

6-30-2006

## Concern for Information Privacy and Online Consumer Purchasing

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### Recommended Citation

Van Slyke, Craig; Shim, J.T.; Johnson, Richard; and Jiang, James J. (2006) "Concern for Information Privacy and Online Consumer Purchasing," *Journal of the Association for Information Systems*, 7(6), .  
DOI: 10.17705/1jais.00092

Available at: <https://aisel.aisnet.org/jais/vol7/iss6/16>

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## Concern for Information Privacy and Online Consumer Purchasing<sup>1</sup>

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### **Abstract**

*Although electronic commerce experts often cite privacy concerns as barriers to consumer electronic commerce, there is a lack of understanding about how these privacy concerns impact consumers' willingness to conduct transactions online. Therefore, the goal of this study is to extend previous models of e-commerce adoption by specifically assessing the impact that consumers' concerns for information privacy (CFIP) have on their willingness to engage in online transactions. To investigate this, we conducted surveys focusing on consumers' willingness to transact with a well-known and less well-known Web merchant. Results of the study indicate that concern for information privacy affects risk perceptions, trust, and willingness to transact for a well-known merchant, but not for a less well-known merchant. In addition, the results indicate that merchant familiarity does not moderate the relationship between CFIP and risk perceptions or CFIP and trust. Implications for researchers and practitioners are discussed.*

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<sup>1</sup> Elena Karahanna was the accepting senior editor. Kathy Stewart Schwaig and David Gefen were the reviewers. This paper was submitted on October 12, 2004, and went through 4 revisions.

## Introduction

Although information privacy concerns have long been cited as barriers to consumer adoption of business-to-consumer (B2C) e-commerce (Hoffman et al., 1999, Sullivan, 2005), the results of studies focusing on privacy concerns have been equivocal. Some studies find that mechanisms intended to communicate information about privacy protection such as privacy seals and policies increase intentions to engage in online transactions (Miyazaki and Krishnamurthy, 2002). In contrast, others find that these mechanisms have no effect on consumer willingness to engage in online transactions (Kimery and McCord, 2002). Understanding how consumers' concerns for information privacy (CFIP), or their concerns about how organizations use and protect personal information (Smith et al., 1996), impact consumers' willingness to engage in online transactions is important to our knowledge of consumer-oriented e-commerce. For example, if CFIP has a strong direct impact on willingness to engage in online transactions, both researchers and practitioners may want to direct efforts at understanding how to allay some of these concerns. In contrast, if CFIP only impacts willingness to transact through other factors, then efforts may be directed at influencing these factors through both CFIP as well as through their additional antecedents.

Prior research on B2C e-commerce examining consumer willingness to transact has focused primarily on the role of trust and trustworthiness either using trust theory or using acceptance, and adoption-based theories as frameworks from which to study trust. The research based on trust theories tends to focus on the structure of trust or on antecedents to trust (Bhattacharjee, 2002; Gefen, 2000; Jarvenpaa et al., 2000; McKnight et al., 2002a). Adoption- and acceptance-based research includes studies using the Technology Acceptance Model (Gefen et al., 2003) and diffusion theory (Van Slyke et al., 2004) to examine the effects of trust within well-established models. To our knowledge, studies of the effects of trust in the context of e-commerce transactions have not included CFIP as an antecedent in their models. The current research addresses this by examining the effect of CFIP on willingness to transact within a nomological network of additional antecedents (i.e., trust and risk) that we expect will be influenced by CFIP.

In addition, familiarity with the Web merchant may moderate the relationship between CFIP and both trust and risk perceptions. As an individual becomes more familiar with the Web merchant and how it collects and protects personal information, perceptions may be driven more by knowledge of the merchant than by information concerns. This differential relationship between factors for more familiar (e.g. experienced) and less familiar merchants is similar to findings of previous research on user acceptance for potential and repeat users of technology (Karahanna et al., 1999) and e-commerce customers (Gefen et al., 2003).

Thus, this research has two goals. The first goal is to better understand the role that consumers' concerns for information privacy (CFIP) have on their willingness to engage in online transactions. The second goal is to investigate whether familiarity moderates the effects of CFIP on key constructs in our nomological network. Specifically, the following research questions are investigated:

*How do consumers' concerns for information privacy affect their willingness to engage in online transactions?*

*Does consumers' familiarity with a Web merchant moderate the impact of concern for information privacy on risk and on trust?*

This paper is organized as follows. First, we provide background information regarding the existing literature and the constructs of interest. Next, we present our research model and develop the hypotheses arising from the model. We then describe the method by which we investigated the hypotheses. This is followed by a discussion of the results of our analysis. We conclude the paper by discussing the implications and limitations of our work, along with suggestions for future research.

## Research Model and Hypotheses

Figure 1 presents this study's research model. Given that concern for information privacy is the central focus of the study, we embed the construct within a nomological network of willingness to transact in prior research. Specifically, we include risk, familiarity with the merchant, and trust (Bhattacharjee, 2002; Gefen et al., 2003; Jarvenpaa and Tractinsky, 1999; Van Slyke et al., 2004) constructs that CFIP is posited to influence and that have been found to influence. We first discuss CFIP and then present the theoretical rationale that underlies the relationships presented in the research model. We begin our discussion of the research model by providing an overview of CFIP, focusing on this construct in the context of e-commerce.

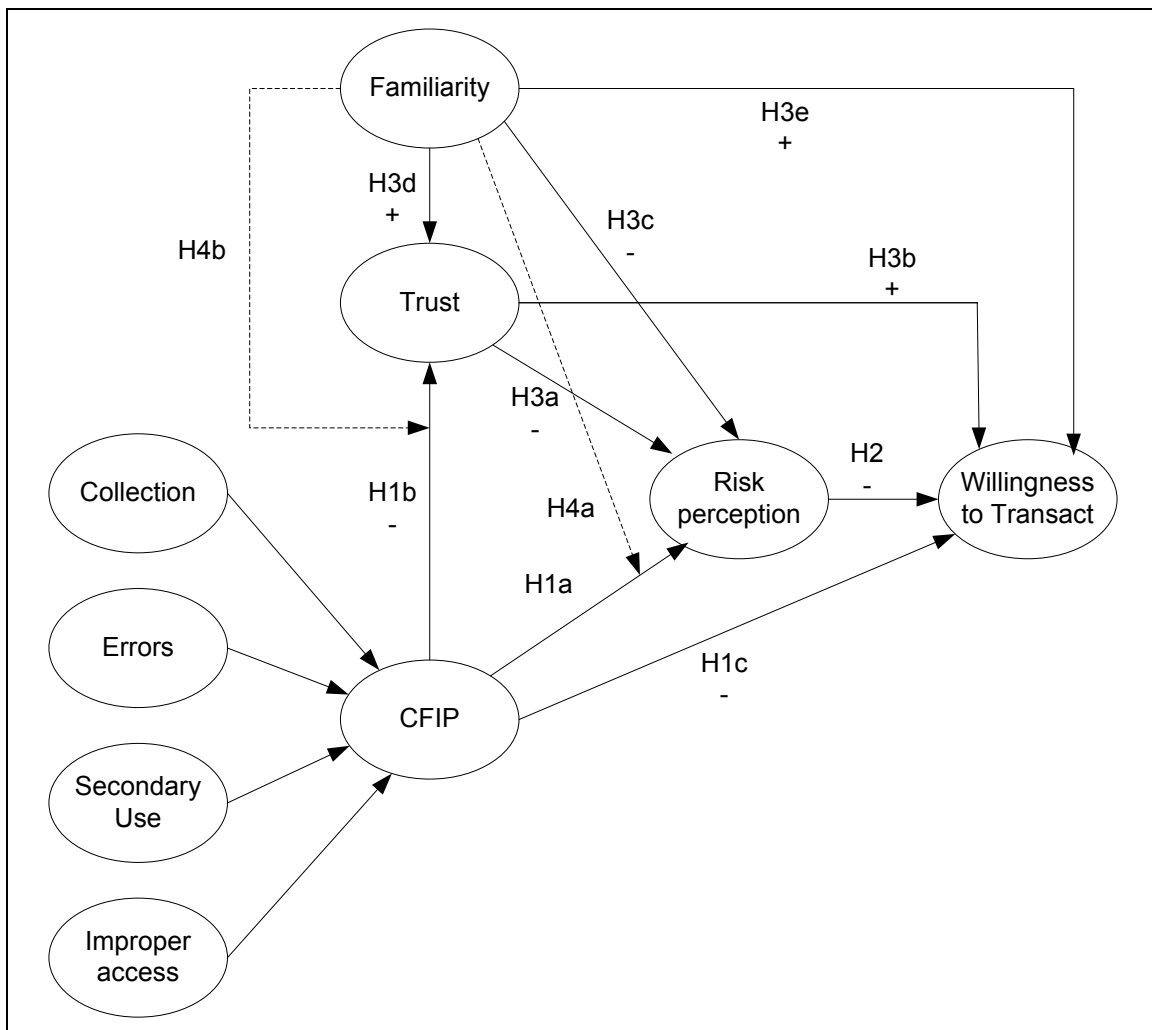


Figure 1. Research Model

## **Concern for Information Privacy**

Information privacy refers to an individual's ability to personally control information about his or herself (Stone et al., 1983). There is a growing concern about how much individuals are able to protect their personal information. As a result, concern for information privacy (CFIP) has begun to receive attention in the information systems literature. An individual's CFIP is a general concern about how organizations use and protect personal information (Smith et al., 1996, Stewart and Segars, 2002). As such, the focus is not on how an individual perceives the policies of an individual organization, but instead on the broader concerns surrounding information collection and use by organizations in general (Malhotra et al., 2004).

