority of Affective and Cognitive Factors in Person Perception," *Personality and Social Psychology Bulletin*, 21, 996-1011.

Ekman, P. (1982), *Emotion in the Human Face,* 2nd Edition, Cambridge, England: Cambridge University Press.

Erikson, Erik (1950), *Child and Society.* New York: Norton.

Fabrigar, Leandre R. and Richard E. Petty (1999), "The Role of Affective and Cognitive Bases of Attitudes in Susceptibility to Affectively and Cognitively Based Persuasion," *Personality and Social Psychology Bulletin*, 25 (3), 363-381.

Faconti, John and Mieke Massink (1997), "A Syndetic Approach to Human Computer Interfaces," *ERCIM News,* 29. Available at: http://www.ercim.org/publication/Ercim_News/enw29/faconti.html.

Falk, Dennis R. and Pat Noonan Wagner (1985), "Intimacy of Self-Disclosure and Response Processes as Factors Affecting the Development of International Relationships," *Journal of Social Psychology*, 125 (October), 557-570.

Federal Aviation Administration (1996). The Interfaces between Flightcrews and Modern Flight Deck Systems [Online]. FAA Human Factors Team Report. Available: http://www.faa.gov/avr/afs/interfac.pdf (viewed February 26, 2001).

Fogg, B. J. and Clifford Nass (1997), "Silicon Sycophants: Effects of Computers That Flatter," *International Journal of Human-Computer Studies*, 46(5), 551-561.

Foner, Leonard N. (1993), "What is an Agent, Anyway? A Sociological Case Study," White Paper, The MIT Media Laboratory. Available at: http://foner.www.media.mit.edu/people/foner/Julia/Julia.html.

Forno, Richard and Willian Feinbloom (2001), "PKI: A Question of Trust and Value," *Communications of the ACM,* 4, 20-

Fournier, Susan (1998), "Consumers and Their Brands: Developing Relationship Theory in Consumer Research," *Journal of Consumer Research*, 24 (March), 343-373.

Friedland, Nehemia (1990), "Attribution of Control as a Determinant of Cooperation in Exchange Interactions," *Journal of Applied Social Psychology,* 20, 303-320.

Friedman, Batya, Peter H. Kahn, Jr., and Daniel C. Howe (2000), "Trust Online," *Communications of the ACM*, 43 (12), 34-39.

Fukuyama, Francis (1995), *Trust: The Social Virtues and the Creation of Prosperity*. London: Hamish Hamilton.

Fulk, J., C. W. Steinfield, J. Schmitz, and J. G. Power (1987), "A Social Information Processing Model of Media Use in Organizations," *Communication Research*, 14 (5), 529-552.

Gabarro, John J. (1978), "The Development of Trust, Influence, and Expectations," in *Interpersonal Behavior: Communication and Understanding in Relationships,* Anthony G. Athos and John J. Gabarro Eds. (pp. 290-303). New Jersey: Prentice Hall.

Gambetta, Diego (1988), "Can We Trust Trust?," in *Trust: Making and Breaking Cooperative Relations,* Diego Gambetta Ed., pp. 213-237. New York: Basil Blackwell Ltd.

Ganesan, Shankar (1994), "Determinants of Long-Term Orientation in Buyer-Seller Relationships*," Journal of Marketing*, 58 (April), 1-19.

Garbarino, Ellen and Mark S. Johnson (!999), "The Different Roles of Satisfaction, Trust, and Commitment in Customer Relationship," *Journal of Marketing,* 63 (April), 80-87.

Garfinkel, Harold (1963), "A Conception of, and Experiments with, 'Trust' as a Condition of Stable Concerted Actions," In *Motivation and Social Interaction*, O.J. Harvey Ed. (pp.187-238). New York: Rival Press.

Gefen, D. (2000), "E-Commerce: The Role of Familiarity and Trust", *Omega The International Journal of Management Science*, 28 (6), 725-737.

Geller, E. Scott (1999), "Interpersonal Trust: Key to Getting the Best from Behavior-Based Safety Coaching," *Personal Safety,* April, 16-19.

Geyskens, Inge, Jan-Benedict Steenkamp, Lisa Scheer and Nirmalya Kumar (1996), "The Effects of Trust and Interdependence on Relationship Commitment: A Trans-Atlantic Study," *International Journal of Research in Marketing*, 13 (October), 303-317.

Ghosh, Anup K. (1998), *E-commerce Security: Weak Link, Best Defenses*. New York, NY: John Wiley & Sons.

Gibb, Jack R. (1978), TRUST: A New View of Personal and Organizational Development. Los Angeles, California.

Gibson, J. J, (1977), The Theory of Affordances. In *Perceiving, Acting, and Knowing,* R. E. Shaw and J. Brandford Eds. Hillsdale, NJ: Lawrence Erlbaum Associates.

Gibson, J. J. (1979), *The Ecological Approach to Visual Perception.* Boston: Houghton Mifflin.

Giffin, Kim (1967), "The Contribution of Studies of Source Credibility to a Theory of Interpersonal Trust in the Communication Process," *Psychological Bulletin,* 68 (August), 104-120.

Gilmore, George William (1919), *Animism.* Boston: Marshall Jones.

Goldberg, L. R. (1999). A Broad-Bandwidth, Public Domain, Personality Inventory Measuring the Lower-Level Facets of Several Five-Factor Models. In I. Mervielde, I. Deary, F. De Fruyt, & F.

Ostendorf (Eds.), *Personality Psychology in Europe*, Vol. 7 (pp. 7-28). Tilburg, The Netherlands: Tilburg University Press.

Goldberg, L. R. (in press). The Comparative Validity of Adult Personality Inventories: Applications of a Consumer-Testing Framework. In S. R. Briggs, J. M. Cheek, & E. M. Donahue (Eds.), *Handbook of Adult Personality Inventories*.

Goleman, Daniel (1995). *Emotional Intelligence*. New York: Bantam Books.

Golembiewski, Robert T. and M. McConkie, M. (1975), "The Centrality of Interpersonal Trust in Group Processes," in *Theories of Group Processes*, Cooper, C.L. ed. (pp. 131-185), New York: Wiley.

Gould, John D., Stephen J. Boies, and Clayton Lewis (1991), "Making Usable, Useful, Productivity-Enhancing Computer Applications," *Communications of the ACM*, 34 (1), 74-85.

Govier, Trudy (1997), *Social Trust and Human Communities*. Montreal, Canada: McGill-Queen's University Press.

Gray, Jeffrey A. (1990), "Brain Systems that Mediate Both Emotion and Cognition," Special Issue: Neuropsychological Perspective on Emotion, *Cognition and Emotion,* 4 (3), 269-288.

Greenwald, Amy R., Jefferey O. Kephart, and Gerald J. Tesauro (1999), "Strategic Procebot Dynamics," in *Proceedings of the ACM Conference on E-commerce,* Michael Wellman and Stuart Feldman Eds., pp. 58-67.

Guise, Barnie I., Cynthia H. Pollans, and Ira D. Turkat (1982), "Effects of Physical Attractiveness on Perception of Social Skill," *Perceptual and Motor Skills*, 54 (3), 1039-1042.

Gulati, Ranjay (1995), "Does Familiarity Breed Trust? The Implications of Repeated Ties for Contractual Choice in Alliance," *Academy of Management Journal,* 38 (1), 85-112.

Gurley, J. William (2000), "The One Internet Metric That Really Matters," *Fortune,* 141 (March 6), 392.

Guttman, Robert and Pattie Maes (1998), "Agent-Mediated Integrative Negotiation for Retail E-commerce," in *Agent Mediated E-commerce,* Pablo Noriega and Carles Sierra Eds. Selected Papers from the First International Workshop on Agent Mediated Electronic Trading, AMET-98. Berlin: Springer.

Hafner, K. and J. Markoff (1992), *Cyberpunk: Outlaws and Hackers on the Computer Frontier*. New York, NY: Touchstone.

Hair et al. (1998) "Multivariate Data Analysis" 5th edition. Prentice Hall.

Hansell, Saul (2001), "Marketers Find Internet Offers New Avenues to Customers," New York Times, March 26, p. C1.

Harmon, Robert R. and Kenneth A. Coney (1982), "The Persuasive Effects of Source Credibility in Buy and Lease Situations," *Journal of Marketing Research*, 19, 255-260.

Harris, Michael (1983), *Cultural Psychology*. New York: Harper and Row.

Haugtvedt, Curtis P. and Duane T. Wegener (1994), "Message Order Effects in Persuasion: An Attitude Strength Perspective," *Journal of Consumer Research*, 21 (June), 205-218.

Hawes, John M, Kenneth E. Mast, and John E. Swan (1989), "Trust Earning Perceptions of Sellers and Buyers," *Journal of Personal Selling and Sales Management*, 9, (Spring), 1-8.

Hawes, John M. and C. P. Rao, and Thomas L. Baker (1993), "Retail Salesperson Attributes and the Role of Dependability in the Selection of Durable Goods," *Journal of Personal Selling and Sales Management,"* 13 (4), 61-71.

Heimer, Carol (1976), "Uncertainty and Vulnerability in Social Relations," Mimeographed. Chicago, IL:University of Chicago Press.

Heinssen, Robert K. Carol R. Glass, and Luanne A. Knight (1987), "Assessing Computer Anxiety: Development and Validation of the Computer Anxiety Rating Scale," *Computers in Human Behavior*, 3, 49-59.

Herzberg, Lars (1988), "On the Attitude of Trust," *Inquiry,* 31, 307-322.

Heslin, James (1968), "Trust and the Cab Driver," in *Sociology and Everyday Life*, Marcello Truzzi Ed. (pp.138-158), New Jersey: Prentice Hall.

Higgins, E. Tory (1997), "Beyond Pleasure and Pain," *American Psychologist*, 52 (December), 1280-1300.

Hinds, Pamela J. (1998), "User Control and Its Many Facets: A Study of Perceived Control in Human-Computer Interaction," Hewlett-Packard Labs Technical Reports, HPL-98-154. Available at: http://www.hpl.hp.com/techreports/98/HPL-98-154.html.

Hirschman, Elizabeth C. (1983), "Predictors of Self-Projection, Fantasy Fulfillment, and Escapism," *Journal of Social Psychology,* 120 (June), 63-76.

Hobbes, Thomas [1640] (1750), *Human Nature.* London: J.M. Dent and Co.

Hoffman, Donna L. and Thomas P. Novak (1998), "Trustbuilders vs. Trustbusters," [Online], *The Industry Standard.* Available at: http//www.thestandard.com/article.

Hoffman, Donna L., Thomas P. Novak, and Marcos Peralta (1998), "Building Consumer Trust in Online Environments: The Case for Information Privacy," *Communications of the ACM*, 42 (4), 80-85.

Holbrook, Morris B. and Elizabeth C. Hirschman (1982), "The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun," *Journal of Consumer Research*, 9 (September), 132-140.

Holmes, John G., and John K. Rempel (1989), "Trust in Close Relationships," in *Close Relationships: Review of Personality and Social Psychology,* C. Hendrik Ed. (vol. 10, pp.187-220). London: Sage.

Homans, George (1961), Social Behavior.- Its Elementary Forms, New York: Harcourt, Brace and World.

Horsburgh, H. J. N. (1960), "The Ethics of Trust," *Philosophical Quarterly* 10, 343-354.

Hosmer, Larue Tone (1995), "Trust: The Connecting Link Between Organization Theor and Philosophical Ethics," *Academy of Management Review,* 20 (2), 379-403.

Hovland, Carl I., Irving L. Janis, and Harold H. Kelley (1953). *Communication and Persuasion: Psychological Studies of Opinion Change.* New Haven, CT: Yale University Press.

Huberman, Bernado A., Matt Franklin, and Ted Hogg (1999), "Enhancing Privacy and Trust in Electronic Communities," in *Proceedings of the ACM Conference on E-commerce,* Michael Wellman and Stuart Feldman Eds., pp. 78-86.

Humphrey, J. and H. Schumitz (1998), "Trust and Inter-Firm Relations in Developing and Transition Economies," *The Journal of Development Studies,* 34 (4), 32-61.

Hutchins, E. (1995). *Cognition in the Wild.* Cambridge, MA: The MIT Press.

International Personality Item Pool (2001). A Scientific Collaboratory for the Development of Advanced Measures of Personality Traits and Other Individual Differences. [Online] Available at:http://ipip.ori.org/.

Isaacs, K. S., James M. Alexander, and Ernest A. Haggard (1967), "Faith, Trust and Gullibility," *International Journal of Psychoanalysis,* 44, 461-469.

Jarvenpaa, S., N. Tractinsky, and M. Vitale, (2000), "Consumer Trust in an Internet Store," *Information Technology and Management Journal,* 1, 1-2, 45-71.

Jay, T. (1981), "Computerphobia. What to Do About It," *Educational Technology,* 21, 47-48.

Jefferies, Frank L. and Richard Reed (2000). "Trust and Adaptation in Relational Contracting," *Academy of Management Review,* 25 (4), 873-882.

Johnson, Steven (1999). *Interface Culture: How New Technology Transforms The Way We Create and Communicate.* San Francisco, CA: HarperEdge.

Johnson-George, Cynthia and Walter Swap (1982), "Measurement of Specific Interpersonal Trust: Construction and Validation of a Scale to Assess Trust in a Specific Other," *Journal of Personality and Social Psychology,* 43, 1306-1317.

Jones, Gareth R. and Jennifer M. George (1998), "The Experience and Evolution of Trust: Implications for Cooperation and Teamwork," *Academy of Management Review,* 23 (3), 531-546.

Joseph, W. Benoy (1982), "The Credibility of Physically Attractive Communicators: A Review," *Journal of Advertising,* 11 (3), 15-24.

Joshi, Ashwin and Rodney L. Stump (1999), "The Contingent Effect of Specific Asset Investment on Joint Action in Manufacturer-Supplier Relationships: An Empirical Test of Moderating Role of Asset Investments, Uncertainty, and Trust," *Journal of the Academy of Marketing Science,* 27 (3), 291-305.

Karahanna, Elena and Detmar Straub (1999), "The Psychological Origins of Perceived Usefulness and Ease-Of -Use," *Information & Management,* 35 (4), 237-250.

Kee, Herbert W. and Robert E, Knox (1970), "Conceptual and Methodological Considerations in the Study of Trust," *Journal of Conflict Resolution,* 14, 357-366.

Keen, Peter, Craigg Balance, Sally Chan, and Steve Schrump (2000), *E-commerce Relationship: Trust By Design*. Upper Saddle River, NJ: Prentice Hall PTR.

Kelley, Harold H. and John W. Thibaut (1978), *Interpersonal Relations: A Theory of Interdependence*, New York, NY: John Wiley & Sons.

Kempf, DeAnna S. (1999), "Attitude Formation from Product Trial: Distinct Roles of Cognition and Affect for Hedonic and Functional Products," *Psychology and Marketing*, 16 (1), 35-50.

Kiesler, S., L. Sproull, and K. Waters (1996), "A 'Prisoner's Dilemma' Experiment on Cooperation in Social Dilemmas," *Journal of Personality and Social Psychology, 66,* 513-529.

Kiesler, Sara, Jane Siegel, and Timothy W. McGuire (1984), "Social Psychological Aspects of Computer-Mediated Communication," *American Psychologist*, 39 (10), 1123-1134.

King, J. A. (1995), "Intelligent Agents: Bringing Good Things to Life," *AI Expert,* February, 17-19.

King, J. A. (1995), "Intelligent Agents: Part 2," *AI Expert*, March, 10-12.

King, Ruth C. and Xia Weidong (1997), "Media Appropriateness: Effects of Experience on Communication Media Choice," *Decision Sciences,* 28 (4), 877-910.

Kirk, Elizabeth E. (2001), "Evaluating Information Found on the Internet," [Online] http://milton.mse.jhu.edu:8001/research/education/net.html.

Knapik, Michael and Jay Johnson (1998). *Developing Intelligent Agents for Distributed Systems.* McGraw-Hill: New York.

Koda, Tomoko and Pattie Maes (1996), "Agents with Faces: The Effect of Personification," *Proceedings of IEEE International Workshop on Robot and Human Communication.* ACM Press, 189-194.

Kruglanski, Arie W., Donna M. Webster, and Adena Klem (1993), "Motivated Resistance and Openness to Persuasion in the Presence or Absence of Prior Information," *Journal of Personality and Social Psychology*, 65 (3), 861-876.

Kuchinskas, Susan (1999), "MySimon Puts Price Power in Users' Hands," *Mediaweek,* May 24, 9 (21), 38.

Kumar, Nirmalya (1996), "The Power of Trust in Manufacturer Retailer Relationships," *Harvard Business Review*, 74 (November-December), 92-106.

Kumar, Nirmalya, Lisa K. Scheer, Jan-Benedict E. M. Steenkamp (1995), "The Effects of Perceived Interdependence on Dealer Attitudes," *Journal of Marketing Research,* 32 (August), 348-356.

Kunii, Irene, M. and Otis Port (2001), "Robots," *Business Week*, March 19, 42-48.

Kwak, Mary (2001), "Searching for Search Costs," *MIT Sloan Management Review,* 42 (3), 8-9.

Larzelere, Robert E. and Ted L. Huston (1980), "The Dyadic Trust Scale: Toward Understanding Interpersonal Trust in Close Relationships," *Journal of Marriage and Family,* 42 (August), 595-604.

Laurel, B. (1990), "Interface Agents: Metaphors with Character," in *The Art of Human-Computer Interface Design*, B. Laurel Ed., pp.355-365, New York, NY: Addison Wesley.

Lazarus, Richard S. (1982), "Thoughts on the Relations between Emotion and Cognition," *American Psychologist*, 37 (9), 1019-1024.

