

**PRODUCT-RELATED DECEPTIVE INFORMATION PRACTICES IN B2C
E-COMMERCE: FORMATION, OUTCOMES, AND DETECTION**

by

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ABSTRACT

With the rapid growth of e-commerce, online fraud and deception are also on the rise. However, compared to the rising public sensitivity to e-commerce deception, the academic research community's interest in studying this phenomenon has not been high. Given the paucity in this area, this research aims to provide answers to the following research questions: How can product-related e-commerce deception be performed? How will different deceptive information practices affect consumer judgment and decision making? What are the consequences of e-commerce deception, when it is detected by consumers? How can counter-deception mechanisms be designed to help consumers better detect product-related e-commerce deception?

To address these questions, a typology of deceptive information practices that takes into account the unique characteristics of business-to-consumer (B2C) e-commerce was first developed, providing a conceptual starting point for this research. Next, two online experiments were conducted to examine the effects of different e-commerce deception tactics on consumer decision making and to explore the effects of two design characteristics of a potential counter-deception mechanism (i.e., warning) on consumers' deception detection performance.

This research not only furthers our understanding of the phenomenon of e-commerce deception but also provides valuable input for government monitoring/regulating agencies, consumer protection/advocacy organizations, and industry associations in their effort to combat deception online. This research thus contributes to a user-focused approach to IS adoption research.

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To my parents, husband, and son

CHAPTER 1. INTRODUCTION¹

1.1 PROBLEM DEFINITION, MOTIVATION, AND RESEARCH QUESTIONS

The rapid growth of electronic commerce (e-commerce) has created fertile ground for online fraud and deception (Federal Trade Commission, 2001; Grazioli & Jarvenpaa, 2000). The Federal Trade Commission (FTC), the US Securities and Exchange Commission (SEC), the Federal Bureau of Investigation (FBI), as well as consumer protection agencies, such as the National Consumers League (NCL), have all voiced concerns over Internet consumer fraud and have initiated specialized programs targeted at detecting and prosecuting such practices (Grazioli & Jarvenpaa, 2003b). According to the annual report released by the Internet Crime Complaint Center (IC3)—a partnership between the FBI, the National White Collar Crime Center (NW3C), and the Bureau of Justice Assistance (BJA)—in 2008, the IC3 received a total of 275,284 complaints from consumers claiming to have been defrauded online, which represents a 33.1% increase over the previous year; the total dollar loss linked to online fraud was US \$265 million, about \$25 million more than in 2007; and the average individual loss amounted to \$931 (Internet Crime Complaint Center, 2008). In addition to financial damage, victims of Internet deception often suffer from the psychological damage of being victimized, the loss of time for filing complaints and refund requests, and the loss of private information (Grazioli & Jarvenpaa, 2000). The increases in online fraud can also adversely affect honest online businesses. When consumers are reluctant to make purchases online for fear of deception, online businesses as a whole suffer from loss in sales and reputation.

E-commerce deceptive practices revealed in prior research include: (1) insufficient information disclosure of refund policies, warranty information, and cancellation terms, (2) contract default, (3) product-related deception, such as misrepresented goods, (4) non-delivery or late delivery, and (5) misuse of personal and financial information (Pavlou & Gefen, 2005; Singsangob, 2005). The research reported in this thesis focuses on *product-related* deceptive information practices.

¹ A version of this chapter is part of an article that has been accepted for publication. Xiao, B., & Benbasat, I. "Product-Related Deception in E-Commerce: A Theoretical Perspective." *MIS Quarterly*, forthcoming 2010.

A 1999 survey by Indiana University and the professional service organization KPMG revealed that product information is the most important concern for online customers over the age of 25 (Indiana University–KPMG, 1999). The importance of product information to consumers has motivated online merchants to perform deceptive manipulations on such information so as to influence consumers' judgment and decision making in e-commerce settings. According to Pavlou and Gefen (2005), product misrepresentation is one of the most common forms of Internet fraud reported. The NCL has also consistently ranked product misrepresentation among the top two Internet scams (e.g., NCL's Fraud Center, 2007). Many consumers enjoy the convenience and low prices offered by online shopping, yet these benefits may be countermanded by the increased risk associated with the products purchased online.

When buyers have trouble discriminating between good and bad products, even a small minority of deceptive products might "poison" a market – driving out good products and eventually the consumers, resulting in a "lemons market" (Akerlof, 1970). Consequently, consumers' inability to differentiate between deceptive and honest product representations poses a serious problem for the sustained viability of e-commerce. Unfortunately, consumers are, in general, poor detectors of deception, though not every individual is equally susceptible to deception (Ekman, 1992). To counter this threat, we need to understand how product-related deception works in e-commerce and explore measures that can be taken to counter such deception.

Consumer deception is clearly an important concern for e-commerce. However, the academic research community's interest in studying this phenomenon has not been high. The empirical studies conducted by Pavlou and Gefen (2005) as well as by Grazioli and colleagues (Grazioli, 2004; Grazioli & Jarvenpaa, 2000, 2001, 2003a, 2003b; Grazioli & Wang, 2001) (summarized in Table 1-1) represent the limited research effort in this area.

Table 1.1 Summary of Deception Studies in E-Commerce

Study	Tasks	Independent Variables	Dependent Variables	Major Findings
Grazioli and Jarvenpaa (2000)	Lab experiment with 80 MBA students Give a second opinion on a website	Type of website ▪ Real ▪ Forged (with six deceptive assurance and trust mechanisms)	▪ Perceived deception ▪ Perceived risk ▪ Trust ▪ Attitude toward shopping ▪ Actual purchase and willingness to buy	<ul style="list-style-type: none"> ▪ Most subjects failed to detect the fraud manipulations, albeit a few succeeded ▪ The fraud has the effect of increasing the consumers' reliance in assurance mechanisms and trust mechanisms, which in turn decrease perceived risk and increase trust in the store ▪ Actual purchase and willingness to buy depend on consumers' attitude toward the web store, which in turn depends on trust and perceived risk. ▪ Trust moderates the relationship between risk and attitude ▪ The presence of assurance mechanisms decreases perceived risk ▪ Perceived deception moderates the relationship between assurance mechanisms and risk ▪ Perceived deception increases perceived risk ▪ The presence of trust mechanisms increased trust ▪ Perceived deception decreases trust

Table 1.1 Summary of Deception Studies in E-Commerce

Study	Tasks	Independent Variables	Dependent Variables	Major Findings
Grazioli & Wang (2001)	Lab experiment with 93 undergraduate students Give a second opinion on a website	Type of website <ul style="list-style-type: none"> ▪ Real ▪ Forged (with six deceptive assurance and trust mechanisms) 	<ul style="list-style-type: none"> ▪ Perceived deception ▪ Perceived risk ▪ Trust ▪ Willingness to buy ▪ Attitude toward the store ▪ Reliance on trust mechanisms and assurance mechanisms ▪ Perception of physical existence ▪ Perceived size 	<ul style="list-style-type: none"> ▪ Most subjects failed to detect deception ▪ Willingness to buy depends on consumers' attitude toward the web store, which in turn depends on trust and perceived risk. ▪ Perceived deception moderates the relationship between assurance mechanisms and risk ▪ Perceived deception increases perceived risk ▪ The presence of trust mechanisms increased trust ▪ Perceived deception decreases trust ▪ The deceptive manipulations had the malicious effect of increasing reliance on assurance and trust mechanisms ▪ Subjects' competence at evaluating the hypothesis of deception was a strong differentiator between successful and unsuccessful detectors ▪ Successful detectors relied on assurance mechanisms and discounted trust mechanisms, but unsuccessful detectors relied on both
Grazioli (2004)	Lab experiment with 80 MBA students Give a second opinion on a website	Type of website <ul style="list-style-type: none"> ▪ Real ▪ Forged (with six deceptive assurance and trust mechanisms) 	<ul style="list-style-type: none"> ▪ Perceived deception 	<ul style="list-style-type: none"> ▪ Subjects who correctly detected deception heeded less cues than subjects who missed it ▪ Priming subjects to generate the hypothesis of deception weakly facilitated detection success. Moreover, subjects who missed a deception changed perceived deceptiveness of the site upward when primed ▪ Successful detectors were better at testing the hypothesis that a cue has been manipulated ▪ Successful detectors relied on assurance cues and heavily discount trust cues. Unsuccessful detectors did the opposite.

Table 1.1 Summary of Deception Studies in E-Commerce

Study	Tasks	Independent Variables	Dependent Variables	Major Findings
Grazioli and Jarvenpaa (2001, 2003a, 2003b)	Content analysis of 201 cases of Internet deception	Identity of deception target ▪ Businesses vs. individuals Identity of the deceiver ▪ Businesses vs. individuals	Selection of Internet deception tactics	<ul style="list-style-type: none"> ▪ Business deceivers are more likely to use <i>masking</i> and <i>relabeling</i> than individual deceivers, whereas the latter is more likely to use <i>mimicking</i> and <i>inventing</i> than the former ▪ Deceivers are more likely to use <i>mimicking</i> against a business target but <i>relabeling</i> and <i>inventing</i> against an individual target ▪ Most <i>masking</i> occurs between a business deceiver and an individual target ▪ Most <i>mimicking</i> occur between an individual deceiver and a business target ▪ Simple tactics such as inventing (36%), relabeling (25%), and mimicking (22%) account for about 82% of the sample cases ▪ More sophisticated tactics such as dazzling and double play are the least used tactics (less than 3% of the time) ▪ Internet deception occurs most frequently between a business deceiver and a consumer target (i.e. B2C deception) ▪ The second most frequent case is the deception perpetrated by a consumer against another consumer (i.e. C2C deception)

Table 1.1 Summary of Deception Studies in E-Commerce

Study	Tasks	Independent Variables	Dependent Variables	Major Findings
Pavlou and Gefen (2005)	<p>Survey of 404 buyers from eBay and Amazon</p> <p>Content analysis of longitudinal data of the same buyers</p>	Psychological contract violation of individual sellers	<ul style="list-style-type: none"> ▪ Psychological contract violation of community of sellers ▪ Trust in community of sellers ▪ Perceived risk from community of sellers ▪ Transaction intentions ▪ Price premiums 	<ul style="list-style-type: none"> ▪ Fraud/deception, product misrepresentation, contract default, product delivery delay, product guarantees, and payment policy were identified as underlying sources of psychological contract violation of individual sellers ▪ Psychological contract violation of individual sellers positively influenced psychological contract violation of the entire community of sellers ▪ Psychological contract violation of the entire community of sellers had significantly reduced buyers' trust in the community of sellers and their transaction intentions and resulted in lower price premiums for an identical product ▪ Psychological contract violation of the entire community of sellers had significantly increased buyers' perception of risk from transacting with the community of sellers

This thesis aims to further our understanding of deception in e-commerce and its detection by providing answers to the following major research questions:

1. How can product-related e-commerce deception be performed? (addressed by the typology presented in Chapter 2)
2. How will different deceptive information practices affect consumer judgment and decision making? (addressed by the empirical study reported in Chapter 3)
3. What are the consequences of e-commerce deception when it is detected by consumers? (addressed by the two empirical studies reported in Chapter 3 and 4)
4. How can counter-deception mechanisms be designed to help consumers better detect product-related e-commerce deception? (addressed primarily by the empirical study reported in Chapter 4)

The answers to these questions should be of interest to academic researchers, e-commerce practitioners, consumer protection/advocacy organizations, and government monitoring/regulating agencies.

In the remainder of this chapter, product-related e-commerce deception is defined and its similarities with and differences from deception in traditional commerce are discussed.

1.2 DEFINING PRODUCT-RELATED E-COMMERCE DECEPTION

To obtain an understanding of deceptive information practices in e-commerce, definitions of deception suggested by psychologists and communication researchers are identified. They include:

- “A communicator’s deliberate attempt to foster in others a belief or understanding which the communicator considers to be untrue” (P. J. DePaulo & DePaulo, 1989, p. 1553).
- “Message distortion resulting from deliberate falsification or omission of information by a communicator with the intent of stimulating in another, or others, a belief that the communicator himself or herself does not believe” (G. R. Miller, 1983, p. 92).
- “The deliberate attempt, whether successful or not, to conceal, fabricate, and/or manipulate in any other way factual and/or emotional information, by verbal and/or nonverbal means, in order to create or maintain in another or in others a belief that the communicator himself or herself considers false” (Masip, Garrido, & Herrero, 2004, p. 148).

Three characteristics of deception appear to be consistent across the above definitions:

1. Deception is an intentional or deliberate act. The element of *intentionality* is what distinguishes *deception* (i.e., intentional distortion of messages) from *misinformation* (i.e., unintentional distortion of messages) (Masip et al., 2004, p. 148).
2. Deception is accomplished by manipulating information in some way.
3. Deception has an instrumental end goal—that is, to create or maintain a belief by another that the communicator herself believes to be false.

In accordance with these characteristics, this thesis research defines *product-related e-commerce deceptive information practices* as the deliberate manipulation of product-related information perpetrated by online merchants to mislead consumers in order to induce desired attitudinal and behavioral changes in consumers—changes that are detrimental to consumers and beneficial to the merchants.

As a conscious, knowing, intentional, or deliberate act, deception is motivation-driven and performed to attain certain goal(s) (D. B. Buller & Burgoon, 1996). Prior research on deception, with its focus on *face-to-face* interpersonal deception, has revealed different motives for deceiving. Goffman (1974) addressed benign and exploitive motives underlying fabrication. Linskold and Walters (1983) developed a typology of deceptive motivations ranging from altruistic, individualistic, to exploitive. O’Hair and Cody (1994) as well as DePaulo et al. (1996) categorized motives for lies into self-oriented (e.g. to advance self interest) and other-oriented

(e.g. to protect the interest of others). Buller and Burgoon (1996) asserted that deception can be enacted for instrumental (e.g. maintain influence, harm the target for self-gain), relational (e.g. maintain or terminate relationship, avoid conflict, protect partner from worry and hurt), or identity motivations (e.g. avoid shame or embarrassment, enhance or protect self-esteem). Table 1-2 illustrates the correspondence among these typologies. Motives displayed across the same row are similar in nature (though the terms referring to the motives may differ across researchers).

Table 1.2 Correspondence between Different Typologies of Motives for Deception

Buller and Burgoon (1996)	Goffman (1974)	Linskold and Walters (1983)	O'Hair and Cody (1994) Depaulo et al. (1996)
Identity		Individualistic	Self-oriented
Instrumental	Exploitive	Exploitive	
Relationship	Benign	Altruistic	

Self-serving, exploitive deception is considered the most morally reprehensible (D. B. Buller & Burgoon, 1996). The loss to online consumers typically results from deception perpetrated by online companies for exploitive (or instrumental) purposes, such as, to induce consumers to purchase certain products that they would not otherwise choose without the deception. Therefore, this research has as its focus deception performed by *online companies* (with consumers being victims) to achieve exploitive (or instrumental) objectives.

1.3 E-COMMERCE DECEPTION AS COMPARED TO DECEPTION IN TRADITIONAL COMMERCE

With the advent of e-commerce, the potential of new Internet technologies to mislead or deceive consumers is considerable. As noted by Heckman and Wobbrock (2000), every new technology applicable to commerce (e.g., telegraph, telephone, radio, or television) helps the unscrupulous to swindle the unwary. E-commerce is no exception. Although many deceptive information practices in e-commerce settings are variations of well-known deception types already used in

the traditional physical shopping context—such as the misrepresentation of merchants, products, and return/refund policies—the advent of e-commerce has not only made deception more likely and the perpetration of deceptive acts easier, but has also introduced new avenues for deception (Grazioli & Jarvenpaa, 2001, 2003a).

First, the unique characteristics of the Internet, such as digital environment, low entry barriers, spatial/temporal separation, and anonymity, have made it a fertile ground for deception. The Internet is a digital environment, which lowers the effort for online companies to create and change information content as well as to manipulate the presentation and production of such information content in order to achieve deception. For instance, web pages can be constructed to attract/distract attention, encourage/discourage cross-comparisons, force choices, and create pressure to buy immediately (Aditya, 2001). The Internet also lowers the resources needed to set up a genuine-looking online storefront, thus making the merchant's identity easy to falsify and difficult to authenticate. In addition, the physical distance between the web merchant and its customers, as well as the temporal separation of payment and product delivery, makes it harder for customers to verify the truthfulness of the website or its claims. Moreover, since anonymity provides people with a low threat setting, it may breed disinhibited antisocial behavior (Suler, 2004, 2005), including deception.

Second, the various innovative technologies supporting e-commerce have also given rise to novel forms of deceptive practices. Prior research (e.g., Benassi, 1999; Glover & Benbasat, 2006; Grazioli & Jarvenpaa, 2000) has revealed a number of information technology (IT) mechanisms that can be used by online companies to increase consumers' trust in e-commerce websites and/or mitigate their risk perceptions associated with online shopping. However, as illustrated in Table 1-3, both trust-building mechanisms and risk-reducing tools can be exploited by dishonest companies to deceive consumers (Grazioli, 2004; Grazioli & Jarvenpaa, 2000). For instance, an online company may design a product recommendation agent (PRA) that provides biased product recommendations to serve the interests of the company. It may provide a virtual product experience (VPE) (Jiang & Benbasat, 2004, 2007) that does not represent consumers' real experiences with a product (Bloom et al. 1994). It may also employ multimedia technologies (e.g., Flash, animations) to excite consumers in a manner similar to what fast-talking

salespersons can do in physical shopping settings, thus leading consumers to make impulse purchases they may regret later (Bloom, Milne, & Adler, 1994). In electronic marketplaces such as eBay, a seller can collude with a group of buyers in order to receive unfairly high ratings, thus allowing that seller to receive more orders from buyers and at a higher price than deserved (Dellarocas, 2000).

Table 1.3 Examples of Deception Associated with E-Commerce IT-Artifacts

IT Artifacts	Examples of Deception
Product recommendation agent (PRA)	The online company designs a PRA that provides biased product recommendations to serve the interests of the company.
Online testing (or virtual product experience)	The virtual experience does not represent consumers' real experiences with a product (e.g., the performance for certain features is artificially enhanced).
Third-party seal(s)/certificate(s)	The third-party privacy/security seal embedded in the online company's website is forged by the company.
Escrow service	The online company does not disclose to consumers that the "third-party" payment service it recommends is actually a branch of the online company.
Shipment tracking system	The tracking system provides false product shipping information.
Online consumer review	Staff of the online company pose as prior customers to author positive reviews at the consumer forum, or the online company may filter out negative reviews left by prior customers.
Chat with other consumers	The "other customer" with whom a customer is chatting is a staff member of the online company.

The remainder of the thesis is structured as follows. Chapter 2 presents a typology of deceptive information practices that takes into account the unique characteristics of business-to-consumer (B2C) e-commerce, which provides a conceptual starting point for this research. Chapter 3 reports an online experiment examining consumer vulnerability to various types of deceptive

information practices (i.e., content manipulation, non-personalized order manipulation, and personalized order manipulation). Chapter 4 reports another online experiment exploring the effects of two design characteristics (i.e., content and framing) of potential counter-deception mechanism (i.e., warning) on consumers' deception detection performance. Chapter 5 summarizes the studies conducted, outlines the major contributions of this research, and provides suggestions for future research.

CHAPTER 2. A TYPOLOGY OF PRODUCT-RELATED DECEPTIVE INFORMATION PRACTICES IN E-COMMERCE²

Prior research has suggested many different ways of classifying deception. Summarizing the multitude of previous categorizations of deception, Buller, Burgoon, and colleagues (D. B. Buller, Burgoon, White, & Ebisu, 1994; Burgoon, Buller, Ebisu, & Rockwell, 1994) distinguished among three relatively distinct types of deception: (1) *concealment*—to withhold, omit, or disguise relevant information; (2) *equivocation*—to present information vaguely and/or ambiguously; and (3) *falsification*—to present false or exaggerated information. Extending Buller and Burgoon’s “concealment–equivocation–falsification” classification, which is generic enough to be applied to different deception cases, we include a new dimension detailing the specific operational-level deception techniques in which the three types of deception are carried out in the e-commerce context. This results in a 3x3 typology of deceptive information practices that describes how deception works within e-commerce. The typology has two dimensions: one representing the three deception types already examined in prior deception research and the other representing the following three specific implementation techniques:

1. The manipulation of *information content*, which refers to the direct alteration of the content of product information provided at an e-commerce website.
2. The manipulation of *information presentation*, which refers to the manipulation of the design of how product information is presented to consumers at an e-commerce website.
3. The manipulation of *information generation*, which refers to the manipulation of the dynamic production of product information at an e-commerce website, based on consumer interests, needs, and/or preferences obtained explicitly or implicitly.

Each of these dimensions will be discussed in greater detail in the remainder of this Chapter.

It should be noted many similarities exist between deception in e-commerce product websites and deception in other contexts (e.g., advertising, personal selling, close relationship, employment), particularly in advertising. While an exact demarcation between honest advertising

² A version of this chapter is part of an article that has been accepted for publication. Xiao, B., & Benbasat, I. Product-Related Deception in E-Commerce: A Theoretical Perspective. *MIS Quarterly*, forthcoming 2010.

and deceptive advertising is often difficult to make, we consider a piece of advertising deceptive when it employs any of the deceptive manipulations specified in our 3x3 typology of deceptive information practices in order to “mislead the consumer acting reasonably in the circumstances, to the consumer’s detriment” (Calfee & Ford, 1988, p. 86).

2.1 MANIPULATIONS PERFORMED ON INFORMATION CONTENT

Prior studies in interpersonal deception have focused predominantly on the nonverbal cues accompanying deception, such as pitches and tones, body gestures, and facial expressions, rather than on the deceptive messages communicated by the deceivers (Buller & Burgoon, 1996). Research investigating deceptive messages has primarily examined manipulations that can be performed on the *content* rather than the *presentation* of these messages. For instance, McCornack (1992) and Buller and Burgoon (1996) propose that individuals can manipulate the content of information simultaneously along several different dimensions such as *completeness*, *clarity*, and *veridicality*, which correspond to the three deception types *concealment*, *equivocation*, and *falsification*, respectively.

For product-related information provided at an e-commerce website, content can be concealed, equivocated, and/or falsified by online companies. For instance, an online company can withhold negative information (e.g., a known safety problem) about a product (i.e., *concealment*); provide vague information about the total cost (e.g., selling price, tax, shipping and handling fee) of a product (i.e., *equivocation*); give ambiguous information concerning product return and refund policies (i.e., *equivocation*); automatically filter out negative consumer reviews (i.e., *concealment*); pose as consumers to write positive reviews about products and services received from the company (i.e., *falsification*); or even sell a nonexistent product (i.e., *falsification*).

In sum, by altering the availability and quality of information, online companies can manipulate the content of product information at an e-commerce website so as to enhance consumers’ evaluation of those particular products.

2.2 MANIPULATIONS PERFORMED ON INFORMATION PRESENTATION

In addition to the direct alteration of the content of product information, deceptive manipulations can also be performed on the presentation of product information at an e-commerce website. Kleimuntz and Schkade (1993) note that the presentation of information can be designed to encourage effective decision making. In the same vein, the design of information presentation and delivery can be manipulated to lead to biased decision making. Since the number of potential ways for presentation and delivery of certain information content is vast, we focus on two important characteristics that apply to a broad range of contexts: *presentation media* and *information organization*.

2.2.1 Presentation Media

Deceptive manipulations can be performed on the presentation of product information at an e-commerce website via the manipulation of *presentation media*. Information content can be presented using a variety of media in the e-commerce context, such as text, graphics, audio, video, and animations, so that users can make better sense of the information available (Lim & Benbasat, 2000). Heller and Martin (1995) have categorized four different types of presentation media with increasing complexity: *text*, *graphics*, *sound*, and *motion*. We add to this classification a new media type, *virtual experience* (e.g., virtual reality), which involves active consumer interaction with the media (Jiang & Benbasat, 2004, 2007).

Online companies can manipulate presentation media in three ways to achieve their deceptive ends. First, an online company can alter the individual features of a medium to either inhibit correct product understanding or foster incorrect product understanding; for instance, an online company may use images (still images or videos) of small size and low fidelity to present a product that has some exterior problems (i.e., *concealment*). It can also manipulate the response rate of an online product demonstration to mislead consumers about a particular product feature; for example, it may demonstrate a shorter delay between shots of a digital camera (i.e., *falsification*).

Second, by manipulating the level of *vividness* of a presentation—that is, the extent to which the presentation is emotionally interesting, imagery provoking, and inherently appealing (Sundar & Kalyanaraman, 2003)—deceptive online companies can direct consumers’ attention toward irrelevant information, distract their attention from relevant information, and shape their overall attitude toward and judgment of certain products. For instance, an online company may choose a text-only presentation for a product with desirable functionalities but unappealing appearance (i.e., *concealment*). The same company may use flashy animations as a “decoy” to distract consumers from processing non-vivid yet more useful and informative textual descriptions (i.e., *concealment*). In addition to attracting consumers’ attention, the sensory stimuli supplied by a vivid presentation may also trigger intense emotional responses (e.g., *pleasure* and *arousal*) that can overwhelm consumers’ self-observation during online shopping, leading to unregulated buying behavior (e.g., impulse buy) (LaRose, 2001).

Finally, a common deceptive practice utilized by online companies is to present conflicting information via different media. For instance, a digital camera retailer may state truthfully in the textual description that the interchangeable lens of a single lens reflex (SLR) camera is not included in the package; however, it may display an image of the camera with lens attached, with no annotation to indicate that the lens is not included (i.e., *concealment* and *equivocation*). Since information conveyed in images is given greater weight in consumer judgment than that conveyed in text, particularly when the two types of information are in conflict (Argyle, Alkema, & Gilmour, 1971; Bone & France, 2001), consumers are likely to be misled into believing that the lens featured in the image is actually part of the package and may potentially make a purchase decision to their own detriment.

2.2.2 Information Organization

The manipulation of information presentation can also be achieved via the manipulation of *information organization*. Information content in an e-commerce website can be organized meaningfully into groups (Jarvenpaa, 1989; Kleinmuntz & Schkade, 1993), hierarchies, and/or sequences (Kleinmuntz & Schkade, 1993). Information organization provides a cognitive incentive system for decision makers by influencing the effort and accuracy associated with

information processing strategies and, therefore, inducing the use of different strategies (Kleinmuntz & Schkade, 1993). Unscrupulous online companies can manipulate the way information is organized in their web pages to encourage or discourage the use of certain information processing strategies by consumers. For instance, to encourage consumers to compare different products based on a certain attribute (e.g., the only attribute on which the promoted products have advantage over other products), online companies may provide the functionality to sort by that attribute alone (i.e., *concealment*). Likewise, since information at a deep level of navigation requires more effort to access (Chau, Au, & Tam, 2000), online companies can “hide” negative product information and consumer reviews such that consumers have to traverse many levels of navigation to locate such information (i.e., *concealment*).

The sequence in which information appears may influence consumers’ judgment as to the relevance and/or importance of the individual pieces of information (Kleinmuntz & Schkade, 1993; Schkade & Kleinmuntz, 1994), particularly when consumers hold certain expectations as to the order of information presentation; for instance, when they expect that products are arranged in order of decreasing popularity. Deceptive online companies can thus influence consumers’ decision making by manipulating the sequence of presented information in accordance with their expectations. For example, online companies may present a promoted product at the top of their “bestselling list” in order to increase the chance that consumers will choose that particular product (i.e., *falsification*).

In summary, the manipulation of information presentation can be achieved in two ways. First, by a combination of the different means of manipulating presentation media, online companies can influence consumers’ product understanding and attention as well as emotional responses conducive to deception. Second, by manipulating the way product information is organized at an e-commerce website, deceptive online merchants can influence consumers’ information processing strategies as well as the accessibility and the perceived relevance of information.