Concern for information privacy is a multidimensional construct consisting of four dimensions (Smith et al., 1996). *Collection* concerns center around individuals' perceptions as to whether data are collected and stored appropriately. *Unauthorized secondary use* reflects individuals' concerns regarding whether data that are collected for one purpose may be inappropriately used for some other purpose without authorization. *Improper access* pertains to concerns over whether unauthorized individuals are able to view data. Concerns regarding *errors* relate to individuals' concerns about whether data about them is adequately protected against accidental or intentional errors (Smith et al., 1996).

## **CFIP and E-commerce**

While there is considerable interest in privacy-related issues in the context of online consumer purchasing, to our knowledge there have been no direct investigations of CFIP in this context. It is important to understand CFIP in the context of e-commerce, because there is evidence that privacy apprehensions may limit e-commerce use (Hoffman et al., 1999). In fact, early surveys of consumer e-commerce report privacy as one of the most important concerns of consumers when engaging in online shopping (Phelps et al., 2001).

Although there has been limited focus on the concern for information privacy construct in the context of e-commerce, many studies have focused on aspects of information privacy relevant to the CFIP construct (Table 1).

As can be seen in the table, the research studies provide evidence that consumers are concerned about multiple aspects of their information privacy, from collection to use, and have indicated that these concerns represent barriers to their use of Web merchants. Although consumers have indicated that their concerns regarding information privacy are important, other research has found that interventions meant to allay consumer concerns about privacy, such as privacy seals, improve consumer perceptions of the merchant, but do not necessarily lead to increased patronage intentions (Kimery & McCord, 2002).

Interestingly, the research does suggest when perceptions of risk regarding the transaction are high, privacy seals can lead to increased patronage decisions (Malhotra et al, 2004). In addition, the studies found that concerns for privacy influence the trust in the Web merchant as well as the perceptions of risk in providing information (Miyazaki & Krishnamurthy, 2002). From these studies, we argue that CFIP impacts behavior via two mechanisms, effects on risk and trust. These are discussed in the following sections.

<b>Table 1. Privacy Studies focusing on Issues Relevant to CFIP Dimensions</b>		
Study	Privacy Concern	Relevant Finding
Hoffman et al. (1999)	Environmental Control Secondary Data Use	Consumers declined to provide personal information to Web merchants when they did not trust them.
Phelps et al. (2000)	Secondary Data Use	Concerns about secondary data use decreases use of direct-marketing merchants.
Milne (2000)	Secondary Data Use	Concerns about secondary data use decreases use of direct-marketing merchants.
Kovar et al. (2000b)	Information Privacy	Attending to privacy seals (by clicking on them) leads to increased expectations as to product and service quality.
Kovar et al. (2000a)	Information Privacy	Attending to privacy seals leads to expectations of positive future privacy behaviors of the merchant.
Kimery & McCord (2002)	Information Privacy	Privacy Seals (ex. TRUSTe, BBB, etc.) did not increase trust or intentions to purchase from a Web merchant.
Miyazaki & Krishnamurthy (2002)	Information Privacy	Use of privacy seals encouraged information disclosure and intention to engage in e-commerce when perceived risk was high.
Malhotra et al (2004)	Internet Users Concern for Information Privacy	Concerns about privacy were associated with less trust in and increased risk when providing information to acquire a free membership to a discount club.

### **CFIP and Risk Perceptions**

Risk perception is an individual's belief regarding the probability of gains or losses associated with purchasing goods or services from a Web merchant (Mayer et al., 1995). Because by its very nature, e-commerce requires the disclosure of personal information (such as name, address, and account information), online consumers must contend with the possibility of risks associated with the collection, protection, and use of information when privacy violations occur (Pavlou, 2003).

For example there have been multiple, visible instances of corporate computer systems being compromised, exposing millions of customers' personal information (Lemos and Charny, 2000, Reuters, 2006). In addition, companies such as Amazon.com sell or trade consumer information, even when their original privacy policies prohibited this behavior (Rosencrance, 2000). Unintentional privacy violations may also increase consumers' risk perceptions. For example, in 2000 hackers broke into computer retailer Egghead's computer systems, compromising the data of millions of customers. Over 3.5 million credit card numbers may have been stolen (Olvasrud, 2000). Finally, identity theft, which is largely an information privacy issue, is increasing and is often associated with online commerce (Cohen, 2001). Table 2 maps the risks emanating from privacy violations to the CFIP dimensions.

<b>Table 2 – CFIP Dimensions and E-commerce Risks</b>	
<b>CFIP Dimension</b>	<b>Risk</b>
Collection	<ul style="list-style-type: none"> <li>Some sites may require registration for access; registration may require disclosure of personal information, putting this information in danger of misuse. Once collected, the consumer may be exposed to unauthorized secondary use or improper access, leading to different types of harm. If the information is misused, consumers may suffer.</li> </ul>
Errors	<ul style="list-style-type: none"> <li>Merchants' internal systems may not function properly, leading to errors in individuals' data. This erroneous data may lead to mis-billings, incorrect shipments and other negative consequences.</li> <li>Incorrect billing and/or delivery data may lead to inaccurate billing or delayed delivery.</li> </ul>
Unauthorized secondary use	<ul style="list-style-type: none"> <li>Data, particularly email addresses, may be sold to and used by third-parties without authorization. This may lead to consumers suffering negative consequences due to spam and other unwanted contacts.</li> <li>Preference data may be tracked (e.g. through cookies, or through "click-stream" data), and this information may be disclosed to third-parties and/or used inappropriately. This may lead to negative consequences related to unwanted consumer profiling.</li> </ul>
Improper access	<ul style="list-style-type: none"> <li>Lack of security on merchants' systems may lead to security violations and access by unauthorized individuals. This may lead to identity theft, fraudulent billing and other consequences.</li> <li>Weakness (real or perceived) in Internet security may lead to perception of possible interception of data when traveling over the Internet. This may lead to identity theft, fraudulent billing and other consequences.</li> </ul>

There are other reasons to think that CFIP and risk perceptions are related. Some have suggested that the information exchange between consumers and merchants constitutes an implied social contract. One aspect of this contract is that merchants will utilize and protect consumers' information appropriately (Phelps et al., 2000). Individuals with high CFIP may be concerned that, in general, organizations do not protect their data sufficiently well to satisfy this social contract. In turn this may heighten perceptions of risk in transacting with a specific Web merchant. In fact, empirical evidence exists that information privacy concerns impact the perceptions of the risk of sharing personal information in exchange for a membership in a discount buying club (Malhotra et al., 2004). In addition, Hoffman et al. (1999) found that over 72% of the individuals in their survey believed that revealing personal information to Web merchants was not worth the risk. Therefore, we argue that consumers who are more concerned about information privacy are likely to also perceive higher risks of engaging in online commerce. Thus, we formulated the following hypothesis:

*H1a: Consumers' concerns for information privacy are positively related to their perceptions of the risk of conducting transactions with a Web merchant.*

It may also be that CFIP impacts e-commerce-related behaviors through its influence on trust. In the following section, we discuss this relationship.

## CFIP and Trust

CFIP represents an individual's generalized concerns about how organizations collect, store, protect, and use personal information. These concerns become salient when engaging in transactions, and may affect the trust that these individuals place in the Web merchant.

Trust in the Web merchant has been characterized as the belief that the merchant "will not behave opportunistically by taking advantage of the situation" (Gefen et al., 2003, p. 54), and as the trustor's expectations about the ability (competence), benevolence, and integrity of the merchant, (Bhattacharjee, 2002, Doney and Cannon, 1997, McKnight et al., 2002a). Privacy concerns may be a factor in determining the level of trust a consumer is willing to place in an organization. Research indicates that Internet-specific privacy concerns have a negative impact on trust-related beliefs (Malhotra et al., 2004).