Lazarus, Richard S. (1984), "On the Primacy of Cognition," *American Psychologist*, 39 (2), 124-129.

Ledingham, J. A. (1984), "Are Consumers Ready for the Information Age?" *Journal of Advertising Research,* 24 (4), 31-37.

Lee, J. D., and N. Moray (1994), "Trust, Self-Confidence, and Operator's Adaptation to Automation," *International Journal of Human-Computer Studies*, 40, 153-184.

Legace, Rosemary R. and Greg G. Marshall (1994), "Buyers' Trust of Salespeople: Does It Go Beyond the Dyad? In *National Conference in Sales Management*, Weilbaker and Ridnour, Eds., 44-48.

Lennon, Jennifer A. (1997), *Hypermedia Systems and Application: World Wide Web and Beyond.* Berlin, Germany: Springer Verlag.

Levi, M. (1996), "Social and Unsocial Capital: A Review Essay of Robert Putnam's "Making Democracy Work"," *Politics and Society*, 24 (1), 45-56.

Lewandowsky, Stephen, Michael Mundy, and Garard P.A. Tan (2000), "The Dynamics of Trust: Comparing Humans to Automation," *Journal of Experimental Psychology: Applied*, 6 (2), 104-123.

Lewicki, Roy J., Daniel J. McAllister, and Robert J. Bies (1998), "Trust and Distrust: New Relationships and Realities," *Academy of Management Review*, 23 (July), 438-458.

Lewis, J. David and Andrew Weigert (1985), "Trust as a Social Reality,' *Social Forces*, 63, 967-985.

Lieberman, Henry (1997), "Autonomous Interface Agents," *Proceedings of the ACM Conference on Computers and Human Interface,* CHI-97, Atlanta, Georgia, March 1997.

Luhmann, Niklas (1979), *Trust and Power.* New York: John Wiley.

Luhmann, Niklas (1988), "Familiarity, Confidence, Trust: Problems and Alternatives," in *Trust: Making and Breaking Cooperative Relations,* Diego Gambetta Ed., pp. 94-108. New York: Basil Blackwell Ltd.

Lynch, John G. and Thomas K. Srull (1982), "Memory and Attention Factors in Consumer Choice: Concepts and Research Methods," *Journal of Consumer Research, 9*, 18-37.

Mackie, Diane M. and John J. Skelly (1994), "The Social Cognition Analysis of Social Influence: Contributions to the Understanding of Persuasion and Conformity," in *Social Cognition: Impact on Social Psychology*, Patricia G. Devine, David L. Hamioton, and T. M. Ostrom, Eds, San Diego, CA: Academic Press, 259-289.

Madhavan, Ravindranath and Rajiv Grover (1998), "From Embedded Knowledge to Embodied Knowledge: New Product Development as Knowledge Development," *Journal of Marketing, 62* (October) , 1-12.

Maes, Pattie (1994), "Agents That Reduce Work and Information Overload," *Communications of the ACM*, 37 (7), 31-40.

Maes, Pattie, Ben Shneiderman, and Jim Mille (1997), "Intelligent Software Agents vs. User-Controlled Direct Manipulation: A Debate," *Proceedings of the CHI '97 Conference*. Available: http://www.acm.org/sigs/sigchi/chi97/proceedings/panel/jrm.htm.

Mahajan, Vijay, M. Eitan, and Frank M. Bass (1990), "New Product Diffusion Models in Marketing: A Review and Directions for Research," *Journal of Marketing,* 54 (January), 1-26.

Marcoulides, G. A. (1989), "Measuring Computer Anxiety: The Computer Anxiety Scale," *Educational and Psychological Measurement,* 49, 733-739.

Markman, Arthur B. and Miguel C. Brendl (2000), "The Influence of Goals on Value and Choice," in *The Psychology of Learning and Motivation*, Vol. 39, ed. Douglas L. Medin, San Diego, CA: Academic Press, 97-129.

Matthews, Stephen, William Nix, and Evan Berlack (2001), "Internet Privacy, Securit y in Next Hurdle for Oil and Gas Industry," *Oil & Gas Journal,* 99 (25), 66-78.

Mayer, John D. and Peter Salovey (1997), "What is an Emotional Intelligence?" in *Emotional Development and Emotional Intelligence: Educational Implications.* Peter Salovey, David J. Sluyter et al., Eds. New York, NY: Basic Books, 3-34.

Mayer, Roger, James H. David, and F. David Schoorman (1995), "An Integrative Model of Organizational Trust," *Academy of Management Review*, 20 (3), 709-734.

McAllister, Daniel J. (1995), "Affect- and Cognition-Based Trust as Foundations for Interpersonal Cooperation in Organizations," *Academy of Management Journal,* 38, 24-59.

McCauley, Dan P. and Karl W. Kuhnert (1992), "A Theoretical Review and Empirical Investigation of Employee Trust in Management," *Public Administration Quarterly*, 16 (2), 265-278.

McDougall, William (1911), *Body and Mind: A History and Defense of Animism*, New York: MacMillan.

McGinnies, Elliot and Charles D. Ward (1980), "Better Liked Than Right: Trustworthiness and Expertise as Factors in Credibility," *Personality and Social Psychology Bulletin, 6*, 467-472.

McInerney, V., D.M. McInerney, and K. E. Sinclair (1994), "Student Teachers, Computer Anxiety and Computer Experience," *Journal of Educational Computing Research*, 11, 17-50.

McKnight, D. Harrison, Larry L. Cummings, and Norman L. Chervany (1998), "Initial Trust Formation in New Organizational Relationship," *Academy of Management Review*, 23 (3), 473-490.

McLuhan, Marshall (1964), *Understanding Media: The Extension of Man.* Hazel Watson and Viney Ltd. UK.

Mick, David Glen and Susan Fournier (1998), "Paradoxes of Technology: Consumer Cognizance, Emotions, and Coping Strategies," *Journal of Consumer Research,* 25 (September), 123-143.

Miles, Raymond E. and Charles C. Snow (1995), "The New Network Firm: A Spherical Structure Built on a Human Investment Philosophy," *Organizational Dynamics*, (Spring), 4-18.

Miller, George A., Eugene Galanter, and Karl H. Pribram (1960). *Plans and the Structure of Behavior.* New York: Holt.

Milliman, Ronald E. and Douglas E. Fugate (1988), "Using Trust Transference as a Persuasion Technique," *Journal of Personal Selling and Sales Management*, 8 (August), 1-7.

Mitchell, V.W., and M. Greatorex (1993), "Risk Perception and Reduction in the Purchase of Consumer Services," *The Services Industry Journal*, 13 (4), 179-200.

Mitchell, Vincent-Wayne, Fiona Davies, Luiz Moutinho, and Vassiliades Vassos (1999), "Using Neural Networks to Understand Service Risk in the Holiday Product," *Journal of Business Research,* 46 (2), 167-180.

Molina, Alfonso (1997), "Issues and Challenges in the Evolution of Multimedia: The Case of Newspaper," *Futures*, 29 (3), 193-222.

Moon, Youngme (1996). *Similarity Effects in Human Computer Interaction: Effects of Individual personality, Computer Personality, and User Control on Attraction and Attribution of Responsibility.* Unpublished Doctoral Dissertation. Stanford University.

Moon, Youngme (2000), "Intimate Exchanges: Using Computers to Elicit Self-Disclosure from Consumers," *Journal of Consumer Research,* 26 (March), 323-339.

Moon, Youngme and Clifford I. Nass (1996), "How Real Are Computer Personalities? Psychological Responses to Personality Types in Human-Computer Interaction," *Communication Research,* 23 651-674.

Moore, D. L. and Hutchinson, J. W. (1985), "The Influence of Affective Reactions to Advertising," in *Psychological Processes and Advertising Effects,* L. Alwitt and A. A. Mitchell (Eds.), pp. 65-87. Hillsdale, NJ: Lawrence Erlbaum.

Moore, Kevin R. (1998), "Trust and Relationship Commitment in Logictics Alliances: A Buyer Perspective," *International Journal of Purchasing and Materials Management*, 34 (Winter), 24-37.

Moore, Mick (1999), "Truth, Trust and Market Transactions: What Do We Know?" *The Journal of Development Studies*, 36 (1), 74-88.

Moorman, Christine, Gerard Zaltman, and Rohit Deshpande (1992), "Relationships between Providers and Users of Market Research

Moorman, Christine, Rohit Deshpande, and Gerard Zaltman (1993), "Factors Affecting Trust in Market Research Relationships," *Journal of Marketing*, 15 (January), 81-101.

Morgan, Robert M. and Shelby D. Hunt (1994), "The Commitment-Trust Theory of Relationship Marketing," *Journal of Marketing*, 58 (July), 20-38.

Moukas, Alexandros, Giorgos Zacharia, Robert Guttman, and Pattie Maes (2000), "Agent-Mediated E-commerce: An MIT Media Laboratory Perspective," *International Journal of E-commerce*, 4 (3). 5-21.

Muir, B. M. (1987). "Trust between Humans and Machines, and the Design of Decision Systems," *International Journal of Man-Machine Studies*, (5-6), 527-539.

Muir, B. M., and N. Moray (1996), "Trust in Automation. Part II Experimental Studies of Trust and Human Intervention in a Process Control Simulation," *Ergonomics,* 39, 429-460.

Murch, Richard and Tony Johnson (1998), *Intelligent Software Agents.* Prentice Hall.

Murugesan, San (1997), "Intelligent Agents on the Internet and Web," TENCON '97 IEEE Region 10 Annual Conference. Speech and Image Technologies for Computing and Telecommunications, *Proceedings of IEEE*, Volume, 97-102.

Myers, Brad, Scott E. Hudson, and Randy Pausch (2000), "Past, Present, and Future of User Interface Software Tools," *ACM Transactions on Computer-Human Interaction*, 7 (1), 3-28.

Nass, Clifford I. and Laurie Mason (1990), On the Study of Technology and Task: A Variable-Based Approach," in *Organizations and Communications Technology,* Eds. Janet Fulk and Charles W. Steinfeld Newbury Park, CA: Sage Publications, 46-67.

Nass, Clifford, Katherine Isbister, E. Lee (2000), "Truth Is Beauty: Researching Embodied Conversational Agents," In *Embodied Conversational Agents*, Justine Cassells, Joseph Sullivan, Scott Prevost, and Elizabeth Churchill Eds., Cambridge, MA: MIT Press, 374-402.

Nass, Clifford, Youngme Moon, and N. Green (1997), "Are Computers Gender-Neutral? Gender Stereotypic Responses to Computers," *Journal of Applied Social Psychology*, 27(10), 864-876.

Nass, Clifford, Youngme Moon, J. Morkes, Eun-Young Kim, and B. J. Fogg (1997), "Computers are Social Actors: A Review of Current Research," In B. Friedman (Ed.), Moral and Ethical issues in Human-Computer Interaction. Stanford, CA: CSLI Press.

Nelson, T. H. (1990), "The Right Way to Think About Software Design," in *The Art of human-Computer Interface Design*, B. Laurel Ed. Pp. 235-244. Reading, MA: Addison-Wesley.

Nelson, Theodor H. (1965), "A File Structure for the Complex, the Changing and the Indeterminate," in *Proceedings of ACM 20th National Conference*, pp. 84-100.

Newcomb, S.R., H.A. Kipp, and Newcomb, V.T. (1991), "Hytime: The Hypermedia/Time-Based Document Structuring Language," *Communications of the ACM,* 34 (11), 67-83.

Nicholson, Carolyn Y., Larry D. Compeau, and Rajesh Sethi (2001), "The Role of Interpersonal Liking in Building Trust in Long-Term Channel Relationship," *Journal of the Academy of Marketing Science,* 29 (1), 3-15.

Nida, Eugene A; and William Smalley (1959), *Introducing Animism.* New York: Friendship.

Nooteboom, Bart, Hans Berger, and Niels G. Noorderhaven (1997), "Effects of Trust and Governance on Relational Risk," *Academy of Management Journal,* 40 (2), 308-338.

Norman, Donald (1998), *The Invisible Computer: Why Good Products Can Fail, The Personal Computer is So Complex, and Information Appliances are the Solution,* Cambridge, MA: The MIT Press.

Norman, Donald A. (1988), *The Psychology of Everyday Things.* New York, NY: Basic Books.

Norman, Donald A. (1990), *The Design of Everyday Things.* New York, NY: Doubleday.

Novick, Laura R. (1988), "Analogical Transfer, Problem Similarity and Expertise," *Journal of Experimental Psychology, 14*, 510-520.

Oakes, G. (1990), "The Sales Process and the Paradoxes of Trust," *Journal of Business Ethics*, 9, 171-179.

O'Connell, Brian (1999, January 20), "Microsoft's Smart Card Play," *Bank Technology News*.

O'Neill, N. and G. O'Neill (1972), *Open Marriage.* New York, NY: Avon.

Ostwald, P. F. (1965), "Acoustic Methods in Psychiatry," *Scientific American,* 212, 82-91.

Ovans, Andrea (1999), "Is Your Web Site Socially Savvy?" *Harvard Business Review,* 77 (3), 20-21.

Oviatt, Sharon and Philop Cohen (2000), "What Comes Naturally -- Multimodal Interfaces That Process," *Communications of the ACM*, 43 (March), 45-53.

Palatano, A. and C. M. Seifert (1997), "Opportunistic Planning: Being Remineded of Pending Goals," *Cognitive Psychology*, 34, 1-36.

Palmer, Jonathan W. and David A. Griffith (1998), "Information Intensity: A Paradigm for Understanding Web Site Design," *Journal of Marketing Theory and Practice,* 6 (3), 38-42.

Palmer, Jonathan W., Joseph P. Bailey, and Samer Faraj (2000), "The Role of Intermediaries in the Development of Trust on the WWW: The Use and Prominence of Trusted Third Parties and Privacy Statements," *Journal of Computer Mediated Communication,* 5 (March). Available: http://www.ascusc.org/jcmc/vol5/issue3/palmer.html.

Parasuraman, A., Valerie Zeithaml, and Lernard L. Berry (1985), "A Conceptual Model of Service Quality and Its Implications for Future Research," *Journal of Marketing,* 49 (Fall), 41-51.

Parise, S., S. Kiesler, Lee Sproull, and K. Waters (1999), "Cooperating Life-Like Interface Agents," *Computers in Human Behavior*, 15, 123-142.

Parkhe, Arvind (1993), "Strategic Alliance Structuring- A Game Theoretic and Transaction Cost Examination of Interfirm Cooperation," *Academy of Management Journal,* 36 (August), 794-829.

Parrot, W. Gerrod and Jay Schulkin (1993), "Neuropsychology and the Cognitive Nature of the Emotions," Special Issue: Neuropsychological Perspective on Emotion, *Cognition and Emotion*, 7 (1), 43-59.

Parry, John (1968), *The Psychology of Human Communication.* Elsevier, New York.

Parsons, T. and R. F. Bales (1955), *Family, Socialization, and Interaction Process.* Glendoe, IL: Free Press.

Pavlou, Paul A. and David W. Stewart (2000), "Measuring the Effects and Effectiveness of Interactive Advertising: A Research Agenda," *Journal of Interactive Advertising,* 1 (1). Available: http://www.jiad.org.

Pearce, Barnett (1974), "Trust in Interpersonal Communication," *Speech Monographs,* 4, 236-244.

Peau, Michael, Erin Alison Szabo, Jason Anderson, and Joshua Morrill (2001), "The Role and Impact of Affect in the Process of Resistance to Persuasion," *Human Communication Research,* 27 (2), 216-252.

Peppers, Don and Martha Rogers (1993), *The One-to-One Future: Building Relationship One Customer at a Time.* New York: Currency/Doubleday.

Peterson, Robert A. and Vijay Mahajan (1978), "Multi-Product Growth Models," in *Research in Marketing*, J. Sheth, ed. Greenwich, CT: JAI Press, Inc., 201-231.

Petty, Richard E. and Duane. T. Wegener (1993), "Flexible Correction Processes in Social Judgment: Correcting for Context-Induced Contrast," *Journal of Experimental Social Psychology*, 29 (March), 137-165.

Petty, Richard E. and Duane. T. Wegener (1998), "Matching versus Mismatching Attitude Functions: Implications for Scrutiny of Persuasive Messages," *Personality and Social Psychology Bulletin,* 24 (3 March), 227-240.

Petty, Richard E. and John T. Cacioppo (1981). *Attitude and Persuasion: Classic and Contemporary Approaches.* Dubuque, Iowa: W.C. Brown Publishers.

Petty, Richard E. and John T. Cacioppo (1986a). *Communication and Persuasion: Central and Peripheral Routes to Attitude Change.* New York: Springer-Verlag.

Petty, Richard E. and John T. Cacioppo (1986b), "The Elaboration Likelihood Model of Persuasion," in *Advances in Experimental Social Psychology*, L. Berkowitz Ed., Vol. 19, pp. 123-205. San Diego, CA: Academic Press.

Petty, Richard E., Duane T. Wegener, and Leandre F. Fabrigar (1997), "Attitudes and Attitude Change," *Annual Review of Psychology*, 48, 609-647.

Piaget, Jean (1975). *The Child's Conception of the World*, trans. By Joan and Andrew Tomlingson. Totowa, NJ: Littlefield, Adams.

Picard, Rosalind (1997). *Affective Computing.* Cambridge, MA: MIT Press.

Picard, Roz (1997), *Affective Computing,* Cambridge, MA: MIT Press.

Pine, Joseph B. (1993), *Mass Customization: The New Frontier in Business Competition.* Boston, MA: Harvard Business School Press.

Platania, Judith and Gary P. Moran (2001), "Social Facilitation as a Function of the Mere Presence of Others," *Journal of Social Psychology*, 141 (2), 190-197.