2.3 MANIPULATIONS PERFORMED ON INFORMATION GENERATION

The third type of deceptive manipulation is performed on *information generation*, which refers to the dynamic production of product-related information at an e-commerce website, based on consumer interests, needs, and/or preferences obtained explicitly or implicitly. Examples of e-commerce technology supporting dynamic production of information include search engines, product catalogs, and online product recommendation agents (PRAs). Our discussion of the manipulation of information generation focuses on *PRAs* because they are likely to be the first technological artifacts with which a consumer interacts at an e-commerce website that has a vast number of products or choices.

PRAs are software artifacts that take as input individual consumers' product-related interests or preferences, obtained either explicitly or implicitly, and subsequently provide recommendations for products that match the consumers' expressed interests or preferences (Xiao & Benbasat, 2007). Appropriately designed PRAs can enable consumers to make informed purchase decisions by reducing their information overload and search complexity, while improving their decision quality. However, the degree to which PRAs actually empower consumers depends upon the veracity and objectivity of the PRAs (Hill, King, & Cohen, 1996; King & Hill, 1994).

Users of automated decision aids have been found to place undue trust in such technologies, leading to the abusive use of such systems and biased decision-making processes, particularly when the competence of the systems far exceeds that of their users (e.g., Mosier, Skitka, Burdick, & Heers, 1998; Skitka, Mosier, & Burdick, 1999). Two classes of errors that often emerge in highly automated decision-making environments are *omission* errors (which occur when people fail to respond to system irregularities/events because the automated decision aid fails to detect or indicate them) and *commission* errors (which occur when people incorrectly follow the directive or recommendation of the automated decision aid, despite contra-indications from other sources of information) (Mosier et al., 1998; Skitka et al., 1999). Likewise, consumers (particularly those with little experience in the intended product category) may over-rely on the PRAs to make decisions for them, rather than using the PRAs as one component of a thorough monitoring and decision-making process (Skitka, Mosier, & Burdick, 2000). Moreover, people

have a tendency to trust experts or specialists. Just as we trust advice from human experts rather than that offered by non-expert friends and relatives, we also trust IT artifacts that claim specialty. People who lack expertise in the subject matter are likely to perceive a technology labeled as “specialist” (e.g., PRAs acting as online sales advisors) to be credible (Reeves & Nass, 1996; Tseng & Fogg, 1999).

Unscrupulous online companies can prey upon consumers’ double vulnerabilities, that is, their *trust in automation* and *trust in specialists*, by designing deceptive PRAs that provide recommendations biased toward their own interest. For instance, a PRA can focus consumers’ attention only on criteria on which the promoted products have a distinctive competitive advantage (Wagner, Klein, & Keith, 2001) (i.e., *concealment*); provide false decision guidance to influence consumers’ decision criteria (i.e., *falsification*); give priority to promoted products by manipulating the underlying algorithm for generating recommendations (Aksoy & Bloom, 2001) (i.e., *falsification*); mix promoted products (which do not go through the PRA’s filtering process) with those that actually fit consumers’ preferences in an unordered set of recommendations (i.e., *equivocation*); exclude products that best fit consumers’ preferences from its recommendation list (i.e., *concealment*); and provide vague or overly general explanations on how the recommendations are generated (i.e., *equivocation*). There have already been some reported incidents of companies generating false recommendations to consumers. For instance, Amazon.com has admitted to using faux recommendations to drive business to its new clothing store partners. The false recommendations were positioned right next to the legitimate recommendations for books, music, etc. that were generated based on customers’ purchase histories (Wingfield & Pereira, 2002).

In summary, by manipulating how personalized information is generated at an e-commerce website (e.g., through product recommendations), online merchants can influence consumers’ product evaluation and subsequently their decision making.

2.4 SUMMARY

In this section, a two-dimensional typology of deceptive information practices in e-commerce is presented. The three major types of deception—*concealment*, *equivocation*, and *falsification*—examined in prior deception research comprise one dimension, while the other dimension consists of the three operational-level deception techniques—the manipulation of information *content*, the manipulation of information *presentation*, and the manipulation of information *generation*—in the e-commerce context, with the latter dimension being our focus of discussion. Please see **Table 2-1** for examples of deceptive information practices in e-commerce based on our new typology.

Table 2.1 Examples of Product-Related Deceptive Information Practices in B2C E-Commerce			
Deception Types	Manifestations of Deception Types		
	Manipulation of Info Content	Manipulation of Info Presentation (Media and Organization)	Manipulation of Info Generation
Concealment	The website withholds negative information (e.g., a known safety problem) about a product.	The websites use flashy animations as a “decoy,” that is, to distract consumers from processing non-vivid yet more useful and informative textual descriptions (→ Presentation media).	The PRA focuses consumers’ attention only on criteria on which the promoted products have a distinctive competitive advantage.
	The website automatically filters out negative consumer reviews.	To encourage consumers to compare different products on a certain attribute (e.g., the only attribute on which the promoted products have advantage over other products), the website provides the functionality to sort by that attribute alone (→ Information organization)	The PRA excludes products that best fit consumers’ preferences from the recommendation list.

Table 2.1 Examples of Product-Related Deceptive Information Practices in B2C E-Commerce

Deception Types	Manifestations of Deception Types		
	Manipulation of Info Content	Manipulation of Info Presentation (Media and Organization)	Manipulation of Info Generation
Equivocation	The website provides vague information about the total cost (e.g., selling price, tax, shipping and handling fee) of a product.	The website shows conflicting information about what is included in the package with different media. For instance, while displaying a vivid image of an SLR camera with lens attached (with no annotation to indicate that the lens is not included), the website states (truthfully) in the textual description that the lens of the camera is sold separately (→ Presentation media).	The PRA presents an unordered set of recommendations, mixing promoted products (which do not go through the PRA's filtering process) with those that actually fit consumers' preferences.
	The website gives ambiguous information concerning product return and refund.		The PRA provides vague or overly general explanations as to how the recommendations are generated.
Falsification	The website sells a nonexistent product.	The website manipulates the response rate of an online product demonstration to mislead consumers about a particular product feature (e.g., demonstrate a shorter delay between shots of a digital camera) (→ Presentation media).	The PRA gives priority to promoted products by manipulating the underlying algorithm for generating recommendations.
	Staff of the online company pose as prior consumers and write positive reviews about products and services received from the company.	The website presents promoted products at the top of its "bestselling list" (→ Information organization).	The PRA provides false decisional guidance (i.e., guidance as to how to choose a certain product) to influence consumers' decision criteria.

Overall, the typology not only contributes to a better understanding of the different types of product-related deception that can be performed by online merchants to take advantage of consumers but also provides a conceptual starting point for the thesis research. The next two chapters empirically examine the effects of some deceptive information practices described in this typology and possible counter-deception tactics.

CHAPTER 3. AN EMPIRICAL INVESTIGATION OF CONSUMER VULNERABILITY TO DECEPTIVE INFORMATION PRACTICES AT E-COMMERCE PRODUCT WEBSITES (STUDY 1)

3.1 OVERVIEW

Chapter 2 presented a typology of product-related deceptive information practices that illustrates the various techniques that can be employed by online merchants to deceive consumers at e-commerce websites. Since the number of potential techniques for manipulating product-related information at an e-commerce website is vast, this chapter presents a study that investigates consumer vulnerability to a subset of these techniques in a simulated online shopping context. Given the concerns about e-commerce deception and the paucity of empirical research on this phenomenon, Study 1 aims to explore the effects of these deception techniques on consumers' shopping behavior as well as their evaluation of the e-commerce website. The two key questions that will be investigated are: (1) Do consumers perceive deceptive information practices at e-commerce product websites? (2) What is the impact of perceived deceptiveness on consumers' shopping behavior and their future purchase intentions?

More specifically, Study 1 focuses on *content manipulation* and *order manipulation*. *Content manipulation* is operationalized in this study as the *equivocation* of product detail information (i.e., to present product detail information vaguely and/or ambiguously. For instance, the resolution of a digital camera is described as a value range “3 to 5 mega-pixels” instead of an absolute value “3 mega-pixels”)³. It is an instance of the *manipulation of information content*⁴ as described in detail in Chapter 2. *Equivocation* is chosen over the other two types of deception (i.e., concealment and falsification; see Chapter 2) for two reasons. First, outright lying (i.e., *falsification*) is generally not tolerated and is subject to severe penalty and retribution when caught. As such, outright lying is comparatively rare. In contrast, misleading half-truths (such as

³ Since the true value of the digital camera attribute is included in the value range, this manipulation is considered to be *equivocation* and not *falsification*.

⁴ Note that *content manipulation* can be achieved via *concealment*, *equivocation*, or *falsification*.

equivocation and *concealment*) are extremely common (Sandman, 2004). Second, Burgoon, Buller, and colleagues (1994; 1996) found that of the three types of deception (i.e., *equivocation*, *concealment*, and *falsification*), *equivocation* produced the greatest degree of detection accuracy. The vague and indirect nature of equivocal messages makes it more noticeable than the other two types of deception. Fatt (2001) also suggests *equivocation* is more likely to result in detection than *falsification*. While Grazioli and Jarvenpaa (2003a) argue that *falsification* is hard for online consumers to identify because detection requires assessing the content of an offer to transact via the Internet, the same applies to *concealment*. Due to its greater detectability, the study of equivocation thus provides a more *conservative test* of the effect of *content manipulation*. If consumers cannot detect deception by *equivocation*, which is comparatively easy to detect, they are likely to have more difficulty in detecting the other two types of deception (i.e., *concealment* and *falsification*).

In addition to the direct alteration of the content of product information, deceptive manipulations can also be performed on the order in which products are displayed at an e-commerce website, referred to as *order manipulation* in this study. The sequence in which information appears may influence consumers' judgment as to the relevance and/or importance of the individual pieces of information (Kleinmuntz and Schkade 1993; Schkade and Kleinmuntz 1994), particularly when consumers hold certain expectations as to the order of information presentation; for instance, when they expect that products are arranged in order of decreasing popularity or utility. Deceptive online companies can thus influence consumers' decision making by manipulating the sequence of presented information in accordance with their expectations. This study examines two types of order manipulation:

- *Non-personalized* order manipulation implemented by the online company. Promoted products (i.e., products promoted or pushed by the online companies; products on which deceptive information practices will be performed) are displayed before other, non-promoted products. Products are claimed to be ordered by decreasing popularity. This type of *order manipulation* is an instance of the *manipulation of information presentation* described in detail in Chapter 2.

- *Personalized order manipulation* implemented via a product recommendation agent (PRA) embedded at the e-commerce website. The PRA displays the promoted products before other, non-promoted products and claims that products are ordered by how well they satisfy consumers' expressed preferences. This type of *order manipulation* is an instance of the *manipulation of information generation* described in detail in Chapter 2.

An online experiment was conducted to investigate the effects of content manipulation and *order manipulation* on consumers' product *choice* as well as their evaluation of the e-commerce website. The study also examined the effect of a potential counter-deception mechanism (i.e., *warning*) on the dependent variables of interest. The results of the study show that both *content manipulation* and *order manipulation* can bias consumers towards *choosing* the promoted products. *Personalized order manipulation* proves to be the most effective in influencing consumers' product *choice*. Consistent with prior research in deception detection, when provided with a *warning* message about potential deception in e-commerce websites, consumers are more likely to consider the e-commerce website that they are shopping at to be deceptive, regardless of whether the website is indeed deceptive or not. The results also indicate that consumers who perceive the e-commerce website as deceptive will have heightened *perception of risk* associated with *shopping at the e-commerce website* and experience intense *feeling of violation*, which jointly determine consumers' *attitude towards the e-commerce website* and subsequently, their *intention to shop at the e-commerce website*.

To our knowledge, this is the first empirical study that examines and explicitly compares the effects of different deception manipulations on consumers shopping behavior at an e-commerce product website. It thus fills a void in the literature and contributes to a better understanding of the phenomenon of e-commerce deception.

The remainder of this chapter is organized as follows. Section 3.2 presents prior research related to the current study. Section 3.3 develops hypotheses. The research method and results of hypothesis testing are reported in sections 3.4 and 3.5, and the chapter concludes with a discussion of the results, limitations, and contributions of the study and some future research areas.

3.2 PRIOR RESEARCH

The section reviews prior research conducted on deceptive information practices, warning, perceived risk, and feeling of violation.

3.2.1 Effects of Deceptive Information Practices on Consumer Judgment and Decision Making

Prior research has studied the effects of deceptive advertising (i.e., manipulation performed on the message claims) on consumer attitude and purchase intention, the *primacy effect* and *recency effect* on persuasion, and the influence of PRAs on consumer decision making.

3.2.1.1 Manipulation of Information Content

Marketing researchers have studied the effects of deceptive advertising on consumers' beliefs about and their attitudes towards advertised products, attitudes toward the ads, and behavioral intention to purchase the advertised products (e.g., Barbour & Gardner, 1982; Braun & Loftus, 1998; Bruno & Harris, 1980; Burke, DeSarbo, Oliver, & Robertson, 1988; Dyer & Kuehl, 1978; Ford & Yalch, 1982; Gaeth & Timothy, 1987; Gardner, 1975; Johar, 1995, 1996; Licata, Biswas, & Krishnan, 1998; McGrew, 1985; Olson & Dover, 1978; Peterson, 1985). These studies focused on either explicit or implicit message claims, thus falling into the category of *manipulation of information content*.

Ambiguous advertising (i.e., deceiving through equivocation) is a major type of deceptive advertising (Carroll & Buchholtz, 2003) investigated in prior research. For instance, Gaeth and Heath (1987) found that elderly consumers were more susceptible to ambiguous advertising and less responsive to training due to age-related deficits in cognitive processing skills. Burke et al. (1988) showed that ambiguous evaluative claims about a hypothetical ibuprophen-based pain reliever increased consumers' brand attribute beliefs, affect, and purchase intentions. Licata et al. (1998) examined the effect of ambiguous and exaggerated tensile price advertising (e.g., "Save up to X%) on consumer discounting behavior, price perceptions, and behavioral intentions. They found that consumers were influenced by both plausible discount claims and implausible

discount claims (but they tend to believe in the latter less than the former), particularly when the discount claims pertained to a service (rather than a product).

Due to the separation of time from the viewing of an ad to the actual purchase behavior, product *choice* has never been the focal dependent variable in deceptive advertising studies.

3.2.1.2 Order Effects

Given that consumers' preferences are often ill-defined and unstable, their product choice is likely susceptible to the sequence in which the products are presented (Bettman & Kakkar, 1977). The American Airlines reservation system, Sabre, provides a classic, real-world example of the effects of presentation order on consumer choice (Phillips & Thomas, 1988). Sabre always displayed an American flight at the top of the screen for a given route, which produced a bias favoring American flights. After a 12-year legal battle, Sabre began listing in order of departure time with carriers arranged randomly in the event of time ties. However, compared to information format and organization, there has been less attention paid to effects of information presentation *order* (or sequence) on consumer judgment and decision making in the academic literature (Schkade & Kleinmuntz, 1994).

Prior research on impression formation and persuasion has identified two order effects – *primacy effect* (favoring the first position in an array of stimuli) and *recency effect* (favoring the last position in an array of stimuli) (see Haugtvedt & Wegener, 1994). A review of order effects across various disciplines and media supports both primacy and recency effects (see J. Murphy, Hofacker, & Mizerski, 2006), demonstrating the importance of an item's position in an ordered list on memory, attitude formation, and choice. For instance, Duncan and Murdock (2000) found that television viewers were more likely to recall advertisements placed at the end of a commercial break than ads placed toward the beginning, demonstrating a *recency effect*. Zhao (1997) found a *primacy effect* on the liking of advertisements (attitude toward the ad), an indicator of potentially favorable advertising effects for a brand. In an eye-tracking study on reading of Yellow Pages, Lohse (1997) found that experimental participants tended to view and

choose ads that were at the top of the alphabetical list, demonstrating a *primacy effect*. This result helps explain why restaurant managers place high margin items at the top of a menu, as customers are more likely to order items near the top of a menu (Ditmer & Griffin, 1994; J. E. Miller, 1980). The concept of involvement has been found to moderate position effects. In a study of 188 political races in Ohio's 1992 elections, Miller and Krosnick (1998) investigated candidates' name order on election outcomes and found *primacy effects* in almost half the races. However, in races that voters perceived as high involvement—with party affiliation listed, high levels of publicity and incumbents involved—the effect of the candidate's serial position was less important, consistent with the predictions of the elaboration likelihood model (Petty & Cacioppo, 1986a, 1986b).

In online environments, there has been more evidence that supports *primacy effects* than evidence supporting *recency effects* (e.g., Ansari & Mela, 2003; Breugelmans, Campo, & Gijsbrechts, 2007; Drèze & Zufryden, 2004; Hofacker & Murphy, 2005). Ansari and Mela (2003) investigated serial position related clicking behavior in emails or web pages in their efforts to "...develop a statistical optimization approach for customization of information on the Internet" (p. 131). Analyzing clickstream data from 1,048 users who received opt-in emails from a leading website, they found significant *primacy effect*, as in Lohse (1997). In a study of an outside link's contribution to a website's online visibility, Drèze and Zufryden (2004) showed that the higher up the link appears on a page, the better (*primacy effect*). However, the two field experiments conducted by Murphy et al. (2006) revealed both primacy and recency effects on consumers' clicking behavior. In an online shopping context, Breugelmans, Campo and Gijsbrechts (2007) investigated the effect of product sequence on consumer purchase decisions in an online grocery store. They found that, despite the ease of searching on the Internet, alternatives placed in the first screen (or product page) were more likely to be chosen by consumers (*primacy effect*), particularly when consumers had difficulty evaluating the assorted products at the website. Wang and Benbasat (2009) also found that consumers were more likely to choose a product from the first two pages of recommendations made by an online decision aid.

Although empirical studies in this research stream were not conducted in a deception context, the research evidence nevertheless points to the potential of *order manipulation* in influencing consumers' judgment and decision making.

3.2.1.3 Manipulative PRAs

Research in e-commerce product recommendation agents (PRAs) has demonstrated that PRAs have the potential to both aid and influence consumers in their decision making (Cosley, Lam, Albert, Konstan, & Riedl, 2003; Haubl & Murray, 2003; Senecal, 2003; Senecal & Nantel, 2004). If exploited by unscrupulous PRA providers (e.g., unethical online retailers), such potential for influence can also become a powerful weapon against consumers. Two empirical studies (Aksoy & Bloom, 2001; Cosley et al., 2003) have looked into potential PRA manipulations, though neither study has directly examined the impact of deceptive PRAs on consumer decision making. Aksoy and Bloom (2001) manipulated the product attribute importance weights (which deviated from the weights expressed by PRA users) used by a PRA to generate recommendations. They found that PRA users who received the recommendations generated from manipulated attribute importance weights had higher search effort, reduced decision quality, and degraded perception of the usefulness of the recommendations. Cosley et al. (2003) presented PRA users with a set of movie recommendations, with each movie accompanied by the PRA's predicted rating (i.e. the PRA's prediction of a user's liking of a movie, based on the user's profile), which was manipulated to be either higher, lower, or the same as the actual predicted rating. They found that PRAs providing manipulated predicted ratings significantly lowered users' satisfaction with the PRAs' recommendations.

There are only a limited number of empirical studies that explored the impact of the presentation order of personalized recommendations on consumer judgment and decision making. An eye tracking experiment by Pan et al. (2007) revealed that college student Internet users have an inherent trust in Google's ability to rank results by their true relevance to the query. When participants selected a link from Google's result pages, their decisions were strongly biased towards links higher in position, even if that content was less relevant to the search query.

Although the study was conducted in a general Internet context (rather than in an e-commerce context), the results of this study nevertheless attest to the tremendous influence recommendation technologies can have on what and how information is accessed and used. Tam and Ho (Ho & Tam, 2005; Tam & Ho, 2005) conducted a series of field experiments examining the effects of personalized recommendations on users' information processing during different stages of decision making. They found that personalized recommendations that were highlighted as top recommendations (via a sorting cue) were more likely to attract users' attention, induce user elaboration, and result in choice.

3.2.2 Effects of Warning on Deception Detection

Existing evidence suggests that, one's ability to detect deception increases when suspicion is aroused (G. R. Miller & Stiff, 1993; Parasuraman, 1984; Stiff, Kim, & Ramesh, 1992). "Suspicion aroused by a third party is an important part of veracity judgment" (Stiff et al., 1992, p. 342). Explicit *warnings* about potential deceptive behaviors can arouse an individual's suspicion and induce her sensitivity to deception, thus increasing the likelihood of detecting deception. Prior research has demonstrated the positive effect of warning on deception detection accuracy. For instance, Biros et al. (2002), Grazioli (2004), and George, Marett, and Tilley (2004) showed that suspicious receivers had a better chance to detect deception than unsuspicious ones. However, since aroused suspicion can place individuals in a heightened state of alert (Biros et al., 2002), explicit warning about deception may result in greater likelihood for individuals to both uncover deception when it does exist and report deception when it does not exist (Burgoon et al., 1994; Parasuraman, 1984).

In sum, no prior research has examined and compared the differential effects of various deceptive information practices on consumers' product consideration and choice in an e-commerce context. Study 1 seeks to fill this void in the literature and to contribute to a better understanding of deception in e-commerce.

3.2.3 Perceived Risk and Feeling of Violation

Attitude has historically been conceptualized as a multi-component entity encompassing cognition and affect (Millar & Tesser, 1986). Cognitive-based attitude refers to beliefs, thoughts, or rational arguments about an attitude object (Verplanken & Hofstee, 1998). It can be identified by enumerating the reasons for liking or disliking the attitude object, as suggested by Millar & Tesser (1986). Since Study 1 focuses on e-commerce deception, an unfavorable behavior from the consumers' point of view, *perceived risk of shopping at the e-commerce website* (i.e., consumers' perception of uncertainty and adverse consequences of engaging in e-commerce activities) (Dowling & Staelin, 1994) is adopted as the cognitive component of attitude. *Perceived risk* is a key element of the buyer-seller relationship and has been established in prior research as an important mediator between perception of deception and later outcomes (such as attitude and intention) (e.g., Grazioli & Jarvenpaa, 2000; Grazioli & Wang, 2001; Pavlou & Gefen, 2005; Robinson, 1996).

Organization behavior researchers found that perceived psychological contract breach (i.e., one's perception that another party has failed to fulfill adequately the promised obligations) could result in the *feeling of violation* (i.e., an affective and emotional experience of disappointment, frustration, anger, and resentment that may emanate from the perception that one has been betrayed or mistreated) (Morrison & Robinson, 1997; Robinson & Morrison, 2000). In an e-commerce context, intense *feeling of violation* arises when consumers perceive that online merchants have intentionally violated their transactional obligations by engaging in opportunistic behavior. Thus, in Study 1, *feeling of violation* is adopted as the affective component of attitude.

Perceived risk has been well studied in the B2C e-commerce context (see Glover& Benbasat, 2006 for a review); however, *feeling of violation* is seldom studied empirically (even in organizational settings). By having both *perceived risk* (the cognitive component) and *feeling of violation* (the affective component) in the research model and examining them as important consequences of individuals' perception of website deceptiveness and predictors of their overall

attitude toward shopping at the e-commerce website, Study 1 aims to achieve a fuller understanding of the linkages between *perceived deceptiveness* and *attitudes* and *intentions*.

3.3 HYPOTHESIS DEVELOPMENT

In this section, the research model for Study 2 is presented and the hypotheses developed based on the research model are introduced.

3.3.1 Research Model

The research model for Study 1 is shown in Figure 3-1.

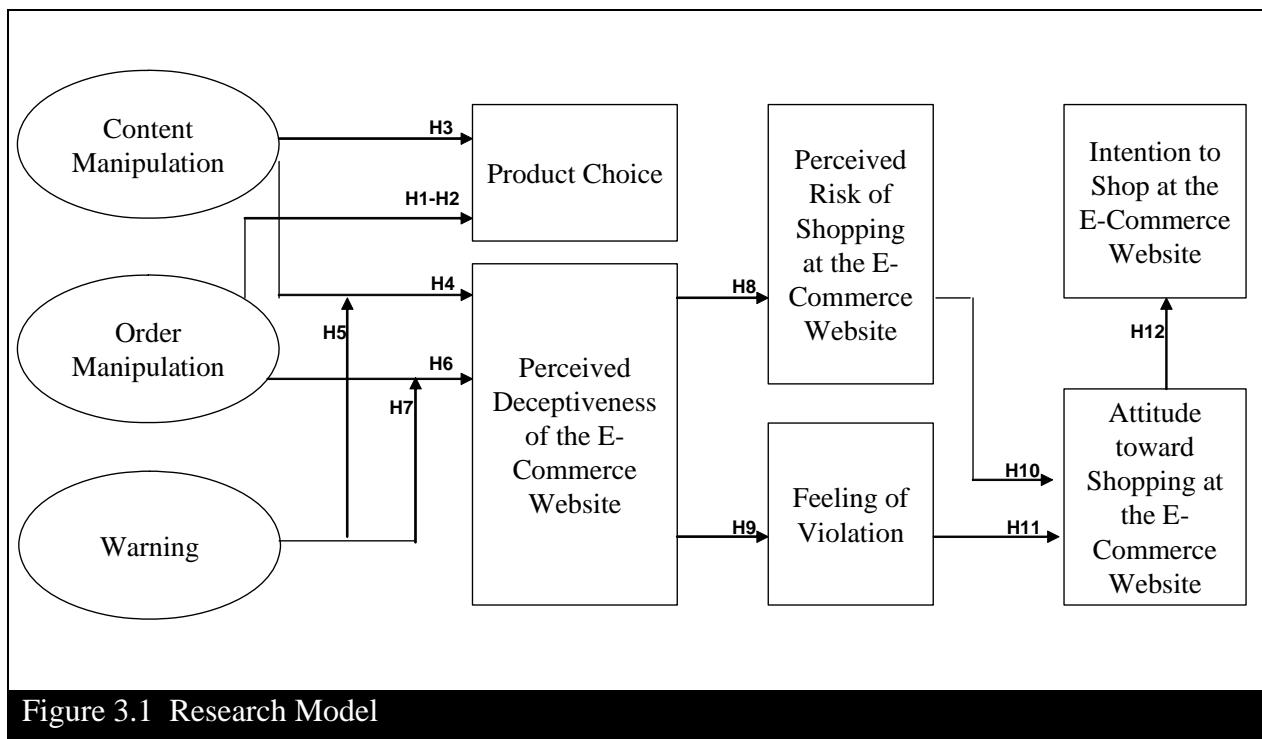


Figure 3.1 Research Model

As illustrated in the research model, both *content manipulation* and *order manipulation* are hypothesized to affect consumers' *product choice* (H1-H3) as well as their *perceived deceptiveness of the e-commerce website* (H4 and H6). Explicit *warning* about potential

deception moderates the effect of the deceptive manipulations on *perceived deceptiveness of the e-commerce website* (H5 and H7). Consumers' *perceived deceptiveness of the e-commerce website* will positively influence their *perceived risk of shopping at the e-commerce website* (H8) and their *feeling of violation* (H9), which will, in turn, jointly influence their *attitude toward shopping at the e-commerce website* (H10-11) and their subsequent *intention to shop at the e-commerce website* (H12). To achieve a full understanding of the outcomes of deception, this study examines both the immediate behavioral outcome of e-commerce deception (i.e., *product choice*) and the perceptual/attitudinal/intentional outcomes (i.e., *perceived risk*, *feeling of violation*, *attitude*, and *intention*) that may influence consumers' future purchase behavior.