Web merchants' adoption of privacy seals and other privacy-related signals may also provide support for the relationship between privacy concerns and trust. We argue that these privacy-related mechanisms are intended to allay consumers' privacy concerns. These seals, in effect, demonstrate to the consumer that the merchant is willing and able to properly protect the consumer's information. Further, these mechanisms also signal that the merchant is committed to behaving properly (i.e. in a trustworthy manner) when dealing with the consumers' information. Thus we believe that these privacy-signaling mechanisms may be evidence of a link between privacy concerns and trust.

This implicit relationship can be theoretically supported. In the information systems literature, many studies use Mayer et al.'s (Mayer et al., 1995) conceptualization of trustworthiness as consisting of three dimensions: ability, benevolence, and integrity. Ability beliefs pertain to the merchant's competence. Integrity refers to the consumer's beliefs about whether the merchant lives up to a set of rules that are acceptable to the consumer. Benevolence beliefs reflect whether the consumer believes that the merchant will do good by the consumer, and will not be motivated purely by a profit motive (Bhattacharjee, 2002, Gefen et al., 2003, McKnight et al., 2002a, Olvasrud, 2000). Trustworthiness beliefs are personal in nature; they are not objective assessments but rather reflect the perceptions of the individual. Different individuals may have vastly different beliefs about the trustworthiness of a given merchant. It may be that those individuals with high information privacy concerns are more likely to be skeptical when assessing the trustworthiness of a merchant. For example, individuals with higher concerns about the collection of personal information, the accuracy of that information, and the protection of that information, may be skeptical about the ability of the merchant to accurately collect and protect their personal information. Similarly, individuals who are highly concerned about improper access and unauthorized secondary use may be less likely to feel that they can trust any specific organization to behave with appropriate integrity (especially given the multiple visible instances where organizations have not done so). For instance, selling or sharing consumers' information with trading partners may represent profit opportunities to a merchant, and it may be that consumers who are concerned about unauthorized secondary use might perceive a merchant would take advantage of such opportunities and be less benevolent. Given the above, we believe that CFIP will have an impact on trust, as stated below.

*H1b: Consumers' concerns for information privacy are negatively related to their trust in the Web merchant.*



CFIP may also have a direct impact on willingness to transact beyond those that are mediated by risk and trust. In the next section we discuss literature that supports this thinking.

### **CFIP and Willingness to Transact**

As discussed earlier, previous research has argued that privacy concerns represent a key barrier to consumer e-commerce (Hoffman et al., 1999). In one study (Hoffman et al., 1999) researchers found that by far the most commonly cited reason for not purchasing from Web merchants was concern over personal information. In addition, many of the mechanisms currently being implemented and researched to increase participation in e-commerce, such as privacy statements and privacy seals, are geared toward reducing concerns for privacy (Kimery and McCord, 2002, Miyazaki and Krishnamurthy, 2002). The beliefs underlying these approaches are that, as in other direct marketing contexts, consumer concerns for information privacy are reducing participation in e-commerce and that mechanisms that reduce these concerns will lead to increased willingness to purchase from Web merchants (Milne and Boza, 1999, Miyazaki and Fernandez, 2001). Further evidence supporting the relationship between privacy concerns and purchase-related behaviors can be found in the direct marketing literature where concerns for privacy affect both information disclosure and purchase intentions (Phelps et al., 2000, Phelps et al., 2001).

The interventions referenced in the previous paragraph are intended to increase consumers' beliefs that merchants will behave in a competent and benevolent (e.g. trustworthy) manner and to reduce risk perceptions. Thus, the impact of CFIP on willingness to transact is likely fully mediated by trust and risk. However, since some prior research has implied a possible direct relationship, for completeness, we also posit a direct influence, as stated in the following hypothesis.

*H1c: Consumers' concerns for information privacy are negatively related to their willingness to conduct transactions with a Web merchant.*

To more clearly understand the relative impact of CFIP in the nomological network, relationships among trust, risk, and willingness to transact are also included. Further, we posit that familiarity moderates some of the relationships in the model. These issues are discussed in the following section.

### ***Extending the Nomological Net***

#### **Risk Perceptions and Willingness to Transact**

As defined earlier, perceived risk is defined as an individual's belief regarding the probability of gains or losses associated with purchasing goods or services from an online merchant (Mayer et al., 1995). Pavlou (2003) lists a number of risks associated with engaging in e-commerce, including economic risk, personal risk, and privacy risk. Economic risk is the probability of actual monetary loss. Personal risk comes from acquiring potentially unsafe products or services or the seller not performing satisfactorily. Given that merchants and consumers are not co-located in online transactions, this perceived risk may be greater than in an offline transaction. For example, consumers may find it more difficult to assess the quality of certain types of products and may face increased risk of merchant non-performance (i.e. does not ship

the product, ships the wrong product, etc.) than when purchase and acquisition occur simultaneously. Although this may be less of an issue for some products, such as books, the risks exist regardless of the product type.

Finally, privacy risk focuses on the potential for the illegitimate disclosure of private information. In online transactions, personal information is transmitted over a public computer network and is often stored on merchants' online servers, which places the information at risk if proper steps are not taken to secure and limit the use of it. These concerns are not unreasonable, given that there are multiple examples of consumer data being compromised, such as the case in 2000 when Egghead.com's systems were broken into, and more than three million consumers had their credit card information compromised (Lemos and Charny, 2000).

Thus, it should not be surprising that many studies have found that perceptions of risk are negatively associated with willingness to engage in online transactions across merchants, products, and cultures (Jarvenpaa and Tractinsky, 1999, Jarvenpaa et al., 2000, Kimery and McCord, 2002, McKnight et al., 2002b, Pavlou, 2003). Therefore, we argue that perceptions of risk will be negatively related to consumer willingness to transact with an online merchant, and pose the following hypothesis:

*H2: Consumers' perceptions of the risk of conducting transactions with a Web merchant are negatively related to their willingness to conduct transactions with that merchant.*

### **Familiarity, Trust, Risk, and Willingness to Transact**

The relationships given in the following hypotheses are well established in prior research (cf. Bhattacharjee, 2002, cf. Gefen et al., 2003, Gefen and Straub, 2004, Jarvenpaa and Tractinsky, 1999, Malhotra et al., 2004, McKnight and Chervany, 2001-2002, McKnight et al., 2002b, Pavlou, 2003, Van Slyke et al., 2004). Although we do not provide extended discussions justifying these hypotheses, they are included for the sake of completeness.

*H3a: Consumers' trust in a Web merchant is negatively related to their perceptions of risk of purchasing from that Web merchant.*

*H3b: Consumers' trust in a Web merchant is positively related to their willingness to conduct transactions with that Web merchant.*

*H3c: Consumers' familiarity with a Web merchant is negatively related to their perceptions of the risk of conducting transactions with that Web merchant.*

*H3d: Consumers' familiarity with a Web merchant is positively related to their perceptions of trust in that Web merchant.*

*H3e: Consumers' familiarity with a Web merchant is positively related to their willingness to conduct transactions with that Web merchant.*

Having developed hypotheses related to our first research question, we now turn attention to our second question, which pertains to the moderating effect of merchant familiarity.

## **Moderating Role of Merchant Familiarity**

Prior research has shown that different factors influence use intentions as one gains experience with an innovation or merchant. For example, there is empirical evidence that the factors influencing the initial adoption of an information technology innovation differ from those that influence continued use (Karahanna et al., 1999). Other research has shown that in the context of consumer e-commerce, trust-building factors differ for potential and repeat customers (Kim and Park, 2005). In addition, antecedents of willingness to transact vary between potential and repeat customers (Gefen et al., 2003b). Thus, we argue that familiarity can moderate both the relationship between CFIP and trust and CFIP and risk.

As individuals' CFIP increases, they should be less likely to trust Web merchants in general. Yet, research has suggested that when individuals are more familiar with a specific Web merchant their trust in it increases (Bhattacharjee, 2002, Gefen et al., 2003) because they feel that the merchant has performed in a trustworthy manner in the past and should do so again in the future. This suggests that the impact of CFIP, which is a general belief about organizations' privacy practices, on trust may be moderated by familiarity with the specific merchant. As consumers become more familiar and have more experiences with a merchant, generalized privacy concerns will be of less importance because, even though consumers have privacy concerns in general, their first-hand experience with the merchant provides evidence that they can trust the Web merchant with their personal information.