Porter, Michael and V. Millar (1985), "How Information Gives You Competitive Advantage," *Harvard Business Review,* 63 (4), 119-160.

Prendergast, Gerard and Norman Marr (1994), "Challenging Human Interaction in the Delivery of Banking Services: New Zealand as a Microcosm of European Banking in the Futures," *Journal of Retail Banking Services* 18 (4), 33-40.

Prentice, D. (1974), "The Effects of Trust-Destroying Communication on Verbal Fluency In the Small Group," *Speech Mono,* 42, (4 November), 262-270.

Price, Linda L. and Eric J. Arnould (1999), "Commercial Friendships: Service Provider-Client Relationship in Context," *Journal of Marketing*, 63 (October), 38-56.

Priester, Joseph R. and Richard E. Petty (1995), "Source Attributions and Persuasion: Perceived Honesty as a Determinant of Message Scrutiny," *Personality and Social Psychology Bulletin*, 21 (6), 637-654.

Putrevu, Sanjay and Kenneth R. Lord (1994), "Comparative and Noncomparative Advertising: Attitudinal Effects Under Cognitive and Affective Involvement Conditions," *Journal of Advertising*, 23 (2), 77-90.

Rainer, Banse and Klaus R. Scherer (1996), "Acoustic Profiles in Vocal Emotion Expression," *Journal of Personality and Social Psychology*, 70 (3), 614-636.

Ramsey, Rosemary P. and Ravipreet S. Sohi (1997), "Listening to Your Customers: The Impact of Perceived Salesperson Listening Behavior on Relationship Outcomes," *Journal of the Academy of Marketing Science*, 25 (2), 127-137.

Ratneshwar, S., Cornelia Pechman, and Allan Shocker (1996), "Goal-Derived Categories and the Antecedents of Across-Category Consideration," *Journal of Consumer Research,* 23 (December), 240-250.

Ravindranath, Madhavan and Rajiv Grover (1998), "From Embedded Knowledge to Embodied Knowledge: New Product Development as Knowledge Management," *Journal of Marketing*, 62 (4), 1-12.

Reagle, Joseph and Lorrie Faith Cranor (1999), "The Platform for Privacy Preferences," *Communications of the ACM*, 42 (2), 48-55.

Reeves, Byron and Clifford Nass (1996), *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places.* New York, NY: Cambridge University Press.

Rempel, John K., John G. Holmes, and Mark P. Zanna (1985), "Trust in Close Relationships," *Journal of Personality and Social Psychology,* 49, 95-112.

Rewick, Jennifer (2000), "Clinching the Holiday E-Sale --- Some 65% of Online Shoppers Bolt at the Checkout Point; E-tailers Try to Keep Them." *Wall Street Journal,* (October 9), B1.

Rich, Gregory A. (1997), "The Sales Manager as a Role Model: Effects of Trust, Job Satisfaction, and Performance of Salespeople," *Journal of the Academy of Marketing Science*, 25 (4), 319-328.

Rieke, M. L. and S. J. Guastello (1995), "Unresolved Issues in Honesty and Integrity Testing," *American Psychologist,* 50, 458-459.

Ring, Peter S. and Andrew H. Van de Ven (1992), "Structuring Cooperative Relationships Between Organizations," *Strategic Management Journal*, 13 (October), 483-498.

Ring, Peter S. and Andrew H. Van de Ven (1994), "Developmental Processes of Cooperative Interorganizational Relationships," *Academy of Management Review,* 19 (January), 90-118.

Ring, Peter Smith and Andrew H. Van de Van (1994), "Developmental Processes of Cooperative Interorganizational Relationships," *Academy of Management Journal*, 19, 90-118.

Rosen, L. and P. Maguire (1990), "Myths and Realities of Computerphobia: A Meta Analysis," *Anxiety Research*, 3, 175-191.

Rosen, L. D., D. C. Sears, and M. M. Weil (1987), "Computer Phobia," *Behaviour Research Methods, Instruments, and Computers*, 19, 167-179.

Rosenberg, Milton J. (1968), "Hedonism, Inauthenticity, and Other Goads toward Expansion of a Consistency Theory," in *Theories of Cognitive Consistency: A Sourcebook*, ed. Robert P. Abelson et al., Chicago: Rand McNally, 73-111.

Rotter, Julian B. (1967), "A New Scale for the Measurement of Interpersonal Trust," *Journal of Personality*, 35, 651-665.

Rotter, Julian B. (1980), "Interpersonal Trust, Trustworthiness, and Gullibility," *American Psychologist*, 35, 1-17.

Rotter, Julian B. and Donald K. Stein (1970), "Public Attitudes toward the Trustworthiness, Competence, and Altruism of Twenty Selected Occupations," *Journal of Applied Social Psychology*, 1, 334-343.

Rouet , Jean Francois, Jarmo J. Levonen, Andrew Dillon, and Rand Spiro (1996), "An Introduction to Hypertext and Cognition," in *Hypertext and Cognition,* (pp. 3-8) Mahwah, New Jersey: Lawrence Erlbaum Associates.

Rouet, Jean Francois and Jarmo J. Levonen (1996), "Studying and Learning with Hypertext: Empirical Studies and Their Implications, in *Hypertext and Cognition,* Rouet , Jean Francois, Jarmo J. Levonen, Andrew Dillon, and Rand Spiro Eds. (pp. 9-21), Mahwah, New Jersey: Lawrence Erlbaum Associates.

Rouet, Jean Francois, Jarmo J. Levonen, Andrew Dillon, and Rand Spiro (1996), "An Introduction to Hypertext and Cognition," in *Hypertext and Cognition*, Jean Francois Rouet, Jarmo J. Levonen, Andrew Dillon, and Rand Spiro Eds. pp.3-8 Mahwah, New Jersey: Lawrence Erlbaum Associates.

Rousseau, Denise, Sim B. Sitkin, Ronald Burt, and Colin Camerer (1998), "Not So Different After All: A Cross-Discipline View of Trust," *The Academy of Management Review*, 23 (3), 393-404.

Ruekert, Robert E. and Gilbert A. Churchill, JR. (1984), "Reliability and Validity of Alternative Measures of Channel Member Satisfaction," *Journal of Marketing Research*, 21 (May), 226-233.

Schafer, J.Ben, Joseph Konstan, and John Riedl (2000), "E-commerce Recommender Applications," *Journal of Data Mining and Knowledge Discovery*, 5 (1/2), 115-152.

Schindler, Paul L. and Cher C. Thomas (1993), "The Structure of Interpersonal Trust in the Workplace," *Psychological Reports*, 73, 563-573.

Schlenker, Barry M., B. Helm, and J. T. Tedeschi (1973), "The Effects of Personality and Situational Variables on Behavioral Trust," *Journal of Personality and Social Psychology*, 25, 419-427.

Schultz, Don E. and Scott Bailey (2000), "Customer/Brand Loyalty in an Interactive Marketplace," *Journal of Advertising Research,* May/June, 41-52.

Schumann, David W. (forthcoming) "Media and Market Segmentation Strategies as Contributing Factors to Restricted Exposure to Diversity: A Discussion of Potential Societal Consequences" In L.J. Shrum (ed.) *Blurring the Lines: The Psychology of Entertainment Media*, Mahwah, NJ: Lawrence Erlbaum and Associates.

Schurre, Paul H. and Julie L. Ozanne (1985), "Influences on Exchange Processes: Buyers' Preconceptions of a Sellers' Trustworthiness and Bargaining Toughness," *Journal of Consumer Research,* 11 (March), 939-953.

Schwartz, Ari (2000), "A Larger Role in the Public Policy Process for User Control," *Communications of the ACM*, 44 (3), 106-107.

Searle, John R. (1997), "Minds, Brains, and Programs," in *Mind Design II: Philosophy, Psychology, Artificial Intelligence,* 2nd Revision, John Haugeland Ed. Cambridge, MA: The MIT Press, 183-204.

Sellerberg, Ann-Mari (1982), "On Modern Confidence," *Acta Sociologica,* 25, 39-48.

Selnes, Fred (1998), "Antecedents and Consequences of Trust and Satisfaction in Buyer-Seller Relationships," *European Journal of Marketing,* 32 (3/4), 305-322.

Sheppard, Blair H. and Dana M. Sherman (1998), "The Grammars of Trust; A model and General Implications," *Academy of Management Review*, 23 (3), 427-437.

Shirk, Henrietta Nickels (1996), "Cognitive Architecture in the Hypermedia Instruction," in *Hypertext and Cognition,* Jean Francois Rouet. Jarmo J. Levonen, Andrew Dillon, and Rand Spiro Eds. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Short, John, Ederyn Williams, and Bruce Christie (1976), *The Social Psychology of Telecommunications.* John Wiley and Sons, Ltd, Chichester, England.

Siguaw, Judy A., Penny M. Simpson, and Thomas L. Baker (1998), "Effects of Supplier Market Orientation on Distributor Market Orientation and the Channel Relationship: The Distributor Perspective," *Journal of Marketing*, 62 (July), 99-111.

Simon, H. (1987), "Computers and Society," in *Computing and Change on Campus*, S. Kiesler and L. Sproull Eds, pp. 4-15. Cambridge, England: Cambridge University Press.

Simonson, M. R., M. Maurer, and M. Montag-Torardi, and M. Whitaker (1987), "Development of a Standardized Test of Computer Literacy and a Computer Anxiety Index," *Journal of Educational Computing Research,* 3, 231-247.

Sims, Rod (1997), "Interactivity: A Forgotten Act," *Computers in Human Behavior,* 13(2), 157-180.

Singh, Jagdap and Deepak Sirdeshmukh (2000), "Agency and Trust Mechanisms in Consumer Satisfaction and Loyalty Judgments," *Journal of the Academy of Marketing Science,* 28 (1), 150-167.

Sitkin, Sim B. and Nancy L. Roth (1993), "Explaining the Limited Effectiveness of Legalistic "Remedies" for Trust/Distrust," *Organizational Science*, 4, 367-392.

Smith, Adam [1759] (1976), *The Theory of Moral Sentiments.* Oxford: Clarendon Press.

Smith, Craig A. (1989), "Dimensions of Appraisal and Physiological Response in Emotion," *Journal of Personality and Social Psychology,* 56 (3), 339-353.

Smith, J. Brock and Donald W. Barclay (1997), "The Effects of Organizational Differences and Trust on the Effectiveness of Selling Partner Relationships," *Journal of Marketing,* 61 (January), 3-21.

Smith, J. Brock and Donald W. Barclay (1999), Selling Partner Relationships" The Role of Interdependence and Relative Influence," *Journal of the Personal Selling and Sales Management,* 19 (4), 21-40.

Smith, Ken G., Stephen J. Carroll, and Susan J. Ashford (1995), "Intra- and Inter-organizational Cooperation: Toward a Research Agenda," *Academy of Management Journal*, 38 (1), 7-23.

Sonnenberg, Frank K (1992), "Partnering- Entering the Age of Cooperation," *Journal of Business Strategy,* 13 (May/June), 49-52.

Sonnerberg, F.K. (1994), "Trust Me...Trust Me Not," *Journal of Business Strategy*, 15, 14-16.

Sproull, L, R. Subramani, S. Kiesler, J. Walker, and K. Waters (1996), "When the Interface is a Face," *Human-Computer Interaction*, 11, 97-124.

Sproull, Lee and Sara Kiesler (1986), "Reducing Social Context Cues: Electronic Mail in Organizational Communication," *Management Science*, 32(11), 1492-1513.

Sterling, B. (1992), *The Hacker Crackdown: Law and Disorder on the Electronic Frontier.* New York, NY: Arbor.

Sternthal, Brian, Ruby Roy Dholakia, and Clark Leavitt (1978), "The Persuasive Effect of Source Credibility: Tests of Cognitive Response," *Journal of Consumer Research*, 4 (March), 252-60.

Steuer, J. (1992), "Defining Virtual Reality: Dimensions Determining Telepresence," *Journal of Communication*, 42 (2), 73-93.

Stinnet, N. and J. Walters (1977), *Relationship in Marriage and Family.* New York, NY: McMillan.

Strate, Lance (1999), "The Varieties of Cyberspace: Problems in Definition and Delimitation," *Western Journal of Communication*, 63 (3), 382-412.

Strate, Lance, R. Jacobson, and S. B. Gibson (1996), *Communication and Cyberspace: Social Interaction in an Electronic Environment.* Cresskill, NJ: Hampton Press.

Strodtbeck, F.L. and E. Mann (1956), "Sex Role Differentiation in Jury Deliberation. *Sociometry*, 19, 3-11.

Strub, Peter J. and T. B. Priest (1976), "Two Patterns of Establishing Trust: The Marijuana User," *Sociological Focus,* 9 (4), 399-411.

Swan, John E., and J. Nolan (1985), "Gaining Customer Trust: A Conceptual Guide for the Salesperson," *Journal of Personal Selling and Sales Management*, 5, 39-48.

Swan, John E., I. Fredrick Trawick and David W. Silva (1985), "How Industrial Salespeople Gain Customer Trust," *Industrial Marketing Management*, 14 (August), 203-211.

Swan, John E., I. Fredrick Trawick, Jr., David Rink, and Jenny Roberts (1988), "Measuring Dimensions of Purchaser Trust of Industrial Salespeople," *Journal of Personal Selling and Sales Management*, 8 (May), 1-9.

Swan, John E., Michael R. Bowers, and Lynne, D. Richardson (1999), "Customer Trust in the Salesperson: An Integrative Review and Meta-Analysis of the Empirical Literature," *Journal of Business Research,* 44 (2), 93-107.

Swan, John W., I. Fredrick Jr. Trawick, and David W. Silva (1988), "How Industrial Salespeople Gain Customer Trust," *Industrial Marketing Management,* 14, 203-211.

Tan, Yao-Hua and Walter Thoen (2001), "Toward a Generic Model of Trust for E-commerce," *International Journal of E-commerce*, 5 (2), 61-74.

The Economist (2001), "Banner-Ad Blues," February 24, pp. 63-64.

Thomas, D. O. (1978), 'The Duty to Trust," *Proceedings of the Aristotelian Society*, 79, 89-101.

Todman, J. and E. Monaghan (1994), "Qualitative Differences in Computer Experience, Computer Anxiety, and Students' Use of Computers: A Path Model," *Computers in Human Behavior*, 10, 529-539.

Traverse, Michael David (1996). *Programming with Agents: New metaphors for thinking about computation*. Unpublished Doctoral Dissertation. MIT.

Trevino, L. K., Daft, R. L., & Lengel, R. H. (1990). Understanding Managers' Media Choices: A Symbolic Interactionist Perspective. In J. Fulk & C. Steinfield (Eds.), Organizations and Communication Technology (pp. 71-94). Newbury Park, CA: Sage.

Trevino, L. K., Lengel, R. H., & Daft, R. L. (1987). Media Symbolism, Media Richness, and Media Choice in Organizations: A symbolic interactionist perspective. *Communication Research,* 14(5), 553-74.

Trevino, L., R. H. Lengel, W. Bodensteiner, E. Gerlof and N. K. Muir (1990), "The Richness Imperative and Cognitive Style: The Role of Individual Differences in Media Choice Behavior," *Management Communication Quarterly*, 4, 176-197.

Trevino, Linda K., Robert H. Lengel, and Richard L. Daft (1987), "Media Symbolism, Media Richness, and Media Choice in Organizations: A Symbolic Interactionist Perspective," *Communications Research,* 14 (5), 553-574.

Triandis H.C. (1978), "Some Universals of Social Behavior," *Personality and Social Psychology Bulletin*, 4, 1-16.

Turkle, Sherry (1984). *The Second Self: Computers and the Human Spirit*. New York: Simon & Schuster.

Turkle, Sherry (1995). *Life on the Screen: Identity in the Age of the Internet*. New York: Simon & Schuster.

Urban, Glen L., Fareena Sultan, and William Qualls (1999), "Design and Evaluation of a Trust-Based Advisor on the Internet," MIT Sloan School of Management Working Paper. Available: http://ebusiness.mit.edu/research/papers/forum.

Urban, Glen, John R. Houser, William J. Qualls, Bruce D. Weinberg, Jonathan D. Bohlmann, and Roberta A. Chicos (1997), "Information Acceleration: Validation and Lessons from the Field," *Journal of Marketing Research*, 34 (February), 143-153.

User Interface Engineering (2001). "Are the Product Lists on Your Site Reducing Sales?" *E-Commerce White Paper*.[On-Line]. Available: http://www.uie.com.

Waern, Y. and R. Ramberg (1995), "People's Perception of Human and Computer Advice*," Computers in Human Behavior,* 12, 17-27.

Worthy, Morgan, Albert L. Gary, and Gay M. Kahn (1969), "Self-Disclosure as an Exchange Process," *Journal of Personality and Social Psychology,* 13 (1), 59-63.

Walker, Janet H, Lee Sproull, and R. Subramani (1994), "Using a Human Face in an Interface," *The Proceedings of CHI '94*, ACM Press, 85-91.

Wallace, Patricia (1999), *The Psychology of the Internet.* Cambridge University Press, Cambridge, UK.

Wallace, William P. (1963), "Review of The Historic, Empirical and Theoretical Statues of the Von-Restorff Phenomenon," *Psychological Bulletin, 63*, 410-424.

Warner, Rebecca M. and David B. Sugarman (1986), "Attributions of Personality Based on Physical Appearance, Speech, and Handwriting," *Journal of Personality and Social Psychology*, 50-792-799.

Watson, David and Lee Anna Clark (1997), "Extraversion and Its Positive Emotional Core," in *Handbook of Personality Psychology*, Robert Hogan, John Johnson, and Stephen Briggs Eds., San Diego, CA: Academic Press, 767-793.

Webster, Frederick E. (1992), "The Changing Role of Marketing in the Corporation," *Journal of Marketing*, 56 (October), 1-17.