3.3.2 Definitions of Constructs

Content manipulation refers to the *equivocation* of product detail information at an e-commerce website. **Order manipulation** refers to deceptive manipulations that can be performed on the order in which products are displayed at an e-commerce website. Both *non-personalized* and *personalized order manipulation* are examined in this study.

Warning refers to an explicit warning issued to consumers about the possibility of product-related deception in e-commerce websites.

Product choice refers to the products a consumer chooses to purchase at the e-commerce website. E-commerce deception is not an end in itself. Rather, it has an instrumental end-goal, that is, to induce certain desired perceptual and/or behavioral changes in consumers, potentially to their detriment. This study focuses on one important change, namely, change in consumers' *product choice*.

Perceived deceptiveness of the e-commerce website is defined as the extent to which a consumer believes that product-related information provided by an e-commerce website is deceptive. Perceived deceptiveness is triggered by negative-valenced violation of consumers' preconceived

expectations, often as a result of the deceptive information practices performed by online merchants, or the recognition of cues suggesting deceptive information practices.

Perceived risk of shopping at the e-commerce website is defined as a consumer' expectation that shopping at the e-commerce website could have unwanted outcomes (Glover & Benbasat, 2006). It is adopted as the cognitive component of attitude. *Feeling of violation* refers to a combination of disappointment emotions and anger emotions emanating from the perception that one has been betrayed or mistreated by the online merchants (Morrison & Robinson, 1997; Robinson & Morrison, 2000).

Consumers' *attitude toward shopping at the e-commerce website* refers to their overall evaluation of shopping at the e-commerce website. Finally, *intention to shop at the e-commerce website* is a behavioral loyalty intention capturing a consumer's intention to return to the e-commerce website as well as her intention to recommend the website to friends and relatives.

Studies in different areas have shown that *perceived deceptiveness*, *perceived risk*, *feeling of violation*, *attitude*, and *intention* are closely related psychological states. For instance, *perceived risk* has been shown to be positively influenced by *perceived deceptiveness* and has been established as an important link between *perceived deceptiveness* and *attitude* and *intention* (e.g., Grazioli & Jarvenpaa, 2000; Pavlou & Gefen, 2005; Robinson, 1996). Although *feeling of violation* is seldom studied empirically, it was theorized to be a strong affective response closely related to *perceived deceptiveness* (Morrison & Robinson, 1997; Robinson & Morrison, 2000). Study 1 includes all these closely related concepts in one research model to attain a full understanding of the nomological network for the focal construct – *perceived deceptiveness*.

3.3.3 Hypotheses

This section presents hypotheses regarding the effects of content manipulation and order manipulation on consumers' shopping behavior as well as their evaluation of the e-commerce website.

3.3.3.1 Hypotheses Regarding Consumer Decision Making

Although prior research on *order effects* in various disciplines supports both *primacy effects* and *recency effects* (see J. Murphy et al., 2006), the evidence is clearer for *primacy effects* than for *recency effects* in online environment (e.g., Ansari & Mela, 2003; Breugelmans et al., 2007; Drèze & Zufryden, 2004; Hofacker & Murphy, 2005). Behavioral research reveals that consumers are “cognitive misers” who aim to exert as little cognitive effort as possible while retrieving and processing information (Costley & Brucks, 1992). To reduce the cognitive processing effort, consumers may selectively choose to ignore certain alternatives (Bettman et al., 1988). Online product assortment is typically large and requires more than one screen (or product page) to display all the alternatives. Being cognitive misers, online consumers will likely be reluctant to engage in a complete category search, even if they only have to scroll among different screens (Breugelmans et al., 2007). Without the assurance that the most attractive alternative might be spotted near the end of the product list, consumers may believe it is time-consuming and cognitively exhaustive to continue searching and processing alternatives (Tan, Chan, Yang, Chan, & Teo, 2004). Thus, products encountered by consumers earlier during the search process will likely receive more attention and hence have a higher probability of being chosen (*primacy effect*). In Study 1, the two types of order manipulations (non-personalized and personalized) not only display promoted products in the first few product pages, before the showing of other, non-promoted products, but also mark the former set of products as better (in terms of popularity or preference-fitting) than the latter set. Such deceptive manipulations enhance the visual salience of the promoted products as well as their perceived relevance or importance, thus increasing the likelihood for the promoted products to be selected by consumers as their final *choice*. It is thus hypothesized that:

H1: Compared to those shopping at an e-commerce website with *no order manipulation*, consumers shopping at an e-commerce website with *order manipulation* (either *non-personalized* or *personalized*) will be more likely to *choose* promoted products.

Further, consumers normally seek advice from salespersons in brick-and-mortar stores, especially when they are unfamiliar with the intended product categories (Radin & Predmore, 2002). In an online environment, it is natural for them to turn to online decision support tools, such as PRAs, which fulfill a role comparable to that of salespersons in an offline setting. Insomuch as automation bias and expertise bias (Mosier et al., 1998; Reeves & Nass, 1996; Skitka et al., 1999; Tseng & Fogg, 1999) render consumers vulnerable to PRAs embodying deceptive practices, they are likely to choose products recommended by the PRAs. Therefore, consumers' product choice are expected to be influenced to a greater extent by personalized order manipulation than by non-personalized order manipulation. It is thus hypothesized that:

H2: Compared to those shopping at an e-commerce website with *non-personalized order manipulation*, consumers shopping at an e-commerce website with *personalized order manipulation* will be more likely to *choose* promoted products.

In this study, *content manipulation* is performed by equivocating the product detail information (e.g., describing the resolution of a digital camera as a value range “3 to 5 mega-pixels” instead of an absolute value “3 mega-pixels”), thus making the promoted products more attractive to consumers than they really are. Similar to the practice of most e-commerce websites, in this study, detailed product information about a product is only available when a consumer explicitly requests it by clicking on the “More Info” button in the product listing page. At the *choice* stage of the decision making process, consumers typically undertake a detailed analysis of the alternatives in the consideration set (Payne, 1982; Shocker et al., 1991), scrutinizing the content of product information and assessing the merit of the products (Petty & Cacioppo, 1986b). Since *content manipulation* operates directly on the content of product information to influence its quality and processability, it is expected to exert great influence on a consumer's product *choice*. It is thus hypothesized that:

H3: Compared to those shopping at an e-commerce website with *no content manipulation*, consumers shopping at an e-commerce website with *content manipulation* will be more likely to *choose* promoted products.

3.3.3.2 Hypotheses Regarding Perceived Deceptiveness of the E-Commerce Website

E-commerce deception research has revealed that, although consumers are generally vulnerable to deception perpetrated by online companies, success in deception detection is possible (Grazioli, 2004; Grazioli & Jarvenpaa, 2000, 2001, 2003a, 2003b; Grazioli & Wang, 2001). *Content manipulation* operates by equivocating the detailed information of each product, making such information less clear and precise to consumers. As for *order manipulation*, consumers who exert effort to go through more product pages may perceive the bias in which the products are sequenced or ordered at the e-commerce website. When consumers perceive a website to be low in information clarity and/or when they believe that the order in which products are displayed at the website is biased to their detriment, their preconceived expectations are negatively violated, thus leading consumers to question the website's veracity and thus judge the website as deceptive. Explicit warning about the possibility of deception will increase consumer vigilance and further sensitize them to such anomalies (i.e., unclear information, bias in product ordering/sequencing) in the e-commerce website that they are shopping at, leading them to judge the website as deceptive. Thus,

H4-H5: Compared to those shopping at an e-commerce website with *no content manipulation*, consumers shopping at an e-commerce website with *content manipulation* will perceive the website to be more *deceptive* (**H4**), particularly when consumers are *warned* of potential deception in e-commerce websites (**H5**).

H6-H7: Compared to those shopping at an e-commerce website with *no order manipulation*, consumers shopping at an e-commerce website with *order manipulation* (either *non-personalized* or *personalized*) will perceive the website to be more *deceptive* (**H6**), particularly when consumers are *warned* of potential deception in e-commerce websites (**H7**).

3.3.3.3 Hypotheses Regarding the Consequences of Perceived Deceptiveness of the E-Commerce Website

When consumers perceive that an e-commerce website is deceptive, they will be alerted to the potential loss they may suffer (e.g. the products may not be as good as presented in the e-commerce website) in pursuit of their desired outcomes (i.e. obtaining a satisfactory product from the website), thus having an elevated risk perception regarding shopping at the website. Empirical studies by Grazioli and colleagues (Grazioli & Jarvenpaa, 2000; Grazioli & Wang, 2001) have confirmed the positive relationship between perceived deceptiveness and perceived risk. Thus,

H8: Consumers' *perceived deceptiveness of the e-commerce website* will positively influence their *perceived risk of shopping at the e-commerce website*.

A belief in an online merchant's deceptive behavior provokes an intense feeling of disappointment, frustration, anger, and resentment in consumers, since their critical expectations about the online merchant (and its proxy, the e-commerce website) have been violated (Morrison & Robinson, 1997; Robinson & Morrison, 2000). Thus

H9: Consumers' *perceived deceptiveness of the e-commerce website* will positively influence their *feeling of violation*.

The joint effects of cognitive and affective attitude components in determining individuals' overall attitude have been established in prior research. The causal link from attitude to intention has also been established in the Theory of Reasoned Action (Ajzen & Fishbein, 1980) and supported by empirical evidence from various disciplines (e.g. Glover & Benbasat, 2006; Jarvenpaa, Tractingsky, & Saarinen, 1999; Jarvenpaa, Tractingsky, & Vitale, 2000). Therefore,

H10-H11: Consumers' *perceived risk of shopping at the e-commerce website* (**H10**) and the *feeling of violation* experienced by them (**H11**) will negatively influence their overall *attitude toward shopping at the e-commerce website*.

H12: Consumers' *attitude toward shopping at the e-commerce website* will positively influence their *intention to shop at the e-commerce website*.

3.3.3.3 Control Variables

Prior detection research suggests a number of factors that should be controlled due to their potential influence on individuals' perception of the other party's deceptiveness, among which are *truth bias*, *motivation*, and *product expertise*.

Truth bias, a positivity bias, is the predisposition to assume that others' communication is truthful (Carlson, George, Burgoon, Adkins, & White, 2004). Individuals with truth bias will expect that most of the information is deception-free and thus be more likely to accept all the information presented by the e-commerce website at face value. The negative effect of truth bias on individuals' ability to perceive the other party's deceptive intent has been the focus of much conceptual and empirical work in deception detection (e.g., Boyle, 2003; D. B. Buller & Burgoon, 1994; McCornack, 1992; Stiff et al., 1992).

Another important variable influencing individuals' perception of the other party's deceptiveness is **motivation**. Prior research in persuasive communication (e.g., Chaiken, Wood, & Eagly, 1996; Petty & Cacioppo, 1986a, 1986b) has shown that motivated individuals are more likely to process persuasive messages comprehensively than unmotivated ones. Gilovich (1991) argues that motivated individuals will devote more cognitive effort to a task and thus rely less on cognitive biases such as truth bias. Hubbell, Mitchell, and Gee (2001) also argue that a receiver who is highly motivated in the topic of conversation will be more likely to concentrate on the transmitted message and give up some of the positivity toward the sender. Moreover, increased attention and effort as a result of motivation can enable individuals to better distinguish signal from noise, thus enhancing their ability to detect anomalies (Boyle, 2003; Klein, Goodhue, & Davis, 1997). Therefore, when shopping at an e-commerce website designed with deceptive information practices, motivated consumers are more likely to perceive the deceptive intent of the online merchants than unmotivated ones. Literature suggests that a consumer can be involved with *products* or with *purchase decisions* (see Zaichkowsky, 1985 for detail). Whereas *involvement with products* typically leads to perception of greater product importance and greater commitment to brand choice (Howard & Sheth, 1969), *involvement with purchase decisions*

leads one to engage in more information search and spend more time searching for the right selection (Clarke & Belk, 1978). However, Zaichkowsky (1985) found that consumers' involvement with products also correlated positively with information search and alternative evaluation.

Buyers' *product expertise* also exerts significant impact on their anomaly detection process by affecting the *salience* of anomalies. The more product expertise the buyers possess, the more likely for them to recognize anomalies or abnormalities by effectively discriminating between noise and signal (Biros, 1998; Johnson, Grazioli, Jamal, & Berryman, 2001; Klein et al., 1997; Maksimova, 2005)

3.4 RESEARCH METHOD

To test the effects of different e-commerce deceptive information practices on consumer decision making and their evaluation of the e-commerce website, an online experiment was conducted.

3.4.1 Independent Variables and Experimental Design

The three main independent variables are 1) content manipulation, 2) order manipulation, and 3) warning. A **2** (*Content Manipulation*: with or without) x **3** (*Order Manipulation*: without order manipulation, non-personalized order manipulation, or personalized order manipulation) x **2** (*Warning*: with or without) between-subject factorial design (see Table 3-1) was used.

Six experimental websites (five being deceptive and one being honest) were custom designed for the study. Each website featured the same 96 digital cameras from 8 brands, with 12 products in each brand. The product features for the 12 digital cameras in each brand were carefully designed such that 6 products (referred to as the *promoted* products) are dominated by the other 6 products (referred to as the *dominant* products). Each *promoted* product is paired with a dominant *product* in the same brand that has better features but the same price.

Table 3.1 2x3x2 Full Factorial Experimental Design

Group #	1	2	3	4	5	6	7	8	9	10	11	12
Website Version	A	B	C	D	E	F	A	B	C	D	E	F
Warning							X	X	X	X	X	X
Content Manipulation	X	X	X				X	X	X			
Non-Personalized Order Manipulation			X		X			X				X
Personalized Order Manipulation	X			X			X			X		

Content manipulation. Content manipulation was operationalized as the equivocation of product detail information. For four important digital camera attributes (i.e., optical zoom, resolution, LCD size, and rapid fire), the website displays a value range (e.g., 3 to 5 mega-pixels) rather than an absolute value (e.g., 3 mega-pixels), so as to enhance the attractiveness of the promoted products (which are inferior in attributes to dominant products) to consumers. See Figure 3-2 and 3-3 for an example of the detailed product information in a website with or without content manipulation.

Order Manipulation. Each website has 96 digital cameras, with 48 being promoted products and the other 48 being dominant products. Each website has 16 product pages, with each page displaying 6 digital cameras. The design for websites with no order manipulation, with non-personalized order manipulation, and with personalized order manipulation is presented in Table 3-2.



Item # 2525012
Brand: Fuji

Original Price: \$150
Discount Price: \$120

Type:	Compact
Resolution Level:	5 to 7 megapixels
Optical Zoom Level:	3x to 5x
Flash:	Off/On/Auto; Red-Eye Reduction; Flash Sync
Rapid Fire:	>= 2 frames per second
LCD:	>= 2 inches
Manual Exposure Compensation:	Yes
Manual White Balance:	Yes
Manual Focus:	Yes
Manual Shutter:	Yes
Manual Aperture:	No
Macro:	Yes
DPOF:	Yes
Audio:	Yes
Movie:	Yes
Image Stabilization:	No
Battery:	Lithium
Dimension:	101 mm X 61 mm X 27 mm
Weight:	165 grams

Figure 3.2 Example of Product Detail in Website with Content Manipulation⁵

⁵ The four digital camera attributes on which content manipulation was performed are circled in Figure 3.2.



Item # 2525012
Brand: Fuji

Original Price: \$150
Discount Price: \$120

Type:	Compact
Resolution (Megapixel):	5
Resolution (Pixel):	2592x1944
Optical Zoom:	3X
Digital Zoom:	5X
Flash:	Off/On/Auto; Red-Eye Reduction; Flash Sync
Rapid Fire:	2 frames per second
LCD:	2 inches
Manual Exposure Compensation:	Yes
Manual White Balance:	Yes
Manual Focus:	Yes
Manual Shutter:	Yes
Manual Aperture:	No
Macro:	Yes
DPOF:	Yes
Audio:	Yes
Movie:	Yes
Image Stabilization:	No
Battery:	Lithium
Dimension:	101 mm X 61 mm X 27 mm
Weight:	165 grams

Figure 3.3 Example of Product Detail in Website without Content

Table 3.2 Experimental Manipulation

No Order Manipulation	The 96 products are <i>randomly</i> placed in the website.
Non-Personalized Order Manipulation	<p>The 48 promoted products are randomly placed in the <i>first 8</i> products pages whereas the 48 dominant products are randomly placed in product pages 9-16.</p> <p>The website states that the products are ordered by popularity.</p>
Personalized Order Manipulation	<p>The website provides a needs-based product recommendation agent (PRA) that uses an agent-user dialogue to obtain users' preferences. The PRA is adapted from the RA in Wang (2005)</p> <p>After eliciting users' preferences, the PRA places the 48 promoted products in the first 8 product pages and orders them in order of how each product satisfies users' expressed preferences. The PRA then places the 48 dominant products in the next 8 product pages ordered also by how each product satisfies users' expressed preferences.</p> <p>The website states that the products are ordered by how each satisfies users' preferences and displays the ranking number (which is false) for each product.</p>

Figure 3-4 and Figure 3-5 show the first product page of a website with non-personalized and personalized order manipulation, respectively. Figure 3-6 shows the preference-elicitation interface of the PRA in a website with personalized order manipulation.

ForeverCam
We use advanced technologies

DIGITAL CAMERA TUTORIAL ABOUT US TERMS PRIVACY POLICY

The Coupon Code you entered is valid for the purchase of one of the following Digital Cameras, ordered by popularity.

[View Comparison Matrix](#) [View cart](#)

	Item # 2525012 Brand: Fuji More info	Orig. Price: \$150 Discount Price: \$120
	Item # 2122043 Brand: Samsung More info	Orig. Price: \$155 Discount Price: \$124
	Item # 2127034 Brand: Pentax More info	Orig. Price: \$155 Discount Price: \$124

Figure 3.4 First Product Page of a Website with Non-Personalized Order Manipulation

The Coupon Code you entered is valid for the purchase of one of the following Digital Cameras, ordered by how each meets your expressed preferences.

[Explanation](#) [View Comparison Matrix](#) [View cart](#)

Product Ranking

1		Item # 2122040 Brand: Panasonic	Orig. Price: \$155 Discount Price: \$124
----------	---	------------------------------------	--

[More info](#) [Compare](#)

2		Item # 2475060 Brand: Panasonic	Orig. Price: \$160 Discount Price: \$128
----------	---	------------------------------------	--

[More info](#) [Compare](#)

3		Item # 2326049 Brand: Fuji	Orig. Price: \$150 Discount Price: \$120
----------	---	-------------------------------	--

[More info](#) [Compare](#)

Figure 3.5 First Product Page of a Website with Personalized Order Manipulation

Questions from Your Shopping Advisor

Dear Customer ,

The coupon code you just entered is valid for the purchase of one of the digital cameras at discounted price.

I will help you find an appropriate camera by asking you a few questions about your product-related needs. Please reply to all of these questions.

1. Brand

Please indicate one or more brands that you prefer

<input type="checkbox"/> Casio	<input type="checkbox"/> Fuji	<input type="checkbox"/> Kodak	<input type="checkbox"/> Nikon
<input type="checkbox"/> Olympus	<input type="checkbox"/> Panasonic	<input type="checkbox"/> Pentax	<input type="checkbox"/> Samsung

How important is this criterion to you?
 1 2 3 4 5 6 7 8 9 10
 Not Important Very Important

2. Optical Zoom

What type of photos will you be taking most of the time?

- 1) Photos of friends and family in parties or social situations
- 2) Outdoor photos (e.g., scenery, architecture, wildlife), in addition to photos of friends and family
- 3) No preference

How important is this criterion to you?
 1 2 3 4 5 6 7 8 9 10
 Not Important Very Important

3. Resolution

Figure 3.6 Preference-Elicitation Interface of a Website with Personalized Order Manipulation

Warning. For participants assigned to groups with warning, a warning message is displayed right before the shopping task about potential deceptive tactics used by online merchants to mislead consumers in product consideration and choice. The warning message states that:

When shopping at any e-commerce website, be aware that some online companies may employ deceptive tactics to influence consumers' product consideration and product choice. Federal Trade Commission is warning consumers to use caution when shopping online.

The warning message is not part of the e-commerce website. Rather, participants are asked to read the message before they access the e-commerce website. It was designed to be the kind of message that could be built into browsers and displayed when consumers visit e-commerce stores.

3.4.2 Measurement of Dependent Variables and Control Variables

Consumers' *product choice* was operationalized as the selection of one of the promoted products as final choice and thus was a binary variable. It was captured objectively with computer logs.

All the dependent variables and the control variables were 7-point scales adapted from prior research, as shown in Table 3-3, and validated via several rounds of pilot testing.

Table 3.3 Measurement Items for Dependent Variables and Control Variables

	Measures	Adapted From
Dependent Variables		
Perceived deceptiveness of the e-commerce website	<ul style="list-style-type: none"> ▪ Overall, I believe that ForeverCam.com is misleading ▪ Overall, I believe that ForeverCam.com is deceptive ▪ Overall, I believe that ForeverCam.com is biased 	Grazioli and Jarvenpaa (2000)
Perceived risk of shopping at the e-commerce website	<ul style="list-style-type: none"> ▪ There is considerable risk involved in shopping at ForeverCam.com ▪ There is considerable risk involved in shopping at ForeverCam.com ▪ Shopping at ForeverCam.com could lead to undesirable consequences 	Glover and Benbasat (2006)

Table 3.3 Measurement Items for Dependent Variables and Control Variables

	Measures	Adapted From
Feeling of violation	<ul style="list-style-type: none"> ▪ I feel a great deal of disappointment toward ForeverCam.com ▪ I feel a great deal of frustration toward ForeverCam.com ▪ I feel a great deal of anger toward ForeverCam.com 	Morrison and Robinson (Morrison & Robinson, 1997; Robinson & Morrison, 2000)
Attitude toward shopping at the e-commerce website	<ul style="list-style-type: none"> ▪ Buying digital cameras at ForeverCam.com is a good idea ▪ The idea of buying digital cameras at ForeverCam.com is appealing ▪ I like the idea of buying digital cameras at ForeverCam.com ▪ Buying digital cameras at ForeverCam.com would be advisable 	Ajzen & Fishbein (1980) Davis (1989)
Intention to shop at the e-commerce website	<ul style="list-style-type: none"> ▪ I intend to visit ForeverCam.com the next time I need a digital camera. ▪ I would consider buying from ForeverCam.com the next time I need a digital camera. ▪ I would consult ForeverCam.com the next time I want to buy a digital camera. ▪ I would recommend ForeverCam.com to others who look to purchase digital cameras. 	Jarvenpaa et al. (1999)
Control Variables		
Truth bias	<ul style="list-style-type: none"> ▪ I think other people are generally honest ▪ I tend to believe that other people are telling the truth ▪ Overall, people are truthful 	Stiff, Kim, & Ramesh (1992)
Motivation – Involvement with Product	<ul style="list-style-type: none"> ▪ Digital cameras are important to me ▪ Digital cameras mean a lot to me ▪ Digital cameras do not matter to me ▪ Digital cameras are significant to me 	Zaichkowsky (1985)

Table 3.3 Measurement Items for Dependent Variables and Control Variables

	Measures	Adapted From
Motivation – Involvement with Purchase Decision	<ul style="list-style-type: none"> ▪ In selecting from the many types and brands of digital cameras available in the market, I would care a great deal as to which one I buy ▪ It is extremely important to me to make a right choice of digital cameras ▪ In making my selection of digital cameras, I am very much concerned about the outcome of my choice 	Mittal (1989)
Product expertise	<ul style="list-style-type: none"> ▪ I do not feel very knowledgeable about digital cameras ▪ I know a lot about digital cameras ▪ Compared to most other people, I know more about digital cameras ▪ When it comes to digital cameras, I really do not know a lot 	Wang (2005)

3.4.3 Sample

Participants for Study 1 were 246 e-commerce shoppers recruited from a North American panel maintained by a marketing research firm, which specializes in market research sampling and custom panel recruitment. The sample size ensured a 0.8 power for the required hypothesis tests to detect a medium effect of 0.20. An invitation to participate in the study was broadcast by the marketing research firm via e-mail to members of the panel. Individuals were provided with point-based incentive (redeemable for various prizes) for their assistance in the study available through the marketing firm.

3.4.4 Experimental Task and Procedures

All participants were randomly assigned to one of the twelve experimental groups. They were told that a limited selection of digital cameras was currently on sale at an online camera store. They were asked to visit the online camera store, explore the alternatives, and choose a digital

camera as gift for a close friend. They were also informed that, at the end of the task session, they would be asked to provide an evaluation of the e-commerce website. Time was not limited.

To motivate participants to take both the shopping task and the evaluation task seriously, participants were informed before the experiment that the top 25% performers in justifying their product choices would be entered into a draw to get one of twelve \$50 gift certificates to be used towards the purchase of their chosen products.

Participants were first asked to complete a short questionnaire that collected demographic data (e.g., age, gender) and background information (e.g., level of experience with computers and online shopping, pre-existing trust in e-commerce websites, pre-existing risk perception regarding online shopping) and data on the three control variables—*truth bias*, *motivation*, and *product expertise*. They were then asked to read a tutorial on how to navigate their assigned e-commerce website. Next, they were asked to read a tutorial on digital camera attributes and complete a quiz aimed at testing their understanding of important digital camera attributes. After that, participants were asked to read task instructions and then click on a “Start Shopping” button that would take them to their assigned e-commerce website. For participants in the *warning* condition, when they clicked on “Start Shopping” button, a warning message would be displayed. For both the *warning* and *no warning* conditions, participants’ risk perception regarding online shopping was again measured before the start of the shopping task⁶. Participants then proceeded with the shopping task at their assigned e-commerce website. Upon the completion of the shopping task, participants were asked to fill out a questionnaire that included the measures of the dependent variables.

3.5 DATA ANALYSIS AND RESULTS

This section begins by reporting demographic data about participants in the experiment. Manipulation check results are reported in section 3.5.2. Cross-tab analyses were conducted to

⁶ Note that, for the *warning* condition, participants’ risk perception regarding online shopping was measured again after the showing of the warning message and before the start of the shopping task.

test the effects of *content manipulation* and *order manipulation* on participants' product *choice* (section 3.5.4.1). ANCOVA analyses, with *truth bias*, *motivation*, and *product expertise* as control variables, were conducted to test the effects of *content manipulation* and *order manipulation* on *perceived deceptiveness of the e-commerce website*, respectively, as well as the moderating effect of *warning* (section 3.5.4.2).

Partial Least Squares (PLS), as implemented in SmartPLS 2.0.M3, was used to assess the measurement properties of the dependent variables and the relationships among the perceptual variables (i.e., *perceived deceptiveness*, *perceived risk*, *feeling of violation*, *attitude*, and *intention*). The measurement properties of the dependent variables are presented in section 3.5.3 and the results of the structural model are reported in section 3.5.4.3. PLS was chosen over LISREL for two main reasons (Barclay, Thompson, & Higgins, 1995). First, to our knowledge, Study 1 is the first study to examine the effects of *perceived deceptiveness* on both *perceived risk* and *feeling of violation*, thus the focus is on theory-development rather than theory-testing. Second, the sample size (N=246) is enough for PLS analysis, whereas a larger sample is needed for LISREL.

3.5.1 Demographic Data

Table 3-4 outlines the characteristics of the participants who volunteered in the experiment. More females participated in the study than males. The majority of the participants were between 30-49 years old. Over 50% of the participants use the Internet for at least 20 hours each week. Also, more than half of the participants made at least five purchases online during the past 12 months. The demographic profile of the participants is similar to that of online shoppers reported elsewhere (e.g., Pew-Internet, 2008, 2009).