In a similar fashion, familiarity should also moderate the relationship between CFIP and risk perceptions. The basic premise of the relationship between CFIP and risk is that general concerns about information privacy practices used by organizations in collecting, using, storing, and protecting personal information engender higher perceptions of risk with respect to transacting with a specific Web merchant. This relationship can be impacted when a consumer is familiar with the Web merchant, because the consumer will have information indicating that the merchant has behaved appropriately and has adequately protected and not inappropriately used or abused the information provided in the past. Thus, despite the general concerns about privacy that consumers have, they may not have the same level of perceived risk about a specific Web merchant because they are familiar with how their personal information has been used and protected in the past and will be likely to assume that the same will occur in the future. Thus, as individuals become more familiar with a Web merchant, the strength of the relationship between CFIP and risk will be reduced. Therefore, we investigated the following hypotheses:

*H4a: Consumers' familiarity will moderate the relationship between their concern for information privacy and perceptions of risk of a Web merchant.*

*H4b: Consumers' familiarity will moderate the relationship between their concern for information privacy and trust in a Web merchant.*

The empirical study used to test our research model is presented in the following section.

## Method

To enhance generalizability, we validated the model using two data collection efforts: the first used a well-known merchant (Amazon.com) and the second used a less well-known merchant (Half.com). Both studies used the context of an online textbook purchase.

In both studies, data were collected from consumers who were enrolled at a large, urban university in the southeast United States. Participants completed an online survey that assessed their CFIP, perceptions of risk, familiarity, trust, and willingness to transact with the focal Web merchant. The surveys were essentially the same for both data collections, except for items specific to the merchant. Note that CFIP items were worded to reflect a general concern rather than a concern with respect to any particular merchant, whereas the remaining scales were in the context of a specific online merchant.

### Sample Demographics

For the first survey, a total of 1,100 individuals were invited to complete the Amazon.com survey, and 713 usable surveys were completed, for a response rate of 65%. The sample was gender-balanced, with females comprising 52%. Participants ranged in age from 19 to 54 years of age (mean = 23.5). Almost all (97.8%) of the participants reported having access to one or more credit cards and just over 34% of the participants had prior experience purchasing from Amazon.com.

For the second survey, 287 usable surveys were completed, from 854 individuals who were invited to participate, resulting in a 34% response rate. Demographics were similar to the other survey, with just less than half of the participants (45%) being female. Age ranged from 18 to 52 years (mean = 23.1). Virtually all (99%) of the participants reported having access to one or more credit cards. Finally, 27.5% of the participants reported having made a purchase from Half.com.

### Measures

We derived measurement scales intended to represent the constructs in the research model from previously-validated scales. Where necessary, we slightly reworded items to reflect either Amazon.com or Half.com as the merchant of interest. Table 3 provides the source of each scale. Scale items are provided in Appendix A.

<b>Scale</b>	<b>Source</b>
Concern for information privacy	(Smith et al., 1996, Stewart and Segars, 2002)
Collection	
Errors	
Unauthorized secondary use	
Improper access	
Trust	(Bhattacharjee, 2002)
Familiarity	(Gefen, 2000)
Risk perception	(Jarvenpaa et al., 2000)
Willingness to transact	(Jarvenpaa et al., 2000)

With respect to concern for information privacy, to be consistent with prior research into information privacy concerns (Malhotra et al., 2004, Smith et al., 1996, Stewart and Segars, 2002), we focus on general CFIP rather than CFIP that is specific to a particular merchant. Previous research has argued that the Concern for Information Privacy is a second order reflective construct (Stewart and Segars, 2002), consisting of four dimensions (Smith et al., 1996). We argue that CFIP is better modeled as a second order *formative* construct because 1) each dimension can vary independently from each of the other dimensions, and 2) none of the dimensions necessarily needs to covary (e.g. an individual could have a high concern about errors, but low concern about collection). These characteristics are more indicative of a formative construct (Jarvis et al., 2003, Law and Wong, 1999). Therefore, we model CFIP as a formative second-order construct.

To test for the moderating role of familiarity, we constructed an interaction term by computing factor scores for CFIP and familiarity and multiplying these two scores, with the product of these scores used as the indicator for the interaction term. In the following section, we provide results of our data analysis, including the validation of our measurement scales and results related to hypothesis testing.

## Results

We tested two measurement and structural models, one each using the Amazon.com data and one each using the Half.com data. The data were analyzed using PLS Graph 3.0. The results are presented below.

### **Measurement Models**

We tested the measurement model for each dataset with respect to internal consistency and discriminant validity. A common rule of thumb is that item loadings should exceed 0.707 and the average variance extracted (AVE) for the construct should exceed 0.50. All scales had internal consistency reliabilities exceeding 0.80, providing evidence of strong reliability. In addition, as evidence of convergent and discriminant validity, the square root of the AVE for each construct was greater than 0.70 (i.e.,  $AVE > 0.50$ ) and was greater than the correlation with all other constructs in the study. Although all the constructs had strong reliability and validity, one item for the collection subscale of CFIP (Col1 in the Half.com data) had a lower than recommended loading ( $< 0.707$ ). We decided to retain this item because (1) the reliability and validity estimates of the constructs were strong, (2) the scale in question has been successfully used in multiple contexts, and (3) well established scales sometimes exhibit poor loadings when used in different research contexts (Barclay et al., 1995). Tables 4 (Amazon.com) and 5 (Half.com) contain the factor matrix for the constructs in the study. Tables 6 (Amazon.com) and 7 (Half.com) contain the means, standard deviations, internal consistency reliability, square root of the AVE, and inter-construct correlations.

As discussed earlier, we modeled CFIP as a second-order formative construct. For formative constructs, previous research has argued that each item path forming the construct should have weights that are significant, indicating that they each contribute to the overall construct (Bollen and Lennox, 1991, Diamantopoulos and Winklhofer, 2001). As seen in Tables 4 and 5, this holds for the CFIP scales. For the Amazon.com data, the

Table 4. Factor Matrix: Amazon.com Data								
Item	1.	2.	3.	4.	5.	6.	7.	8.
1. Familiarity								
FAM1	<b>.91</b>	.27	-.34	.51	.02	.12	.16	.19
FAM2	<b>.86</b>	.16	-.29	.42	.04	.12	.14	.15
2. Trust								
TR1	.24	<b>.91</b>	-.21	.30	.07	.12	.27	.27
TR2	.20	<b>.91</b>	-.19	.27	.12	.13	.29	.30
TR3	.24	<b>.92</b>	-.23	.30	.06	.12	.26	.25
TR4	.25	<b>.92</b>	-.22	.29	.06	.15	.27	.25
TR5	.21	<b>.90</b>	-.22	.31	.06	.13	.25	.23
TR6	.19	<b>.87</b>	-.21	.29	.03	.10	.22	.20
TR7	.23	<b>.93</b>	-.25	.33	.04	.12	.27	.27
3. Risk Perceptions								
Risk1	-.28	-.23	<b>.87</b>	-.42	.16	-.01	-.04	-.03
Risk2	-.31	-.16	<b>.88</b>	-.39	.12	-.01	-.03	-.01
Risk3	-.35	-.23	<b>.88</b>	-.48	.13	-.03	-.02	-.02
4. Willingness To Transact								
WT1	.51	.30	-.45	<b>.94</b>	.01	.12	.16	.16
WT2	.47	.30	-.43	<b>.91</b>	.03	.13	.16	.16
WT3	.49	.33	-.47	<b>.95</b>	.03	.12	.17	.17
WT4	.49	.30	-.49	<b>.95</b>	-.01	.10	.13	.14
5. Collection								
Col1	-.06	-.02	.19	-.09	<b>.77</b>	.26	.32	.29
Col2	.05	.10	.08	.04	<b>.84</b>	.36	.43	.47
Col3	.01	.06	.15	.01	<b>.89</b>	.38	.49	.48
Col4	.09	.08	.11	.08	<b>.82</b>	.35	.39	.42
6. Errors								
Err1	.06	.10	.01	.08	.30	<b>.78</b>	.38	.44
Err2	.13	.15	-.02	.12	.37	<b>.89</b>	.41	.52
Err3	.11	.12	-.03	.10	.39	<b>.86</b>	.41	.53
Err4	.16	.09	-.03	.13	.36	<b>.89</b>	.41	.55
7. Secondary Use								
SU1	.12	.29	.02	.11	.43	.36	<b>.82</b>	.61
SU2	.14	.26	-.03	.10	.39	.40	<b>.84</b>	.61
SU3	.14	.17	-.01	.13	.43	.40	<b>.83</b>	.62
SU4	.16	.25	-.08	.21	.43	.42	<b>.87</b>	.67
8. Inappropriate Access								
IA1	.16	.24	.00	.17	.45	.53	.66	<b>.86</b>
IA2	.14	.23	-.02	.13	.41	.51	.63	<b>.86</b>
IA3	.19	.25	-.03	.14	.46	.51	.67	<b>.89</b>

weights for collection ( $\beta = 0.321$ ,  $t = 16.235$ ,  $p < .001$ ), errors ( $\beta = 0.271$ ,  $t = 17.860$ ,  $p < 0.001$ ), secondary use ( $\beta = 0.351$ ,  $t = 28.640$ ,  $p < 0.001$ ), and improper access ( $\beta = 0.291$ ,  $t = 38.697$ ,  $p < 0.001$ ) were significant and related to the higher order construct. For the Half.com data, the weights for collection ( $\beta = 0.205$ ,  $t = 13.618$ ,  $p < 0.001$ ), errors ( $\beta = 0.334$ ,  $t = 13.011$ ,  $p < 0.001$ ), secondary use ( $\beta = 0.351$ ,  $t = 27.635$ ,  $p < 0.001$ ), and improper access ( $\beta = 0.294$ ,  $t = 24.973$ ,  $p < 0.001$ ) were also significant and related to the higher order construct. Thus, the measurement model provides evidence of good psychometric properties of the scales.