Weil, M. M., and L. D. Rosen (1995), "The Psychological Impact of Technology from a Global Perspective: A Study of Technological Sophistication and Technophobia in University Students from Twenty-Three Countries," *Computers in Human Behavior*, 11 (1), 95-133.

Wekselberg, Victor (1996). Reduced "Social" in a New Model of Organizational Trust. *The Academy of Management Review*, 21, 333-335.

Westley, B. H. and W. J. Severin (1964) , "Some Correlates of Media Credibility," *Journalism Quarterly,* 41, 325-335.

Whitely, B. (1997), "Gender Differences in Computer-Related Attitudes and Behavior: A Meta Analysis," *Computers in Human Behavior*, 13, 1-22.

Whitener, Ellen M., Susan E. Brodt, M. Audrey Korsgaard, and Jon M. Werner (1998), "Managers as Initiators of Trust: An Exchange Relationship Framework for Understanding Managerial Trustworthy Behavior," *Academy of Management Review,* 23 (3), 513-530.

Wiggins, J. S. (Ed.). (1996), *The Five-Factor Model of Personality: Theoretical Perspectives.* New York: Guilford Press.

Wilder, Clinton (1998), "Agent Go Price Shopping," *Internetweek,* December 7, 744, p.23.

Williams, C. E. and K. N. Stevens (1972), "Emotions and Speech: Some Acoustic Correlates," *Journal of Acoustical Society of America*, 52, 1238-1250.

Wilton, Peter C. and John G Myers (1986), "Task, Expectancy and Information Assessment Effects in Information Utilization Processes," *Journal of Consumer Research, 12*, 469-486.

Wong, H. Chi and Katia Sycara (2000), "A Taxonomy of Middle-Agents for the Internet," In *Proceedings of the Fourth International Conference on Multi-Agent Systems (ICMAS'2000).* Available: *h*ttp://www.cs.cmu.edu/~softagents/papers/ExtMiddleAgentsICMAS.pdf

Woodside, A. G. and J. W. Davenport (1974), "Effects of Salesman Similarity and Expertise on Consumer Purchasing Behavior," *Journal of Marketing Research,* 11, 198-202.

Wooldridge, Michael and Nichklas R. Jennings (1995), "Intelligent Agents: Theory and Practice," *The Knowledge Engineering Review,* 10 (2), 115-152.

Yaghi, Hussein and Mary Bentley Abu-Saba (1998), "Teachers' Computer Anxiety: An International Perspective," *Computer in Human Behavior,* 14 (2), 321-336.

Yoon, Carolyn (1997), "Age Differences in Consumers' Processing Strategies: An Investigation of Moderating Influences," *Journal of Consumer Research, 24,* 329-342.

Young, C. Louise and Ian F. Wilkinson (1989), "The Role of Trust and Co-operation in Marketing Channels: A Preliminary Study," *European Journal of Marketing*, 23 (2), 109-121.

Zacharia, Giorgos, Alexandria Moukas, and Pattie Maes (1999), "Collaborative Reputation Mechanisms in Electronic Marketplace," *Proceedings of the 32nd Hawaii International Conference on System Sciences*, 1-7.

Zadrozny, Wlodek, M. Budzikowska, J. Chai, N. Kambhatla, S. Levesque, and N. Nicolov (2000), "Natural Languate Dialogue for Personalized Interaction," *Communications of the ACM*, 43 (8), 116-120.

Zajonc, Robert B. (1960), "The Concepts of Balance, Congruity and Dissonance. *Public Opinion Quarterly,*" *24*, 281-296.

Zajonc, Robert B. (1965), "Social Facilitation: A Solution is Suggested for an Old Social Psychological Problem," *Science,* 149, 269-274.

Zajonc, Robert B. (1980), "Feeling and Thinking: Preferences Need No Inferences," *American Psychologist*, 35 (February), 151-175.

Zajonc, Robert B. (1984), "On the Primacy of Affect," *American Psychologist*, 39 (February), 117-123.

Zajonc, Robert B. and Hazel Markus (1982), "Affective and Cognitive Factors in Preferences," *Journal of Consumer Research*, 9 (2), 123-131.

Zajonc, Robert B. and Hazel Markus (1985), "Must All Affect Be Mediated by Cognition?" *Journal of Consumer Research,* 12 (3), 363-364.

Zaltman, Gerald and Christine Moorman (1988), "The Importance of Personal Trust in the Use of Research," *Journal of Advertising Research*, October/November, 16-24.

Zand, Dale E. (1972), "Trust and Managerial Problem Solving," *Administrative Science Quarterly,* 17 (June), 229-239.

Zucker, Lynne G. (1986), "Production of Trust: Institution-Based Sources of Economic Structure, 1840-1920," In *Research in Organizational Behavior*, B. M. Staw and L. L. Cummings, Eds., Vol. 8, pp. 53-111. Greenwich, CT: JAI Press.

Zuckerman, Miron, Mary D. Amidon, Shawn E. Bishop, Scott D. Pomerantz (1982), "Face and Tone of Voice in the Communication of Deception," *Journal of Personality and Social Psychology*, 43 (2), 347-357.

APPENDICES

APPENDIX A. EXPERIMENT

Subject Assignment

Table A-1. Study 1 Subject Assignment

	No Face	Less Human-Like	More Human-Like	Real Face
Cold Script	18	17	16	20
Warm Script	18	26	20	21

Table A-2. Study 2 Subject Assignment

	None/Cold		Less/Warm		Real/Warm	
	Low Info	Rich Info	Low Info	Rich Info	Low Info	Rich Info
Experiential Situation	18	19	18	22	15	17
Instrumental Situation	18	20	19	17	15	15

Table A-3. Studies 1 & 2 Combined Subject Assignment

	None/Cold	Less/Warm	Real/Warm
30%	18	26	21
10%	36	37	30

Table A-4. Low and High Social Presence Scripts
(Comic Sans Script font (size 14) was used on the computer screen)

Low Social Presence Script (Cold Script)	High Social Presence Script (Warm Script)
➢ I'm John.	➢ Hello, my name is John
➢ Continue	➢ Hi! John
➢ I am a computer-simulated shopping agent.	➢ I am your personal shopping agent.
➢ Specialization: Digital Cameras.	➢ And I specialize in digital cameras.
➢ Continue	➢ Continue
➢ My job: Finding a digital camera that is suited to a buyer's needs.	➢ I would like to help you to find a digital camera that best suits your needs.
➢ Continue	➢ Continue
➢ Beginning the Dialogue protocol #0095. Topic-Digital Camera	➢ Let's learn about digital cameras together.
➢ Continue	➢ OK
➢ Important attributes when choosing a digital camera are:	➢ There are important things to think about when choosing a digital camera that is right for you.
➢ 1. Picture resolution	➢ Picture Resolution
➢ 2. Screen Size	➢ Screen Size
➢ 3. Zoom	➢ Zoom
➢ 4. Price	➢ And of course, your budget.
➢ Continue	➢ Continue
➢ Next, demonstrations of differences between products.	➢ I would like to show you how each of these features can make a difference in your pictures.
➢ Continue	➢ Continue
➢ Click one of the buttons below to engage the different picture resolutions	➢ Click one of the buttons below to see the different picture resolutions
➢ Proceed to the next attribute	➢ Good Job! Move on to the next feature
➢ Repeat this attribute	➢ Try this feature again.
➢ Task Completed. End protocol #0095	➢ When you have finished selecting the various features, click here
➢ End	➢ Done
➢ You did not review all the information about Picture Resolutions.	➢ It seems that you did not review all the information about Picture Resolutions.
➢ Go back and review this information	➢ Would you like to see the different picture resolutions?
➢ Go back	➢ Go back
➢ No, Move On	➢ No, Move On
➢ Prices of digital cameras : $200-$450	➢ My cameras are priced from $200 to $450.
➢ Now, Proceed to the next section.	➢ OK, let's move on.
➢ Proceed	➢ Move On
➢ In the next screens, state the importance of each of the following attributes when choosing a digital camera.	➢ In the next screens, can you please tell me how important you consider each of the following features when you buy a digital camera?
➢ 1. Picture Resolution	➢ Picture Resolution
➢ 2. Screen Size	➢ Screen Size
➢ 3. Zoom	➢ Zoom
➢ Continue	➢ Continue
➢ How important is picture resolution when choosing a digital camera?	➢ How important would you consider picture resolution to be when choosing a digital camera?
➢ Click the number that best represents your choice	➢ Click the number that best represents your choice
➢ I want high quality picture resolution	➢ I want high quality picture resolution
➢ I want adequate quality picture resolution.	➢ I want adequate quality picture resolution.

Low Social Presence Script (Cold Script)	High Social Presence Script (Warm Script)
➢ Other features are more important than picture resolution.	➢ Other features are more important than picture resolution.
➢ For picture resolution, response #02(adequate quality) was recorded.	➢ You answered that for picture resolution "you want high quality"
➢ OK	➢ OK
➢ The recorded responses are as follows:	➢ I understand your choices as the following.
➢ Picture Resolution: Adequate Quality	➢ You want adequate quality picture resolution
➢ Screen Size: High Quality	➢ You want a big screen size
➢ Zoom: Low Importance	➢ Other features are more important than zoom.
➢ In order to make changes to recorded responses, click the buttons below.	➢ If you want to make changes to your choices, click the buttons below.
➢ Proceed to see some cameras.	➢ If you are happy with your choices, let's move on to see some cameras!
➢ Proceed	➢ Move On
➢ Beginning the Search Session #0102	➢ There are a variety of camera choices for you.
➢ Using the criteria for the attributes you selected, 4 cameras will be shown to you.	➢ Using your choices of the camera features, I will show you 4 cameras that may suit your needs.
➢ OK	➢ OK
➢ Enough time will be provided to look at these cameras.	➢ Here, you can take as much time as you want to look at these cameras.
➢ Use the "Next Camera" and "Previous Camera" buttons to browse.	➢ Please, use the "Next Camera" and "Previous Camera" buttons to browse.
➢ Continue	➢ Continue
➢ Choose one camera, among the four, that you are most likely to purchase and place the camera in the shopping cart.	➢ Please choose one camera that you would most likely to purchase and send the camera to your shopping cart.
➢ The act of sending the second camera to the shopping cart will remove the first one from the cart.	➢ If you send the second camera to the shopping cart, the first camera will be removed from the cart.
➢ Continue	➢ Continue
➢ Camera 1of 4	➢ Camera 1of 4
➢ Picture Resolution: 600X 400	
➢ Screen Size: 2.5 inch	➢ This camera has 600X 400 picture resolution. The screen size is 2.5 inch and zoom is 2X.
➢ Zoom: 2X	
➢ If you have finished looking at all four cameras and chosen one camera that you would like to purchase, hit this button.	➢ If you have finished looking at all four cameras and chosen one camera that you would like to purchase, hit this button.
➢ End	➢ Done
➢ Currently, the shopping cart is empty.	➢ Currently, your shopping cart is empty.
➢ Go back to make a selection.	➢ Could you please go back to select one camera that you would most likely consider purchasing?
➢ Go Back	➢ Go Back
➢ The camera was sent to the shopping cart.	➢ The camera was sent to the shopping cart.
➢ The shopping cart has VL-WD111.	➢ Good job! I see that your shopping cart has VL-WD111.
➢ Picture Resolution: 600X 400	➢ Picture Resolution: 600X 400
➢ Screen Size: 2 inch	➢ Screen Size: 2 inch
➢ Zoom: 2X	➢ Zoom: 2X
➢ OK	➢ OK
➢ Your camera choice of VN-WD111 is recorded with the computer system.	➢ Realizing that you have already chosen a camera
➢ However, there may be a superior camera choice for you.	➢ I would like to offer another camera that, I believe, can be a better choice for you.

Low Social Presence Script (Cold Script)	High Social Presence Script (Warm Script)
➢ OK	➢ OK
➢ Uploading information about another camera, VQ-PL450…	➢ I believe the best choice for you is
➢ Continue	➢ Continue
➢ John's best pick!	➢ John's best pick!
➢ VQ-PL450	➢ VQ-PL450
➢ Picture Resolution: 800 X 600	➢ Picture Resolution: 800 X 600
➢ Screen Size: 2.5 inch	➢ Screen Size: 2.5 inch
➢ Zoom: 2X	➢ Zoom: 2X
➢ Continue	➢ Continue
➢ Compare this camera, VQ-PL450, with your prior choice in the following attributes	➢ You can compare this camera, VQ-PL450, with your earlier choice, VL-WD111, in the following features
➢ Resolution	➢ Resolution
➢ Screen Size	➢ Screen Size
➢ Zoom	➢ Zoom
➢ Price	➢ Price
➢ Finished Comparison	➢ Finished Comparison
➢ Reasons to purchase VQ-Pl450 -	➢ Why this camera?
➢ VQ-PL450 has two preprogrammed exposure modes which configure the camera in carious types of scenes.	➢ VQ-PL450 has two preprogrammed exposure modes which configure the camera in carious types of scenes.
➢ OK	➢ OK
➢ VQ-PL450 is recommended as a superior camera choice over VL-WD111 which is currently in your shopping cart.	➢ I really think you might enjoy this camera better than VL-WD111 which is currently in your shopping cart.
➢ OK	➢ OK
➢ Your prior camera choice, VL-WD111, $209.99	➢ Earlier you marked this camera, VL-WD111, $209.99
➢ John's Choice, VQ-Pl450, $272.99	➢ John's Choice, VQ-Pl450, $272.99
➢ Choose between these two cameras.	➢
➢ Click on the camera that you would like to purchase	➢ When you are ready to make a final choice, click on the camera you would like to purchase.
➢ Or deny Purchase	➢ If you do not want to buy any of these cameras, click here
➢ Deny Purchase	➢ Don't buy any.
➢ VL-WD111 Transaction #00020-43241 is now in progress.	➢ You are purchasing VL-WD111.
➢ Continue	➢ Continue
➢ Will you accept the final charge of $209.99?	➢ Will you accept the final charge of $209.99?
➢ Yes	➢ Yes
➢ No	➢ No
➢ Enter credit card number	➢ Enter credit card number
➢ Hit the Return key after typing.	➢ Hit the Return key after typing.
➢ User Input Recorded	➢ Thank you.
➢ Processing	➢ Processing
➢ Processing	➢ Processing
➢ Transaction Completed	➢ Done
➢ The shopping task has been completed.	➢ Thank you for shopping with me.
➢ End	➢ Thank you John.
➢ Beginning the dialogue protocol #087645	➢ Our shopping is over now.
➢ In this session, I will provide some data about me and I need to collect information from you.	➢ However, before you go, I would like to learn about you so that I can better assist you next time.
➢ Continue	➢ Continue
➢ I am a fairly new computer agent.	➢ I am a pretty new computer agent.
➢ Factually, 9 months old.	➢ In fact, I have been around here for about 9 months.

Low Social Presence Script (Cold Script)	High Social Presence Script (Warm Script)
➢ What is your age?	➢ How old are you?
➢ Type the Return key after each response.	➢ Please hit the return key after each response.
➢ I'd rather not tell.	➢ I'd rather not tell.
➢ The major part of my database contains educational information about cameras and photography.	➢ I like to learn about picture-taking techniques and new developments in photography.
➢ State your major.	➢ What is your major?
➢ I was built by a computer programmer in North Carolina.	➢ I was put together by my designer in North Carolina.
➢ State your place of birth.	➢ Where is your hometown?
➢ Fourth, a number of similar agent prototypes were also built by the computer programmer who created Agent John.	➢ My designer has also created other computer agents who are like brothers and sisters to me.
➢ State the number of your siblings.	➢ How many brothers and sisters do you have?
➢ Fifth, my memory chip contains a significant amount of graphic and movie stream data.	➢ The reason I like cameras is because they capture the best moments of my life.
➢ State your favorite memory.	➢ What is your favorite memory?
➢ Conversation Completed.	➢ Thank you for chatting with me.
➢ Responses Recorded.	➢ I enjoyed serving you today.
➢ This session has been terminated.	➢ Come back and See me!
➢ End Session.	➢ By John.

Experiment Instruction: Study 1

You are about to participate in a research study on agent-assisted shopping for digital cameras on the Internet.

By participating in this experiment, you will also enter a drawing for two $250 gift certificates. Two randomly selected winners will receive these awards, which can be used on today's shopping trip. If you are selected as a winner and purchase a camera that is less than $250 during today's shopping trip, the difference amount will be awarded as a gift certificate.

Read the following scenario carefully and imagine yourself in the following situation.

Lately, you have been thinking about buying a digital camera. You have saved about $250 for this camera. Now you are going to consult a computer-simulated shopping agent, *John*, to select (and perhaps purchase) a digital camera that is right for you.

Today you brought a credit card with you (see below) in case you see a digital camera that you would really like to purchase.

UT

4389 9043 1243 9057

WHEN YOU ARE READY,

CLICK ON THE "BEGIN" BUTTON ON THE SCREEN,

YOUR SHOPPING TRIP WILL START.

Experiment Instruction: Study 2

(Experiential Shopping Goal)

Please read the following scenario <u>carefully</u> and <u>imagine yourself in this situation.</u>

Let's imagine that you have an upcoming family reunion in two weeks. You have been thinking about this event and you want to buy a digital camera to take pictures of your family members at the reunion. You think that it would be nice to capture the best family moments and upload those pictures on your Web site. This will let everyone in the family enjoy and savor their favorite moments at the reunion. You are happy that everyone in your family is going to be there, expecting that it is going to be a great family time together.

Now you are going to consult a computer-simulated shopping agent, *John*, to select (and perhaps purchase) a digital camera that is right for you.

Your goal in this shopping trip is to enjoy this shopping experience with Agent *John* as you will enjoy the upcoming family reunion.