Table 3.4 Demographic Data

	# of Participants	Percentage
Gender		
Male	107	43.5
Female	139	56.5
Age		
19-29	38	15.4
30-49	153	62.2
50-64	55	22.4
65 and up	0	0
Internet Usage		
Less than 1 hour per week	1	0.4
1-5 hours per week	6	2.4
6-10 hours per week	28	11.4
11-20 hours per week	76	30.9
More than 20 hours per week	135	54.9
Online Shopping Experience		
No online purchase in the past 12 months	33	13.4
Made 1 purchase online in the past 12 months	20	8.1
Made 2-4 purchases online in the past 12 months	56	22.8
Made 5-10 purchases online in the past 12 months	62	25.2
Made more than 10 purchases online in the past 12 months	75	30.5

3.5.2 Manipulation Checks

Manipulation checks were conducted (see Table 3-5) for the three experimental treatments.

Content manipulation. ANOVA results (see Table 3-6) show that the treatment for content manipulation was successful. Participants' perception of the extent to which their assigned website provided a range of values, rather than an absolute value, for some digital camera features was significantly higher in the *content manipulation* condition than in the *no content manipulation* condition ($M = 6.16$ vs. 4.34 , $F(1, 244) = 91.42$, $p < 0.001$).

Order manipulation. Results of cross-tab analysis (see Table 3-7) show that the treatment for *order manipulation* was successful. It was significantly more likely for the first three products viewed or compared by participants to be promoted products in the two *order manipulation* conditions than in the *no order manipulation* condition (92.7% vs. 9.8%, $\chi^2(1, N = 246) = 165.34$, $p < 0.001$).

Table 3.5 Manipulation Checks

Experimental Treatment	Manipulation Check	Statistical Test
Content Manipulation	<p>Measured subjectively with the following item:</p> <p>"I have noticed that, for certain product features (e.g., optical zoom, resolution), ForeverCam.com provides a range of values (e.g., "5 to 7") rather than an absolute value (e.g., "5", "6", or "7")"</p>	ANOVA
Order Manipulation (Non-Personalized and Personalized)	<p>Captured objectively (with computer logs):</p> <p>Whether the first three products viewed/compared by the participant during the shopping task were all promoted products.</p>	Cross-Tab Analysis

Table 3.5 Manipulation Checks

Experimental Treatment	Manipulation Check	Statistical Test
Personalized Order Manipulation	Measured subjectively with the following two items : <ul style="list-style-type: none">▪ “I have noticed that, at ForeverCam.com, there is a Shopping Advisor that helps consumers evaluate and choose digital cameras”▪ “I am aware that ForeverCam.com provides a Shopping Advisor to help consumers make purchase decisions”	ANOVA
Warning	Measured subjectively with the following three items (presented before and after the showing of the warning message): <ul style="list-style-type: none">▪ There is considerable risk involved in shopping online▪ There is a high potential for loss involved in shopping online▪ Shopping online could lead to undesirable consequences	ANCOVA

Personalized order manipulation. ANOVA results (see Table 3-6) show that the treatment for *personalized order manipulation* was successful. Participants in the personalized order manipulation condition had significantly higher awareness of the presence of a shopping advisor than those in the *non-personalized order manipulation* condition or the no order manipulation condition ($M = 5.96$ vs. 4.30 , $F(1, 244) = 54.18$, $p < 0.001$).

Warning. ANCOVA results (see Table 3-6) show that, controlling for participants' pre-existing risk perceptions regarding shopping online, those provided with the warning message perceived online shopping to be significantly more risky than those not provided with such a message ($M = 4.60$ vs. 4.15 , $F(1, 243) = 18.27$, $p < 0.001$).

Table 3.6 ANOVA/ANCOVA Results for Manipulation Checks

ANOVA Results (DV: Perceived Value Range)					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Content Manipulation	203.967	1	203.967	91.417	.000
Error	544.407	244	2.231		
ANOVA Results (DV: Presence of Shopping Advisor)					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Personalized Order Manipulation	150.927	1	150.927	54.180	.000
Error	679.700	244	2.786		
ANCOVA Results (DV: Perceived Risk of Online Shopping)					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Pre-Existing Risk Perception	307.219	1	307.219	468.490	.000
Warning	11.979	1	11.979	18.267	.000
Error	159.351	243	.656		

Table 3.7 Results of Cross Tab Analysis: Order Manipulation * First 3 Products
Viewed/Compared are All Promoted

			First 3 Products Viewed/Compared are All Promoted		Total
			No	Yes	
Order Manipulation	No	Count	74	8	82
		% within Order Manipulation	90.2%	9.8%	100.0%
	Yes	Count	12	152	164
		% within Order Manipulation	7.3%	92.7%	164.0
Pearson Chi-Square (1, N = 246) = 165.34, p = 0.000					

3.5.3 Measurement Model

All dependent variables, except for objective measures, were modeled as reflective constructs. The descriptive data of the dependent variables and control variables are shown in Table 3-8. Individual item reliability, internal consistency, and discriminant validity were examined following the approaches to testing measurement models in PLS suggested by Barclay et al. (1995) and Gefen and Straub (2005). Individual item reliability was examined by the loadings of measures with their corresponding construct (Table 3-10). All of the loadings exceed 0.7, indicating good item reliability.

Internal consistency was assessed by examining the composite reliability index developed by Fornell and Larcker (1981), a measure of reliability similar to Cronbach's alpha. Both composite reliability and Cronbach's alpha are reported in Table 3-9. The benchmark for acceptable

reliability is 0.7. All constructs met this criterion, indication that the measures have good internal consistency.

Table 3.8 Means and Standard Deviations of Dependent and Control Variables

	Mean	Std. Deviation
Dependent Variables		
Perceived deceptiveness of the e-commerce website	2.21	1.24
Perceived risk of shopping at the e-commerce website	2.99	1.34
Feeling of violation	2.05	1.35
Attitude toward shopping at the e-commerce website	5.05	1.34
Intention to shop at the e-commerce website	5.12	1.47
Control Variables		
Truth bias	4.76	1.18
Product expertise	4.19	1.60
Involvement with Product	5.29	1.36
Involvement with Purchase Decision	5.77	1.05

Table 3.9 Internal Consistencies, AVEs, and Correlations of Constructs

	Cronbach's Alpha	Internal Consistency	1	2	3	4	5	6	7	8	9
1. Attitude	0.974	0.981	0.926								
2. Feeling of Violation	0.913	0.945	-0.635	0.853							
3. Intention	0.961	0.972	0.849	-0.643	0.896						
4. Perceived Deceptiveness	0.954	0.970	-0.688	0.759	-0.670	0.915					
5. Perceived Risk	0.920	0.949	-0.689	0.610	-0.633	0.652	0.862				
6. Product Expertise	0.945	0.950	0.065	-0.038	0.098	-0.060	-0.143	0.862			
7. Product Involvement	0.954	0.967	0.173	-0.072	0.194	-0.104	-0.158	0.511	0.879		
8. Purchase Involvement	0.920	0.961	0.153	-0.122	0.214	-0.114	-0.187	0.325	0.581	0.879	
9. Truth Bias	0.919	0.948	0.125	-0.052	0.058	-0.101	-0.163	0.060	0.056	0.037	0.858

Note: The scores in the diagonal of the matrix are square root of Average Variance Extracted (AVEs) while the lower triangle represents the correlations between constructs.

Table 3.10 Loadings and Cross-Loadings of Measures

	ATT	FOV	INT	PD	ProExp	ProdInv	PurInv	Risk	TBias
ATT1	0.971	-0.623	0.818	-0.661	0.818	0.162	0.138	-0.681	0.124
ATT2	0.969	-0.613	0.823	-0.676	0.823	0.177	0.145	-0.651	0.113
ATT3	0.956	-0.619	0.829	-0.660	0.829	0.180	0.195	-0.660	0.114
ATT4	0.954	-0.591	0.799	-0.651	0.799	0.146	0.112	-0.662	0.130
FOV1	-0.650	0.956	-0.661	0.751	-0.661	-0.044	-0.076	0.590	-0.041
FOV2	-0.595	0.934	-0.604	0.707	-0.604	-0.068	-0.115	0.554	-0.056
FOV3	-0.505	0.879	-0.504	0.639	-0.504	-0.093	-0.156	0.546	-0.049
INT1	0.798	-0.593	0.939	-0.618	0.085	0.204	0.192	-0.550	0.069
INT2	0.819	-0.595	0.948	-0.635	0.113	0.193	0.190	-0.634	0.078
INT3	0.762	-0.632	0.943	-0.641	0.080	0.152	0.209	-0.585	0.036
INT4	0.831	-0.615	0.956	-0.641	0.092	0.185	0.218	-0.625	0.033
PD2	-0.677	0.747	-0.664	0.966	-0.076	-0.102	-0.128	0.631	-0.084
PD3	-0.654	0.734	-0.636	0.964	-0.042	-0.101	-0.110	0.629	-0.106
PD4	-0.643	0.698	-0.623	0.941	-0.053	-0.094	-0.087	0.610	-0.102
ProExp1	0.123	-0.043	0.148	-0.051	0.934	0.515	0.376	-0.157	0.100
ProExp2R	0.030	0.009	0.067	-0.018	0.935	0.483	0.297	-0.095	0.060
ProExp3	0.042	-0.027	0.119	0.006	0.790	0.506	0.423	-0.145	0.067
ProExp4R	0.023	-0.042	0.062	-0.066	0.967	0.473	0.275	-0.135	0.026
ProInv1	0.170	-0.047	0.188	-0.086	0.464	0.949	0.583	-0.148	0.110
ProInv2	0.157	-0.077	0.162	-0.092	0.469	0.949	0.531	-0.132	0.080
ProInv3R	0.136	-0.076	0.165	-0.114	0.498	0.903	0.494	-0.151	-0.045
ProInv4	0.192	-0.066	0.216	-0.091	0.475	0.948	0.578	-0.160	0.090
PurInv1	0.146	-0.124	0.202	-0.105	0.302	0.546	0.959	-0.178	0.045
PurInv2	0.149	-0.111	0.209	-0.113	0.322	0.570	0.965	-0.182	0.027
Risk1	-0.613	0.537	-0.592	0.606	-0.178	-0.158	-0.193	0.929	-0.167
Risk2	-0.664	0.593	-0.587	0.617	-0.138	-0.134	-0.190	0.932	-0.134
Risk3	-0.642	0.569	-0.584	0.592	-0.084	-0.150	-0.136	0.924	-0.154
TBias2	0.131	-0.043	0.054	-0.113	0.027	0.019	-0.018	-0.156	0.947
TBias3	0.090	-0.026	0.038	-0.069	0.048	0.067	0.078	-0.111	0.889
TBias4	0.118	-0.073	0.065	-0.091	0.099	0.080	0.067	-0.177	0.942

Barclay et al. (1995) suggest two criteria for discriminant validity. First, the square root of AVE of a construct should be greater than the correlations of the construct with other constructs, thus indicating that the construct shares more variance with its own measures than it shares with other constructs in a model. This criterion is satisfied by the current data, as demonstrated in Table 3-9. Second, no item should load higher on a construct other than the one it intends to measure. The loadings and cross-loadings of measures are shown in Table 3-10. An examination of the matrix reveals that all items satisfy this criterion. A more restrictive guideline suggests that there should be a minimum difference of 0.10 between item loadings and cross loadings (Gefen & Straub, 2005). In Table 3-10, all items satisfy this strict guideline for establishing discriminant validity.

3.5.4 Results of Hypothesis Tests

This section reports the results of the statistical tests conducted to test the hypotheses developed for Study 1.

3.5.4.1 Cross Tab Analyses

A series of cross-tab analyses were conducted to examine the effects of *content manipulation* and *order manipulation* on participants' *product choice*, operationalized as whether the participants' final choice was a promoted product or a dominant product.

First, a cross-tabulation of the *order manipulation* and *product choice* (see Table 3-11) reveals that the percentage of participants choosing one of the promoted products was higher for either *non-personalized* or *personalized order manipulation* condition than for the *no order manipulation* condition (80.5% and 91.5% vs. 52.4%, $\chi^2(2, N = 246) = 32.235, p < 0.001$), with participants assigned to websites with *personalized order manipulation* having the highest percentage of choosing the promoted products.

Table 3.11 Results of Cross Tab Analysis: Order Manipulation * Product Choice

		Product Choice		Total
Order Manipulation	No Order Manipulation	Count	39	43
		% within Order Manipulation2	47.6%	52.4%
	Non-Personalized Order Manipulation	Count	16	66
		% within Order Manipulation2	19.5%	80.5%
	Personalized Order Manipulation	Count	7	75
		% within Order Manipulation2	8.5%	91.5%
Pearson Chi-Square (2, N = 246) = 32.235, <i>p</i> = 0.000				

Additional cross-tab analyses with reduced data set have confirmed the significant difference in participants' likelihood to choose promoted products between the *non-personalized order manipulation* condition and the *no order manipulation* ($\chi^2(1, N = 164) = 26.885, p < 0.001$) as well as between the *personalized order manipulation* condition and the *non-personalized order manipulation* condition ($\chi^2(1, N = 164) = 7.493, p < 0.01$). Thus, H1 and H2 are supported.

A cross-tabulation of the *content manipulation* and *product choice* does not reveal significant effect for *content manipulation* ($\chi^2(1, N = 246) = 2.667, p > 0.1$) (see Table 3-12). However, further analysis at different levels of order manipulation shows that, when there was *no order manipulation*, content manipulation did have significant effect on participants' product choice ($\chi^2(1, N = 82) = 3.947, p < 0.05$) (see Table 3-13). The results of the analysis suggest the existence of an interaction effect – *content manipulation* did exert influence on participants' product choice when *order manipulation* was absent but the effect was overridden when *order manipulation* was present. Thus, H3 is partially supported.

Table 3.12 Results of Cross Tab Analysis: Content Manipulation * Product Choice

		Product Choice		Total
		Dominant Product	Promoted Product	
Content Manipulation	No Content Manipulation	Count	46	77
		% within Order Manipulation2	37.4%	62.6%
	Content Manipulation	Count	34	89
		% within Order Manipulation2	27.6%	72.4%
Pearson Chi-Square (1, N = 246) = 2.667, p = 0.102				

3.5.4.2 ANCOVA Analyses

The ANCOVA results for the impact of *content manipulation*, *order manipulation* and *warning* on *perceived deceptiveness of the e-commerce website* are show in Table 3-14. Neither *content manipulation* nor *order manipulation* has significant effect on *perceived deceptiveness of the e-commerce website*. The only significant main effect is from *warning*. However, no moderating effect is found for *warning*, contrary to our expectation. The results suggest that, compared to those not warned, participants who were warned of potential deception by online retailers were more likely to perceive a website as deceptive, regardless of whether the website was indeed deceptive or not. The provision of *warning* seems to have increased *hit* rate in deception detection at the cost of increased *false alarms*. Thus, while H4 and H6 are not supported, H5 and H7 are partially supported. None of the control variables has significant effect on *perceived deceptiveness of the e-commerce website* and thus they were excluded in further analysis.

Table 3.13 Results of Cross Tab Analysis: Content Manipulation * Product Choice at Different Levels of Order Manipulation

		Product Choice		Total
		Dominant Product	Promoted Product	
No Order Manipulation	No Content Manipulation	Count	34	12
		% within Order Manipulation2	73.9%	26.1%
	Content Manipulation	Count	19	17
		% within Order Manipulation2	52.8%	47.2%
Pearson Chi-Square (1, N = 82) = 3.947, p = 0.047				
Non-Personalized Order Manipulation	No Content Manipulation	Count	10	28
		% within Order Manipulation2	26.3%	73.7%
	Content Manipulation	Count	10	34
		% within Order Manipulation2	22.7%	77.3%
Pearson Chi-Square (1, N = 82) = 0.142, p = 0.706				
Personalized Order Manipulation	No Content Manipulation	Count	2	37
		% within Order Manipulation2	5.1%	94.9%
	Content Manipulation	Count	5	38
		% within Order Manipulation2	11.6%	88.4%
Pearson Chi-Square (1, N = 82) = 1.107, p = 0.293				

Table 3.14 ANCOVA Results (DV: Perceived Deceptiveness of the E-Commerce Website

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Purchase Involvement	.251	1	.251	.169	.681
Product Involvement	2.875	1	2.875	1.934	.166
Product Expertise	1.046	1	1.046	.703	.402
Truth Bias	1.623	1	1.623	1.092	.297
Content Manipulation	3.897	1	3.897	2.621	.107
Order Manipulation	1.120	2	.560	.377	.687
Warning	10.233	1	10.233	6.884	.009
Content Manipulation * Order Manipulation	6.332	2	3.166	2.130	.121
Content Manipulation * Warning	.041	1	.041	.028	.868
Order Manipulation * Warning	2.547	2	1.274	.857	.426
Content Manipulation * Order Manipulation * Warning	.107	2	.054	.036	.965
Error	341.921	230	1.487		

3.5.4.3 Results of PLS Analysis

Figure 3-7 shows the results of the PLS analysis.

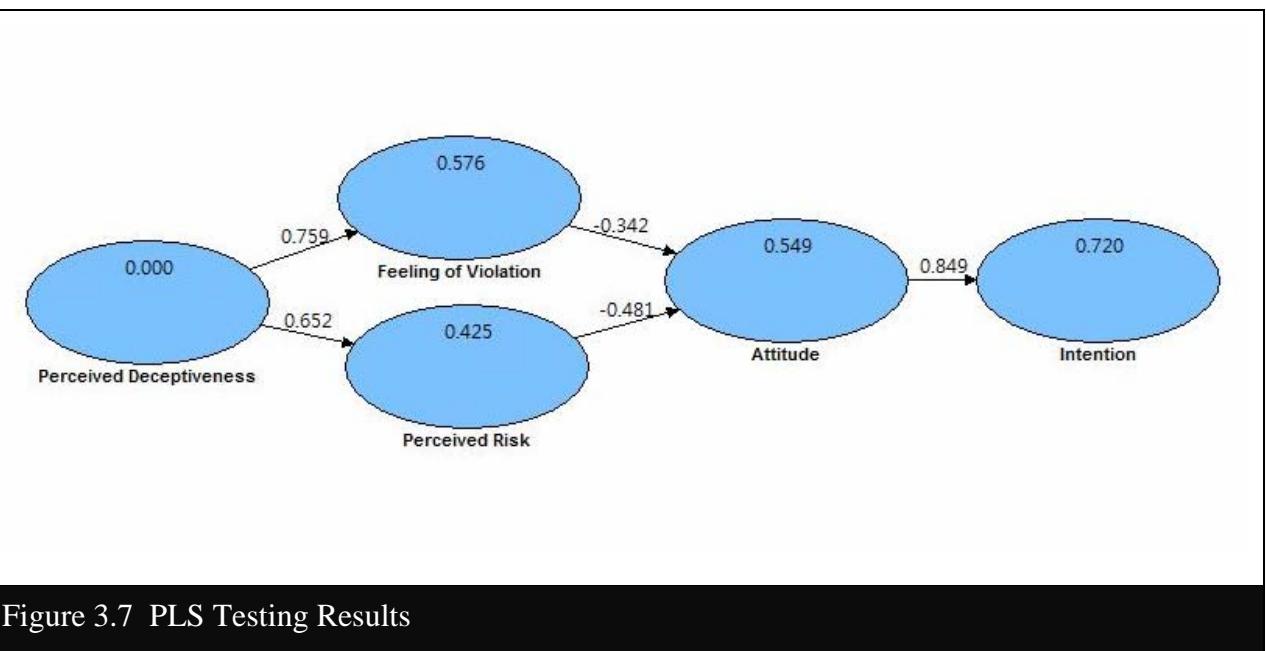


Figure 3.7 PLS Testing Results

In support of H8-H9, the results of the PLS reveal that *perceived deceptiveness of the e-commerce website* has significant positive effect both on *perceived risk of shopping at the e-commerce website* ($\beta = 0.652, p < 0.001$) and on *feeling of violation* ($\beta = 0.759, p < 0.001$).

Both *perceived risk* and *feeling of violation* exert significant impact on *attitude toward shopping at the e-commerce website* ($\beta = -0.481, p < 0.01$ and $\beta = -0.342, p < 0.01$, respectively), jointly explaining 54.9% of the variance in *attitude*. Thus, H10 and H11 are supported.

Finally, in support of H12, *attitude* exerts significant positive effect on *intention to shop at the e-commerce website* ($\beta = 0.849, p < 0.001$).

A summary of the results of the hypothesis tests is provided in Table 3-15.

Table 3.15 A Summary of Hypothesis Testing Results

Hypothesis	Supported?
H1: Compared to those shopping at a website with <i>no order manipulation</i> , consumers shopping at website with <i>order manipulation</i> (either <i>non-personalized</i> or <i>personalized</i>) will be more likely to <i>choose</i> promoted products.	Yes
H2: Compared to those shopping at a website with <i>non-personalized order manipulation</i> , consumers shopping at website with <i>personalized order manipulation</i> will be more likely to <i>choose</i> promoted products.	Yes
H3: Compared to those shopping at a website with <i>no content manipulation</i> , consumers shopping at website with <i>content manipulation</i> will be more likely to <i>choose</i> promoted products.	Partially
H4-H5: Compared to those shopping at a website with <i>no content manipulation</i> , consumers shopping at website with <i>content manipulation</i> will perceive the website to be more <i>deceptive</i> (H4), particularly when consumers are <i>warned</i> of potential deception in e-commerce websites (H5).	H8: No
	H9: Partially
H6-H7: Compared to those shopping at a website with <i>no order manipulation</i> , consumers shopping at website with <i>order manipulation</i> (either <i>non-personalized</i> or <i>personalized</i>) will perceived the website to be more <i>deceptive</i> (H6), particularly when consumers are <i>warned</i> of potential deception in e-commerce websites (H7).	H10: No
	H11: Partially
H8: Consumers' <i>perceived deceptiveness of the e-commerce website</i> will positively influence their <i>perceived risk of shopping at the e-commerce website</i> .	Yes
H9: Consumers' <i>perceived deceptiveness of the e-commerce website</i> will positively influence their <i>feeling of violation</i> .	Yes
H10-11: Consumers' <i>perceived risk of shopping at the e-commerce website</i> (H10) and the <i>feeling of violation</i> experienced by them (H11) will negatively influence their <i>attitude toward shopping at the e-commerce website</i> .	Yes
H12: Consumers' <i>attitude toward shopping at the e-commerce website</i> will positively influence their <i>intention to shop at the e-commerce website</i> .	Yes

3.6 CONCLUSION AND DISCUSSION

This section summarizes the major findings of Study 1, presents its limitations, and discusses its contributions to research and practice.

3.6.1 Discussion of Findings

This experimental study provides strong evidence that consumers are vulnerable to content manipulation and order manipulation performed by online retailers. Consumers' product *choice* at e-commerce website was influenced by deceptive manipulations performed on the *content* of product detail information as well as those performed on the *order* in which products are displayed influences. In particular, consumers' product *choice* are strongly influenced by *personalized* order manipulation, a novel type of deception made possible by technology supporting e-commerce.

Contrary to hypothesized outcomes, the results of this study show that consumers are not competent in detecting deception. In addition, while the provision of *warning* message has increased the *hit* rate in deception detection, warning has also increased *false alarms*. This result is consistent with prior research in deception detection (e.g., Biros, George, & Zmud, 2002; Burgoon et al., 1994; Parasuraman, 1984). Since aroused suspicion places consumers in a heightened state of alert (Biros et al., 2002), explicit warning about deception may have resulted in greater likelihood for them to both uncover deception when it does exist and report deception when it does not exist (Burgoon et al., 1994; Parasuraman, 1984). The results suggest that warning as a counter-deception mechanism should be used with caution – it should only be deployed in situations where the benefits of *hits* outweigh the costs of *false alarms*.

The results of this study show that, as hypothesized, when consumers *perceive* the e-commerce website to be *deceptive*, their *perception of risk* associated with shopping at the website is heightened and intense *feeling of violation* arises. Consumers' *perceived risk* and *feeling of violation* jointly influence their *attitude* and *intention* regarding shopping at the e-commerce website.

3.6.2 Limitations and Future Research

Before discussing the contributions of Study 1, we first consider its limitations. First, the study only examines a very small subset of the deception techniques presented in the typology of product-related deceptive information practices in Chapter 2. Thus, the application of this study's findings to other types of deception techniques requires caution. Other deception techniques may have differential effect on consumers' product consideration, product choice, and their perception of website deceptiveness, hence additional research is needed.

Second, this study operationalizes *warning* as a simple message alerting consumers to potential deceptive tactics used by online merchants to mislead consumers in product consideration and choice. Future research may explore different design characteristics (e.g., content, framing) of warning messages and examine their effect on consumers' deception detection performance.

Third, for *personalized order manipulation*, this study implements a needs-based PRA that uses a compensatory-additive decision strategy in recommending products. However, the PRA can be designed in other ways. For instance, the preference-elicitation questions can be feature-based rather than needs-based (Felix, Niederberger, Steiger, & Stolze, 2001). Also, the PRA can be designed to use an elimination-by-aspect decision strategy rather than a compensatory-additive decision strategy (Wang & Benbasat, 2009). Thus, another potential research topic is to explore the effects of different PRA designs on consumers' product choice as well as on their perception of the website deceptiveness.

Lastly, the relationship between *perceived deceptiveness* and *product choice* would be interesting to explore in future studies. When consumers become suspicious of the online company's deceptive intent, they may not be influenced by product-related information presented at the e-commerce website. As a result, they will be less likely to choose the promoted products (or any product) from the e-commerce website. The design of this study (which required participants to

choose a product whether they perceived deception or not) made it impractical to examine this relationship.

3.6.3 Contribution to Research and Practice

Notwithstanding these limitations, Study 1 makes significant contributions to research and practice. The main contribution to IS research is an understanding of consumer vulnerability to different types of deceptive manipulations in e-commerce product websites.

To our knowledge, this is the first study that explicitly examines consumer vulnerability to different types of deceptive manipulation in e-commerce product websites. The study enhances our understanding of the phenomenon of e-commerce deception and serves as a basis for future empirical as well as theoretical work. This is also the first study that tests a model of e-commerce deception that includes *perceived risk* and *feeling of violation* as cognitive and affective consequences of *perceived website deceptiveness* and predictors of consumers' overall *attitude* toward shopping at the e-commerce website.

Consistent with prior research in e-commerce deception (Grazioli, 2004; Grazioli & Jarvenpaa, 2000, 2001, 2003a, 2003b; Grazioli & Wang, 2001), Study 1 shows that consumers are extremely vulnerable to deception perpetrated by online companies. However, Study 1 contributes above and beyond earlier ones by empirically examining the differential effects of various deception tactics (i.e., content manipulation, non-personalized order manipulation, and personalized order manipulation) on consumers' *product choice* (observed objectively) while shopping at the e-commerce website, in addition to obtaining consumers' subjective evaluation of the deceptiveness of the e-commerce website. The results of study not only enhance the understanding of the way in which different types of product-related e-commerce deception influences different stages of consumer decision making but also make significant contribution to practice. First, they can help government agencies devise strategies and solutions to combat not only deception performed on the *content* of product information but also that performed on the sequential *order* in which products are displayed at e-commerce website, particularly when

consumers hold certain expectations as to how the products are ordered at the website (e.g., when they expect that products are arranged in order of decreasing popularity or relevance). Second, they provide valuable input to consumer advocacy organizations in their effort to raise consumer awareness of deception in e-commerce and educate consumers about different types of deceptive manipulations.