Item	1.	2.	3.	4.	5.	6.	7.	8.
<b>1. Familiarity</b>								
FAM3	<b>.94</b>	.31	.35	.63	-.01	-.02	.01	.04
FAM4	<b>.90</b>	.22	.34	.50	.03	-.01	-.03	.00
<b>2. Trust</b>								
TR1	.26	<b>.86</b>	.48	.32	.06	.06	.12	.19
TR2	.23	<b>.81</b>	.41	.22	.01	.03	.04	.11
TR3	.26	<b>.85</b>	.42	.29	.05	.08	.12	.18
TR4	.24	<b>.83</b>	.37	.24	-.04	.08	.11	.11
TR5	.16	<b>.79</b>	.40	.22	.00	.07	.14	.13
TR6	.24	<b>.84</b>	.44	.29	-.03	.03	.11	.13
TR7	.30	<b>.87</b>	.48	.36	-.02	.07	.15	.15
<b>3. Risk Perceptions</b>								
Risk1	.31	.43	<b>.90</b>	.43	-.08	.04	.07	.11
Risk2	.33	.45	<b>.92</b>	.42	-.10	.07	.06	.07
Risk3	.37	.51	<b>.92</b>	.46	-.08	.04	.09	.10
<b>4. Willingness to Transact</b>								
WT1	.58	.32	.44	<b>.95</b>	-.06	-.01	.00	.03
WT2	.58	.31	.50	<b>.93</b>	-.03	.01	.05	.06
WT3	.60	.34	.45	<b>.96</b>	-.04	.00	.06	.09
WT4	.60	.32	.44	<b>.96</b>	-.05	.02	.05	.09
<b>5. Collection</b>								
Col1	.00	-.08	-.20	-.14	<b>.61</b>	.19	.20	.21
Col2	-.03	-.01	-.12	-.05	<b>.75</b>	.33	.43	.44
Col3	.06	.06	-.03	-.02	<b>.84</b>	.41	.51	.52
Col4	-.01	.00	.00	.01	<b>.78</b>	.38	.45	.48
<b>6. Errors</b>								
Err1	-.02	.07	.08	.04	.29	<b>.80</b>	.43	.46
Err2	-.01	.09	.07	.03	.41	<b>.90</b>	.60	.64
Err3	.00	.05	.01	.01	.41	<b>.86</b>	.53	.60
Err4	-.01	.04	.03	-.06	.42	<b>.88</b>	.54	.61
<b>7. Secondary Use</b>								
SU1	.01	.10	.05	.05	.46	.53	<b>.87</b>	.70
SU2	-.08	.12	.02	-.01	.45	.55	<b>.83</b>	.64
SU3	.02	.12	.11	.01	.46	.47	<b>.83</b>	.61
SU4	.02	.12	.10	.09	.52	.55	<b>.88</b>	.74
<b>8. Inappropriate Access</b>								
IA1	-.01	.12	.09	.02	.53	.61	.69	<b>.89</b>
IA2	.06	.16	.13	.10	.45	.59	.68	<b>.86</b>
IA3	.02	.18	.06	.06	.54	.61	.73	<b>.91</b>

As can be seen in Tables 6 and 7, scale means for the CFIP subscales in the two data sets do not differ systematically. This is appropriate because the CFIP items measure general concerns rather than merchant-specific concerns; we would not expect there to be systematic differences between the two data sets, and statistical tests (t-tests) indicate no significant differences between the two data sets on the CFIP dimensions ( $p < 0.05$ ). In contrast, since the other scales are merchant-specific, we would expect differences across the two data sets. Indeed, as expected, the means for trust,

**Table 6. Means, Std. Deviations, Correlations, Reliability Estimates, and Validity Coefficients: Amazon.com Data**

Construct	M	SD	ICR	1.	2.	3.	4.	5.	6.	7.	8.
1. Risk	2.9	0.9	.91	.88							
2. Trust	5.6	1.1	.97	-.24	.91						
3. Familiarity	4.9	1.3	.88	-.36	.25	.89					
4. Willingness to Transact	4.7	1.2	.97	-.49	.33	.53	.94				
5. Collection	5.5	1.0	.90	.16	.07	.03	.02	.83			
6. Errors	5.5	1.0	.92	-.02	.14	.14	.13	.41	.86		
7. Secondary Use	6.4	0.9	.91	-.03	.29	.17	.16	.50	.47	.84	
8. Improper Access	6.4	0.9	.90	-.02	.28	.19	.17	.51	.59	.75	.87

**Table 7. Means, Std. Deviations, Correlations, Reliability Estimates, and Validity Coefficients: Half.com Data**

Construct	M	SD	ICR	1.	2.	3.	4.	5.	6.	7.	8.
1. Risk	3.3	1.1	.93	.91							
2. Trust	5.3	0.9	.94	-.51	.84						
3. Familiarity	4.2	1.7	.92	-.37	.29	.92					
4. Willingness to Transact	4.1	1.6	.97	-.48	.34	.62	.94				
5. Collection	5.3	1.2	.84	.09	.01	.01	-.05	.75			
6. Errors	5.8	1.1	.92	-.05	.07	-.01	.01	.45	.86		
7. Secondary Use	6.4	1.1	.91	-.08	.14	-.01	.04	.55	.62	.85	
8. Improper Access	6.4	1.1	.92	-.10	.17	.03	.07	.57	.68	.79	.89

Shaded elements along the diagonal represent the square root of the variance shared between the constructs and their measures. Off diagonal elements are the correlations among constructs. For discriminant validity, diagonal elements should be larger than off-diagonal elements.

Note: ICR = Internal Consistency Reliability

familiarity, and willingness to transact are higher for Amazon.com (the more well-known merchant), and risk is higher for Half.com (the lesser known merchant).

Having assessed the validity of our measures, we next examine the structural models and present the results.