You are about to participate in a research study on agent-assisted shopping for digital cameras on the Internet.

By participating in this experiment, you will also enter a drawing for two $250 gift certificates. Two randomly selected winners will receive these awards, which can be used on today's shopping trip. If you are selected as a winner and purchase a camera that is less than $250 during today's shopping trip, the difference amount will be awarded as a gift certificate.

For today's shopping trip we provide you with a credit card (see below) in case you see a digital camera that you would really like to purchase.

WHEN YOU ARE READY,

CLICK ON THE "BEGIN" BUTTON ON THE SCREEN,

YOUR SHOPPING TRIP WILL START.

Please read the following scenario <u>carefully</u> and <u>imagine yourself in this situation.</u>

Let's imagine that you are a professional photographer. You have a job interview for a photographer position in the *Online Encyclopedia of Botany and Minerals* in two weeks. Your job as a photographer will be to take pictures of plants, trees, and rocks. You understand that, in today's publishing industry, pictorial images that are captured by a digital camera, which can be stored and transferred electronically, can get you ahead in your job. For this job interview, you are about to create a picture portfolio to demonstrate your ability as a photographer.

Now, you are going to consult a computer-simulated shopping agent, *John*, to select (and perhaps purchase) a digital camera that is right for you.

Your goal in this shopping trip is to find a camera that will help you to create a good portfolio and be successful in this job interview.

Debriefing Statement

Information to UT students

        Thank you for participating in this research study on agent-assisted online shopping. The information you provided in this study is very valuable and will be used only for academic purposes. Please be assured that any information you provided in this research project will be kept confidential. The purpose of this study was to understand the effects of anthropomorphism (i.e., similarity to a real person) and social presence (e.g., warmth) on user perceptions regarding electronic shopping agents, including consumer attitudes and trust.

        Since we tied the incentive (i.e., two gift certificates) to this experimental study to enhance the purchase experience for the respondents, you were informed about a drawing for two $250 gift certificates, $250 representing the average price of actual digital cameras. Since we are aware that many students may not be in the market for digital cameras, the winners of the drawing will each be presented with $250 in cash to use any manner they choose.

        Since this research project is still in progress, we would greatly appreciate if you would <u>not</u> discuss this experiment or the incentive with your classmates or friends who could be potential participants of this study. The information you provide through your responses is very important to us and it is highly desirable that every respondent come in to the experiment with the same level information about the study. So please, for the integrity of the study, <u>please do **not** discuss this study with potential respondents (e.g., your classmates or friends) until the study is over in July</u>.

        You will be receiving extra credit for your participation in this research study. If you have any questions regarding the incentive or the course credit, please contact Dr. Eun-Ju Lee. Again, thank you for participating in this important study.

<div align="center">

Dr. Eun-Ju Lee
344 Stokely Management Center
Dept of Marketing, Logistics, and Transportation
University of Tennessee
974-4179
Elee5@utk.edu

</div>

APPENDIX B. SURVEY

Personality Survey

Please complete this survey measuring various personality dimensions. Please take your time and think about where you fit on each response. Answer by checking the cell that best represents your response.

<u>Example</u>

If you "Strongly Agree" that you make friends easily,

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Makes friends easily					V

I see myself as someone who is…

		Strongly	Disagree	Neutral	Agree	Strongly Agree
1	Makes friends easily					
2	Warms up quickly to others					
3	Feels comfortable around people					
4	Acts comfortably with others					
5	Cheers people up					
6	Is hard to get to know					
7	Often feels uncomfortable around people					
8	Avoids contact with others					
9	Keeps others at distance					
10	Retreats from others					
11	Seeks quiet					
12	Avoids crowds					
13	Starts conversations					
14	Prefers to be alone					
15	Loves large parties					

	I see myself as someone who …	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
16	Talks to a lot of different people at parties					
17	Enjoys being part of a group					
18	Involves others in what I am doing					
19	Loves surprise parties					
20	Is interested in people					
21	Makes people feel at ease					
22	Knows how to comfort others					
23	Inquires about others' well-being					
24	Takes time for others					
25	Makes people feel welcome					
26	Shows my gratitude					
27	Makes others feel good					
28	Is not really interested in others					
29	Rarely smiles					
30	Trusts others					
31	Believes that others have good intentions					
32	Trusts what people say					
33	Believes that people are basically moral					
34	Believes in human goodness					
35	Thinks that all will be well					
36	Distrusts people					
37	Suspects hidden motives in others					
38	Is wary of others					
39	Believes that people are essentially evil					
40	Acts as a leader					
41	Defends one's own beliefs					

42	Has leadership abilities					
	I see myself as someone who …	Strongly	Disagree	Neutral	Agree	Strongly Agree
43	Makes decision easily					
44	Has strong personality					
45	Does not use harsh languages					
46	Loves children					
	I see myself as someone who is..	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
47	Aggressive					
48	Ambitious					
49	Analytical					
50	Assertive					
51	Athletic					
52	Competitive					
53	Dominant					
54	Forceful					
55	Independent					
56	Individualistic					
57	Masculine					
58	Self-reliant					
59	Self-sufficient					
60	Willing to take a stand					
61	Willing to take risks					
62	Affectionate					
63	Cheerful					
64	Childlike					
65	Compassionate					
66	Eager to soothe hurt feelings					

67	Feminine					
	I see myself as someone who is…	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
68	Flatterable					
69	Gentle					
70	Gullible					
71	Loyal					
72	Sensitive to the needs of others					
73	Shy					
74	Soft spoken					
75	Sympathetic					
76	Tender					
77	Understanding					
78	Warm					
79	Yielding					

Please answer the following by checking the cell that best represents your response.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I prefer complex to simple problems.					
2	I like to have the responsibility of handling a situation that requires a lot of thinking.					
3	Thinking is not my idea of fun.					
4	I would rather do something that requires little thought rather than something that is sure to challenge my thinking abilities.					
5	I try to anticipate and avoid situations where there is likely change I will have to think in depth about something.					
6	I find satisfaction in deliberating hard and for long hours.					
7	I only think as hard as I have to.					
8	I prefer to think about small, daily projects to long-term ones.					

9	I like tasks that require little thought once I've learned them.					
10	The idea of relying on thought to make my way to the top appeals to me.					
11	I really enjoy a task that involves coming with new solutions to problems.					
12	Learning new ways to think doesn't excite me very much.					
13	I prefer my life to be filled with puzzles that I must solve.					
14	The notion of thinking abstractly is appealing to me.					
15	I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.					
16	I feel relief rather than satisfaction after completing a task that required a lot of mental effort.					
17	It's enough for me that something gets the job done; I don't care how or why it works.					
18	I usually end up deliberating about issues even when they do not affect me personally.					

Please provide the following information about yourself. This information will be used only for academic purposes and to assure you receive extra credit.

1. **What is your e-mail address?**

_____

2. **What is your UT ID Number?**

_____

3. **What is your name?**

_____

Trust Survey

Please take time and think about your experiences with Agent *John*. For each item below, please answer by checking the response that best represents your thoughts and feelings toward Agent *John*.

Example

If you "Strongly Agree" that Agent *John* was helpful,

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Agent *John* was helpful					X

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	When it came to buying cameras, Agent *John* knew enough to give me a good advice.					
2	I was willing to trust Agent *John* to make camera purchases even if I was unable to monitor his activities.					
3	Agent *John* was capable of recommending cameras that were appropriate for me.					
4	I believed Agent *John* did not make false claims.					
5	I wish there had been a good way to see exactly what Agent *John* was doing while he was interacting with me.					
6	I believed Agent *John* had good intentions towards helping me.					
7	I was willing to let Agent *John* make important choice decisions for me.					
8	Agent *John* responded to my needs in a caring way.					
9	I believed Agent *John* provided trustworthy information.					
10	I felt close to Agent *John*.					
11	I had faith in Agent *John*'s knowledge about cameras.					
12	Agent *John* was like a friend during the shopping experience.					
13	Agent *John* seemed to care about me.					
14	I would not let Agent *John* have influence over other purchases that are important to me.					
15	Agent *John* performed his job reliably.					

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
16	I believed Agent *John* would be capable of deceiving me if it was in his best interests.					
17	I felt Agent *John* was on my side.					
18	I was confident about Agent *John*'s expertise in camera.					
19	I would be comfortable giving Agent *John* responsibility to make camera purchase decisions for me.					
20	I believed the information provided by Agent *John* was accurate.					
21	I would not give my personal information to Agent *John*.					
22	Agent *John* was a reliable shopping partner.					
23	I could trust that Agent *John* would not reveal my personal information to others.					
24	I trusted Agent *John*'s expertise in camera.					
25	I believed Agent *John* was honest with me.					
26	Agent *John* helped me make good decisions.					
27	Agent *John* would not misplace my purchase order.					
28	In general, I would not give my credit card number to Internet agents.					
29	I had faith that Agent *John* would respect my privacy.					
30	Agent *John* made me feel good.					
31	I will have to be cautious in my dealings with Agent *John*.					
32	I would be suspicious of Agent *John*'s recommendations.					
33	I felt that Agent *John* hid important information from me.					
34	I had a favorable attitude toward Agent *John*.					
35	I liked Agent *John*.					
36	I would shop with Agent *John* again.					
37	My interaction with Agent *John* was clear and understandable.					
38	My interaction with Agent *John* did not require a lot of my mental effort.					
39	I found it cumbersome to use Agent *John* for my shopping.					

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
40	I found it easy to get Agent *John* to do what I wanted him to do.					
41	Overall, I found Agent *John* easy to use.					
42	I was confused when I interacted with Agent *John*.					
43	My interaction with Agent *John* was frustrating.					
44	Agent *John* improved my performance when shopping for digital cameras.					
45	Agent *John* helped me to make a better purchase decision than would otherwise be possible.					
46	Agent *John* enhanced my effectiveness in shopping for cameras.					
47	I found Agent *John* to be useful in my shopping.					
48	Agent *John* improved the quality of my shopping.					
49	Agent *John* saved me time.					
50	Overall, I found Agent *John* to be useful.					
51	Overall, I could trust Agent *John*.					

1. **How would you rate your shopping experience with Agent *John?***

For example, if you think that you were extremely pleasant when shopping with John,

Unpleasant ____:____:____:____:____:____:__X__ Pleasant

I was:

Displeased ____:____:____:____:____:____:____ Pleased

Dissatisfied ____:____:____:____:____:____:____ Satisfied

Unhappy ____:____:____:____:____:____:____ Happy

2. **What do you think of Agent *John?***

John was:

Insensitive ____:____:____:____:____:____:____ Sensitive

Cold ____:____:____:____:____:____:____ Warm

Unsociable ____:____:____:____:____:____:____ Sociable

Unfriendly ____:____:____:____:____:____:____ Friendly

Unemotional ____:____:____:____:____:____:____ Emotional

Unresponsive ____:____:____:____:____:____:____ Responsive

Impersonal ____:____:____:____:____:____:____ Personal

Dull ____:____:____:____:____:____:____ Vivid

3. **How closely do you think Agent John's face resembles an actual person?**

Not at all Closely ____:____:____:____:____:____:____ Very Closely

4. **How closely do you think Agent John's face resembles a picture of a real person's head?**

Not at all Closely ____:____:____:____:____:____:____ Very Closely

Please take your time to think about the following questions and let us know what you thought about the experiment.

1. What did you think the experiment was about?

2. Do you have any general comments about the experiment?

3. Did you have any technical problems with the experiment?

4. How did you feel about the way Agent *John* presented information?

5. How did you feel about Agent *John*?

4. Do you own a digital camera?   YES_____   NO_____

5. Please indicate how much you:

		Very Little		Neutral		Very Much
1	Use digital cameras.					
2	Are interested in digital cameras.					
3	Are a digital camera expert.					
4	Are interested in digital cameras, relative to other people.					
5	Use computers at school					
6	Use computers at home					
7	Search product information online					
8	Purchase online					

6. How many hours do you spend on the Internet per week?

                                  _____hrs

7. What are the items you bought over the Internet during the past six months?

Please provide the following information about yourself. This information will be used only for academic purposes and to assure you receive extra credit.

8. What is your e-mail address? _____

9. What is your name?   _____

10. What is the class that you will be receiving this extra credit for?

    Course TITLE   _____   INSTRUCTOR _____

APPENDIX C. ADDITIONAL ANALYSES

Table C-1. Principal Component Analysis for Six Trust Factors

ITEM	Cogntive Trust	Benevolence	Trusting Intention	Doubt	Privacy/Security Concern
CO4	**0.8106**	0.2133	0.1066	-0.0331	0.1399
CO3	**0.7902**	0.1515	0.1526	-0.1493	0.1474
CO2	**0.7695**	0.1285	0.1860	-0.0477	0.2117
IC3	**0.6642**	-0.0394	0.0510	-0.2211	0.3232
IC1	**0.6583**	0.2541	0.1537	-0.2961	0.1444
IC4	**0.6384**	0.2768	0.1157	-0.3056	0.0355
T1	**0.6293**	0.1430	0.2705	0.0411	0.1099
IC2	**0.6088**	0.1057	0.1398	-0.2648	0.0447
BE4	0.0958	**0.7954**	0.1903	-0.0066	0.1356
BE5	0.0905	**0.7924**	0.1011	-0.0075	0.1337
BE3	0.1428	**0.7027**	0.0320	-0.1151	0.1910
BE2	0.1776	**0.7008**	0.2978	-0.0087	0.0599
BE1	0.2586	**0.6330**	0.1027	-0.1965	-0.0253
TI3	0.1536	0.2293	**0.8005**	-0.0426	0.0364
TI2	0.2025	0.2314	**0.7962**	-0.0443	0.0832
TI1	0.3434	0.1270	**0.6675**	-0.2240	0.1369
DO1	-0.2592	-0.1066	-0.2435	**0.7143**	-0.0632
DO2	-0.0209	-0.0164	0.0075	**0.7036**	-0.2099
DO4	-0.2540	-0.1570	-0.1220	**0.6151**	-0.3109
DO3	-0.4259	-0.0213	0.0627	**0.4944**	0.0524
PS2	0.2397	0.0604	-0.0186	-0.0202	**0.7543**
PS1	0.1262	0.1768	0.1542	-0.2482	**0.6905**
PS3	0.2060	0.2680	0.1290	-0.2326	**0.6684**
Eigen Value	8.071	2.234	1.546	1.234	1.092
Variance Explained (%)	20.31	13.79	9.51	9.47	8.57
Chronbach's α	0.8977	0.8228	0.7844	0.6880	0.6937

Table C-2. Correlations among the Six Trust Dimensions (N=382)

	Competence (CO)	Information Credibility (IC)	Benevolence (BE)	Trusting Intentions (TI)	Doubt (DO)	Privacy/security (PS)
CO (sig.)	**1.00**					
IC (sig.)	.694** (.000)	**1.00**				
BE (sig.)	.415** (.000)	.374** (.000)	**1.00**			
TI (sig.)	.478** (.000)	.439** (.000)	.475** (.000)	**1.00**		
DO (sig.)	-.449** **(.000)**	-.517** **(.000)**	-.280** (.000)	-.327** (.000)	**1.00**	
PS (sig.)	.391** (.000)	.397** (.000)	.392** (.000)	.317** (.000)	-.436** (.000)	**1.00**

** Correlation is significant at the 0.01 level (2-tailed).

Table C-15. Conversion Frequencies - Study 1

SCRIPT1			FACE				Total
			NONE	LESS	WARM	REAL	
COLD	CONVERSION	NO	14	13	14	16	57
		YES	2	1	2	4	9
	Total		16	14	16	20	66
WARM	CONVERSION	NO	17	24	17	20	78
		YES	1	2	0	0	3
	Total		18	26	17	20	81

Table C-16. Conversion Frequencies - Study 2

SITUATION	INFORMATION RICHNESS			FACE/SCRIPT			Total
				None/Cold	Less/Warm	Real/Warm	
Experiential	Info Non- Rich	CONVERSION	NO	6	10	7	23
			YES	12	8	8	28
		Total		18	18	15	51
	Info Rich	CONVERSION	NO	7	16	7	30
			YES	12	6	10	28
		Total		19	22	17	58
Instrumental	Info Non- Rich	CONVERSION	NO	6	14	9	29
			YES	12	5	6	23
		Total		18	19	15	52
	Info Rich	CONVERSION	NO	8	8	8	24
			YES	12	9	7	28
		Total		20	17	15	52

Table C-17. Conversion Frequencies – Studies 1 & 2 Combined

PRICE UPGDADE			FACE/SCRIPT			Total
			None/Cold	Less/Warm	Real/Warm	
30%	CONVERSION	NO	16	24	21	61
		YES	2	2	0	4
	Total		18	26	21	65
10%	CONVERSION	NO	12	24	16	52
		YES	24	13	14	51
	Total		36	37	30	103

Table C-18. Relationships among the Personality Traits (N=379)

		NASUM	NCSUM	FESUM	MASUM	TSUM
NASUM (Need for Association)	Pearson Correlation	**1.000**	**.085**	**.194****	**.358****	**.463****
	Sig. (2-tailed)		.097	.000	.000	.000
NCSUM (Need for Cognition)	Pearson Correlation		**1.000**	**.065**	**.326****	**.001**
	Sig. (2-tailed)			.208	.000	.983
FESUM (Feminine Orientation)	Pearson Correlation			**1.000**	**-.183****	**.295****
	Sig. (2-tailed)				.000	.000
MASUM (Masculine Orientation)	Pearson Correlation				**1.000**	**.055**
	Sig. (2-tailed)					.287
TSUM (Trusting Personality)	Pearson Correlation					**1.000**
	Sig. (2-tailed)					.