An additional contribution of this study to practice is the finding that personalized order manipulation using PRA has the greatest impact on consumers' product choice. The study demonstrates that PRAs do have the potential to influence consumer decision making to their detriment. It is thus important for government agencies (e.g., the Federal Trade Commission in the United States, the Office of Consumer Affairs in Canada), industry leaders (e.g., Amazon, Expedia, Dell), and consumer organizations (e.g., National Consumers League in the United States, Consumers' Association of Canada) to not only promote consumer awareness of such novel deception made possible by innovative technologies supporting e-commerce but also to establish guidelines for good business practice for online companies. For example, a guideline might recommend that, in addition to providing an explanation regarding the PRA's reasoning logic, a website featuring a PRA should provide a fit score for each product (in the recommendation list) and detailed explanation as to how the score is calculated. The guideline might also require the e-commerce website to implement functionalities that allow consumers to sort/search/compare all products (not only those in the recommendation list) by brand, price, and important product features; such functionalities would enable consumers to detect anomalies resulting from deception more easily. Strong, enforceable self-regulation and self-policing by industry members are critical to addressing the growing problem of e-commerce deception. After all, deception affects not only consumers but also honest businesses online – if consumers are reluctant to make purchases online for fear of deception, online businesses as a whole suffer from loss in sales and reputation.

Finally, the warning mechanism examined in this study (i.e., a message containing explicit warning about possibility of deception) represents a counter-deception mechanism that could be readily implemented as a browser plug-in and triggered when consumers navigate to unsecured or non-reputable e-commerce websites. At such websites, where the danger of deception is real

and the results are often deplorable, boosting hit rate may be more important than reducing false alarm rate. However, when consumers visit websites against which there are no valid complaints, the warning message should **not** be triggered, because of its potential to over-sensitize consumers, causing them to see deception when there is none. In the end, the purpose of any counter-deception mechanism is to protect consumers in e-commerce transactions rather than deterring them from engaging in e-commerce.

CHAPTER 4. EFFECTS OF WARNING MESSAGE CONTENT AND WARNING MESSAGE FRAMING ON CONSUMERS' PERFORMANCE IN DETECTING DECEPTION BY ONLINE PRODUCT RECOMMENDATION AGENTS (STUDY 2)

4.1 OVERVIEW

Study 1 has revealed that consumers are vulnerable to deceptive manipulations performed on the *content* of product information and the *order* in which products are displayed at e-commerce website. In particular, it has demonstrated the power of deceptive PRAs in influencing consumers' product choice. Moreover, Study 1 has examined the effectiveness of *warning* as a potential counter-deception tactic and found that explicit *warning* about potential deception in e-commerce website can enhance *hit* rate in deception detection at the cost of increased *false alarms*. Study 2 focuses on deception by PRAs and extends Study 1 in two aspects:

1. It explores the two sub-processes (or stages) of consumers' deception detection process, namely, the *noticing of anomaly* and the *attribution of noticed anomaly* and examines the effect of each sub-process on the final outcome of the detection process -- a determination of deceptiveness;
2. It investigates the effect of different warning message *content* and *framing* on consumers' performance in detecting deception. More specifically, it aims to answer two key questions: (1) Will the inclusion of risk-avoiding *advice* in a warning message enhance consumers' accuracy (i.e., high *hit* rate and low *false alarm* rate) in deception detection? (2) Will *negatively-framed* advice be more effective in enhancing detection accuracy than *positively-framed* advice?

An online experiment was conducted to investigate these two aspects. The results of the study show that when consumers notice anomalies in deceptive PRAs and, in particular, when they attribute the noticed anomalies to deception on the part of the PRAs, they are more likely to consider the PRA that they are using to be deceptive, suggesting that the *noticing of anomaly* and the *attribution of noticed anomaly* are the two sub-processes of deception detection, consistent

with the model of deception detection (Johnson, Grazioli, & Jamal, 1993; Johnson et al., 2001). The results of the study also show that the provision of explicit *warnings* about potential deception by PRA enhances consumers' deception detection performance in noticing anomalies and attributing anomalies by increasing the *hits* rate without at the same time increasing *false alarms*. More importantly, the provision of warning messages that include *negatively-framed* advice proves to be the most effective mechanism in supporting consumers' effort in detecting deception. Finally, consistent with Study 1, the results of Study 2 indicate that consumers who perceive the PRA as deceptive will have heightened *perception of risk of using the PRA* and intense *feeling of violation from using the PRA*, which jointly determine consumers' overall *attitude towards PRA* and subsequently, their *intention to use the PRA*.

To our knowledge, Study 2 is the first empirical study that examines and explicitly compares the effectiveness of different warning manipulations in supporting consumers during different stages of the deception detection process. It thus fills a void in the literature and contributes not only to a better understanding of the phenomenon of e-commerce deception but also to the concerted effort by government agencies, consumer protection organizations, and industry associations to combat online deception.

The remainder of this chapter is organized as follows. Section 4.2 presents prior research related to the current study. Section 4.3 develops hypotheses. The research method and results of hypothesis testing are reported in section 4.4 and 4.5, and the chapter concludes with a discussion of the results, limitations, and contributions of the study and some future research areas.

4.2 PRIOR RESEARCH

The section reviews prior research conceptualizing the processes of deception detection as well as research on the content and framing of warning messages.

4.2.1 Processes of Deception Detection

Prior research suggests that individuals solve the problem of detecting deception by identifying anomalies in an environment that has been manipulated by the deceiver, and by interpreting those anomalies in the light of the deceiver's adversarial goals (Dennett, 1987; Johnson et al., 1993).

The *model of deception detection*, an information processing model of deception detection, was introduced by Johnson and colleagues (Johnson et al., 1993; Johnson et al., 2001). The model describes four processes (i.e., *activation*, *hypothesis generation*, *hypothesis evaluation*, and *global assessment*) by which individuals, based on their domain knowledge and the available information cues, reach the determination that information provided by another party is deceptive (Grazioli, 2004).

The *activation* process (which corresponds to the *mental representation* component of diagnostic decision making) consists of allocating attention to cues, based on the presence of discrepancies between what is observed and what is expected. Individuals continuously compare the information cues that they observe in the environment with their expectations about these cues; a discrepancy between the two (e.g. a too-good-to-be-true offer) may be labeled as an anomaly and trigger subsequent interpretation processes (i.e., *hypothesis generation* and *hypothesis evaluation*) (Grazioli, 2004; Johnson et al., 1993; Johnson et al., 2001).

The *hypothesis generation* (which corresponds to the *hypothesis generation* component of diagnostic decision making) process is where individuals generate interpretive hypotheses to explain the anomalies detected during the activation process. Upon detecting an anomaly, individuals will often generate potential hypotheses or causes to explain the anomaly (Johnson et al., 2001; Koonce, 1993). Because human behavior is frequently amenable to different interpretations (e.g. Borkenau, 1986; Higgins, 1989), the same act can be quite often considered from multiple perspectives (Wojciszke, 2005). As such, several alternatives (e.g. deception, innocent mistakes, incompetence, etc.) are often available to explain the observed anomaly.

The *hypothesis evaluation* (which corresponds to the *information search* and *hypothesis evaluation* components of diagnostic decision making) process is where the hypotheses generated previously are evaluated to determine their acceptability. Once a plausible hypothesis has been generated, individuals will evaluate the hypothesis by searching for information relevant to the hypothesis (Koonce, 1993). The newly acquired information can either confirm or disconfirm the generated hypothesis. It can also result in a refinement of the originally generated hypothesis or the generation of additional hypotheses. Therefore, the two processes of hypothesis generation and hypotheses evaluation are sequential and iterative.

The *global assessment* process consists of combining the accepted hypotheses into a final assessment of deceptiveness (Johnson et al., 2001). At any time during an individual's interaction with another party, the individual may arrive at a global, integrated evaluation of that party (e.g. honest/deceptive). This global evaluation can either result from the iterative *hypothesis-generation hypothesis-evaluation* process triggered by the identification of an instance of anomaly or be based on a summarization of previously generated individual attributions (when multiple rounds of deception detection associated with different anomalies are involved).

In a similar vein, researchers in psychological contract breach⁷ in organizational settings (Morrison & Robinson, 1997; Robinson, 1996; Robinson & Morrison, 2000) have specified a two-stage model for detecting psychological contract breach, in which individuals *perceive* psychological contract breach before *attributing* it to purposeful renegeing, renegeing due to inability, or misunderstanding. In this model, the *hypothesis generation* and *hypothesis evaluation* sub-processes of the *model of deception detection* are combined into a single stage and the *global assessment* sub-process is omitted.

Informed by the *model of deception detection* (Johnson et al. 1992; 2001) and in line with the more parsimonious model for detecting psychological contract breach (Morrison & Robinson, 1997; Robinson, 1996; Robinson & Morrison, 2000), Study 2 focuses on two sequential sub-

⁷ Research in psychological contract breach is closely related to deception research in that deception can be considered as purposeful renegeing on a psychological contract whereas incompetence can be considered as renegeing due to inability.

processes of individuals' deception detection process, namely, the *noticing of anomaly* and the *attribution of identified anomaly*. Individuals' competence in noticing anomalies and in making proper attributions of such anomalies will likely help them perform better in deception detection (P. E. Johnson et al., 1993; P. E. Johnson et al., 2001).

4.2.2 Content and Framing of Warning Message

Prior research has revealed a number of different deception detection mechanisms (summarized in Table 4-1) that can be used to enhance consumers' deception detection performance. These mechanisms can be broadly categorized into *training* and *warning*.

Prior research (e.g., de Turck, Harszlak, Bodhorn, & Texter, 1990; B. M. DePaulo, Lassiter, & Stone, 1982; Zuckerman, Koestner, & Alton, 1984) suggests that *training* in deception detection will provide individuals with necessary knowledge to discriminate deception from non-deception and thus enhance their deception detection performance. While there exist some empirical studies (e.g., Garrido, Masip, & Herrero, 2004; Tilley, 2005; Vrij, Evans, Akehurst, & Mann, 2004) showing that training people how to identify and classify deceptive behaviors increased their ability to detect deception, others (e.g., Autrey, 2001; Biros, 1998; Biros et al., 2002) found that such effects also depended on additional factors such as the type and timing of training (e.g. ahead-of-time or just-in-time; generic or domain-specific) provided to individuals. However, unlike in a criminal investigation context or organizational context where police interrogators, company recruiting officers, or system users can receive formal training in detecting cues of deception in the confessions of suspects, resumes of applicants, or data in the system, it is costly to provide such training to individual consumers shopping online at different websites. Besides, there is no guarantee that everyone will have access to such training.

Table 4.1 Deception Detection Mechanisms Used in Prior Studies

Type of Mechanisms	Empirical Studies	Effect on Detection Performance
Training		
Watch list of possible fraudulent manipulations	Grazioli and Wang (2001)	No significant difference was found between the group that received the intervention and the one that did not.
	Autrey, 2001; Biros, 1998; Biros et al. (2002)	No significant effect on detection success
Training in cue recognition	Tilley (2005)	Training (one week before task) had significant effect on deception detection accuracy
	Garrido et al. (2004); Vrij et al. (2004)	Training people how to identify and classify deceptive behaviors increased their ability to detect deception,
Training + Warning	Biros, 1998; Biros et al. (2002)	Just-in-time training + warning – resulted in increased detection success but at the cost of increased false alarms
	Tilley (2005)	No significant effect on deception detection accuracy
Warning		
Explicit verbal warning	Biros, 1998; Biros et al. (2002); George, Marett, and Tilley (2004)	Warning resulted in better detection success without increasing false alarms
	George and Marett (2004); Marett and George (2005); Tilley (2005)	Warning had no effect on deception detection accuracy
FTC pamphlet on Internet fraud	Grazioli and Wang (2001)	No significant difference was found between the group that received the intervention and the one that did not.
Priming	Grazioli (2004)	This intervention significantly increased deception success without increasing false alarms

Existing evidence also indicates that individuals' ability to detect deception increases when their suspicion is aroused (G. R. Miller & Stiff, 1993; Parasuraman, 1984; Stiff et al., 1992). Explicit *warnings* about potential deceptive behaviors can arouse individuals' suspicion and induce their sensitivity to deception, thus increasing their likelihood to generate deception hypothesis. However, the positive effect of warning on deception detection accuracy has received mixed empirical support. Whereas Biros et al. (2002), Grazioli (2004), and George, Marett, and Tilley (2004) showed that suspicious receivers had a better chance to detect deception than unsuspicious ones, others (e.g. George & Marett, 2004; Grazioli & Wang, 2001; Marett & George, 2005) did not show positive influence of induced suspicion on deception detection accuracy. Study 1 (reported in Chapter 3) revealed that warning enhanced consumers' performance in detecting deception at the cost of increased false alarms. The mixed reports may be a result of the differential design of warning message in different studies. However, prior research in deception detection has focused on the presence or absence of warning messages on deception detection performance, without investigating design variables that affect the effectiveness of the warning messages, a gap that this research aims to fill.

In Study 2, we examine two design characteristics of warning message (i.e., the *content* and *framing* of warning message) and empirically investigate their effects on consumers' performance in detecting a deception PRA.

Content of Warning Message. In marketing literature, there is extensive research in the effectiveness of product warning messages (e.g., warning labels on tobacco packages). Consumer product warning is required by law to not only communicate clearly the nature and magnitude of the risk facing consumers but also provide recommendations or tips on how to avoid that risk (Kelley, Gaidis, & Reingen, 1989; Ross, 1981). The provision of such recommendations or tips on what consumers can do to avoid the negative consequences described in the warning message will enhance consumers' perceived self-efficacy (Celuch, Lust, & Showers, 1995; Strahan et al., 2002), that is, their "judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391). Consumers will be more likely to attempt to change their behavior (e.g., quit

smoking) if they believe they can succeed, that is, if they have a high level of perceived self-efficacy (Strahan et al., 2002).

In line with research in product warning messages, in a PRA-assisted online shopping context, a warning message will likely be more effective in enhancing consumers' deception detection performance if it also includes advices or tips on what actions consumers can take to avoid the risk of deception by PRA, in addition to a description of the risk itself. Therefore, Study 2 examines a type of warning message that not only alerts consumers to potential deception by online PRAs but also includes risk-avoiding advice that, when followed by consumers, can help them detect deception in PRAs

Framing of Warning Message. Message framing is a persuasive communication strategy aimed at motivating behavior through presentation of equivalent appeals or opinions framed in terms of either gains or losses (Gerend & Sias, 2009). Whereas a gain-framed appeal or opinion emphasizes the benefits of taking action, a loss-framed appeal or opinion emphasizes the costs of failing to take action (Gerend & Sias, 2009; Rothman, Bartels, Wlaschin, & Salovey, 2006). Drawing on Kahneman and Tversky's (1979) prospect theory, Rothman and Salovey (1997) propose that the influence of a given frame (i.e., gain-frame or loss-frame) on behavior depends on whether the behavior under consideration is perceived to be a risky or safe course of action. Since people are relatively open to taking risks when faced with potential loses (e.g., lives lost) but they tend to avoid risks in the face of potential gains (e.g., lives saved) (Kahneman & Tversky, 1979), loss-framed appeals or opinions are more effective in promoting behaviors thought to involve risks whereas gain-framed appeals or opinions work better in promoting behaviors associated with safety or certainty (Gerend & Sias, 2009; Rothman et al., 2006).

Levin, Schneider, and Gaeth (1998) have developed a typology to distinguish between three different kinds of framing – risky choice framing, attribute framing, and goal framing.

- In *risky choice framing*, introduced by Tversky and Kahneman (1981) and traditionally associated with the term “framing”, the outcomes of a potential choice involving options differing in level of risk are described in different ways (e.g., “1/3 chance 600 people will be saved” vs. “2/3 chance 600 people will die”). People are more likely to take risks

when options focus attention on the chance to avoid losses than when options focus on the chance to realize gains (Levin et al., 1998).

- In *attribute framing*, a single attribute within any given context is the subject of the framing manipulation (e.g., “75% lean” vs. “25% fat”). In this type of framing, attributes are judged more favorably when labeled in positive terms rather than negative terms (Levin et al., 1998).
- *Goal framing* is designed to influence the implicit goals that an individual adopts. In particular, the consequences of a particular behavior are specified in either positive or negative terms. A negatively framed message emphasizing losses tends to have a greater impact on a given behavior than a comparable positively framed message emphasizing gains (Levin et al., 1998).

Rothman and Salovey (2006; 1997) further explain that a behavior (or course of action) is considered risky or safe depending on the extent to which it is perceived to afford an unpleasant outcome. When people are considering a behavior (a *detection* behavior, for example, cancer screening or annual health checkup) that they perceive involves some risk of an unpleasant outcome (e.g., it may detect a health problem), loss-framed appeals or opinions should be more persuasive. In contrast, gain-framed appeals or opinions are more effective when people are considering a behavior (a *prevention* behavior, for example applying sunscreen or using mouth rinse) that they perceive involves a relative low risk of an unpleasant outcome (e.g., it prevents the onset of a health problem) (Rothman et al., 2006; Rothman & Salovey, 1997). Existing empirical evidence is largely supportive of Rothman and Salovey’s *detection-prevention* classification (See Rothman et al., 2006 for a review).

In Study 2, the risk-avoiding advice included in the warning message is framed either positively (emphasizing the *gain* or *positive* implication associated with following the advice) or negatively (emphasizing the *loss* or *negative* implication associated with not following the advice). Such framing falls into the category of *goal-framing*, since it aims to influence the implicit goals that consumers adopt.

4.3 HYPOTHESIS DEVELOPMENT

In this section, the research model for Study 2 is presented and the hypotheses developed based on the research model are introduced.

4.3.1 Research Model

The research model for Study 2 is presented in Figure 4-1.

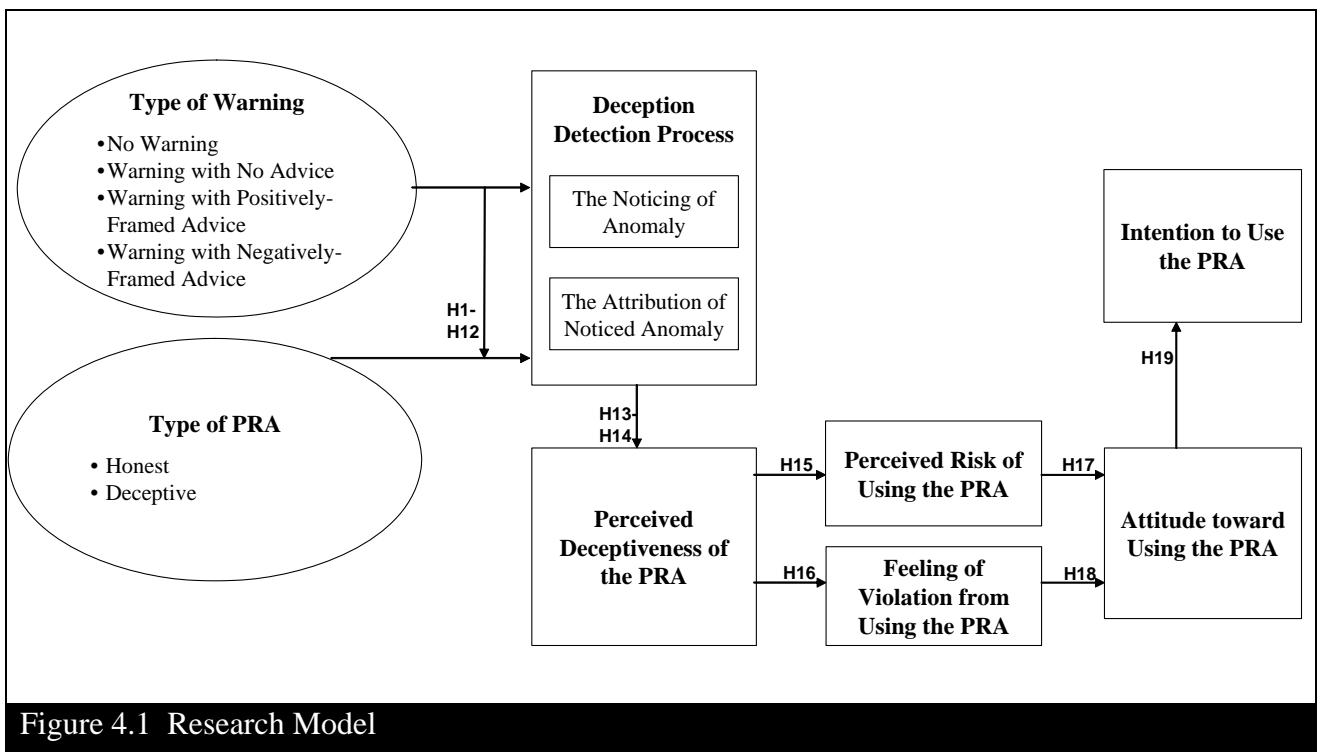


Figure 4.1 Research Model

4.3.2 Definition of Constructs

Type of PRA refers to whether the PRA at the e-commerce website is an honest one or a deceptive one. An **honest** PRA is one that recommends products solely based on the consumers' expressed preferences whereas a **deceptive** PRA is one that provides misleading product recommendations biased to the benefit of the online store and to the detriment of the consumer.

Type of warning refers to the different types of warning messages (if available) issued to consumers about the possibility of deception by PRAs provided at the e-commerce website. In the *no warning* condition, consumers receive no warning about the possibility of PRA deception. In the *warning with no advice* condition, consumers are warned of the risk of PRA deception but are not provided with advice for avoiding such risk. In the other two conditions, consumers are provided with a warning message that includes either *positively-framed* or *negatively framed* advice for avoiding risk.

Consumers' **deception detection process** consists of two sub-processes: ***the noticing of anomaly*** (i.e., whether consumers notice or perceive anomalies in the PRA's recommendations) and ***the attribution of noticed anomaly*** (i.e., whether consumers attribute the anomalies noticed in the PRA's recommendations to deception by PRA).

Perceived deceptiveness of the PRA is defined as the extent to which a consumer believes that the PRA provided at the e-commerce website is deceptive. Perceived deceptiveness is triggered by negative-valenced violation of consumers' preconceived expectations, often as a result of the deceptive information practices performed by online merchants, or the recognition of cues suggesting deceptive information practices.

As in Study 1, ***perceived risk of using the PRA*** is adopted as the cognitive component of attitude and is defined as a consumer's expectation that using the PRA could have unwanted outcomes (Glover & Benbasat, 2006). ***Feeling of violation from using the PRA*** is adopted as the affective component of attitude and refers to a combination of disappointment, frustration, anger, and irritation emotions toward the PRA, which emanate from the perception that one has been betrayed or mistreated by the PRA (Morrison & Robinson, 1997; Robinson & Morrison, 2000).

Consumers' **attitude toward using the PRA** refers to their overall evaluation of PRA use at the e-commerce website. Finally, ***intention to use the PRA*** is a behavioral loyalty intention capturing a consumer's intention to reuse the PRA as well as her intention to recommend the PRA to friends and relatives.

As discussed in Study 1, *perceived deceptiveness*, *trust*, *distrust*, *attitude*, and *intention* are closely related psychological states, all reflecting a strong pathway in our cognition. They are included again in the research model of Study 2 to corroborate the nomological network for the focal construct – *perceived deceptiveness*.

4.3.3 Hypothesis Development

Signal detection theory (Davies and Parasuraman 1982) differentiates between two classes of events—*noise* (i.e., the background) and *signal* (i.e., stimulus that deviates from background noise and thus may be detected)—and explains the performance of individuals who strive to determine the presence of a signal. Signal detection theory specifies four possible outcomes in error detection tasks: (1) *hits*, (2) *misses*, (3) *false alarms*, and (4) *correct rejections*. In the context of deception detection, information that is free from manipulation might be considered noise, whereas information that is tampered by manipulation of its content, presentation, and/or generation would provide a signal (Biros 1998). As such, there are also four possible outcomes in a deception detection task, which determine an individual’s deception detection performance:

- A *hit* occurs when consumers detect deception when it does exist.
- A *miss* occurs when consumers fail to detect deception when it does exist.
- A *false alarm* occurs when consumers report deception when it does not exist.
- A *correct rejection* occurs when consumers do not report deception when it does not exist.

Study 2 focuses on *hits* and *false alarms* as indicators of *deception detection success* and *deception detection failure*, respectively⁸.

- *Hits* occur when consumers notice anomalies in the recommendations of a *deceptive PRA* and correctly attribute the anomalies to deception by the PRA;
- *False alarms* occur when consumers reports anomalies in the recommendations of an

⁸ *Misses* and *correct rejections* are not examined in this study, since they are the opposite of hits and false alarms, respectively.

honest PRA and falsely attribute the anomalies to deception by the PRA.

4.3.3.1 Effects of Warning on Deception Detection

Prior research reveals that individuals' ability to detect deception increases when their suspicion is aroused (G. R. Miller & Stiff, 1993; Parasuraman, 1984; Stiff et al., 1992). Explicit *warnings* about potential deception by PRA can arouse consumers' suspicion, thus increasing their likelihood to notice anomalies in the recommendations of a deceptive PRA and subsequently attribute them to deception. However, results of Study 1 (reported in Chapter 3) suggest that, by inducing consumers' sensitivity to deception, *warning* may also increase the likelihood for consumers to report anomalies in the recommendations of an honest PRA and attribute them to deception, resulting in false alarms. Thus, it is expected that simply *warning* consumers about the risk of deception without at the same time providing them with strategies to handle such risk will enhance *hit* rate at the cost of increased *false alarms*, both in the *noticing of anomalies* and in the *attribution of noticed anomalies*.

H1: Compared to those not provided with warning, consumers provided with *warning with no advice* will be more likely to *notice anomalies* in a deceptive PRA (**H1a**) and *attribute such anomalies* to deception (**H1b**), resulting in more *hits*.

H2: Compared to those not provided with warning, consumers provided with *warning with no advice* will be more likely to *notice anomalies* in an honest PRA (**H2a**) and *attribute such anomalies* to deception (**H2b**), resulting in more *false alarms*.

Research in product warning messages suggests that the inclusion of risk-avoiding recommendations or tips in warning message enhances consumers' perceived self-efficacy (Celuch et al., 1995; Strahan et al., 2002) and motivates them to change their behavior (Strahan et al., 2002). Study 2 focuses on advice that could help consumers detect deception. In PRA-assisted online shopping context, a warning message will likely be more effective in enhancing consumers' deception detection accuracy (indicated by more *hits* and fewer *false alarms*) if it also includes advice or tips on what actions consumers can take to handle the risk of deception

by PRA, in addition to a description of the risk itself. An example action (used for Study 2) is to verify the PRA's recommendations by comparing the recommended products with other, non-recommended products in the same brand using functionalities such as searching-by-brand and/or a comparison matrix. Consumers who follow the advice, either *positively-framed* or *negatively-framed*, included in the warning message by adopting such action will have greater accuracy in identifying anomalies in a PRA and in making attributions of such anomalies. Thus, consumers who receive *warning* with either *positively-framed* or *negatively-framed advice* are expected to have more *hits* than those receiving *no warning* without simultaneously having more *false alarms*.

H3: Compared to those provided with *no warning*, consumers provided with a *warning* message that *includes positively-framed advice* for handling risk will be more likely to *notice anomalies* in a deceptive PRA (**H3a**) and *attribute such anomalies* to deception (**H3b**), resulting in more *hits*.

H4: Compared to those provided with *no warning*, consumers provided with a *warning* message that *includes negatively-framed advice* for handling risk will be more likely to *notice anomalies* in a deceptive PRA (**H4a**) and *attribute such anomalies* to deception (**H4b**), resulting in more *hits*.

H5: Compared to those provided with *no warning*, consumers provided with a *warning* message that *includes positively-framed advice* for handling risk will be equally likely to *notice anomalies* in an honest PRA (**H5a**) and *attribute such anomalies* to deception (**H5b**), resulting in a similar number of *false alarms*.