### **Structural Models**

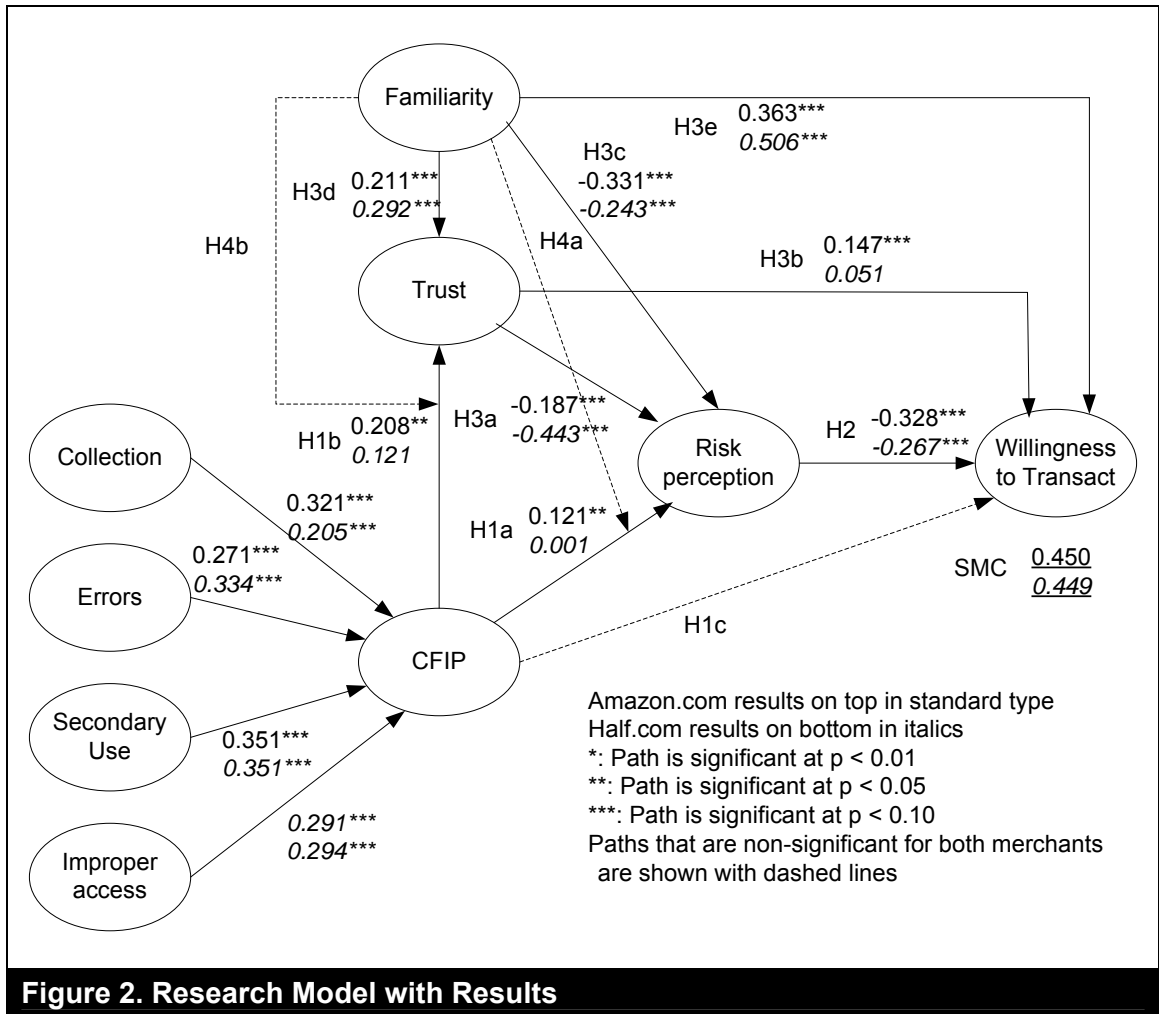
We used a two-step approach using PLS to empirically examine our hypotheses. The first step analyzed a structural model that included all main effects shown in our research model along with interaction terms to examine whether familiarity moderates the impact of CFIP on trust and risk. In order to test the moderation effects, we added two paths to our main effects model. One path goes from the interaction term to trust; this path tests whether familiarity moderates the impact of CFIP on trust. The other path goes from the interaction term to risk; this path tests whether familiarity moderates the impact of CFIP on risk. This analysis indicated that neither of the moderation hypotheses (H4a & H4b) were supported (i.e. both paths from the interaction term have non-significant beta coefficients). For the Amazon.com data, the t-values for familiarity's moderation of CFIP to risk and trust were 1.20 and 0.52, respectively. For the Half.com data, the t-values for familiarity's moderation of CFIP to risk and trust were 0.46 and 1.31, respectively.



**Table 8. Results of Hypothesis Tests**

Hypothesis	Merchant					
	Amazon.com			Half.com		
	B	p	Support	B	p	Support
H1a: CFIP → RP	0.121	< 0.05	✓	0.001	n.s.	X
H1b: CFIP → TR	0.208	< 0.01	--	0.121	n.s.	X
H1c: CFIP → WT	0.061	n.s.	X	0.002	n.s.	X
H2: RP → WT	-0.328	< 0.001	✓	-0.267	<0.001	✓
H3a: TR → RP	-0.187	< 0.001	✓	-0.443	< 0.001	✓
H3b: TR → WT	0.147	< 0.001	✓	0.051	n.s.	X
H3c: FAM → RP	-0.331	< 0.001	✓	-0.243	<0.001	✓
H3d: FAM → TR	0.211	< 0.001	✓	0.292	<0.001	✓
H3e: FAM → WT	0.363	< 0.001	✓	0.506	<0.001	✓

Legend: ✓ = Supported      -- = Significant in Opposite Direction Theorized  
 X = Not supported      n.s. = Non-significant



Because the paths related to the moderation effects were not significant, we tested a second structural model, consisting of only the main effects. Testing the main effects paths in the first structural model would be inappropriate due to the presence of the interaction terms (Carte and Russell, 2003). Using PLS, we assessed the structural

model by examining path coefficients. Using t-tests, and consistent with recommendations (Chin, 1998), we used bootstrapping to determine the significance of each path. The results are discussed below, summarized in Table 8 and shown graphically in Figure 2.

For the Amazon.com dataset, in support of H1a, CFIP affected risk perceptions ( $\beta = 0.121$ ,  $p < .05$ ). CFIP also impacted trust ( $\beta = 0.208$ ,  $p < .01$ ), but in the opposite of the expected direction. H1c, which posited that CFIP would directly affect willingness to transact, was not supported. Support was found for H2, with risk perceptions affecting willingness to transact ( $\beta = -0.328$ ,  $p < .001$ ). Support was also found for the remaining hypotheses: trust affected risk perceptions (H3a;  $\beta = -0.187$ ,  $p < 0.001$ ) and willingness to transact (H3b;  $\beta = 0.147$ ,  $p < 0.001$ ); and familiarity had significant impacts on risk perceptions (H3c;  $\beta = -0.331$ ,  $p < 0.001$ ), on trust (H3d;  $\beta = 0.211$ ,  $p < 0.001$ ), and on willingness to transact (H3e;  $\beta = 0.363$ ,  $p < 0.001$ ). Overall, the variables explained 10% of the variance in trust, 17% of the variance in risk perceptions, and 41% of the variance in willingness to transact. The explained variance in this study was similar to other models of consumer e-commerce use (e.g. Bhattacharjee, 2002, Gefen, 2000, e.g. Gefen, 2002, Jarvenpaa et al., 2000).

For the Half.com dataset, the results were surprising. Contrary to H1a, H1b, and H1c, CFIP did not affect risk perceptions, trust in the Web merchant, or willingness to transact ( $p > 0.05$  for all). In support of H2, risk perceptions affected willingness to transact ( $\beta = -0.267$ ,  $p < 0.001$ ). Results further indicated that trust affected risk perceptions (H3a;  $\beta = -0.443$ ,  $p < 0.001$ ), but not willingness to transact (H3b;  $\beta = 0.051$ ,  $p > 0.05$ ). In addition, familiarity affected risk perceptions (H3c;  $\beta = -0.243$ ,  $p < 0.001$ ), trust in the Web merchant (H3d;  $\beta = 0.292$ ,  $p < 0.001$ ), and willingness to transact (H3e;  $\beta = 0.506$ ,  $p < 0.001$ ). Overall, the variables explained 10% of the variance in trust, 32% of the variance in risk perceptions, and 46% of the variance in willingness to transact.

### Post-Hoc Analysis

As noted earlier, our study focuses on general privacy concerns rather than privacy concerns specific to a merchant. Although this is consistent with prior work on CFIP (Smith et al., 1996, Stewart and Segars, 2002) and information privacy concerns in the context of e-commerce (Malhotra et al., 2004), it is possible that consumers may also form concerns regarding how specific organizations collect, protect, and use personal information. Thus, it is possible that merchant-specific CFIP (MS-CFIP) might have different impacts than general CFIP. Therefore, we collected additional data on the role of MS-CFIP by re-wording the CFIP scale items to reflect a specific merchant (e.g. Amazon.com).

Results from analysis of the measurement models for these are provided in Tables 9 and 10. As can be seen, the results for both the inter-construct correlations (Tables 9 and 10) and structural models (Table 11) for MS-CFIP are similar to those for the general CFIP analysis. In fact, for both the Amazon.com and Half.com datasets, although beta coefficients differed slightly for relationships involving CFIP, the same paths were significant for both MS-CFIP and CFIP.