** Correlation is significant at the 0.01 level (2-tailed).

Low Feminine Individuals

High Feminine Individuals
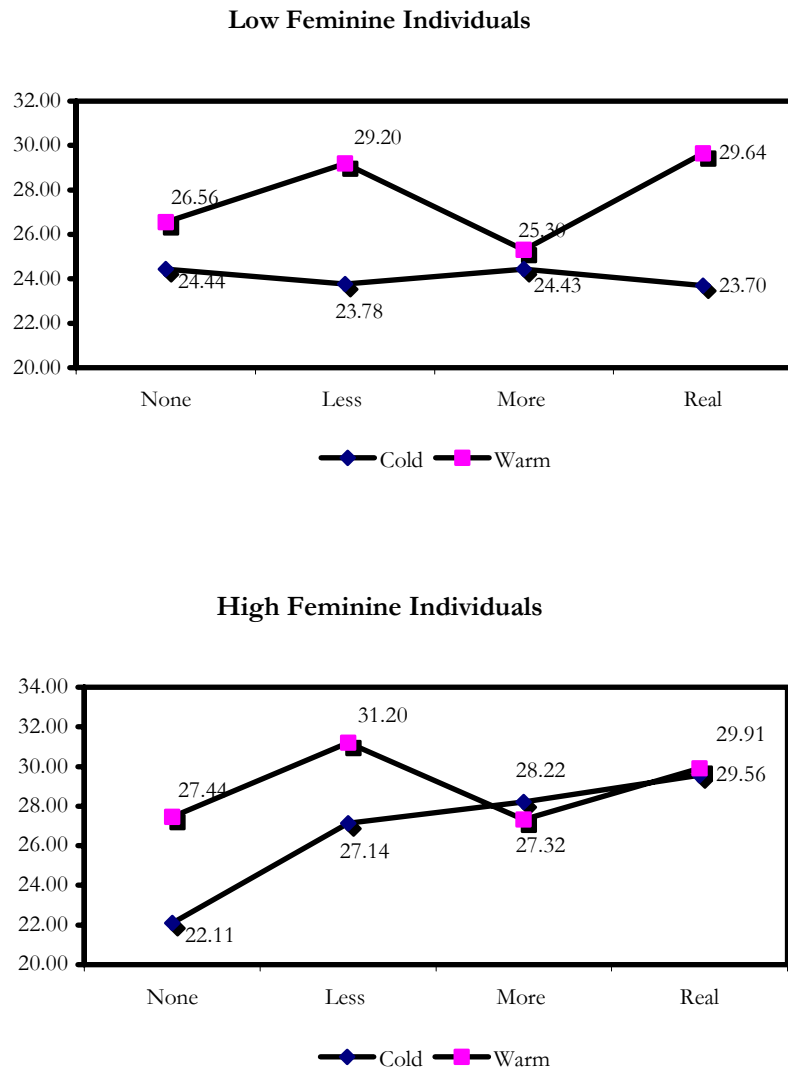
Figure C-1. Perception of Social Presence by Feminine Orientation (Study 1)

APPENDIX D. SELF-DISCLOSURE CONTENTS

Table D-1. Responses to Agent *John*'s Self-Disclosure Request (Study 1)

Agent *John*: What is your favorite memory? / State your fanorite memory.

- 21st birthday party
- A high school home run game winner
- A swiss lake I visited on a trip.
- A trip I took with my Family to South America
- Alternative Spring Break Trip to Tallahasse Florida
- Amsterdam with friends
- beach days
- Beach vacation with family
- becoming a dj
- being a gymnastist as a child
- being in love
- being with family and friends
- Breaking the Continental record for swimming
- building a jeep with my father
- Camping in Grand Teton National Park
- camping with buddiews
- canoeing down the Rio Grande in Big Bend National Park
- Christmas
- Christmas at my Grandmothers house
- college
- college life here at ut
- Competing at UCA Nationals
- Difficult to answer. I have many.
- don't have just one
- don't know
- drinking
- Europe vacation
- family vacation at the beach
- Family vaccation
- first day of college
- First day of college
- first time playing soccer
- Getting married
- Getting my dog.
- Going on a cruise for my senior trip
- Going on a family vacation during the summer
- Going to Austria to ski
- going to disney world when i was 2 with my mom and dad
- Going to Miami with friends
- Going to my first major league baseball game.
- Going to Olympic Trials

Agent *John*: What is your favorite memory? / State your fanorite memory.

- going to the beach with my family
- Graduating from High school
- Graduation
- Hiking
- hole-in-one in golf
- holidays
- holidays with my family
- home with my grandmother
- Honeymoon
- I do not have one
- I dont know I have long term memory loss
- I have a lot of them
- i have many
- I have tons of fav. memories and they all would be growing up in a large family with 5 kids and great parents. We had lots of fun!
- last day of school
- Learning to rock climb.
- Living as an exchange student in Japan for 4 months
- living in sicily
- Maui
- meeting my girlfriend
- mountain bike trips
- My dad tucking me in at night when I was little.
- My first dad at UT.
- My first Home run in Baseball
- my first trip to neyland statdium for a game
- my grandmother
- My kids getting along and getting a picture of it
- My little puppy
- My senior year in high school.
- my spring break trip to Key West last week
- my vacation to Mexico
- My wedding day
- My wedding!!!
- Nephews Birth
- Playing Basketball
- Playing basketball in highschool
- Playing high school football
- Playing sports
- Safari in Kenya
- Shawshank Redemption
- Skiing
- South Africa mission trip

Agent *John*: What is your favorite memory? / State your fanorite memory.

- Spending time with my boyfriend
- Spending time with my great grandmother before she passed away and learning about her life compared to mine.
- Spring Break
- Summer camping trips with my family
- Tearing the goalposts down against Florida in 98'
- Tennessee football games
- Thanksgiving dinners
- The Beach with my friends and family.
- travel abroad
- Traveling to Europe
- Trip to London
- Trip tp Prague
- Utah
- vacations
- WDW
- what?
- When I came home upon completing a 2 year Mormon mission in Seattle
- when I first met my boyfriend
- when I got my new car
- When I went on Vacation to Hawaii.
- when i won best actor in a play in high school
- When we are all together at the cabin for the last time.
- Winning a swim meet.
- WINNING THE LITTLE LEAGUE WORLD SERIES
- winning the state championship in high school

Table D-2. Responses to Agent *John*'s Self-Disclosure Request (Study 2)

Agent *John*: What is your favorite memory? / State your fanorite memory.

- Family times together
- 80
- A picture of me when I was a baby with my aunt giving me my bottle.
- a slumber party with my four best friends the last night in the dorm
- A vacation when I was 5
- All my birthdays
- All of College
- Any quality time with my family
- beach trip with my boyfriend during high school
- beatnuts concert
- Becoming a Christian
- being with family
- Being with my brother
- BEING WITH MY FAMILY DURING THE HOLIDAYS
- being with my parents
- birth of daughter
- Birth of my children
- Birth of my daughter
- Camping with my dad.
- can't choose
- Can't pick just one
- cancun trip
- childhood
- Childhood
- childhood memories with my extended family
- christmas
- Christmas 2001
- Christmas when I was a child.
- cinco de mayo 2001
- Clifty Falls
- college
- dancing
- Disney World
- diving on Great Barrier Reef
- do not have a favorite
- Don't have one
- Falling in love
- First kiss between my girlfriend and I
- flying in an airplane
- Fourwheeling in Butterfly Gap with my best friend.
- Fun times with my girls
- getting engaged
- getting married on June 2, 2001
- going camping with my family
- Going on hiking trips to the falls
- Going to Brazil
- Going to college
- Going to Hawaii with my family
- Going to my Great-Grandmothers for Christmas and exchanging presents with all of my family.
- Going to Paris, France and other countries.

Agent *John*: What is your favorite memory? / State your fanorite memory.

- going to the beach
- Going to the Debbie Gibson Concert with my Dad
- graduating from high school
- Graduating High school
- Graduation
- Graduation from High School
- graduation trip to Europe
- Grandfather's 99th birthday party
- Growing in a small town. As a kid going down to the creek and fishing and swimming.
- Growing up on a farm
- Having fun at the beach
- high school
- High School
- Hilton Head
- holding my first nephew for the first time
- Home life
- I don't know
- I remember almost every weekend when I was little we used to go to this amusement park in Pigeon Forge. It was not very big and is no longer there, but I always had so much fun.
- In a boat on the lake/ocean
- Ironing fall leaves between two pieces of wax paper in kindergarten at Rocky Hill Elementary School as an art project. (Just being in kindergarten period)
- It's a toss-up, but I suspect it will soon be my wedding day in 6 weeks.
- Laughing and talking to my sisters and mother.
- living close to the beach with my family
- Making a cd
- Making out with girls
- memories of my grandparents
- Moving to Tennessee
- my baby when he was a newborn at the hospital
- my children when they were babies
- my childrens' birthdays
- My favorite memories consist of my younger years at home with my grandmother.
- My first trip to Europe (Rome, Florence, Paris, and London).
- My grandfather
- My granny reading Mother Goose tales to me when I was a little girl.
- My high school senior trip to Cancun
- My High School Years
- my mom making buttermilk biscuits
- my semester in italia
- My trip to Jamaica
- my wedding
- My wedding
- My wedding day
- My wedding/honeymoon
- Of my grandmother and I.
- photographic memory
- pictures
- Playing Baseball
- Playing baseball when I was younger.

Table D-2. Continued

Agent *John*: What is your favorite memory? / State your fanorite memory.

- Playing football when I was a child
- Playing golf with my father
- Playing in the sand box
- Playing with my brother and German Shephard when I was very little
- Recieving my 1st Car
- riding camels from cairo to the pyramids
- riding motorcycle with my dad
- Seeing Nsync up close in concert
- skiing with my dad
- soccer
- Spending time at neighborhood pool in summers
- Sporting events
- Spring Break 2002
- spring formal 2000
- State Soccer Championship '97
- Summer Beach Trips
- summer camp
- summer on the tennessee river
- Swimming at the pool
- the 4th of July, 1999
- The beach at night
- The birth of my first grandchild
- The first time I discovered on my own what it meant to be in love.
- The first time I saw my boyfriend
- The first time I saw the ocean
- The last time my Mom, Dad, brothers, and I were all on a trip together.
- There are many, but scoring 4 goals and getting 3 assists and winning our championship hockey game was really great.
- there are many, too many to choose just one, sorry
- There are several. To choose only one is impossible.
- Time spent with my family and friends
- times with my friends
- to much to think right now
- to play with my niece and nephew and have dinner together
- today i am having my first chile
- too many to choose
- traveling
- Traveling to Oxford with my Dad
- UT vs Florida `98
- Vacation
- Vacation with my family
- Vacations as a child.
- vaction trips with my family
- When my daughter was born!
- When my parents got married
- winning state high school golf championship
- working with my father
- Total

APPENDIX E. PARAMETER ESTIMATES

E-1. Parameter Estimates (Table 4-5 Continued)

		B	Std. Error	t	Sig.
Dependent Variable	Parameter				
COGTRUST	Intercept	27.967	.937	29.838	.000
	[SCRIPT1=1.00]	1.905	1.303	1.462	.146
	[SCRIPT1=2.00]	0	.	.	.
	[FACE1=1.00]	.222	1.322	.168	.867
	[FACE1=2.00]	1.037	1.227	.845	.399
	[FACE1=3.00]	-.542	1.287	-.422	.674
	[FACE1=4.00]	0	.	.	.
	[SCRIPT1=1.00] * [FACE1=1.00]	-2.607	1.891	-1.378	.170
	[SCRIPT1=1.00] * [FACE1=2.00]	-3.144	1.857	-1.693	.093
	[SCRIPT1=1.00] * [FACE1=3.00]	1.283	1.897	.676	.500
	[SCRIPT1=1.00] * [FACE1=4.00]	0	.	.	.
	[SCRIPT1=2.00] * [FACE1=1.00]	0	.	.	.
	[SCRIPT1=2.00] * [FACE1=2.00]	0	.	.	.
	[SCRIPT1=2.00] * [FACE1=3.00]	0	.	.	.
	[SCRIPT1=2.00] * [FACE1=4.00]	0	.	.	.
	TSUM	.186	.058	3.187	.002
BENE	Intercept	13.506	.634	21.295	.000
	[SCRIPT1=1.00]	.409	.882	.464	.643
	[SCRIPT1=2.00]	0	.	.	.
	[FACE1=1.00]	.352	.894	.393	.695
	[FACE1=2.00]	.640	.831	.771	.442
	[FACE1=3.00]	.517	.871	.593	.554
	[FACE1=4.00]	0	.	.	.
	[SCRIPT1=1.00] * [FACE1=1.00]	-2.786	1.280	-2.177	.031
	[SCRIPT1=1.00] * [FACE1=2.00]	-2.340	1.256	-1.863	.065
	[SCRIPT1=1.00] * [FACE1=3.00]	-1.711	1.284	-1.333	.185
	[SCRIPT1=1.00] * [FACE1=4.00]	0	.	.	.
	[SCRIPT1=2.00] * [FACE1=1.00]	0	.	.	.
	[SCRIPT1=2.00] * [FACE1=2.00]	0	.	.	.
	[SCRIPT1=2.00] * [FACE1=3.00]	0	.	.	.
	[SCRIPT1=2.00] * [FACE1=4.00]	0	.	.	.
	TSUM	.117	.040	2.965	.004

a This parameter is set to zero because it is redundant.

		B	Std. Error	t	Sig.
Dependent Variable	Parameter				
BENE	Intercept	14.125	.625	22.590	.000
	[FACE1=1.00]	.217	.917	.237	.813
	[FACE1=2.00]	.783	.847	.925	.356
	[FACE1=3.00]	.576	.892	.646	.519
	[FACE1=4.00]	0	.	.	.
	[SCRIPT1=1.00]	.497	.906	.548	.584
	[SCRIPT1=2.00]	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00]	-2.943	1.314	-2.240	.027
	[FACE1=1.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00]	-2.527	1.286	-1.964	.052
	[FACE1=2.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=3.00] * [SCRIPT1=1.00]	-1.796	1.316	-1.365	.175
	[FACE1=3.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=1.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=2.00]	0	.	.	.
	FECENTER	-6.790E-02	.069	-.988	.325
	[FACE1=1.00] * FECENTER	.103	.096	1.070	.286
	[FACE1=2.00] * FECENTER	.207	.102	2.029	.044
	[FACE1=3.00] * FECENTER	8.951E-02	.089	1.009	.315
	[FACE1=4.00] * FECENTER	0	.	.	.
	[SCRIPT1=1.00] * FECENTER	.164	.100	1.639	.104
	[SCRIPT1=2.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00] * FECENTER	-.316	.153	-2.069	.040
	[FACE1=1.00] * [SCRIPT1=2.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00] * FECENTER	-.310	.175	-1.774	.078
	[FACE1=2.00] * [SCRIPT1=2.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SCRIPT1=1.00] * FECENTER	-9.179E-02	.141	-.652	.516
	[FACE1=3.00] * [SCRIPT1=2.00] * FECENTER	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=1.00] * FECENTER	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=2.00] * FECENTER	0	.	.	.
COGTRUST	Intercept	28.938	.885	32.704	.000
	[FACE1=1.00]	4.035E-02	1.297	.031	.975
	[FACE1=2.00]	1.462	1.198	1.220	.224
	[FACE1=3.00]	-.437	1.262	-.346	.730
	[FACE1=4.00]	0	.	.	.
	[SCRIPT1=1.00]	2.000	1.283	1.559	.121
	[SCRIPT1=2.00]	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00]	-2.790	1.860	-1.500	.136
	[FACE1=1.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00]	-3.835	1.821	-2.106	.037
	[FACE1=2.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=3.00] * [SCRIPT1=1.00]	1.143	1.862	.614	.540
	[FACE1=3.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=1.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=2.00]	0	.	.	.
	FECENTER	-9.764E-02	.097	-1.003	.317
	[FACE1=1.00] * FECENTER	.241	.136	1.766	.080
	[FACE1=2.00] * FECENTER	3.757E-02	.144	.260	.795
	[FACE1=3.00] * FECENTER	.145	.126	1.156	.250
	[FACE1=4.00] * FECENTER	0	.	.	.
	[SCRIPT1=1.00] * FECENTER	.195	.142	1.370	.173
	[SCRIPT1=2.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00] * FECENTER	-.475	.216	-2.200	.029
	[FACE1=1.00] * [SCRIPT1=2.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00] * FECENTER	.475	.248	1.918	.057

[FACE1=2.00] * [SCRIPT1=2.00] * FECENTER	0	.	.	.
[FACE1=3.00] * [SCRIPT1=1.00] * FECENTER	3.358E-02	.199	.169	.866
[FACE1=3.00] * [SCRIPT1=2.00] * FECENTER	0	.	.	.
[FACE1=4.00] * [SCRIPT1=1.00] * FECENTER	0	.	.	.
[FACE1=4.00] * [SCRIPT1=2.00] * FECENTER	0	.	.	.

a This parameter is set to zero because it is redundant.