H6: Compared to those provided with *no warning*, consumers provided with a *warning* message that *includes negatively-framed advice* for handling risk will be equally likely to *notice anomalies* in an honest PRA (**H6a**) and *attribute such anomalies* to deception (**H6b**), resulting in a similar number of *false alarms*.

Moreover, consumers who receive *warning* with either *positively-framed* or *negatively-framed advice* are also expected to have more *hits* and fewer *false alarms* than those who are warned

about the risk of PRA deception but not provided with advice on what actions they can take to handle such risk.

H7: Compared to those provided with *warning with no advice*, consumers provided with a *warning* message that *includes positively-framed advice* for handling risk will be more likely to *notice anomalies* in a deceptive PRA (**H7a**) and *attribute such anomalies* to deception (**H7b**), resulting in more *hits*.

H8: Compared to those provided with *warning with no advice*, consumers provided with a *warning* message that *includes negatively-framed advice* for handling risk will be more likely to *notice anomalies* in a deceptive PRA (**H8a**) and *attribute such anomalies* to deception (**H8b**), resulting in more *hits*.

H9: Compared to those provided with *warning with no advice*, consumers provided with a *warning* message that *includes positively-framed advice* for handling risk will be less likely to *notice anomalies* in an honest PRA (**H9a**) and *attribute such anomalies* to deception (**H9b**), resulting in fewer *false alarms*.

H10: Compared to those provided with *warning with no advice*, consumers provided with a *warning* message that *includes negatively-framed advice* for handling risk will be less likely to *notice anomalies* in an honest PRA (**H10a**) and *attribute such anomalies* to deception (**H10b**), resulting in fewer *false alarms*.

According to Levin et al.(1998), in *goal framing*, *negatively* framed message emphasizing losses tends to have a greater impact on a given behavior than a comparable *positively* framed message emphasizing gains. Prior research in message framing also suggests that *loss-framed* (*gain-framed*) appeals are more persuasive when the behavior under consideration involves relatively high (low) risk of an unpleasant outcome (Rothman et al., 2006; Rothman & Salovey, 1997). In the context of Study 2, since the task of detecting deception necessarily involves the risk of unpleasant outcome (i.e., uncovering deception by the PRA), an appeal in the warning message persuading consumers to adopt the risk-handling behavior advocated in the message (i.e., use functionalities such as searching-by-brand and comparison matrix to verify the PRA's

recommendations) is likely to be more effective in inducing such behavior (and thus resulting in more accuracy in identifying anomalies) when the appeal is framed as *loss* than when it is framed as *gain*. Thus,

H11: Compared to those provided with a *positively-framed* warning message, consumers provided with a *negatively-framed* warning message will be more likely to *notice anomalies* in a deceptive PRA (**H7a**) and *attribute such anomalies* to deception (**H7b**), resulting in more *hits*.

H12: Compared to those provided with a *positively-framed* warning message, consumers provided with a *negatively-framed* warning message will be less likely to *notice anomalies* in an honest PRA (**H8a**) and *attribute such anomalies* to deception (**H8b**), resulting in fewer *false alarms*.

4.3.3.2 Effects of Type of PRA and Deception Detection Process on Perceived Deceptiveness

In line with the model of deception detection (Johnson et al. 1993; Johnson et al. 2001), if consumers notice the anomalies in the PRA's product recommendations (whether the PRA is deceptive or honest) and subsequently make deception-related attributions about such anomalies, they are likely to consider the PRA as deceptive in global evaluation⁹. Thus,

H13-H14: When consumers *notice anomalies* in the PRA's recommendations (**H13**) and *attribute such anomalies* to deception (**H14**), they will *perceive the PRA to be deceptive*.

4.3.3.3 Consequences of Perceived Deceptiveness of the PRA

The left side of the research model (see Figure 4-1) examines the effect of different types of warning on consumers' deception detection accuracy (i.e., *hits* and *false alarms*). This section

⁹ Note that the *noticing of anomaly* and the attribution of noticed anomaly are two sub-processes of the deception detection process. The final outcome of the deception detection process is a determination of the other party's deceptiveness (the *perception of deceptiveness* in this study). Whereas *attribution* is based on specific instances, the *perception of deceptiveness* is an overall judgment.

lists the hypotheses on the right side of the research model, which replicates the model investigated in Study 1 (reported in Chapter 3).

H15: Consumers' *perceived deceptiveness of the PRA* will positively influence their *perceived risk of using the PRA*.

H16: Consumers' *perceived deceptiveness of the PRA* will positively influence their *feeling of violation from using the PRA*.

H17: Consumers' *perceived risk of using the PRA* will negatively influence their *attitude toward using the PRA*.

H18: Consumers' *feeling of violation from using the PRA* will negatively influence their *attitude toward using the PRA*.

H19: Consumers' *attitude toward using the PRA* will positively influence their *intention to use the PRA*.

4.4 RESEARCH METHOD

To test the effects of different types of warning on consumers' deception detection performance and their evaluation of the PRA, an online experiment was conducted.

4.4.1 Independent Variables and Experimental Design

The two main independent variables are 1) type of PRA and 2) type of warning. A **2** (*Type of PRA*: honest or deceptive) x **4** (*Type of Warning*: no warning, warning with no advice, warning with positively-framed advice, or warning with negatively-framed advice) between-subject factorial design (see Table 4-2) was used.

Table 4.2 2x4 Full Factorial Experimental Design

Group #	1	2	3	4	5	6	7	8
Type of PRA					X	X	X	X
No Warning	X				X			
Warning with No Advice		X				X		
Warning with Positively-Framed Advice			X				X	
Warning with Negatively-Framed Advice				X				X

Type of PRA. Two experimental websites (one providing a deceptive PRA and the other providing an honest PRA) were adapted from Study 1. Each website featured the same 96 digital cameras from 8 brands, with 12 products in each brand. The product features for the 12 digital cameras in each brand were carefully designed such that 6 products (referred to as the *promoted* products) were dominated by the other 6 products (referred to as the *dominant* products). Each *promoted* product was paired with a dominant *product* in the same brand that had better features but the same price. Two content-filtering PRAs for digital cameras were adapted from Study 1. Table 4-3 illustrates how the two PRAs were designed.

Type of Warning. For participants assigned to groups with warnings, a warning message is displayed right before the experimental task at the e-commerce website. The design of different types of warning messages is illustrated in Table 4-4.

Table 4.3 The Design of PRAs

Both Deceptive and Honest PRAs

- Use needs-based questions in preference elicitation
- Calculate a fit score for every available product based on users' expressed needs
- Provide explanation on how the PRA makes recommendations
- Users can use a comparison matrix to compare products
- The PRA will generate a list of 12 products, with 6 products in each page.
- As in Wang (2005), users can search products by brand and thus view additional products that are not recommended by the PRA

Honest PRA

- Select 12 products among all available products that have the highest fit-scores and present them in the recommendation list

Deceptive PRA

- Select 12 products **in the promoted set** that have the highest fit-scores and present them in the recommendation list

Table 4.4 Design of Warning Messages

Type of Warning Message	Text of Warning Message
Warning with No Advice	<p>When shopping at online stores that provide automated Shopping Advisors (also called Recommendation Agents, Recommender Systems, Virtual Agents, or Shopping Assistants), please be aware that some advisors may provide product recommendations biased toward certain brands or toward products with certain characteristics.</p> <p>Consumers are urged to use caution when shopping with the assistance of such advisors.</p>

Table 4.4 Design of Warning Messages

Type of Warning Message	Text of Warning Message
Warning with Positively-Framed Advice	<p>When shopping at online stores that provide automated Shopping Advisors (also called Recommendation Agents, Recommender Systems, Virtual Agents, or Shopping Assistants), please be aware that some advisors may provide product recommendations biased toward certain brands or toward products with certain characteristics.</p> <p>Consumers are advised to verify the Shopping Advisor's recommendations by comparing recommended products with other, non-recommended products in each of your preferred brands, using functionalities such as comparison matrix and searching by brand that are available at the website. Recommended products are the products included in the Shopping Advisor's list of recommendations. Non-recommended products (in addition to the recommended ones) in each brand can usually be found when you use the searching by brand function.</p> <p>Research shows that consumers who verify the Shopping Advisor's product recommendations have <i>increased chance</i> of distinguishing an honest Shopping Advisor from a deceptive one and <i>reduced risk</i> of being misled by biased recommendations.</p>
Warning with Negatively-Framed Advice	<p>When shopping at online stores that provide automated Shopping Advisors (also called Recommendation Agents, Recommender Systems, Virtual Agents, or Shopping Assistants), please be aware that some advisors may provide product recommendations biased toward certain brands or toward products with certain characteristics.</p> <p>Consumers are advised to verify the Shopping Advisor's recommendations by comparing recommended products with other, non-recommended products in each of your preferred brands, using functionalities such as comparison matrix and searching by brand that are available at the website. Recommended products are the products included in the Shopping Advisor's list of recommendations. Non-recommended products (in addition to the recommended ones) in each brand can usually be found when you use the searching by brand function.</p> <p>Research shows that consumers who fail to verify the Shopping Advisor's product recommendations have <i>reduced chance</i> of distinguishing an honest Shopping Advisor from a deceptive one and <i>increased risk</i> of being misled by biased recommendations.</p>

As in Study 1, the warning message is not part of the e-commerce website. Rather, participants are asked to read the message before they access the e-commerce website. It was designed to be the kind of message that could be built into browsers and loaded when consumers visit e-commerce stores.

4.4.2 Measurement of Dependent Variables and Control Variables

Most of the dependent variables and control variables were 7-point scales adapted from prior research, as shown in Table 4-5. However, *perceived anomaly* in the PRA's recommendations and *attribution* of noticed anomalies were newly developed for Study 2, based on the definitions of the two sub-processes of the deception detection process (i.e., the noticing of anomaly and the attribution of noticed anomaly) in prior research (Johnson et al., 1993; Johnson et al., 2001; Morrison & Robinson, 1997; Robinson, 1996; Robinson & Morrison, 2000). All the variables were validated via several rounds of pilot testing.

Table 4.5 Measurement Items for Dependent Variables and Control Variables

	Measures	Source
Dependent Variables		
Perceived anomaly in the PRA's recommendations	<ul style="list-style-type: none"> ▪ I noticed inconsistencies between Pat's requirements and the shopping advisor's product recommendations ▪ I found that, in each of Pat's preferred brands, some non-recommended products actually fit Pat's preferences better than the products recommended by the shopping advisor. That is to say, products that best meet Pat's preferences were not included in the shopping advisor's recommendations ▪ I have noticed other things (not mentioned above) that are unexpected, unusual, or abnormal in the shopping advisor's product recommendations. 	Newly developed

Table 4.5 Measurement Items for Dependent Variables and Control Variables

	Measures	Source
Attribution of noticed anomaly to deception ¹⁰	<p>How likely do you think that each of the following is a cause of the negative outcomes described above?</p> <ul style="list-style-type: none"> ▪ The shopping advisor is unwilling to do its best to help its user ▪ The shopping advisor intentionally provides biased or misleading product recommendations to benefit the online retailer 	Newly developed
Perceived deceptiveness of the PRA	<p>Overall, the Shopping Advisor is</p> <ul style="list-style-type: none"> ▪ Genuine ... Misleading ▪ Truthful ... Deceptive ▪ Fair ... Biased 	Grazioli and Jarvenpaa (2000)
Perceived risk of using the PRA	<ul style="list-style-type: none"> ▪ There is considerable risk involved in using the shopping advisor to select digital cameras at ForeverCam.com ▪ There is a high potential for loss involved in using the shopping advisor to select digital cameras at ForeverCam.com ▪ Using the shopping advisor to select digital cameras at ForeverCam.com could lead to undesirable consequences. 	McKnight & ChoudhuryGlover and Benbasat (2006)
Feeling of violation from using the PRA	<ul style="list-style-type: none"> ▪ I feel a great deal of frustration toward the shopping advisor at ForeverCam.com ▪ I feel a great deal of anger toward the shopping advisor at ForeverCam.com ▪ I feel a great deal of irritation toward the shopping advisor at ForeverCam.com 	Morrison and Robinson (Morrison & Robinson, 1997; Robinson & Morrison, 2000)

¹⁰ Only participants who noticed anomalies in the PRA's recommendations were asked to make attributions of the anomalies.

Table 4.5 Measurement Items for Dependent Variables and Control Variables

	Measures	Source
Attitude toward using the PRA	<ul style="list-style-type: none"> ▪ The idea of using the shopping advisor for similar future purchases is appealing ▪ Using the shopping advisor for similar purchase tasks in the future would be advisable ▪ Using the shopping advisor for similar purchase tasks in the future is a good idea ▪ I like the idea of using the shopping advisor for similar purchase tasks in the future 	Ajzen & Fishbein (1980) Davis (1989)
Intention to use the PRA	<ul style="list-style-type: none"> ▪ I intend to reuse the shopping advisor for similar purchase tasks in the future ▪ I predict that I will reuse the shopping advisor for similar purchase tasks in the future ▪ I would consider using the shopping advisor for similar future purchases ▪ I am willing to use this shopping advisor as an aid to help with my decision about which products to buy ▪ I am willing to let this shopping advisor assist me in deciding which product to buy 	Jarvenpaa et al. (1999)
Control Variables		
Truth bias	<ul style="list-style-type: none"> ▪ I think other people are generally honest ▪ I tend to believe that other people are telling the truth ▪ Overall, people are truthful 	Stiff, Kim, & Ramesh (1992)
Product expertise	<ul style="list-style-type: none"> ▪ I do not feel very knowledgeable about digital cameras ▪ I know a lot about digital cameras ▪ Compared to most other people, I know more about digital cameras ▪ When it comes to digital cameras, I really do not know a lot 	Wang (2005)

4.4.3 Sample

Participants for Study 2 were 256 e-commerce shoppers recruited from a North American panel maintained by a marketing research firm, which specializes in market research sampling and custom panel recruitment. The sample size ensured a 0.8 power for the required hypothesis tests

to detect a medium effect of 0.20. An invitation to participate in the study was broadcast by the marketing firm via e-mail to members of the panel. Individuals were provided with point-based incentive (redeemable for various prizes) for their assistance in the study available through the marketing firm.

4.4.4 Experimental Task and Procedures

All participants were randomly assigned to one of the eight experimental groups. They were told that an online camera store, ForeverCam.com, was testing an automated shopping advisor implemented to assist consumers in choosing digital cameras while shopping in the store. Their task was to evaluate the shopping advisor (as well as its product recommendations) at ForeverCam.com and determine whether the shopping advisor was honest or deceptive. They were also provided with the camera-related preferences of Pat (see Figure 4.2) and asked to use these preferences to evaluate the shopping advisor's product recommendations. The participants were informed that, at the end of the task session, they would be asked to provide an evaluation of the PRA.

To motivate participants to take the experimental task seriously, participants were informed before the experiment that those who correctly identified the shopping advisor at the ForeverCam.com as honest or deceptive and provided detailed, well-supported justifications would get a \$25 cash reward.

Participants were first asked to complete a short questionnaire that collected demographic data (e.g., age, gender) and background information (e.g., level of experience with computers and online shopping, pre-existing trust in e-commerce websites, and pre-existing risk perception regarding online shopping) and data on the control variables—*truth bias* and *product expertise*. They were then asked to read a tutorial on how to navigate their assigned e-commerce website. Next, they were asked to read a tutorial on digital camera attributes and complete a quiz aimed at testing their understanding of important digital camera attributes. After that, participants were asked to read task instructions and then click on a “Start Shopping” button that would take them

to their assigned e-commerce website. For participants in one of the three *warning* conditions, when they clicked on the “Start Shopping” button, a warning message would be displayed. For both the three *warning* conditions and the *no warning* condition, participants’ risk perception regarding online shopping was again measured before the start of the shopping task¹¹. Participants assigned to the *warning-with-advice* (positively-framed or negatively framed) condition were also asked to assess the positivity/negativity of the warning message they just read. Participants then proceeded with the evaluation task at their assigned e-commerce website. Upon the completion of the evaluation task, participants were asked to fill out a questionnaire that included the measures of the dependent variables.

Pat's Camera-Related Preferences

(**Important Note:** Please use **Pat's camera-related preferences** (that are presented below), **NOT your own preference**, to evaluate the shopping advisor's product recommendations.)

It is extremely important that Pat can use the digital camera to take snapshots of social gatherings, to photograph landscapes and scenery, and to capture action shots at Pat's favorite sporting events (e.g., hockey games and soccer games). Pat wants to find a digital camera that offers enough flexibility with many manual controls.

It is also important that the digital camera has a large LCD screen, so that Pat can compose and review pictures easily. In addition to posting pictures on the web and emailing them to family and friends, Pat also wants to output razor-sharp prints that are 8 x 10 inches or larger on a high-quality photo printer.

Pat only likes digital cameras from Kodak, Samsung, or Fuji.

Please click on this link to keep Pat's Camera-Related Preferences available during your visit to
ForeverCam.com

**(Note: Keeping Pat's Camera-Related Preferences available will help you evaluate the
truthfulness/deceptiveness of the shopping advisor)**

Figure 4.2 Pat's Product Related Preferences

¹¹ Note that, for the three *warning* conditions, participants’ risk perception regarding online shopping was measured again after the showing of the warning message and before the start of the shopping task.

4.5 DATA ANALYSIS AND RESULTS

This section begins by reporting demographic data about participants in the experiment. Manipulation check results are reported in section 4.5.2. Cross-tab and ANOVA analyses were conducted to test the effects of different types of *warning* on participants' deception detection performance (i.e., their ability to *perceive anomaly* in the PRA's recommendations and to *attribute* noticed *anomaly* to deception) (sections 4.5.4.1 and 4.5.4.2). ANCOVA analysis, with *truth bias* and *product expertise* as control variables, was then conducted to test the effect of the *noticing of anomaly* on *perceived deceptiveness of the PRA* (section 4.5.4.3). An additional ANOVA with a reduced data set was conducted to test the effects of *attribution of anomaly* on *perceived deceptiveness of the PRA* (section 4.5.4.3).

Partial Least Squares (PLS), as implemented in SmartPLS 2.0.M3, was used to assess the measurement properties of the dependent variables and the relationships among the perceptual variables (i.e., *perceived deceptiveness*, *trust*, *distrust*, *attitude*, and *intention*). The measurement properties of the dependent variables are presented in section 4.5.3 and the results of the structural model are reported in section 4.5.4.3. PLS was chosen over LISREL primarily because the sample size (N=256) is enough for PLS analysis, whereas a larger sample is needed for LISREL (Barclay et al., 1995). Also, the benefits offered by LISREL (such as specifying measurement errors) are not central to the research questions of this study.

4.5.1 Demographic Data

Table 4-6 outlines the characteristics of the participants who volunteered in the experiment. More females participated in the study than males. The majority of the participants were between 30-49 years old. Over 50% of the participants use Internet for at least 20 hours each week. Also, more than half of the participants made at least five purchases online during the past 12 months. The demographic profile of the participants is similar to that of online shoppers reported elsewhere (e.g., Pew-Internet, 2008, 2009).

Table 4.6 Demographic Data

	# of Participants	Percentage
Gender		
Male	110	42.9
Female	146	57.1
Age		
19-29	73	28.5
30-49	144	58.2
50-64	39	15.2
65 and up	0	0
Internet Usage		
Less than 1 hour per week	1	0.4
1-5 hours per week	17	6.6
6-10 hours per week	36	14.1
11-20 hours per week	71	27.7
More than 20 hours per week	131	51.2
Online Shopping Experience		
No online purchase in the past 12 months	18	7
Made 1 purchase online in the past 12 months	24	9.5
Made 2-4 purchases online in the past 12 months	59	23
Made 5-10 purchases online in the past 12 months	73	28.5
Made more than 10 purchases online in the past 12 months	82	32

4.5.2 Manipulation Checks

Manipulation checks were conducted (see Table 4-7) for the experimental treatments.

Table 4.7 Manipulation Checks

Experimental Treatment	Manipulation Check	Statistical Test
Type of PRA	<p>Captured objectively (with computer logs): Whether the first three products viewed/compared by the participant during the shopping task were all promoted products.</p>	Cross-Tab Analysis
Warning	<p>Measured subjectively with the following two sets of items: (Measured before the showing of the warning message) <ul style="list-style-type: none"> ▪ There is considerable risk involved in shopping online ▪ Shopping online could lead to undesirable consequences ▪ There is a high potential for loss involved in shopping online (Measured after the showing of the warning message but before the experimental task) <ul style="list-style-type: none"> ▪ Using the shopping advisor to select digital cameras at ForeverCam.com could lead to undesirable consequences ▪ There might be considerable risk involved in using the shopping advisor to select digital cameras at ForeverCam.com ▪ There should be no risk involved in using the shopping advisor to select digital cameras at ForeverCam.com ▪ There might be a high potential for loss involved in using the shopping advisor to select digital cameras at ForeverCam.com </p>	ANCOVA
Content of Warning	<p>Measured subjectively with the following item:</p> <ul style="list-style-type: none"> ▪ Just before you started the evaluation task at ForeverCam.com, you read a message that contains not only a warning to consumers but also practical advice for avoiding risks associated with the automated shopping advisor 	ANOVA
	<p>Captured objectively (with computer logs): Whether the participants used searching-by-brand functionality (as advised in the warning message)</p>	Cross-Tab Analysis

Table 4.7 Manipulation Checks

Experimental Treatment	Manipulation Check	Statistical Test
Framing of Warning	<p>Measured subjectively with the following two radio-button type items:</p> <ul style="list-style-type: none"> ▪ I feel that ... <ul style="list-style-type: none"> ➤ the message stresses the negative implications of failing to verify the shopping advisor's recommendations ➤ the message stresses the positive implications of verifying the shopping advisor's recommendations ▪ I believe that ... <ul style="list-style-type: none"> ➤ I stand to lose important benefits by failing to verify the shopping advisor's recommendations ➤ I stand to gain important benefits by verifying the shopping advisor's recommendations 	Cross-tab Analysis

Type of PRA. Results of cross-tab analysis (see Table 4-9) show that the treatment for *type of PRA* was successful. It was significantly more likely for the first three products viewed or compared by participants to be promoted products in the *deceptive* condition than in the *honest* condition (97.7% vs. 0%, $\chi^2(1, N = 256) = 2.443E2, p < 0.001$).

Warning. ANCOVA results (see Table 4-8) show that, controlling for participants' pre-existing risk perceptions regarding shopping online, those provided with the warning message perceived shopping with the assistance of PRA to be significantly more risky than those not provided with such message ($M = 4.20$ vs. $3.45, F(1, 253) = 24.526, p < 0.001$). Further analysis reveals no significant difference among the three warning conditions in terms of risk perceptions associated with the use of the PRA ($M = 4.20$ vs. 4.22 vs. $4.18, F(1, 188) = 0.048, p = 0.953$).

Content of Warning Message. Results from both ANOVA and cross-tab analysis (see Table 4-8 and 4-9) show that the treatment for *content of warning* (i.e., whether risk-avoiding advice is included in the warning message) was successful. ANOVA shows participants' perception of the extent to which the warning message they read contained practical risk-avoiding advice was

significantly higher in the *warning with advice* condition than in the *warning without advice* condition ($M = 5.42$ vs. 4.28 , $F(1, 254) = 18.437$, $p = 0.000$). Cross-tab analysis (see Table 4-9) shows that it was significantly more likely for the participants to use the searching-by-brand functionality (the risk-avoiding act advocated in the warning message that included advice) in the *warning with advice* condition than in the *warning with no advice* condition (45.3% vs. 12.5%, $\chi^2(1, N = 256) = 33.53$, $p < 0.001$).

Framing of Advice in Warning Message. Results of cross-tab analysis (see Table 4-9) show that the treatment for the *framing of advice* in the warning message was successful. It was significantly more likely for the participants to perceive the warning message they read as emphasizing the *loss* associated with and *negative implications* of failing to adopt the risk-avoiding behavior advocated in the message in the *negatively-framed advice* condition than in the *positively-framed advice* condition (60.9% vs. 29.7%, $\chi^2(1, N = 256) = 12.61$, $p < 0.001$; 70.3% vs. 48.4%, $\chi^2(1, N = 256) = 6.351$, $p < 0.05$).

Table 4.8 ANOVA/ANCOVA Results for Manipulation Checks

ANOVA Results (DV: Presence of Advice in Warning Message)					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Personalized Order Manipulation	83.266	1	83.266	18.437	.000
Error	4.516	254	4.516		
ANCOVA Results (DV: Perceived Risk of Using the PRA)					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Pre-Existing Risk Perception	25.878	1	25.878	21.866	.000
Warning	29.027	1	29.027	24.526	.000
Error	299.424	253	1.183		

Table 4.9 Results of Cross Tab Analysis

Type of PRA * First 3 Products Viewed/Compared are All Promoted						
			First 3 Products Viewed/ Compared are All Promoted		Total	
			No	Yes		
Type of PRA	Honest	Count	128	0	128	
		% within Type of PRA	100%	0%	100.0%	
	Deceptive	Count	3	125	128	
		% within Type of PRA	2.3%	97.7%	100.0%	
Pearson Chi-Square (1, N = 256) = 2.443E2, p < 0.001						
Content of Warning * Using Searching-by-Brand						
			Using Searching-by-Brand		Total	
			No	Yes		
Content of Warning	Without Advice	Count	112	16	128	
		% within Content of Warning	87.5%	12.5%	100.0%	
	With Advice	Count	70	58	128	
		% within Content of Warning	54.7%	45.3%	100.0%	
Pearson Chi-Square (1, N = 256) = 33.53, p < 0.001						

Table 4-9 Results of Cross Tab Analysis

Framing of Warning * Perceived Gain (Loss) of (Not) Adopting the Advocated Behavior			Perceived Gain (Loss) of (Not) Adopting the Advocated Behavior		Total		
Framing of Warning			Gain	Loss			
	Negatively Framed Advice		Count	25	39		
	% within Framing of Warning		39.1%	60.9%	100.0%		
	Positively Framed Advice		Count	45	19		
	% within Framing of Warning		70.3%	29.7%	100.0%		
Pearson Chi-Square (1, N = 256) = 12.61, p < 0.001							
Framing of Warning * Perceived Positive (Negative) Implication of (Not) Adopting the Advocated Behavior			Perceived Positive (Negative) Implication of (Not) Adopting the Advocated Behavior		Total		
Framing of Warning			Negative	Positive			
	Negatively Framed Advice		Count	45	19		
	% within Framing of Warning		70.3%	29.7%	100.0%		
	Positively Framed Advice		Count	31	33		
	% within Framing of Warning		48.4%	51.6%	100.0%		
Pearson Chi-Square (1, N = 256) = 6.348, p < 0.05							

4.5.3 Measurement Model

All dependent variables, except for objective measures, were modeled as reflective constructs. The descriptive data of the dependent variables and control variables are shown in Table 4-10. Individual item reliability, internal consistency, and discriminant validity were examined following the approaches to testing measurement models in PLS suggested by Barclay et al. (1995) and Gefen and Straub (2005). Individual item reliability was examined by the loadings of measures with their corresponding construct (Table 4-12). All of the loadings exceed 0.7, indicating good item reliability.

Table 4.10 Means and Standard Deviations of Dependent and Control Variables

	Mean	Std. Deviation
Dependent Variables		
Perceived deceptiveness of the PRA	2.65	1.63
Perceived risk of using the PRA	3.34	1.38
Feeling of violation from using the PRA	2.29	1.39
Attitude toward using the PRA	5.26	1.55
Intention to use the PRA	5.15	1.61
Control Variables		
Truth bias	5.13	1.03
Product expertise	3.63	1.50

Internal consistency was assessed by examining the composite reliability index developed by Fornell and Larcker (1981), a measure of reliability similar to Cronbach's alpha. Both composite reliability and Cronbach's alpha are reported in Table 4-11. The benchmark for acceptable reliability is 0.7. All constructs met this criterion, an indication that the measures have good internal consistency.