**Table 9. Means, Std. Deviations, Correlations, Reliability Estimates, and Validity Coefficients: MS-CFIP, Amazon.com**

Construct	M	SD	ICR	1.	2.	3.	4.	5.	6.	7.	8.
1. Risk	3.1	.96	.90	.87							
2. Trust	6.3	.89	.89	-.16	.76						
3. Familiarity	5.1	1.3	.88	-.34	.18	.89					
4. Willingness to Transact	4.8	1.3	.96	-.50	.18	.53	.93				
5. Collection	5.1	1.1	.81	.31	-.01	-.07	-.18	.72			
6. Errors	5.6	1.1	.90	.13	.05	.00	-.06	.38	.83		
7. Secondary Use	6.3	1.1	.92	.09	.08	.04	-.03	.49	.42	.86	
8. Improper Access	6.4	0.9	.89	.04	.30	.10	.06	.38	.55	.60	.86

**Table 10. Means, Std. Deviations, Correlations, Reliability Estimates, Validity Coefficients: MS-CFIP, Half.com**

Construct	M	SD	ICR	1.	2.	3.	4.	5.	6.	7.	8.
1. Risk	3.3	1.1	.94	.91							
2. Trust	5.3	0.9	.94	-.51	.84						
3. Familiarity	4.2	1.7	.92	-.37	.29	.92					
4. Willingness to Transact	4.1	1.6	.97	-.48	.34	.62	.94				
5. Collection	5.1	1.2	.82	.17	-.04	-.05	-.13	.73			
6. Errors	5.7	1.1	.91	.01	.00	-.02	-.03	.41	.85		
7. Secondary Use	6.4	1.1	.91	-.06	.13	.00	.01	.47	.61	.84	
8. Improper Access	6.3	1.0	.91	-.06	.16	.03	.05	.48	.67	.80	.87

Shaded elements along the diagonal represent the square root of the variance shared between the constructs and their measures. Off diagonal elements are the correlations among constructs. For discriminant validity, diagonal elements should be larger than off-diagonal elements. Note: ICR = Internal Consistency Reliability

**Table 11. Hypothesis Tests for Merchant-Specific CFIP Data**

Hypothesis	Merchant					
	Amazon.com (Specific CFIP)			Half.com (Specific CFIP)		
	$\beta$	p	Support	B	P	Support
H1a: CFIP → RP	0.1595	<.001	✓	0.0360	n.s.	X
H1b: CFIP → TR	0.1124	<.05	--	-0.0954	n.s.	X
H1c: CFIP → WT	-0.0287	n.s.	X	-0.0215	n.s.	X
H2: RP → WT	0.3485	<.001	✓	-0.2659	<.001	✓
H3a: TR → RP	-0.1235	<.01	✓	-0.4513	<.001	✓
H3b: TR → WT	0.0607	<.10	✓	0.0562	n.s.	X
H3c: FAM → RP	-0.3232	<.001	✓	-0.2400	<.001	✓
H3d: FAM → TR	0.1807	<.01	✓	0.2994	<.001	✓
H3e: FAM → WT	0.4066	<.001	✓	0.5014	<.001	✓

Legend: ✓ = Supported                      -- = Significant in Opposite Direction Theorized  
 X =Not supported                      n.s. = Non-significant

## **Discussion**

The goal of this study is to better understand the impact that consumers' concern for information privacy has on their willingness to transact with Web merchants. The overall results largely confirmed the relationships between familiarity, risk, trust, and willingness to transact found in previous studies, with one exception. In the current study, trust did not affect willingness to transact for the Half.com data. Therefore, our discussion focuses on the findings with respect to CFIP and the differences between the well-known merchant and less-known merchant.

The first finding is that information privacy concerns were important under some conditions. For example, for the well-known merchant (Amazon.com), CFIP affected risk perceptions and trust, whereas for the less well-known merchant (Half.com), CFIP did not. Although familiarity was theorized to affect these differences, familiarity did not moderate the role of CFIP. Thus, an important issue still to be addressed is discovering variables that might explain these differences. Potential variables include reputation and brand. Strong brands such as Amazon.com are associated with positive reputations for high quality and reliability (Hellofs and Jacobson, 1999). This positive reputation can signal to customers that there is limited risk of economic and product non-performance. Given that e-commerce risk comes from economic and product risks as well as information privacy risks (Pavlou, 2003), when customers are not as concerned about economic and product risks (e.g. those purchasing from Amazon.com) then information privacy risks should become more salient as consumers assess the transaction risk and how much trust they should place in the merchant.

The second finding is that CFIP does not directly affect willingness to transact, but instead is fully mediated by trust and risk. As previously discussed, much of the theoretical justification for the role of CFIP suggested mediation; our results confirmed this. Thus, mechanisms designed to reduce information privacy concerns (e.g. privacy seals) may actually be most effective when they reduce risk perceptions and increase trust in the vendor.

A third finding of this study is that familiarity did not moderate the relationships between CFIP and both trust and risk, although there were differences in the role of CFIP for the more well-known merchant (Amazon.com) and less-known merchant (Half.com). For the less-known merchant, familiarity, trust, and risk perceptions were important factors affecting consumer willingness to engage in online transactions, but CFIP was not a significant determinant of trust, risk, or willingness to transact. Conversely for the well-known merchant, CFIP affected risk perceptions and trust, and marginally affected willingness to transact.

One potential reason for this comes from how we have defined and assessed familiarity. To date, familiarity has focused on the knowledge of the merchant and its processes (e.g. how to purchase a book, when to enter the credit card number, etc.). Familiarity does not take into consideration firm reputation or brand. As discussed earlier, Amazon.com has a strong brand and reputation, which may reduce the salience of risk from economic or product non-performance, thus increasing the salience of privacy concerns. This "hierarchy of concerns" suggests that when a merchant has a less familiar brand or reputation (e.g. Half.com), consumers may focus on factors related to the uncertainty of dealing with the merchant (e.g. risk or trust) when deciding whether or not to conduct transactions online. Information privacy concerns may be further down in the hierarchy. Consider the issue of risk perceptions. For Half.com, trust in the merchant affected risk perceptions, but CFIP did not. Conversely for Amazon.com, the relationship between

trust and risk was lower (-0.194 vs. -0.436) and similar in strength to the relationship between CFIP and trust. This suggests that for a Web merchant with a weaker brand or reputation, the lack of trust affects how consumers perceive the risk of transacting with it. This creates a hurdle (increased perceptions of risk) that must be overcome before other concerns are considered. Conversely, for a better-known merchant that has a strong reputation of trustworthiness (such as Amazon.com), this hurdle has been overcome, freeing individuals to focus on other factors that affect risk, such as CFIP.

A fourth, but surprising finding is that for the Amazon.com data, the relationship between CFIP and trust was in the opposite direction theorized (i.e. it was positive) and contrary to previous research in this area (Malhotra et al., 2004). A potential explanation for this concerns the nature of the focal relationship. When the relationship between the merchant and consumer is primarily focused on information exchange (rather than payment processing and order fulfillment), the negative relationship between CFIP and trust may hold. For example, in the Malhotra et al. (2004) study, individuals were asked to provide personal information on shopping habits in exchange for membership to a fictitious buying club. In this case, consumers' trust is based on how well they believe that the firm will protect their personal information. There need be no concern that the firm cannot be trusted to deliver the correct product, charge the customer's account correctly, etc.

In a purchasing context, individuals have to trust the merchant to not only collect, protect, and use their information appropriately, but also must have a basic trust that the firm will behave appropriately in product delivery and payment processing. Thus, the relationship between CFIP and trust may be more complex than previously theorized.

Another potential explanation is that a third factor influences both CFIP and trust (e.g. knowledge). It may be that consumers who are knowledgeable about information technology issues have higher levels of CFIP because they understand the potential for problems. Given that Amazon.com is a market leader in e-commerce and market leaders typically enjoy a strong reputation for high quality and reliability (Hellofs and Jacobson, 1999), the positive correlation between CFIP and Amazon could be due to the strong concern for privacy coupled with a strong belief in Amazon.com's high trustworthiness. Another possible variable that impacts both CFIP and trust is locus of control. Individuals with an internal locus of control tend to feel that they can properly interact with and control their environments (Broedling, 1975, Rotter, 1966). Such individuals may be highly concerned with information privacy, because they are very aware that once they have given up their private information to an organization, they no longer have control over how the information is protected or used. Interestingly, research shows that individuals with a high internal locus of control tend to be more trusting of others (Austin and Aubuchon, 1979, Massari and Rosenblum, 1979). Thus, it may be that internal locus of control impacts both CFIP and trust positively. Of course, this is highly speculative; additional research is needed to investigate this and other factors that may influence both CFIP and trust.

An additional surprising finding is that trust did not affect willingness to transact for Half.com. Given the strong findings from previous research about the importance of trust on transaction intentions (cf. Bhattacharjee, 2002, Gefen et al., 2003, Gefen and Straub, 2004) and the high correlations between risk and willingness to transact ( $r = -.48$ ), trust and willingness to transact ( $r = .34$ ), and risk and trust ( $r = -.51$ ), we believe that the non-significant finding may indicate that under some conditions the relationship between trust and willingness to transact may be mediated by risk.

Finally, for both Amazon.com and Half.com, familiarity and risk have larger impacts on willingness to transact than trust does. This provides evidence of the importance of risk perceptions and suggests the need for researchers to more deeply investigate the role of risk perceptions in e-commerce.