E-3. Parameter Estimates (Table 4-6 Continued)

	B	Std. Error	t	Sig.
Parameter				
Intercept	6.891	.255	27.055	.000
[FACE1=1.00]	1.314E-02	.373	.035	.972
[FACE1=2.00]	.511	.344	1.485	.140
[FACE1=3.00]	-.263	.363	-.723	.471
[FACE1=4.00]	0	.	.	.
[SCRIPT1=1.00]	-8.731E-03	.370	-.024	.981
[SCRIPT1=2.00]	0	.	.	.
[FACE1=1.00] * [SCRIPT1=1.00]	-.800	.535	-1.494	.137
[FACE1=1.00] * [SCRIPT1=2.00]	0	.	.	.
[FACE1=2.00] * [SCRIPT1=1.00]	-.763	.524	-1.456	.148
[FACE1=2.00] * [SCRIPT1=2.00]	0	.	.	.
[FACE1=3.00] * [SCRIPT1=1.00]	.413	.537	.768	.444
[FACE1=3.00] * [SCRIPT1=2.00]	0	.	.	.
[FACE1=4.00] * [SCRIPT1=1.00]	0	.	.	.
[FACE1=4.00] * [SCRIPT1=2.00]	0	.	.	.
MACENTER	-9.517E-03	.023	-.412	.681
[FACE1=1.00] * MACENTER	-4.184E-02	.042	-1.000	.319
[FACE1=2.00] * MACENTER	1.684E-02	.038	.438	.662
[FACE1=3.00] * MACENTER	-2.590E-02	.033	-.788	.432
[FACE1=4.00] * MACENTER	0	.	.	.
[SCRIPT1=1.00] * MACENTER	-1.126E-03	.042	-.027	.979
[SCRIPT1=2.00] * MACENTER	0	.	.	.
[FACE1=1.00] * [SCRIPT1=1.00] * MACENTER	7.330E-02	.062	1.183	.239
[FACE1=1.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.
[FACE1=2.00] * [SCRIPT1=1.00] * MACENTER	-2.978E-02	.060	-.495	.622
[FACE1=2.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.
[FACE1=3.00] * [SCRIPT1=1.00] * MACENTER	4.618E-02	.059	.786	.433
[FACE1=3.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.
[FACE1=4.00] * [SCRIPT1=1.00] * MACENTER	0	.	.	.
[FACE1=4.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.

a This parameter is set to zero because it is redundant.

		B	Std. Error	t	Sig.
Dependent Variable	Parameter				
BENE	Intercept	13.984	.639	21.886	.000
	[FACE1=1.00]	.377	.937	.402	.688
	[FACE1=2.00]	1.015	.864	1.175	.242
	[FACE1=3.00]	.717	.911	.787	.432
	[FACE1=4.00]	0	.	.	.
	[SCRIPT1=1.00]	.576	.929	.620	.536
	[SCRIPT1=2.00]	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00]	-2.919	1.343	-2.174	.031
	[FACE1=1.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00]	-2.677	1.314	-2.037	.044
	[FACE1=2.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=3.00] * [SCRIPT1=1.00]	-1.829	1.348	-1.357	.177
	[FACE1=3.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=1.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=2.00]	0	.	.	.
	MACENTER	-4.414E-02	.058	-.762	.447
	[FACE1=1.00] * MACENTER	-4.836E-02	.105	-.461	.646
	[FACE1=2.00] * MACENTER	4.130E-02	.096	.429	.669
	[FACE1=3.00] * MACENTER	3.822E-02	.082	.464	.644
	[FACE1=4.00] * MACENTER	0	.	.	.
	[SCRIPT1=1.00] * MACENTER	7.302E-02	.106	.689	.492
	[SCRIPT1=2.00] * MACENTER	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00] * MACENTER	-4.002E-03	.155	-.026	.980
	[FACE1=1.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00] * MACENTER	-.162	.151	-1.071	.286
	[FACE1=2.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.
	[FACE1=3.00] * [SCRIPT1=1.00] * MACENTER	-5.538E-02	.147	-.376	.708
	[FACE1=3.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=1.00] * MACENTER	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.
COGTRUST	Intercept	28.665	.924	31.019	.000
	[FACE1=1.00]	.360	1.355	.265	.791
	[FACE1=2.00]	1.744	1.249	1.396	.165
	[FACE1=3.00]	-.139	1.318	-.105	.916
	[FACE1=4.00]	0	.	.	.
	[SCRIPT1=1.00]	2.211	1.343	1.646	.102
	[SCRIPT1=2.00]	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00]	-2.939	1.942	-1.514	.132
	[FACE1=1.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00]	-3.775	1.901	-1.986	.049
	[FACE1=2.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=3.00] * [SCRIPT1=1.00]	1.023	1.949	.525	.601
	[FACE1=3.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=1.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=2.00]	0	.	.	.
	MACENTER	-.113	.084	-1.347	.180
	[FACE1=1.00] * MACENTER	-.155	.152	-1.020	.310
	[FACE1=2.00] * MACENTER	.265	.139	1.899	.060
	[FACE1=3.00] * MACENTER	1.591E-02	.119	.133	.894
	[FACE1=4.00] * MACENTER	0	.	.	.
	[SCRIPT1=1.00] * MACENTER	.142	.153	.925	.357
	[SCRIPT1=2.00] * MACENTER	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00] * MACENTER	.147	.225	.654	.514
	[FACE1=1.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00] * MACENTER	-.421	.218	-1.929	.056

[FACE1=2.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.
[FACE1=3.00] * [SCRIPT1=1.00] * MACENTER	-3.384E-02	.213	-.159	.874
[FACE1=3.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.
[FACE1=4.00] * [SCRIPT1=1.00] * MACENTER	0	.	.	.
[FACE1=4.00] * [SCRIPT1=2.00] * MACENTER	0	.	.	.

a This parameter is set to zero because it is redundant.

E-5. Parameter Estimates (Table 4-11 Continued)

Dependent Variable	Parameter	B	Std. Error	t	Sig.
BENE	Intercept	14.041	.624	22.502	.000
	[FACE1=1.00]	.311	.916	.340	.735
	[FACE1=2.00]	.889	.844	1.054	.294
	[FACE1=3.00]	.814	.893	.911	.364
	[FACE1=4.00]	0	.	.	.
	[SCRIPT1=1.00]	.501	.902	.556	.579
	[SCRIPT1=2.00]	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00]	-2.862	1.309	-2.186	.031
	[FACE1=1.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00]	-2.548	1.280	-1.991	.048
	[FACE1=2.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=3.00] * [SCRIPT1=1.00]	-1.920	1.313	-1.462	.146
	[FACE1=3.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=1.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=2.00]	0	.	.	.
	NACENTER	-4.051E-03	.050	-.081	.936
	[FACE1=1.00] * NACENTER	-2.536E-02	.099	-.255	.799
	[FACE1=2.00] * NACENTER	.140	.076	1.851	.066
	[FACE1=3.00] * NACENTER	.121	.079	1.523	.130
	[FACE1=4.00] * NACENTER	0	.	.	.
	[SCRIPT1=1.00] * NACENTER	4.799E-02	.096	.498	.619
	[SCRIPT1=2.00] * NACENTER	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00] * NACENTER	-2.576E-02	.142	-.181	.857
	[FACE1=1.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00] * NACENTER	-.233	.131	-1.776	.078
	[FACE1=2.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.
	[FACE1=3.00] * [SCRIPT1=1.00] * NACENTER	-.158	.140	-1.130	.261
	[FACE1=3.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=1.00] * NACENTER	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.
COGTRUST	Intercept	28.799	.901	31.957	.000
	[FACE1=1.00]	.237	1.323	.179	.858
	[FACE1=2.00]	1.415	1.218	1.161	.248
	[FACE1=3.00]	-.251	1.290	-.194	.846
	[FACE1=4.00]	0	.	.	.
	[SCRIPT1=1.00]	2.063	1.302	1.584	.116
	[SCRIPT1=2.00]	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00]	-2.784	1.891	-1.473	.143
	[FACE1=1.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00]	-3.498	1.848	-1.893	.060
	[FACE1=2.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=3.00] * [SCRIPT1=1.00]	1.162	1.897	.613	.541
	[FACE1=3.00] * [SCRIPT1=2.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=1.00]	0	.	.	.
	[FACE1=4.00] * [SCRIPT1=2.00]	0	.	.	.
	NACENTER	-1.704E-02	.072	-.235	.814
	[FACE1=1.00] * NACENTER	-.126	.144	-.875	.383
	[FACE1=2.00] * NACENTER	.301	.109	2.748	.007
	[FACE1=3.00] * NACENTER	5.352E-02	.114	.468	.641
	[FACE1=4.00] * NACENTER	0	.	.	.
	[SCRIPT1=1.00] * NACENTER	7.212E-02	.139	.518	.605
	[SCRIPT1=2.00] * NACENTER	0	.	.	.
	[FACE1=1.00] * [SCRIPT1=1.00] * NACENTER	7.259E-02	.206	.353	.725
	[FACE1=1.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.
	[FACE1=2.00] * [SCRIPT1=1.00] * NACENTER	-.145	.189	-.767	.444

[FACE1=2.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.
[FACE1=3.00] * [SCRIPT1=1.00] * NACENTER	-.177	.202	-.875	.383
[FACE1=3.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.
[FACE1=4.00] * [SCRIPT1=1.00] * NACENTER	0	.	.	.
[FACE1=4.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.

a This parameter is set to zero because it is redundant.

E-6. Parameter Estimates (Table 4-10 Continued)

Parameter	B	Std. Error	t	Sig.
Intercept	6.926	.249	27.852	.000
[FACE1=1.00]	-1.218E-02	.365	-.033	.973
[FACE1=2.00]	.444	.336	1.321	.189
[FACE1=3.00]	-.271	.356	-.762	.447
[FACE1=4.00]	0	.	.	.
[SCRIPT1=1.00]	-3.510E-02	.359	-.098	.922
[SCRIPT1=2.00]	0	.	.	.
[FACE1=1.00] * [SCRIPT1=1.00]	-.780	.522	-1.495	.137
[FACE1=1.00] * [SCRIPT1=2.00]	0	.	.	.
[FACE1=2.00] * [SCRIPT1=1.00]	-.717	.510	-1.407	.162
[FACE1=2.00] * [SCRIPT1=2.00]	0	.	.	.
[FACE1=3.00] * [SCRIPT1=1.00]	.403	.523	.770	.443
[FACE1=3.00] * [SCRIPT1=2.00]	0	.	.	.
[FACE1=4.00] * [SCRIPT1=1.00]	0	.	.	.
[FACE1=4.00] * [SCRIPT1=2.00]	0	.	.	.
NACENTER	1.275E-02	.020	.638	.524
[FACE1=1.00] * NACENTER	-5.105E-02	.040	-1.288	.200
[FACE1=2.00] * NACENTER	4.607E-02	.030	1.525	.130
[FACE1=3.00] * NACENTER	1.396E-02	.032	.442	.659
[FACE1=4.00] * NACENTER	0	.	.	.
[SCRIPT1=1.00] * NACENTER	-2.456E-02	.038	-.639	.524
[SCRIPT1=2.00] * NACENTER	0	.	.	.
[FACE1=1.00] * [SCRIPT1=1.00] * NACENTER	5.223E-02	.057	.920	.359
[FACE1=1.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.
[FACE1=2.00] * [SCRIPT1=1.00] * NACENTER	1.417E-02	.052	.271	.787
[FACE1=2.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.
[FACE1=3.00] * [SCRIPT1=1.00] * NACENTER	1.960E-03	.056	.035	.972
[FACE1=3.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.
[FACE1=4.00] * [SCRIPT1=1.00] * NACENTER	0	.	.	.
[FACE1=4.00] * [SCRIPT1=2.00] * NACENTER	0	.	.	.

a This parameter is set to zero because it is redundant.

	B	Std. Error	t	Sig.
Parameter				
Intercept	7.733	.304	25.472	.000
[FACE1=1.00]	-.333	.402	-.830	.408
[FACE1=2.00]	-.557	.417	-1.337	.183
[FACE1=3.00]	0	.	.	.
[INFO1=1.00]	-1.067	.429	-2.484	.014
[INFO1=2.00]	0	.	.	.
[SITU1=1.00]	-.263	.417	-.631	.529
[SITU1=2.00]	0	.	.	.
[FACE1=1.00] * [INFO1=1.00]	1.000	.575	1.740	.083
[FACE1=1.00] * [INFO1=2.00]	0	.	.	.
[FACE1=2.00] * [INFO1=1.00]	.995	.582	1.711	.089
[FACE1=2.00] * [INFO1=2.00]	0	.	.	.
[FACE1=3.00] * [INFO1=1.00]	0	.	.	.
[FACE1=3.00] * [INFO1=2.00]	0	.	.	.
[FACE1=1.00] * [SITU1=1.00]	7.327E-02	.562	.130	.896
[FACE1=1.00] * [SITU1=2.00]	0	.	.	.
[FACE1=2.00] * [SITU1=1.00]	.372	.566	.657	.512
[FACE1=2.00] * [SITU1=2.00]	0	.	.	.
[FACE1=3.00] * [SITU1=1.00]	0	.	.	.
[FACE1=3.00] * [SITU1=2.00]	0	.	.	.
[INFO1=1.00] * [SITU1=1.00]	.796	.598	1.331	.185
[INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[INFO1=2.00] * [SITU1=2.00]	0	.	.	.
[FACE1=1.00] * [INFO1=1.00] * [SITU1=1.00]	-1.162	.808	-1.438	.152
[FACE1=1.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[FACE1=1.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[FACE1=1.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.
[FACE1=2.00] * [INFO1=1.00] * [SITU1=1.00]	-.677	.809	-.837	.404
[FACE1=2.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[FACE1=2.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[FACE1=2.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.
[FACE1=3.00] * [INFO1=1.00] * [SITU1=1.00]	0	.	.	.
[FACE1=3.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[FACE1=3.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[FACE1=3.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.

a This parameter is set to zero because it is redundant.

Dependent Variable	Parameter	B	Std. Error	t	Sig.
COGTRUST	Intercept	29.768	1.127	26.422	.000
	[FACE1=1.00]	1.063	1.387	.766	.445
	[FACE1=2.00]	.813	1.423	.571	.569
	[FACE1=3.00]	0	.	.	.
	[INFO1=1.00]	-.323	1.491	-.217	.829
	[INFO1=2.00]	0	.	.	.
	[SITU1=1.00]	-.547	1.426	-.383	.702
	[SITU1=2.00]	0	.	.	.
	[FACE1=1.00] * [INFO1=1.00]	.248	2.001	.124	.901
	[FACE1=1.00] * [INFO1=2.00]	0	.	.	.
	[FACE1=2.00] * [INFO1=1.00]	-1.481	2.000	-.741	.460
	[FACE1=2.00] * [INFO1=2.00]	0	.	.	.
	[FACE1=3.00] * [INFO1=1.00]	0	.	.	.
	[FACE1=3.00] * [INFO1=2.00]	0	.	.	.
	[FACE1=1.00] * [SITU1=1.00]	-.133	1.930	-.069	.945
	[FACE1=1.00] * [SITU1=2.00]	0	.	.	.
	[FACE1=2.00] * [SITU1=1.00]	.132	1.927	.068	.946
	[FACE1=2.00] * [SITU1=2.00]	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00]	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00]	0	.	.	.
	[INFO1=1.00] * [SITU1=1.00]	1.310	2.055	.637	.525
	[INFO1=1.00] * [SITU1=2.00]	0	.	.	.
	[INFO1=2.00] * [SITU1=1.00]	0	.	.	.
	[INFO1=2.00] * [SITU1=2.00]	0	.	.	.
	[FACE1=1.00] * [INFO1=1.00] * [SITU1=1.00]	-2.897	2.776	-1.044	.298
	[FACE1=1.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
	[FACE1=1.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
	[FACE1=1.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.
	[FACE1=2.00] * [INFO1=1.00] * [SITU1=1.00]	.928	2.761	.336	.737
	[FACE1=2.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
	[FACE1=2.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
	[FACE1=2.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.
	[FACE1=3.00] * [INFO1=1.00] * [SITU1=1.00]	0	.	.	.
	[FACE1=3.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
	[FACE1=3.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
	[FACE1=3.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.
	TSUM	.150	.051	2.923	.004
BENE	Intercept	14.067	.882	15.955	.000
	[FACE1=1.00]	.858	1.086	.790	.430
	[FACE1=2.00]	.596	1.114	.536	.593
	[FACE1=3.00]	0	.	.	.
	[INFO1=1.00]	.114	1.167	.098	.922
	[INFO1=2.00]	0	.	.	.
	[SITU1=1.00]	1.367	1.116	1.225	.222
	[SITU1=2.00]	0	.	.	.
	[FACE1=1.00] * [INFO1=1.00]	-1.078	1.566	-.689	.492
	[FACE1=1.00] * [INFO1=2.00]	0	.	.	.
	[FACE1=2.00] * [INFO1=1.00]	.289	1.565	.184	.854
	[FACE1=2.00] * [INFO1=2.00]	0	.	.	.
	[FACE1=3.00] * [INFO1=1.00]	0	.	.	.
	[FACE1=3.00] * [INFO1=2.00]	0	.	.	.
	[FACE1=1.00] * [SITU1=1.00]	-1.962	1.510	-1.299	.195
	[FACE1=1.00] * [SITU1=2.00]	0	.	.	.
	[FACE1=2.00] * [SITU1=1.00]	-.436	1.508	-.289	.773
	[FACE1=2.00] * [SITU1=2.00]	0	.	.	.

[FACE1=3.00] * [SITU1=1.00]	0	.	.	.
[FACE1=3.00] * [SITU1=2.00]	0	.	.	.
[INFO1=1.00] * [SITU1=1.00]	-.565	1.608	-.351	.726
[INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[INFO1=2.00] * [SITU1=2.00]	0	.	.	.
[FACE1=1.00] * [INFO1=1.00] * [SITU1=1.00]	.101	2.173	.046	.963
[FACE1=1.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[FACE1=1.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[FACE1=1.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.
[FACE1=2.00] * [INFO1=1.00] * [SITU1=1.00]	.564	2.160	.261	.794
[FACE1=2.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[FACE1=2.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[FACE1=2.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.
[FACE1=3.00] * [INFO1=1.00] * [SITU1=1.00]	0	.	.	.
[FACE1=3.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[FACE1=3.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[FACE1=3.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.
TSUM	5.761E-03	.040	.143	.886

a This parameter is set to zero because it is redundant.