Barclay et al. (1995) suggest two criteria for discriminant validity. First, the square root of Average Variance Extracted of a construct should be greater than the correlations of the construct with other constructs, thus indicating that the construct shares more variance with its own measures than it shares with other constructs in a model. This criterion is satisfied by the current data, as demonstrated in Table 4-11. Second, no item should load higher on a construct than on the one it intends to measure. The loadings and cross-loadings of measures are shown in Table 4-12. An examination of the matrix reveals that all items satisfy this criterion. A more restrictive guideline suggests that there should be a minimum difference of 0.10 between item loadings and cross loadings (Gefen & Straub, 2005). In Table 4-12, all items (except INT2) satisfy this strict guideline for establishing discriminant validity.

Table 4.11 Internal Consistencies, AVEs, and Correlations of Constructs

	Cronbach's Alpha	Internal Consistency	1	2	3	4	5	6	7
1. Attitude	0.968	0.979	0.940						
2. Feeling of Violation	0.897	0.936	-0.695	0.829					
3. Intention	0.953	0.970	0.885	-0.689	0.914				
4. Perceived Deceptiveness	0.969	0.980	-0.771	0.782	-0.786	0.942			
5. Perceived Risk	0.907	0.942	-0.771	0.763	-0.762	0.797	0.844		
6. Product Expertise	0.922	0.944	0.193	-0.077	0.209	-0.091	-0.119	0.808	
7. Truth Bias	0.951	0.968	0.128	-0.123	0.128	-0.102	-0.111	0.222	0.910

Note: The scores in the diagonal of the matrix are square roots of AVEs while the lower triangle represents the correlations between constructs.

Table 4.12 Loadings and Cross-Loadings of Measures

	Attitude	Perceived Deceptiveness	FOV	Intention	Product Expertise	Perceived Risk	Truth Bias
ATT1	0.974	-0.767	-0.695	0.860	0.185	-0.774	0.136
ATT3	0.961	-0.726	-0.655	0.854	0.188	-0.714	0.108
ATT4	0.974	-0.749	-0.671	0.861	0.190	-0.752	0.127
Deceptiveness1	-0.756	0.974	0.770	-0.772	-0.080	0.775	-0.097
Deceptiveness2	-0.767	0.979	0.770	-0.767	-0.078	0.786	-0.116
Deceptiveness4	-0.721	0.958	0.735	-0.748	-0.108	0.759	-0.083
FOV2	-0.676	0.753	0.917	-0.661	-0.126	0.726	-0.115
FOV3	-0.554	0.667	0.890	-0.582	-0.028	0.614	-0.100
FOV4	-0.659	0.710	0.924	-0.632	-0.050	0.736	-0.120
INT2	0.869	-0.717	-0.671	0.949	0.260	-0.738	0.141
INT4	0.828	-0.752	-0.625	0.961	0.172	-0.690	0.096
INT5	0.840	-0.785	-0.678	0.958	0.165	-0.757	0.129
ProdExp3	0.146	-0.060	-0.037	0.160	0.911	-0.082	0.206
ProdExp4R	0.172	-0.095	-0.116	0.194	0.913	-0.139	0.181
ProdExp5	0.206	-0.096	-0.061	0.205	0.908	-0.116	0.212
ProdExp6	0.156	-0.063	-0.044	0.182	0.863	-0.068	0.205
Risk1	-0.650	0.678	0.686	-0.640	-0.130	0.917	-0.121
Risk2	-0.744	0.740	0.733	-0.721	-0.115	0.927	-0.128
Risk3	-0.723	0.772	0.683	-0.732	-0.085	0.911	-0.061
TruthBias2	0.099	-0.085	-0.094	0.095	0.219	-0.092	0.942
TruthBias3	0.124	-0.113	-0.123	0.133	0.188	-0.113	0.965
TruthBias4	0.141	-0.090	-0.133	0.135	0.235	-0.112	0.955

4.5.4 Results of Hypothesis Tests

In this section, results of hypothesis tests are reported.

In prior literature, both dichotomous judgment and continuous ratings have been used to measure deceptiveness. Some researchers argue that dichotomous scales yield less valid results than

continuous ratings, because the former cannot detect subtle variations in certain types of deception (e.g., equivocation and concealment) (Burgoon et al., 1994). In addition, continuous measures allow for greater variability in responses and thus should be more reliable and produce stronger effects (Levine, 2001). Other researchers, however, question the validity of scaling deceptiveness. For instance, Levine (2001) argues that, since most conceptual definitions of deception treat deception as a binary construct, it is reasonable to measure it as such. Moreover, measuring perceived deceptiveness continuously risks confounding perception of deception with confidence judgments, importance judgments, and judgments of morality (Levine, 2001). Researchers from both camps agree that the use of continuous and dichotomous measures may yield different results.

Because of the exploratory nature of Study 2, both continuous and dichotomous measures of the *noticing of anomaly*, the *attribution of anomaly* and the *perception of deceptiveness* are used in testing the hypotheses related to consumers' deception detection process (in sections 4.5.4.1-4.5.4.3). More confidence can be placed in the findings if results of multiple analyses prove to be identical or similar.

4.5.4.1 Effects of Warning on the Noticing of Anomaly

Upon completion of the experimental task at the e-commerce website, participants were asked three questions (with 7-point scale) about whether they had noticed anything anomalous, abnormal, or unusual in the PRA's recommendations. Responses of participants who answered "Mildly Agree", "Agree", or "Strongly Agree" to any of the three questions were coded as "1", meaning that they have noticed anomalies in the PRA's recommendations. Responses of participants who answered otherwise (i.e. "Strongly Disagree", "Disagree", "Mildly Disagree", or "Neutral") were coded as "0", meaning that they have not noticed anomalies in the PRA's recommendations.

A cross-tab analysis was first conducted to examine the overall relationship between *warning* and the *noticing of anomaly*. The results (see Table 4-13) show that, in the *honest* PRA condition,

the percentage of participants reporting anomalies was highest for the *warning with no advice* group (40.6%), followed by the *warning with positively-framed advice* group (37.5%), the *warning with negatively-framed advice* group (21.9%), and finally the *no warning* group (18.8%). In the *deceptive* PRA condition, however, the percentage of participants reporting anomalies was highest for the *warning with negatively-framed advice* group (87.5%), followed by the *warning with positively-framed advice* group (68.8%), the *warning with no advice* group (65.6%), and the *no warning* group (37.5%)..

Additional cross-tab analyses with reduced data show that:

- Participants assigned to the *warning with no advice* condition had significantly more *hits* (65.6% vs. 37.5%, $\chi^2(1, N = 128) = 5.067, p < 0.05$) and *false alarms* (40.6% vs. 18.8%, $\chi^2(1, N = 128) = 3.668, p = 0.055$) than those assigned to the *no warning* condition (see the percentages in Table 4-13). These results support H1a and H2a.
- Participants assigned to the *positively-framed advice* condition had significantly more *hits* than those assigned to the *no warning* condition (68.8% vs. 37.5%, $\chi^2(1, N = 64) = 6.275, p < 0.05$) (see the percentages in Table 4-13). However, the two groups did not have statistically significant difference in terms of *false alarms* (37.5% vs. 18.8%, $\chi^2(1, N = 64) = 2.783, p = 0.095$) (see the percentages in Table 4-13). These results support H3a and H5a.
- Participants assigned to the *negatively-framed advice* condition had significantly more *hits* than those assigned to the *no warning* condition (87.5% vs. 37.5%, $\chi^2(1, N = 64) = 17.067, p < 0.001$) (see the percentages in Table 4-13). However, the two groups did not have statistically significant difference in terms of *false alarms* (21.9% vs. 18.8%, $\chi^2(1, N = 64) = 0.097, p = 0.756$) (see the percentages in Table 4-13). These results support H4a and H6a.

Table 4.13 Results of Cross Tab Analysis: Warning * Noticing of Anomaly

<u>In Honest PRA Condition</u>		Noticing of Anomaly		Total	
		No	Yes		
Warning	No Warning	Count	26	6	
		% within Warning	81.2%	18.8%	
	Warning with No Advice	Count	19	13	
		% within Warning	59.4%	40.6%	
	Warning with Positively-Framed Advice	Count	20	12	
		% within Warning	62.5%	37.5%	
	Warning with Negatively-Framed Advice	Count	25	7	
		% within Warning	78.1%	21.9%	
<u>In Deceptive PRA Condition</u>		Noticing of Anomaly		Total	
		No	Yes		
Warning	No Warning	Count	20	12	
		% within Warning	62.5%	37.5%	
	Warning with No Advice	Count	11	21	
		% within Warning	34.4%	65.6%	
	Warning with Positively-Framed Advice	Count	10	22	
		% within Warning	31.2%	68.8%	
	Warning with Negatively-Framed Advice	Count	4	28	
		% within Warning	12.5%	87.5%	

- Participants assigned to the *negatively-framed advice* condition had significantly more *hits* (87.5% vs. 64.6%, $\chi^2(1, N = 64) = 4.267, p < 0.05$) than those assigned to the *warning with no advice* condition (see the percentages in Table 4-13). However, the two groups did not have statistically significant difference in terms of *false alarms* (21.9% vs. 40.6%, $\chi^2(1, N =$

$64) = 2.618, p = 0.106$). These results support H8a but not H10a.

- There was no significant difference in *hits* (65.6% vs. 56.3%, $\chi^2(1, N = 64) = 0.591, p = 0.442$) or *false alarms* (37.5% vs. 40.6%, $\chi^2(1, N = 64) = 0.66, p = 0.798$) between participants receiving *positively-framed advice* and those receiving *warning with no advice* (see the percentages in Table 4-13). These results support neither H7a nor H9a.
- Participants receiving *negatively-framed advice* were more likely to notice anomalies in the recommendations of the *deceptive PRA*, thus having more *hits* (87.5% vs. 68.8%, $\chi^2(1, N = 64) = 3.291, p = 0.07$) when compared to those assigned to *positively-framed advice* condition (see the percentages in Table 4-13). However, the difference between the two groups in terms of *false alarms* was non-significant (21.9% vs. 37.5%, $\chi^2(1, N = 64) = 1.871, p = 0.17$) (see the percentages in Table 4-13). These results support H11a but not H12a.

To corroborate the findings of cross-tab analysis, an ANOVA test with planned contrasts was also conducted. The results (see table 4-14) are as follows:

- There was no significant difference in terms of *perceived anomaly* between participants who received *warning with no advice* and those receiving *no warning*, both in the *honest PRA* condition ($t(124) = 1.423, p = 0.157$) and in the *deceptive PRA* condition ($t(124) = 1.622, p = 0.107$). These results do not support H1a or H2a.
- In the *deceptive PRA* condition, the *perception of anomaly* was significantly higher for those who received *positively-framed advice* in the warning message than those receiving *no warning* ($t(124) = 2.926, p < 0.01$). In the *honest PRA* condition, the difference between the two groups was non-significant ($t(124) = 0.992, p = 0.323$). These results support H3a and H5a.
- In the *deceptive PRA* condition, the *perception of anomaly* was significantly higher for those who received *negatively-framed advice* in the warning message than those receiving *no warning* ($t(124) = 4.490, p < 0.001$). In the *honest PRA* condition, the difference between the two groups was non-significant ($t(124) = 0.761, p = 0.448$). These results support H4a

and H6a.

Table 4.14 ANOVA Planned Contrasts for Perceived Anomaly

Group A	Group B	Difference in Mean¹²	df	t	Sig.
Honest PRA Condition					
Warning with No Advice	No Warning	0.45	124	1.423	0.157
Warning with Positively-Framed Advice	No Warning	0.31	124	0.992	0.323
Warning with Negatively-Framed Advice	No Warning	-0.24	124	0.761	0.448
Warning with Positively-Framed Advice	Warning with No Advice	-0.14	124	0.430	0.668
Warning with Negatively-Framed Advice	Warning with No Advice	-0.69	124	2.183	0.031
Warning with Negatively-Framed Advice	Warning with Positively-Framed Advice	-0.55	124	1.753	0.082
Deceptive PRA Condition					
Warning with No Advice	No Warning	0.58	124	1.622	0.107
Warning with Positively-Framed Advice	No Warning	1.05	124	2.926	0.004
Warning with Negatively-Framed Advice	No Warning	1.61	124	4.490	0.000
Warning with Positively-Framed Advice	Warning with No Advice	0.47	124	1.304	0.195
Warning with Negatively-Framed Advice	Warning with No Advice	1.03	124	2.868	0.005
Warning with Negatively-Framed Advice	Warning with Positively-Framed Advice	0.56	124	1.564	0.120

¹² Difference in Mean = Group A Mean – Group B Mean

- In the *deceptive (honest)* PRA condition, the *perception of anomaly* was significantly higher (lower) for those who received *negatively-framed advice* in the warning message than those receiving a *warning with no advice* ($t(124) = 2.868, p < 0.01$; $t(124) = 2.183, p < 0.05$). These results support H8a and H10a.
- There was no significant difference in *perceived anomaly* between the *warning with no advice* group and the warning with *positively-framed advice* group ($t(124) = 1.304, p = 0.195$; $t(124) = 0.430, p = 0.668$). These results support neither H7a nor H9a.
- In the *honest* PRA condition, the *perception of anomaly* was lower for those who received *negatively-framed advice* in the warning message than those receiving warning with *positively-framed advice* ($t(124) = 1.753, p = 0.082$). However, the difference between the two groups was non-significant in the *deceptive* PRA condition ($t(124) = 1.564, p = 0.120$). These results support H12a but not H11a.

In sum, all three warning mechanisms (i.e., *warning with no advice*, *warning with positively-framed advice*, and *warning with negatively-framed advice*) were effective in enhancing participants' *hit rate* in *noticing anomalies* in a *deceptive* PRA, with *warning with negatively-framed advice* being most effective. In the *honest* PRA condition, whereas participants receiving *warning with no advice* were more likely to *report anomalies* in an *honest* PRA, the provision of *warning with advice* did not result in increased *false alarms*. Participants receiving *warning with negatively-framed advice* had significantly fewer *false alarms* when compared to those receiving *warning with positively-framed advice* or *warning with no advice*.

4.5.4.2 Effects of Warning on the Attribution of Noticed Anomaly

Participants who reported having noticed anomalies in the PRA's recommendation (a total of 121 participants out of 256) were asked two questions (with 7-point scale) indicating their willingness to attribute such anomalies to deception by the PRA. Participants' responses were

coded as “1” (meaning that participants have attributed noticed anomalies to deception) or “0” (meaning that participants have not attributed noticed anomalies to deception) in the same way described above for anomaly-related questions.

A cross-tab analysis was first conducted to examine the overall relationship between *warning* and the *attribution of noticed anomaly*. The results (see Table 4-15) show that, in the *honest* PRA condition, the percentage of participants reporting anomalies was highest for the *warning with positively-framed advice* group (33.3%), followed by the *warning with no advice* group (30.8%), the *warning with negatively-framed advice* group (14.3%), and finally the *no warning* group (0%). In the *deceptive* PRA condition, however, the percentage of participants reporting anomalies was highest for the *warning with negatively-framed advice* group (64.3%), followed by the *warning with no advice* group (47.6%), the *warning with positively-framed advice* group (36.4%), and the *no warning* group (25%).

Additional cross-tab analyses with reduced data show that:

- Participants assigned to the *positively-framed advice* condition had neither significantly more *hits* (36.4% vs. 25%, $\chi^2(1, N = 34) = 0.458, p = 0.498$) nor significantly more *false alarms* (33.3% vs. 0%, $\chi^2(1, N = 18) = 2.571, p = 0.109$) than those assigned to the *no warning* condition (see the percentages in Table 4-15). These results support H5b but not H3b.
- Participants assigned to the *negatively-framed advice* condition had significantly more *hits* than those assigned to the *no warning* condition (64.3% vs. 25%, $\chi^2(1, N = 40) = 5.199, p < 0.05$) (see the percentages in Table 4-15). However, the two groups did not have statistically significant difference in terms of *false alarms* (14.3% vs. 0%, $\chi^2(1, N = 13) = 0.929, p = 0.335$) (see the percentages in Table 4-15). These results support H4b and H6b.

Table 4.15 Results of Cross Tab Analysis: Warning * Attribution of Noticed Anomaly

		Attribution of Noticed Anomaly		Total	
		No	Yes		
<u>In Honest PRA Condition</u>					
Warning	No Warning	Count	6	0	
		% within Warning	100%	0%	
	Warning with No Advice	Count	9	4	
		% within Warning	69.2%	30.8%	
	Warning with Positively- Framed Advice	Count	8	4	
		% within Warning	66.7%	33.3%	
	Warning with Negatively- Framed Advice	Count	6	1	
		% within Warning	85.7%	14.3%	
		Attribution of Noticed Anomaly		Total	
		No	Yes		
<u>In Deceptive PRA Condition</u>					
Warning	No Warning	Count	9	3	
		% within Warning	75%	25%	
	Warning with No Advice	Count	11	10	
		% within Warning	52.4%	47.6%	
	Warning with Positively- Framed Advice	Count	14	8	
		% within Warning	63.6%	36.4%	
	Warning with Negatively- Framed Advice	Count	10	18	
		% within Warning	35.7%	64.3%	

- Participants assigned to the *negatively-framed advice* condition had significantly more *hits* than those assigned to the *positively-framed advice* condition (64.3% vs. 36.4%, $\chi^2(1, N = 50) = 3.848, p = 0.05$) (see the percentages in Table 4-15). However, the two groups did not have statistically significant difference in terms of *false alarms* (14.3% vs. 33.3%, $\chi^2(1, N = 19) = 0.827, p = 0.363$) (see the percentages in Table 4-15). These results support H11b but not H12b.
- No other statistically significant difference was found, and thus H1b, H2b, H7b, H8b, H9b, H10b are not supported.

Again, ANOVA planned contrast tests were conducted to corroborate the findings from the cross-tab analysis. Results of the analysis (see Table 4-16) show that the only significant difference in the *attribution of noticed anomaly* was between those who received *negatively-framed advice* in the warning message and those receiving *no warning* ($t(79) = 2.404, p < 0.05$) in *deceptive PRA* condition. No other statistically significant difference was found. These results support H4b, H5b, and H6b.

In sum, in the *honest* PRA condition, there was no significant difference among different warning conditions in *attributing the noticed anomalies*. However, in the *deceptive* PRA condition, participants receiving *warning with negatively-framed advice* were significantly more likely to *attribute the noticed anomalies* to deception than those receiving *warning with positively-framed advice* or those receiving *no warning*. *Warning with negatively-framed advice* again proves to be the most effective support mechanism in the second stage of the deception detection process – the *attribution of noticed anomaly*.

Table 4.16 ANOVA Planned Contrasts for Attribution of Noticed Anomaly

Group A	Group B	Difference in Mean ¹³	df	t	Sig.
Honest PRA Condition					
Warning with No Advice	No Warning	0.40	34	0.534	0.597
Warning with Positively-Framed Advice	No Warning	0.21	34	0.276	0.784
Warning with Negatively-Framed Advice	No Warning	-0.62	34	0.738	0.466
Warning with Positively-Framed Advice	Warning with No Advice	-0.19	34	0.313	0.756
Warning with Negatively-Framed Advice	Warning with No Advice	-1.02	34	1.438	0.160
Warning with Negatively-Framed Advice	Warning with Positively-Framed Advice	-0.83	34	1.154	0.257
Deceptive PRA Condition					
Warning with No Advice	No Warning	0.71	79	1.273	0.207
Warning with Positively-Framed Advice	No Warning	0.70	79	1.266	0.209
Warning with Negatively-Framed Advice	No Warning	1.29	79	2.404	0.019
Warning with Positively-Framed Advice	Warning with No Advice	-0.01	79	0.021	0.984
Warning with Negatively-Framed Advice	Warning with No Advice	0.57	79	1.277	0.205
Warning with Negatively-Framed Advice	Warning with Positively-Framed Advice	0.58	79	1.316	0.192

¹³ Difference in Mean = Group A Mean – Group B Mean

4.5.4.3 Effects of Deception Detection Process on Perceived Deceptiveness

All participants were asked four questions (with 7-point scale) indicating their perception of the PRA's deceptiveness. Responses of participants who answered "Mildly Agree", "Agree", or "Strongly Agree" to any of the four questions were coded as "1", meaning that they have perceived the PRA as deceptive. Responses of participants who answered otherwise (i.e. "Strongly Disagree", "Disagree", "Mildly Disagree", or "Neutral") were coded as "0", meaning that they have not perceived the PRA as deceptive.

Effect of the Noticing of Anomaly. A cross-tabulation of the *noticing of anomaly* and *deception perceived* (the binary variable created from *perceived deceptiveness*) (see Table 4-17) shows that participants who *noticed anomalies in the PRA's recommendations* were more likely to *perceive the PRA as deceptive* (39.7% vs. 1.5%, $\chi^2(1, N = 256) = 59.207, p < 0.001$). This finding was corroborated by an ANCOVA analysis, with the *noticing of anomaly* as independent variable, *perceived deceptiveness* as dependent variable, and *truth bias* and *product expertise* as control variables (see Table 4-18: $F(1, 250) = 147.136, p < 0.001$). The results of both analyses support H13. Neither of the control variables has significant effect on *perceived deceptiveness of the PRA* and thus they were excluded from further analysis.

Effect of the Attribution of Noticed Anomaly. An additional cross-tabulation of the *attribution of anomaly* and *deception perceived* (see Table 4-17) shows that participants who *attributed the anomalies noticed in the PRA's recommendations to deception* were more likely to *perceive the PRA as deceptive* (77.1% vs. 15.1%, $\chi^2(1, N = 1216) = 46.535, p < 0.001$). This finding was corroborated by an ANOVA analysis with the *attribution of anomaly* as independent variable and *perceived deceptiveness* as dependent variable (see Table 4-18: $F(1, 119) = 93.540, p < 0.001$). The results of both analyses support H14.

Table 4.17 Results of Cross Tab Analysis

			Noticing of Anomaly * Deception Perceived			
			Deception Perceived		Total	
			No	Yes		
Noticing of Anomaly	No	Count	133	2	135	
		% within Noticing of Anomaly	98.5%	1.5%	100.0%	
	Yes	Count	73	48	121	
		% within Noticing of Anomaly	60.3%	39.7%	100.0%	
Pearson Chi-Square (1, N = 256) = 59.207, p < 0.001						
			Attribution of Anomaly * Deception Perceived			
			Using Searching-by-Brand		Total	
			No	Yes		
Attribution of Anomaly	No	Count	62	11	73	
		% within Attribution of Anomaly	84.9%	15.1%	100.0%	
	Yes	Count	11	37	48	
		% within Attribution of Anomaly	22.9%	77.1%	100.0%	
Pearson Chi-Square (1, N = 121) = 46.535, p < 0.001						

Table 4.18 ANCOVA/ANOVA Results (DV: Perceived Deceptiveness of the PRA)

The Effect of the Noticing of Anomaly					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Product Expertise	4.207	1	4.207	2.703	.101
Truth Bias	2.897	1	2.894	1.859	.174
Noticing of Anomaly	229.039	1	229.039	147.136	.000
Error	377.670	250	1.511		
The Effect of the Attribution of Anomaly					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Attribution of Anomaly	138.689	1	138.689	93.540	.000
Error	176.439	119	1.483		

4.5.4.4 Consequences of Perceived Deceptiveness

Figure 4-3 shows the results of the PLS analysis.

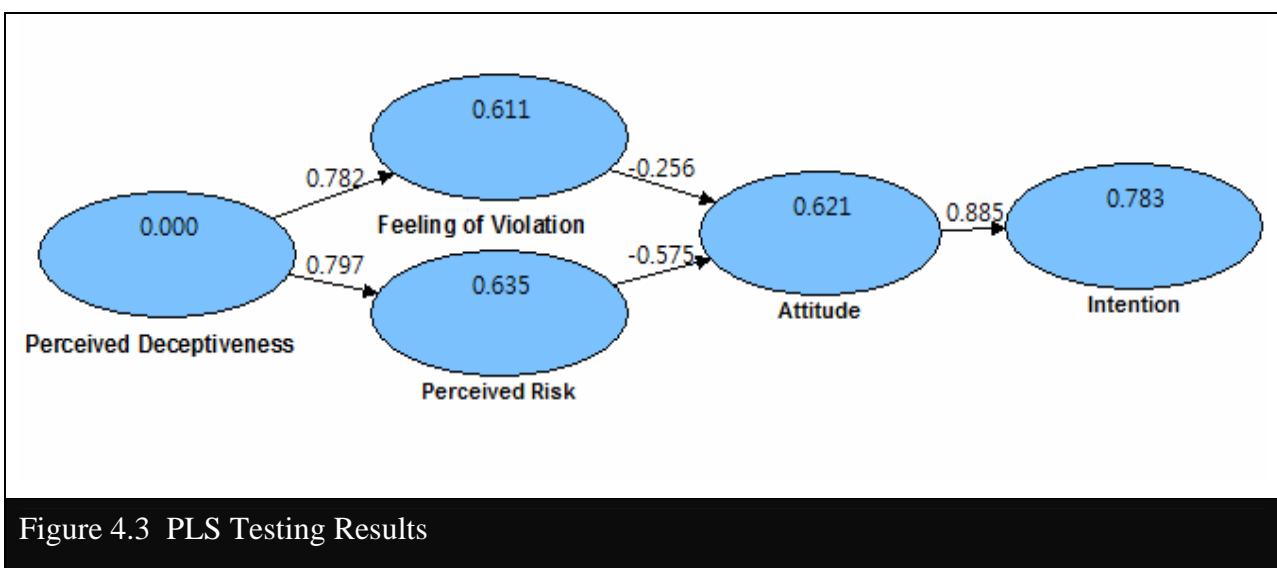


Figure 4.3 PLS Testing Results

In support of H15-H16, the results of the PLS reveal that *perceived deceptiveness of the PRA* has significant positive effect on *perceived risk of using the PRA* ($\beta = 0.797, p < 0.001$) and on *feeling of violation from using the PRA* ($\beta = 0.782, p < 0.001$).

Both *perceived risk of using the PRA* and *feeling of violation from using the PRA* exert significant impact on *attitude toward using the PRA* ($\beta = -0.575, p < 0.001$ and $\beta = -0.256, p < 0.01$, respectively), jointly explaining 62.1% of the variance in *attitude*. Thus, H17 and H18 are supported.

Finally, in support of H19, *attitude* exerts significant positive effect on *intention to use the PRA* ($\beta = 0.885, p < 0.001$).

A summary of hypotheses testing results is provided in Table 4-19.

Table 4.19 A Summary of Hypothesis Testing Results

Hypothesis	Supported?
H1: Compared to those not provided with warning, consumers provided with <i>warning with no advice</i> will be more likely to <i>notice anomalies</i> in a deceptive PRA (H1a) and <i>attribute such anomalies</i> to deception (H1b), resulting in more <i>hits</i> .	H1a ⁺ : Yes
	H1b: No
H2: Compared to those not provided with warning, consumers provided with <i>warning with no advice</i> will be more likely to <i>notice anomalies</i> in an honest PRA (H2a) and <i>attribute such anomalies</i> to deception (H2b), resulting in more <i>false alarms</i> .	H2a ⁺ : Yes
	H2b: No
H3: Compared to those provided with <i>no warning</i> , consumers provided with <i>warning message</i> that <i>includes positively-framed advice</i> for handling risk will be more likely to <i>notice anomalies</i> in a deceptive PRA (H3a) and <i>attribute such anomalies</i> to deception (H3b), resulting in more <i>hits</i> .	H3a ^{**} : Yes
	H3b: No
H4: Compared to those provided with <i>no warning</i> , consumers provided with <i>warning message</i> that <i>includes negatively-framed advice</i> for handling risk will be more likely to <i>notice anomalies</i> in a deceptive PRA (H4a) and <i>attribute such anomalies</i> to deception (H4b), resulting in more <i>hits</i> .	H4a ^{**} : Yes
	H4b ^{**} : Yes

Hypothesis	Supported?
H5: Compared to those provided with <i>no warning</i> , consumers provided with <i>warning message that includes positively-framed advice</i> for handling risk will be equally likely to <i>notice anomalies</i> in an honest PRA (H5a) and <i>attribute such anomalies to deception</i> (H5b), resulting in similar number of <i>false alarms</i> .	H5a ⁺ : Yes
	H5b ⁺ : Yes
H6: Compared to those provided with <i>no warning</i> , consumers provided with <i>warning message that includes negatively-framed advice</i> for handling risk will be equally likely to <i>notice anomalies</i> in an honest PRA (H6a) and <i>attribute such anomalies to deception</i> (H6b), resulting in similar number of <i>false alarms</i> .	H6a ⁺ : Yes
	H6b ⁺ : Yes
H7: Compared to those provided with a <i>warning with no advice</i> , consumers provided with <i>warning message that includes positively-framed advice</i> for handling risk will be more likely to <i>notice anomalies</i> in a deceptive PRA (H7a) and <i>attribute such anomalies to deception</i> (H7b), resulting in more <i>hits</i> .	H7a: No
	H7b: No
H8: Compared to those provided with a <i>warning with no advice</i> , consumers provided with <i>warning message that includes negatively-framed advice</i> for handling risk will be more likely to <i>notice anomalies</i> in a deceptive PRA (H8a) and <i>attribute such anomalies to deception</i> (H8b), resulting in more <i>hits</i> .	H8a ⁺ : Yes
	H8b: No
H9: Compared to those provided with a <i>warning with no advice</i> , consumers provided with <i>warning message that includes positively-framed advice</i> for handling risk will be less likely to <i>notice anomalies</i> in an honest PRA (H9a) and <i>attribute such anomalies to deception</i> (H9b), resulting in fewer <i>false alarms</i> .	H9a: No
	H9b: No
H10: Compared to those provided with a <i>warning with no advice</i> , consumers provided with <i>warning message that includes negatively-framed advice</i> for handling risk will be less likely to <i>notice anomalies</i> in an honest PRA (H10a) and <i>attribute such anomalies to deception</i> (H10b), resulting in fewer <i>false alarms</i> .	H10a [*] : Yes
	H10b: No
H11: Compared to those provided with <i>positively-framed warning message</i> , consumers provided with <i>negatively-framed warning message</i> will be more likely to <i>notice anomalies</i> in a deceptive PRA (H11a) and <i>attribute such anomalies to deception</i> (H11b), resulting in more <i>hits</i> .	H11a ⁺ : Yes
	H11b ⁺ : Yes
H12: Compared to those provided with <i>positively-framed warning message</i> , consumers provided with <i>negatively-framed warning message</i> will be less likely to <i>notice anomalies</i> in an honest PRA (H12a) and <i>attribute such anomalies to deception</i> (H12b), resulting in fewer <i>false alarms</i> .	H12a [*] : Yes
	H12b: No
H13-14: When consumers <i>notice anomalies</i> in the PRA's recommendations (H13) and <i>attribute such anomalies to deception</i> (H14), they will <i>perceive the PRA to be deceptive</i> .	H13 ⁺ : Yes
	H14 ⁺ : Yes

Hypothesis	Supported?
H15: Consumers' <i>perceived deceptiveness of the PRA</i> will positively influence their <i>perceived risk of using the PRA</i> .	Yes
H16: Consumers' <i>perceived deceptiveness of the PRA</i> will positively influence their <i>feeling of violation from using the PRA</i> .	Yes
H17: Consumers' <i>perceived risk of using the PRA</i> will negatively influence their <i>attitude toward using the PRA</i> .	Yes
H18: Consumers' <i>feeling of violation from using the PRA</i> will negatively influence their <i>attitude toward using the PRA</i> .	Yes
H19: Consumers' <i>attitude toward using the PRA</i> will positively influence their <i>intention to use the PRA</i> .	Yes

Note: For the hypotheses tested with both cross-tab analysis and ANOVA planned contrasts:

+: supported only by cross-tab analysis

*: supported only by ANOVA planned contrasts

+: supported by both cross-tab analysis and ANOVA planned contrasts

4.6 CONCLUSION AND DISCUSSION

This section summarizes the major findings of Study 2, presents its limitations, and discusses its contributions to research and to practice.

4.6.1 Discussion of Findings

This experimental study provides strong evidence that although consumers are generally vulnerable to deception, properly designed detection mechanisms (such as warning) can be implemented to help them perform better in deception detection. The three warning mechanisms examined in this study, namely, *warning with no advice*, *warning with positively-framed advice*, and *warning with negatively-framed advice* are effective, albeit to different extents, in supporting consumers in the task of deception detection.

As hypothesized, all three warning mechanisms are effective in enhancing consumers' *hit* rate in *noticing anomalies* in a deceptive PRA. However, the provision of a *warning with no advice* may also result in increased *false alarms*, a finding that is consistent with those of Study 1. When consumers are provided with warning about the risk of deception without simultaneously receiving advice for handling such risk , they will be placed in a heightened state of alert (Biros et al., 2002) and thus will be more likely to report deception even when it does not exist (Burgoon et al., 1994; Parasuraman, 1984). On the other hand, the provision of risk-avoiding advice in the warning message helps improve consumers' accuracy in *identifying anomalies* in the PRA's recommendations, demonstrated by increased *hits* at similar rate of *false alarms*.

The *framing of warning* message (i.e., whether the risk-avoiding advice included in the warning message is positively-framed or negatively-framed) also has significant effect on consumers' performance in identifying anomalies. Compared to those receiving a warning message with *positively-framed* advice, consumers provided with *negatively-framed* advice in the warning message are more likely to *notice anomalies* in a deceptive PRA (resulting in more *hits*) and less likely to *report anomalies* in an honest PRA (resulting in fewer *false alarms*).

In the second stage of the deception detection process, namely, the *attribution of noticed anomalies*, the results of the study reveal that, contrary to hypotheses, *warning with negatively-framed advice* is the only mechanism that is effective in boosting the *hit* rate. Compared to those provided with *positively-framed* warning message or those provided with *no warning*, consumers provided with *negatively-framed* warning message will be more likely to *attribute the anomalies noticed* in a deceptive PRA to deception, without at the same time increasing *false alarms*.

Overall, the results of the study show that, in the PRA-assisted shopping context, the provision of *warning with negatively-framed advice* proves to be the most effective mechanism in supporting consumers during both stages of the deception detection process, increasing their likelihood to *notice anomalies* in a deceptive PRA and subsequently *attribute* such *anomalies to deception* (i.e., more *hits*) without at the same time increasing their likelihood to do so in an honest PRA (i.e., not more *false alarms*).

Further, consistent with the model of deception detection (Johnson et al. 1993; Johnson et al. 2001), the results of Study 2 reveal that consumers are more likely to consider the PRA as deceptive if they have noticed the anomalies in the PRA's product recommendations and subsequently made deception-related attributions about such anomalies.

Finally, consistent with Study 1, the results of Study 2 show that, when consumers *perceive* the PRA to be *deceptive*, they will have elevated risk perception regarding the use of the PRA and experience such negative feelings as frustration, anger, and resentment. Consumers' *perceived risk of using the PRA* and *feeling of violation from using the PRA* jointly influence their *attitude* and *intention* regarding using the PRA.

4.6.2 Limitations and Future Research

A number of limitations are involved with Study 2. First, the study examines one way by which online PRAs deceive consumers, namely, to recommend products from a set of promoted products rather than from all available products. Thus, the application of this study's findings to other types of deception techniques requires caution. Other deception techniques may have differential effect on consumers' performance in noticing and attributing anomalies in PRAs, hence additional research is needed.

Second, as in Study 1, Study 2 implements a needs-based PRA that uses compensatory-additive decision strategy in recommending products. Future studies should explore the effects of different PRA designs (e.g., needs-based vs. feature-based, elimination-by-aspect vs. compensatory-additive) (Felix et al., 2001) on consumers' performance in detecting deceptive PRAs.

Third, this study empirically examines the effect of different design characteristics (e.g., content, framing) of warning messages on consumers' deception detection performance. Future studies may explore other detection support mechanisms (both non-IT-based and IT-based), which can

be implemented in the e-commerce context to support consumers in recognizing anomalies and generating deception hypotheses about such anomalies, thus enabling them to better detect the deception perpetrated by online companies.

Forth, this study focuses on consumers' performance in detecting one novel form of deceptive practice brought about by innovative technologies supporting e-commerce -- PRAs that are designed to provide biased recommendations to the benefits of online merchants. Future study can explore other types of e-commerce technology that can be exploited by dishonest companies to deceive consumers. Prior research (e.g., Benassi, 1999; Glover & Benbasat, 2006; Grazioli & Jarvenpaa, 2000) has revealed a number of information technology (IT) mechanisms that can be used by online companies to increase consumers' trust in e-commerce websites and/or mitigate their risk perceptions associated with online shopping. However, both trust-building mechanisms and risk-reducing tools can be exploited by dishonest companies to deceive consumers (Grazioli, 2004; Grazioli & Jarvenpaa, 2000). For instance, an online company may provide a virtual product experience (VPE) (Jiang & Benbasat, 2005, 2007) that does not represent consumers' real experiences with a product (Bloom et al., 1994). It may also employ multimedia technologies (e.g., Flash, animations) to excite consumers in a manner similar to what fast-talking salespersons can do in physical shopping settings, thus leading consumers to make impulse purchases they may regret later (Bloom et al. 1994). In electronic marketplaces such as eBay, a seller can collude with a group of buyers in order to receive unfairly high ratings, thus allowing that seller to receive more orders from buyers and at a higher price than deserved (Dellarocas, 2000).

Lastly, this study only examined deception-related attribution. Future research may explore different types of attributions (e.g., deception-related attribution vs. competence-related attribution) and investigate factors (beyond *warning*) affecting consumers' causal attributions in a deception detection context.

4.6.3 Contribution to Research and Practice

Study 2 makes significant contributions to research and practice. The main contribution to IS research is an understanding of design characteristics of warning message that can have significant effect on consumers' deception detection performance.

In Study 1, as well as in prior research in deception detection (e.g., Biros et al., 2002; Burgoon et al., 1994; Parasuraman, 1984), the provision of a *warning* message was found to increase the *hit* rate in deception detection at the cost of increasing *false alarms*. Study 2 empirically examines the *content* and *framing* of warning messages and shows that properly designed warning messages can enhance consumers' accuracy in detecting deception. To our knowledge, this is the first study that explicitly examines different design characteristics of warning messages in the deception detection context. It enhances our understanding of the effectiveness of different warning design in supporting deception detection and serves as a basis for future empirical as well as theoretical work.

Study 2 reveals that consumers are extremely vulnerable to deception perpetrated by online PRAs, a finding consistent with Study 1 and prior research in general e-commerce deception (Grazioli, 2004; Grazioli & Jarvenpaa, 2000, 2001, 2003a, 2003b; Grazioli & Wang, 2001). Of all the 128 participants assigned to the deceptive PRA condition, only 83 of them (or 65%) noticed anomalies in the PRA's recommendations. and, only 39 participants among the 83 (47%) correctly attributed the noticed anomalies to deception by PRA. This calls for effective mechanisms/solutions that can help consumers combat this type of deception. Study 2 reveals that a potential counter-deception tactic is to provide warning with *negatively-framed* advice. Since such warning mechanism can boost *hit* rate without increasing *false alarm* rate, it can be readily implemented as a browser plug-in and triggered when consumers try to use PRAs to select products at e-commerce websites.

Finally, according to Campbell & Fiske (1959) and Denzin (1970), validity of research methods and theory construction is best established by the use of multiple triangulation. Study 2 uses one type of triangulation outlined by Denzin (1970), methodological triangulation, by performing

more than one type of statistical analyses (e.g., cross-tab analysis and ANOVA) on the same data set so as to show consistency across procedures, particularly when the sample size is limited (S. A. Murphy, 1989). More confidence can be placed in the findings if results of multiple analyses prove to be identical or similar.

CHAPTER 5. CONCLUSION AND DISCUSSION

5.1 SUMMARY OF THE THESIS

In this thesis, a typology of product-related deception in e-commerce context is developed. In addition, two empirical studies were conducted to explore consumer vulnerability to various deceptive information practices and to examine the effect of the design characteristics of one specific detection support mechanism (i.e., warning) on consumers' deception detection performance. The typology and the results of the two empirical studies provide answers to the research questions that initially motivated the research as follows:

1. How can product-related e-commerce deception be performed?

As specified in the typology, product-related e-commerce deception can be performed along two dimensions. First, product-related information can be *concealed*, *equivocated*, or *falsified*. Second, deceptive manipulation can be performed on the *content*, the *presentation*, and the *generation* of product-related information.

2. How will different deceptive information practices affect consumer judgment and decision making?

Study 1 (reported in Chapter 3) examined the effect of *content manipulation* and *order manipulation* on consumers' product *choice*. The results of the study provide strong evidence that consumers are vulnerable to both content manipulation and order manipulation performed by online retailers. Consumers' product *choice* at e-commerce websites are influenced by deceptive manipulation performed both on the *content* of product detail information and on the *order* in which products are displayed at the websites. In particular, consumers' product *choice* is strongly influenced by *personalized* order manipulation, a novel type of deception made possible by technology supporting e-commerce.

3. What are the consequences of e-commerce deception, when it is detected by consumers?

Results from both Study 1 and Study 2 (reported in Chapter 4) reveal that, when consumers *perceive* an e-commerce website (in Study 1) or an IT artifact (such as PRA) at the e-commerce website (in Study 2) to be *deceptive*, their *perception of risk* associated with shopping at the website or using the IT artifact at the website is heightened and an intense *feeling of violation* arises. Consumers' *perceived risk* and *feeling of violation* jointly influence their *attitude* and behavioral loyalty *intentions*.

4. How can counter-deception mechanisms be designed to help consumers better detect product-related e-commerce deception?

Study 1 examines the effectiveness of a potential counter-deception mechanism (i.e., explicit *warning* about the possibility of deception) on consumers' deception detection performance (i.e., whether they could correctly identify the website that they shopped at as truthful or deceptive). The results of the study reveal that consumers who receive warning are more likely to consider the e-commerce website that they are shopping at to be deceptive, regardless of whether the website is indeed deceptive or not. That is, while the provision of a *warning* message has increased the *hit* rate in deception detection, the warning has also increased *false alarms*.

Study 2 extends Study 1 by exploring the effect of each of the two stages of consumers' deception detection process (i.e., the *noticing of anomaly* and the *attribution of noticed anomaly*) on the final outcome of the detection process – a determination of deceptiveness and examining the impact of two design characteristics (i.e., content and framing) of warning messages on consumers' deception detection performance. The results of the study show that, in a PRA-assisted shopping context, the provision of explicit *warnings* about potential deception by PRA enhances consumers' deception detection performance by increasing their likelihood to *notice anomalies* in a *deceptive PRA* (resulting in more *hits*). In addition, warning messages that include risk-avoiding advice (either positively-framed or negatively-framed) can help reduce *false alarms* in *noticing anomalies*. *Warning with negatively-framed advice* proves to be the most effective mechanism in supporting

consumers during both stages of the deception detection process, increasing their likelihood to *notice anomalies* in a deceptive PRA and subsequently *attribute* such *anomalies to deception* (i.e., more *hits*) without at the same time increasing their likelihood to do so in an honest PRA (i.e., not more *false alarms*).

The answers to these research questions should be of interest to academic researchers, e-commerce practitioners, consumer protection/advocacy organizations, and government monitoring/regulating agencies.

5.2 CONTRIBUTIONS

The thesis makes both theoretical and practical contributions. From a theoretical perspective, there are four major contributions. First, this research advances our knowledge of deception in e-commerce by developing a more comprehensive and finer grained typology that better captures various types of deceptive information practices that can be perpetrated by online companies against consumers in a B2C e-commerce context. The typology includes two dimensions: the three deception types (i.e. concealment, equivocation, and falsification) that have been examined in prior deception research and the three manifestations of these types (i.e., manipulation of information content, manipulation of information presentation, and manipulation of information generation) in e-commerce settings. Examples are provided to illustrate how the various deception tactics can be deployed in e-commerce.

Second, by empirically examining the effects of the three different deceptive information practices (i.e., content manipulation, non-personalized order manipulation, and personalized order manipulation) on consumers' product choice, the research not only provides support to the newly proposed dimension of the typology of e-commerce deceptive information practices but it also fills a void in existing theorization of deception.

Third, by exploring different design characteristics (i.e., content and framing) of warning messages and examining their effect on the two stages of consumers' deception detection process

(i.e., the noticing of anomaly and the attribution of noticed anomaly), this research enhances our understanding of the effectiveness of different warning designs in supporting deception detection and it serves as a basis for future empirical as well as theoretical work.

Fourth, this research tests a model of e-commerce deception that includes both *perceived risk* (the cognitive component) and *feeling of violation* (the affective component) as important consequences of *perceived deceptiveness* and predictors of consumer *attitude* and behavior intention. The model is validated by both of the empirical studies. Rather than simply applying existing theory to a new problem, this research extends theory.

This thesis also makes significant contribution to practice. First, the typology of e-commerce deceptive information practices developed in this research can be used as educational material (e.g., Internet Fraud Tips issued regularly by National Consumers League) for promoting consumer awareness of potential deception perpetrated by online companies. The research thus answers the call for better educating the public about the perils of the Internet (Grazioli & Jarvenpaa, 2000). The typology also provides valuable input for government agencies (e.g., Federal Trade Commission in the United States, Office of Consumer Affairs in Canada), industry leaders (e.g., Amazon, Expedia, Dell), and consumer organizations (e.g., National Consumers League in the United States, Consumers Association of Canada) to establish benchmarks for good business practice for online companies. An example of such a benchmark is the Canadian Code of Practice for Consumer Protection in Electronic Commerce.

Second, a better understanding of consumer vulnerability to different deceptive information practices in e-commerce can help government agencies and consumer organizations pinpoint areas where most deception detection resources should be allocated. For instance, results of Study 1 show that consumers' online decision is greatly influenced by *personalized* order manipulation, a novel type of deception made possible by technology supporting e-commerce. Effective strategies and solutions thus need to be devised to combat such deception.

Third, this research reveals that a potential counter-deception tactic is to provide warning with *negatively-framed* advice. Since such warning mechanisms can boost *hit* rate without increasing

false alarm rate at both stages of the deception detection process, they can be readily implemented as a browser plug-in and triggered when consumers try to use PRAs to select products at e-commerce websites. Online marketplaces such as Amazon and eBay have strong incentive to protect consumers transacting on their platforms. By implementing the warning mechanisms investigated in this research to ward off deception and fraud, the online marketplaces may attract and retain more customers, thus achieving competitive advantage in their industry.

According to Bazerman (2001), consumer research has developed many insights that are more likely to benefit marketers rather than consumers. Bazerman (2001) advocates a consumer-focused approach to the study of consumer behavior (which would advance knowledge aimed at helping consumers make wiser consumption decisions), as opposed to a marketing perspective of consumer behavior (which develops knowledge that focuses on the determinants of consumer purchasing). In parallel to the marketing-focused approach to consumer behavior, IS research also seems to have been focusing on investigating antecedents to users' adoption intention of new technology, without paying adequate attention to guiding users in making rational adoption decisions or developing in-depth understanding of users' adoption decision making process. By developing a typology of deceptive information practices appropriate for the e-commerce context, examining the influence of such deceptive information practices on consumers' product choice, designing detection support mechanisms and testing their effectiveness in enhancing consumers' deception detection performance, this research contributes to a user-focused approach to IS adoption research.

5.3 LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This research limits its scope to product-related deception performed by online companies against consumers in a B2C e-commerce context. The results of the experimental studies may not be generalizable to other contexts (e.g., non-product-related deception, deception performed by consumers against online companies, deception in business-to-business or consumer-to-consumer e-commerce). Moreover, as with any experimental study, the conclusions drawn from

the two experiments in this research are constrained by the actual experimental operationalizations. For instance, for Study 1 (reported in Chapter 3), a different operationalization of content manipulation (e.g., falsification instead of equivocation) may produce different effects on consumers' product choice and product consideration. For Study 2 (reported in Chapter 4), consumers' deception detection performance may differ if they are asked to use a PRA designed differently (e.g., using elimination-by-aspect rather than compensatory-additive decision strategy).

This research represents a necessary first step toward a thorough understanding of deception in e-commerce. Further research can be conducted to examine other kinds of e-commerce deception and to explore other anti-deception mechanisms.

First, this research only examines a very small subset of the deception techniques presented in the typology of product-related deceptive information practices in Chapter 2. Future research can be directed to: (1) other product-related deceptive manipulations; (2) non-product-related deception (e.g., deception performed on reputation systems); (3) deception performed by consumers against online companies in a B2C e-commerce context; and (4) deception performed by either party of a business-to-business (B2B), consumer-to-business (C2B), or consumer-to-consumer (C2C) transaction. Different counter-deception mechanisms need to be designed and implemented for each type of e-commerce situation.

Second, a comprehensive strategy for reducing e-commerce deception must include consideration of *deterrence*, *prevention*, and *detection* (Grazioli & Jarvenpaa, 2003b; Straub & Welke, 1998). Mechanisms in all three areas should be studied in future research. *Deterrence* mechanisms aim to reduce the perpetrators' propensity to deceive and the victims' propensity to engage in risky behaviors (Grazioli & Jarvenpaa, 2003a, 2003b). Perpetrators, when caught, must face certain punishment and severe sanction. Government regulating agencies or independent auditing professionals should conduct unannounced audits of e-commerce websites periodically so as to deter online companies from attempting deception (Wells, 2002). Consumer education, also a potent means of deterrence, can alert consumers to the possibility of deception in e-commerce, thus countering the false sense of safety induced by security technology and the

promise of credit card companies regarding the limited liability arising from online transactions (Grazioli & Jarvenpaa, 2000).

Preventive measures are active countermeasures with the capacity to ward off abuse (Grazioli & Jarvenpaa, 2003a, 2003b). Although the idea of total control and a purely technical solution to prevent deception is unrealistic (Castelfranchi & Tan, 2002), technological solutions such as secure protocols, encryption, and authentication can help prevent certain forms of deception (e.g., illegitimate copycat websites).

Detection mechanisms are the consumers' last line of defense against perpetrators of deception. The theory of deception detection (Johnson et al., 1993; Johnson et al., 2001) suggests that, to be successful in deception detection, individuals must possess necessary domain knowledge and skills in recognizing deception cues, be sensitive to the possibility of deception (so as to generate deception hypothesis), and have effective means to evaluate the generated deception hypothesis. Therefore, an effective e-commerce deception detection mechanism must be able to support consumers in these respects. In addition to non-IT-based solutions, such as *warning* consumers about the possibility of deception (examined in this thesis) and *training* them in recognizing deception cues (examined in prior deception studies), there are some IT-based mechanisms (see Table 5-1 for examples) currently in use or showing promise for future use that can be implemented in the e-commerce context, though their efficacy need to be validated empirically. For instance, site-validation toolbars such as the eBay toolbar and MacAfee anti-fraud toolbar can authenticate the identity of an online company and thus can be implemented to help consumers identify fraudulent website. However, such systems often rely on blacklists taken from member-reporting databases maintained by online trading communities (Abbasi, Zimbra, Chen, & Nunamaker, 2010). Many users have already been exposed to the illegitimate websites by the time they are added to the blacklist (Abbasi et al., 2010). Abbasi and colleagues (2010) thus suggest that automated detection system based on statistical learning theory be deployed to better combat fake websites. Future research may examine the effectiveness of IT-based mechanisms in supporting consumers in recognizing inconsistencies, generating deception hypothesis, and evaluating deception hypothesis, thus enabling them to better detect deceptions perpetrated by online companies.

Table 5.1 Examples of IT-Based Deception Detection Mechanisms

Mechanisms	Description	Implementation
Site validation toolbar	Authenticating the identity of online company based on blacklists taken from member-reporting databases maintained by online trading communities. Examples include Microsoft anti-phishing toolbar, the eBay toolbar, and VirusScan Antifraud toolbar. Site validation can be performed automatically with little user intervention.	Third-party browser plug-in
Automated fake website detection system	Automatically identify fake websites based on statistical learning theory.	Third-party browser plug-in
Reputation systems/performance history	Links to reputable third-party business rating websites (e.g., bizrate.com, opinion.com), results of regular audit of random transactions of the online company or list of known questionable websites (e.g., from browsing sweeps), Better Business Bureau company report, etc.	Links provided by the online company or third-party browser plug-in
Verification assistant	Offers dual browser support and enables consumers to compare and contrast the information about products and services from different websites (e.g., manufacturers' websites, online companies' websites, relevant reputation website, and performance histories).	Third-party browser plug-in
Shopping assistant	A shopping assistant is an intelligent agent that monitors where consumers are in the online transaction process and provides situation-specific checklists to help consumers detect deception. A simple version of a shopping assistant is available free of charge to consumers at econsumer.gov.	Third-party browser plug-in; can stay on top of the screen during online shopping
Fraud detection toolbar	Special toolbar for Internet browser that integrates several deception detection mechanisms.	Third-party browser plug-in

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APPENDIX: CERTIFICATE OF APPROVAL



The University of British Columbia
 Office of Research Services
Behavioural Research Ethics Board
 Suite 102, 6190 Agronomy Road, Vancouver, B.C. V6T 1Z3

CERTIFICATE OF APPROVAL - MINIMAL RISK

PRINCIPAL INVESTIGATOR:	INSTITUTION / DEPARTMENT:	UBC BREB NUMBER:
Izak Benbasat	UBC/Sauder School of Business	H07-00760

INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT:

Institution	Site
UBC	Point Grey Site
Other locations where the research will be conducted:	
N/A	

CO-INVESTIGATOR(S):

Bo Xiao

SPONSORING AGENCIES:

Social Sciences and Humanities Research Council of Canada (SSHRC)

PROJECT TITLE:
Improving the Design of Information Technology Tools Intended to Reduce Consumers' Perceived Risk in Electronic Commerce

CERTIFICATE EXPIRY DATE: May 4, 2008

DOCUMENTS INCLUDED IN THIS APPROVAL:	DATE APPROVED:
	May 4, 2007

Document Name	Version	Date
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Protocol:	1	April 3, 2007
Research Proposal	1	April 3, 2007
Task Instruction	1	April 3, 2007
Friends' Profiles	1	April 3, 2007
Learn about Camera	1	April 3, 2007

Consent Forms:	1	April 3, 2007
Consent Form	1	April 3, 2007

Advertisements:	1	April 3, 2007
Advertisement	1	April 3, 2007

Questionnaire, Questionnaire Cover Letter, Tests:	1	April 3, 2007
Questionnaire	1	April 3, 2007

Other Documents:	1	April 3, 2007
Debriefing	1	April 3, 2007

Other:		
The experimental websites will be custom built and will be located in local server at MIS Lab.		

The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

Approval is issued on behalf of the Behavioural Research I
 and signed electronically by one of the following