E-9. Parameter Estimates (Table 4-24 Continued)

Parameter	B	Std. Error	t	Sig.
Intercept	9.616	.707	13.601	.000
[FACE1=1.00]	.439	.871	.504	.615
[FACE1=2.00]	-.278	.893	-.311	.756
[FACE1=3.00]	0	.	.	.
[INFO1=1.00]	-1.686	.936	-1.802	.073
[INFO1=2.00]	0	.	.	.
[SITU1=1.00]	-.811	.895	-.906	.366
[SITU1=2.00]	0	.	.	.
[FACE1=1.00] * [INFO1=1.00]	.930	1.256	.741	.460
[FACE1=1.00] * [INFO1=2.00]	0	.	.	.
[FACE1=2.00] * [INFO1=1.00]	1.203	1.255	.958	.339
[FACE1=2.00] * [INFO1=2.00]	0	.	.	.
[FACE1=3.00] * [INFO1=1.00]	0	.	.	.
[FACE1=3.00] * [INFO1=2.00]	0	.	.	.
[FACE1=1.00] * [SITU1=1.00]	-.543	1.211	-.448	.655
[FACE1=1.00] * [SITU1=2.00]	0	.	.	.
[FACE1=2.00] * [SITU1=1.00]	.768	1.209	.635	.526
[FACE1=2.00] * [SITU1=2.00]	0	.	.	.
[FACE1=3.00] * [SITU1=1.00]	0	.	.	.
[FACE1=3.00] * [SITU1=2.00]	0	.	.	.
[INFO1=1.00] * [SITU1=1.00]	1.761	1.290	1.365	.174
[INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[INFO1=2.00] * [SITU1=2.00]	0	.	.	.
[FACE1=1.00] * [INFO1=1.00] * [SITU1=1.00]	-1.255	1.742	-.720	.472
[FACE1=1.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[FACE1=1.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[FACE1=1.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.
[FACE1=2.00] * [INFO1=1.00] * [SITU1=1.00]	-.463	1.733	-.267	.789
[FACE1=2.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[FACE1=2.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[FACE1=2.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.
[FACE1=3.00] * [INFO1=1.00] * [SITU1=1.00]	0	.	.	.
[FACE1=3.00] * [INFO1=1.00] * [SITU1=2.00]	0	.	.	.
[FACE1=3.00] * [INFO1=2.00] * [SITU1=1.00]	0	.	.	.
[FACE1=3.00] * [INFO1=2.00] * [SITU1=2.00]	0	.	.	.
TSUM	2.136E-02	.032	.662	.509

		B	Std. Error	t	Sig.
Dependent Variable BENE	Parameter				
	Intercept	15.055	.486	30.963	.000
	[FACE1=1.00]	-.706	.517	-1.365	.174
	[FACE1=2.00]	.498	.515	.966	.335
	[FACE1=3.00]	0	.	.	.
	[SITU1=1.00]	.120	.412	.292	.771
	[SITU1=2.00]	0	.	.	.
	[INFO1=1.00]	-.373	.412	-.906	.366
	[INFO1=2.00]	0	.	.	.
	FECENTER	-.463	.140	-3.301	.001
	[FACE1=1.00] * FECENTER	.521	.153	3.413	.001
	[FACE1=2.00] * FECENTER	.428	.155	2.762	.006
	[FACE1=3.00] * FECENTER	0	.	.	.
	[SITU1=1.00] * FECENTER	.476	.169	2.812	.005
	[SITU1=2.00] * FECENTER	0	.	.	.
	[INFO1=1.00] * FECENTER	.543	.179	3.035	.003
	[INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [INFO1=1.00] * FECENTER	-.422	.202	-2.091	.038
	[FACE1=1.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [INFO1=1.00] * FECENTER	-.612	.213	-2.880	.004
	[FACE1=2.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=1.00] * FECENTER	-.470	.193	-2.439	.016
	[FACE1=1.00] * [SITU1=2.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=1.00] * FECENTER	-.528	.199	-2.656	.009
	[FACE1=2.00] * [SITU1=2.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * FECENTER	0	.	.	.
	[SITU1=1.00] * [INFO1=1.00] * FECENTER	-.493	.219	-2.255	.025
	[SITU1=1.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[SITU1=2.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[SITU1=2.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=1.00] * [INFO1=1.00] * FECENTER	.424	.259	1.634	.104
	[FACE1=1.00] * [SITU1=1.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=2.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=2.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=1.00] * [INFO1=1.00] * FECENTER	.903	.270	3.341	.001
	[FACE1=2.00] * [SITU1=1.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=2.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=2.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * [INFO1=2.00] *	0	.	.	.

	FECENTER				
COGTRUST	Intercept	31.168	.654	47.688	.000
	[FACE1=1.00]	.424	.695	.611	.542
	[FACE1=2.00]	.344	.693	.497	.620
	[FACE1=3.00]	0	.	.	.
	[SITU1=1.00]	-.342	.554	-.617	.538
	[SITU1=2.00]	0	.	.	.
	[INFO1=1.00]	-.507	.554	-.916	.361
	[INFO1=2.00]	0	.	.	.
	FECENTER	-.354	.188	-1.877	.062
	[FACE1=1.00] * FECENTER	.585	.205	2.851	.005
	[FACE1=2.00] * FECENTER	.402	.209	1.928	.055
	[FACE1=3.00] * FECENTER	0	.	.	.
	[SITU1=1.00] * FECENTER	.212	.227	.932	.352
	[SITU1=2.00] * FECENTER	0	.	.	.
	[INFO1=1.00] * FECENTER	.464	.240	1.931	.055
	[INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [INFO1=1.00] * FECENTER	-.545	.271	-2.009	.046
	[FACE1=1.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [INFO1=1.00] * FECENTER	-.606	.286	-2.120	.035
	[FACE1=2.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=1.00] * FECENTER	-.389	.259	-1.502	.135
	[FACE1=1.00] * [SITU1=2.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=1.00] * FECENTER	-.213	.267	-.797	.426
	[FACE1=2.00] * [SITU1=2.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * FECENTER	0	.	.	.
	[SITU1=1.00] * [INFO1=1.00] * FECENTER	-.314	.294	-1.067	.287
	[SITU1=1.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[SITU1=2.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[SITU1=2.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=1.00] * [INFO1=1.00] * FECENTER	.460	.349	1.319	.189
	[FACE1=1.00] * [SITU1=1.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=2.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=2.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=1.00] * [INFO1=1.00] * FECENTER	.598	.363	1.646	.101
	[FACE1=2.00] * [SITU1=1.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=2.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=2.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * [INFO1=2.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * [INFO1=1.00] * FECENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * [INFO1=2.00] * FECENTER	0	.	.	.

a This parameter is set to zero because it is redundant.

E-11. Parameter Estimates (Table 4-21 Continued)

		B	Std. Error	t	Sig.
Dependent Variable BENE	Parameter				
	Intercept	14.855	.504	29.473	.000
	[FACE1=1.00]	-.774	.539	-1.437	.152
	[FACE1=2.00]	.474	.538	.880	.380
	[FACE1=3.00]	0	.	.	.
	[SITU1=1.00]	.342	.430	.796	.427
	[SITU1=2.00]	0	.	.	.
	[INFO1=1.00]	-.341	.430	-.792	.429
	[INFO1=2.00]	0	.	.	.
	NCCENTER	-.182	.103	-1.758	.080
	[FACE1=1.00] * NCCENTER	.200	.131	1.529	.128
	[FACE1=2.00] * NCCENTER	.217	.134	1.627	.105
	[FACE1=3.00] * NCCENTER	0	.	.	.
	[SITU1=1.00] * NCCENTER	.136	.136	.997	.320
	[SITU1=2.00] * NCCENTER	0	.	.	.
	[INFO1=1.00] * NCCENTER	.138	.148	.933	.352
	[INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=1.00] * [INFO1=1.00] * NCCENTER	-.245	.194	-1.259	.209
	[FACE1=1.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=2.00] * [INFO1=1.00] * NCCENTER	-.135	.195	-.693	.489
	[FACE1=2.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=1.00] * NCCENTER	-3.685E-02	.185	-.199	.842
	[FACE1=1.00] * [SITU1=2.00] * NCCENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=1.00] * NCCENTER	-.206	.177	-1.167	.244
	[FACE1=2.00] * [SITU1=2.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * NCCENTER	0	.	.	.
	[SITU1=1.00] * [INFO1=1.00] * NCCENTER	-.346	.203	-1.707	.089
	[SITU1=1.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[SITU1=2.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[SITU1=2.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=1.00] * [INFO1=1.00] * NCCENTER	.319	.267	1.193	.234
	[FACE1=1.00] * [SITU1=1.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=2.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=2.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=1.00] * [INFO1=1.00] * NCCENTER	.241	.272	.887	.376
	[FACE1=2.00] * [SITU1=1.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=2.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=2.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * [INFO1=2.00] *	0	.	.	.

	NCCENTER				
COGTRUST	Intercept	30.990	.659	46.991	.000
	[FACE1=1.00]	.438	.705	.621	.535
	[FACE1=2.00]	.453	.704	.644	.520
	[FACE1=3.00]	0	.	.	.
	[SITU1=1.00]	-.191	.563	-.340	.734
	[SITU1=2.00]	0	.	.	.
	[INFO1=1.00]	-.600	.563	-1.066	.288
	[INFO1=2.00]	0	.	.	.
	NCCENTER	-.246	.135	-1.820	.070
	[FACE1=1.00] * NCCENTER	.341	.171	1.994	.048
	[FACE1=2.00] * NCCENTER	.342	.175	1.953	.052
	[FACE1=3.00] * NCCENTER	0	.	.	.
	[SITU1=1.00] * NCCENTER	.216	.179	1.212	.227
	[SITU1=2.00] * NCCENTER	0	.	.	.
	[INFO1=1.00] * NCCENTER	.155	.194	.801	.424
	[INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=1.00] * [INFO1=1.00] * NCCENTER	-.196	.254	-.769	.443
	[FACE1=1.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=2.00] * [INFO1=1.00] * NCCENTER	-.172	.255	-.676	.500
	[FACE1=2.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=1.00] * NCCENTER	-.241	.242	-.996	.321
	[FACE1=1.00] * [SITU1=2.00] * NCCENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=1.00] * NCCENTER	-.238	.231	-1.027	.305
	[FACE1=2.00] * [SITU1=2.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * NCCENTER	0	.	.	.
	[SITU1=1.00] * [INFO1=1.00] * NCCENTER	-.188	.265	-.708	.480
	[SITU1=1.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[SITU1=2.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[SITU1=2.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=1.00] * [INFO1=1.00] * NCCENTER	.280	.349	.801	.424
	[FACE1=1.00] * [SITU1=1.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=2.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[FACE1=1.00] * [SITU1=2.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=1.00] * [INFO1=1.00] * NCCENTER	-.119	.356	-.334	.739
	[FACE1=2.00] * [SITU1=1.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=2.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[FACE1=2.00] * [SITU1=2.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=1.00] * [INFO1=2.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * [INFO1=1.00] * NCCENTER	0	.	.	.
	[FACE1=3.00] * [SITU1=2.00] * [INFO1=2.00] * NCCENTER	0	.	.	.

a This parameter is set to zero because it is redundant.

E-12. Parameter Estimates (Table 4-27 Continued)

Dependent Variable	Parameter	B	Std. Error	t	Sig.
COGTRUST	Intercept	29.941	.771	38.837	.000
	[SOCIAL=1.00]	-.134	1.002	-.134	.894
	[SOCIAL=2.00]	-9.037E-02	.997	-.091	.928
	[SOCIAL=3.00]	0	.	.	.
	[UPGRADE=1]	-1.689	1.141	-1.481	.141
	[UPGRADE=2]	0	.	.	.
	[SOCIAL=1.00] * [UPGRADE=1]	-.357	1.632	-.219	.827
	[SOCIAL=1.00] * [UPGRADE=2]	0	.	.	.
	[SOCIAL=2.00] * [UPGRADE=1]	1.292	1.542	.838	.403
	[SOCIAL=2.00] * [UPGRADE=2]	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=1]	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=2]	0	.	.	.
	TSUM	.125	.055	2.272	.024
BENE	Intercept	14.262	.619	23.054	.000
	[SOCIAL=1.00]	-1.347	.804	-1.675	.096
	[SOCIAL=2.00]	.731	.800	.914	.362
	[SOCIAL=3.00]	0	.	.	.
	[UPGRADE=1]	-.576	.915	-.629	.530
	[UPGRADE=2]	0	.	.	.
	[SOCIAL=1.00] * [UPGRADE=1]	-.686	1.310	-.523	.601
	[SOCIAL=1.00] * [UPGRADE=2]	0	.	.	.
	[SOCIAL=2.00] * [UPGRADE=1]	1.318E-02	1.237	.011	.992
	[SOCIAL=2.00] * [UPGRADE=2]	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=1]	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=2]	0	.	.	.
	TSUM	7.815E-02	.044	1.777	.077

a This parameter is set to zero because it is redundant.

E-13. Parameter Estimates (Table 4-28 Continued)

		B	Std. Error	t	Sig.
Dependent Variable	Parameter				
COGTRUST	Intercept	30.559	.749	40.790	.000
	[SOCIAL=1.00]	.279	1.011	.276	.783
	[SOCIAL=2.00]	9.413E-02	1.006	.094	.926
	[SOCIAL=3.00]	0	.	.	.
	[UPGRADE=1]	-1.660	1.160	-1.431	.154
	[UPGRADE=2]	0	.	.	.
	[SOCIAL=1.00] * [UPGRADE=1]	-1.045	1.657	-.631	.529
	[SOCIAL=1.00] * [UPGRADE=2]	0	.	.	.
	[SOCIAL=2.00] * [UPGRADE=1]	1.383	1.566	.883	.379
	[SOCIAL=2.00] * [UPGRADE=2]	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=1]	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=2]	0	.	.	.
	FECENTER	4.948E-02	.093	.535	.594
	[UPGRADE=1] * FECENTER	-.147	.135	-1.092	.276
	[UPGRADE=2] * FECENTER	0	.	.	.
	[SOCIAL=1.00] * FECENTER	8.361E-02	.117	.712	.477
	[SOCIAL=2.00] * FECENTER	3.343E-02	.122	.274	.784
	[SOCIAL=3.00] * FECENTER	0	.	.	.
	[SOCIAL=1.00] * [UPGRADE=1] * FECENTER	-.123	.202	-.610	.543
	[SOCIAL=1.00] * [UPGRADE=2] * FECENTER	0	.	.	.
	[SOCIAL=2.00] * [UPGRADE=1] * FECENTER	4.138E-03	.190	.022	.983
	[SOCIAL=2.00] * [UPGRADE=2] * FECENTER	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=1] * FECENTER	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=2] * FECENTER	0	.	.	.
BENE	Intercept	14.701	.583	25.238	.000
	[SOCIAL=1.00]	-1.074	.786	-1.366	.174
	[SOCIAL=2.00]	.722	.783	.923	.357
	[SOCIAL=3.00]	0	.	.	.
	[UPGRADE=1]	-.604	.902	-.669	.504
	[UPGRADE=2]	0	.	.	.
	[SOCIAL=1.00] * [UPGRADE=1]	-1.175	1.288	-.912	.363
	[SOCIAL=1.00] * [UPGRADE=2]	0	.	.	.
	[SOCIAL=2.00] * [UPGRADE=1]	.143	1.218	.117	.907
	[SOCIAL=2.00] * [UPGRADE=2]	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=1]	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=2]	0	.	.	.
	FECENTER	6.883E-02	.072	.956	.340
	[UPGRADE=1] * FECENTER	-.137	.105	-1.306	.194
	[UPGRADE=2] * FECENTER	0	.	.	.
	[SOCIAL=1.00] * FECENTER	7.515E-02	.091	.823	.412
	[SOCIAL=2.00] * FECENTER	4.302E-02	.095	.453	.651
	[SOCIAL=3.00] * FECENTER	0	.	.	.
	[SOCIAL=1.00] * [UPGRADE=1] * FECENTER	-.123	.157	-.784	.434
	[SOCIAL=1.00] * [UPGRADE=2] * FECENTER	0	.	.	.
	[SOCIAL=2.00] * [UPGRADE=1] * FECENTER	.164	.147	1.112	.268
	[SOCIAL=2.00] * [UPGRADE=2] * FECENTER	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=1] * FECENTER	0	.	.	.
	[SOCIAL=3.00] * [UPGRADE=2] * FECENTER	0	.	.	.

a This parameter is set to zero because it is redundant.

VITA

Eun-Ju Lee was born in Tae-Gu, Korea in April 9, 1971 as the youngest daughter to Dr. Kwang-Bae Lee and Oak-Kyung Hwang. She served as a school vice president at Se-Wha High School in Seoul, Korea. She studied Clothing and Textiles and Fashion Marketing/Retailing during her undergraduate and masters programs at Seoul National University. In September 1996, she started her Ph.D. program in Retail and Consumer Sciences at the University of Tennessee and received her first Ph.D. degree (Ph.D. in Human Ecology) in December 2000. Her second Ph.D. degree in Marketing (Ph.D. in Business Administration) from the University of Tennessee is awarded in December 2002. She is an assistant professor in Marketing and the associate director of the Institute of Retail Management at the California State University - Los Angeles. She has published articles in peer-reviewed journals including *Journal of Consumer Affairs, Journal of International Consumer Marketing, International Journal of Services Industry Management, Marketing Management Journal, Journal of Financial Counseling and Planning, Journal of Financial Services Research, Journal of Consumer Education, and Journal of the Korean Society of Clothing and Textiles*. She was the recipient of 2001 ACCI Dissertation Award, 2000 AFCPE Theoretical Article Award, and SMA Best Student Paper Award.