## **Limitations**

Although this work extends our understanding of privacy concerns in the context of engaging in e-commerce transactions, there are factors that may limit its generalizability. First, our research context was limited to one transaction (textbook purchase) from only two online merchants. Results may be idiosyncratic to relatively inexpensive commodity products and to merchants similar to those used in this study. Another potential limitation comes from our use of students as our sample. Results may not generalize to other populations.

Although the use of student participants may limit generalizability, we believe that the use of a student sample was appropriate. First, the research context was purposefully constructed to be realistic to the participants. The students were asked to respond as consumers for textbook purchases, which is something they do each semester. In addition, prior research (McKnight et al., 2002a) has claimed that student populations, being young and relatively well-educated, are similar to the population of online consumers. Further, a recent report indicates that younger people are more likely to be online, as are more educated individuals and those residing in urban areas (Lenhart et al., 2003). Finally, the results of this study were similar to other studies in this area (Gefen, 2000, Gefen et al., 2003, McKnight et al., 2002a, Van Slyke et al., 2004).

One area of concern associated with the use of a student sample is that the sample is dominated by younger consumers, and information privacy concerns may change as one ages. As a result, the relatively young age of our respondents may limit the generalizability of our results. We did investigate correlations between age and individual CFIP sub-scales. These correlations were relatively small, with the largest being 0.093 (age X collection). Even though these correlations are small, future research may wish to investigate a broader sample with respect to age.

Third, in the interest of parsimony, our research model omitted a number of factors that have been found to impact consumers' intentions to make online purchases. Examples of such factors include perceived usefulness, relative advantage, compatibility, and complexity (Gefen et al., 2003, Gefen and Straub, 2004, Van Slyke et al., 2004). Future research should examine the role of CFIP in broader models including these and other factors.

## **Implications and Future Research**

One of the central themes of e-commerce research is that reducing privacy concerns through mechanisms such as privacy seals is an important way of increasing consumers' use of e-commerce. Our research calls into question the focus on reducing concerns about privacy, especially for lesser-known merchants. Concerns about information privacy, whether general or specific to a Web merchant, while important, may not be the most critical driver of an individual's willingness to engage in e-commerce. Instead, these concerns may primarily influence willingness to transact through other factors,

such as risk. Other factors, including risk perceptions, trust, and familiarity, are more important in determining whether a consumer will engage in online purchasing. Because of this, merchants should work on ways to reduce perceptions of risk or increase familiarity and trust. Concern for privacy is a determinant of risk and trust under some conditions, but the nature of the relationships and the conditions under which they hold are not clearly understood.

Therefore, future research should more deeply investigate these relationships. If privacy concerns do not directly affect purchase decisions and are only important in some situations, this could represent an encouraging development for online merchants. An individual merchant is unlikely to impact consumers' concern for information privacy; such concerns are general in nature and are not specific to any particular merchant. Further, even when concerns for information privacy specific to a vendor are considered – which arguably can be influenced by actions of the specific vendor – the same pattern of results is obtained. Given these results, it may be wise for individual merchants to increase willingness to transact by lowering risk perceptions, or increasing trust and familiarity through other means, in addition to addressing privacy concerns. Online merchants may find it fruitful to consider the chain of influence that culminates in increased willingness to transact. By taking steps that increase familiarity and/or trust, merchants may be able to reduce risk perceptions, which will in turn increase consumers' willingness to transact online. Familiarity is particularly promising, given its strong influence on both risk perceptions and willingness to transact. The overall impact of familiarity on willingness to transact is considerably higher than any other single factor. This is true for both more-known and less-known merchants.

Thus, it may behoove online merchants to put considerable effort into taking steps designed to increase familiarity. Examples of such steps include advertising, both online and offline, partnering with better-known entities, and providing incentives to existing customers to recommend the merchant to new customers. One interesting possibility is to increase awareness through providing no-cost services to potential customers through the merchant's Web site. For example, Amazon.com provides a variety of no-cost services that may be of value to potential customers, including editorial and customer reviews, table-of-contents information, song samples, and, more recently, the ability to read book excerpts and perform searches of a book's contents. Providing such valuable services encourages customers to become more familiar with Amazon.com without undertaking the risk of engaging in a transaction.

Merchants may also reduce risk perceptions and increase willingness to transact by taking steps to increase trust. A good example of a trust-increasing mechanism is the eBay member feedback score system, where customers rate sellers on their quality. A customer who is unfamiliar with a particular seller is able to get a sense of the reliability of the seller by reading others' ratings. Keeping customers informed as to the status of their transactions may also increase trust. The impact of trust on risk perceptions and willingness to transact clearly points out the value in merchants being honest and dependable in their dealings with their customers (cf. Bhattacharjee, 2002, cf. Gefen et al., 2003, Pavlou, 2003, Van Slyke et al., 2004).

This study also has implications for those doing e-commerce research. Given the unexpected findings with respect to the relationship between CFIP and trust, future research should seek to better understand this relationship, which may be more complex than previously theorized. Other research designs, such as experiments, could be used

to investigate how different settings and or variables affect the relationship between CFIP and trust. Finally, while the factors included in our research model account for a sizable portion of the variance in risk perceptions for both data sets, other factors may also play a key role. Future research should seek to gain a better understanding of additional factors that may also influence risk perceptions. Results from these studies could be used to assist companies in reducing risk perceptions of existing and potential clients.

As discussed previously, in this study risk perceptions were a stronger predictor of willingness to transact than trust. This suggests that more research is needed to better understand how different risks such as financial or product non-performance, information privacy, etc. each affect consumer intentions. This would be similar to the work that Gefen and Straub (2004) have done with perceptions of trust. It also could be interesting to develop research programs that investigate specific mechanisms by which Web merchants can reduce risk by influencing trust and familiarity.

Researchers should also seek to better understand the role of risk perceptions and corporate branding and reputations. Much of the research on consumer e-commerce has focused on merchants that have strong, positive brands and reputations (such as Amazon.com). For organizations that are less-known (e.g. less recognizable brands), multiple aspects of risk may be of even more importance. For example, researchers may wish to more deeply investigate the relative importance of economic risk and non-performance risk, along with information privacy risks.

Another area that can be explored by future researchers revolves around the role of privacy seals. Extant research is equivocal as to the role that privacy seals play in reducing privacy concerns. A potential reason for this is that privacy seals may reduce perceptions of risk, but not an individual's general concern about privacy. Future research should investigate how privacy seals and other visual cues can be designed to support the reduction of risk perceptions. Researchers may also wish to further explore the concept of a hierarchy of concerns. Our findings seem to indicate that such a hierarchy exists, but future research should specifically explore its existence.

## **Conclusions**

From the beginnings of Web-based consumer-oriented e-commerce, privacy has been a concern widely cited as a barrier to consumer willingness to engage in e-commerce. However, previous empirical research is equivocal as to how these privacy concerns affect consumers' willingness to engage in e-commerce. This study provides evidence that consumers' concerns for information privacy affect willingness to conduct transactions with an online merchant under certain conditions. However, rather than directly impacting willingness to transact, the influence of concern for information privacy is mediated by risk perceptions and trust. In addition, privacy concerns appear to be more important when transacting with a well-known merchant than with a less-known merchant. Finally, our findings suggest that although consumer concerns for information privacy are important, other factors such as risk, trust, and familiarity may actually be more important barriers to e-commerce. Thus, organizations may be better served by putting their efforts into other means of reducing risk and increasing trust and familiarity than by focusing on reducing consumers' privacy concerns alone.



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## Appendix A

### MEASUREMENT SCALE ITEMS

Note: Unless otherwise specified, all anchors on 7-point scale anchored on Very Strong Disagree to Very Strongly Agree.

#### **Concern for information privacy**

##### *Collection*

It usually bothers me when companies ask me for personal information.

When companies ask me for personal information I sometimes think twice about providing it.

It bothers me to give personal information to so many companies.

I'm concerned that companies are collecting too much personal information about me.

##### *Improper access*

Companies should devote more time and effort to preventing unauthorized access to personal information.

Companies should take more steps to make sure that unauthorized people cannot access personal information on their computer.

Computer databases that contain personal information should be protected from unauthorized access—no matter how much it costs.

##### *Errors*

All the personal information in computer databases should be double-checked for accuracy—no matter how much this costs.

Companies should have better procedures to correct errors in personal information.

Companies should devote more time and effort to verifying the accuracy of the personal information in their databases.

Companies should take more steps to make sure that the personal information in their files is accurate.

##### *Secondary Use*

Companies should not use personal information for any purpose unless it has been authorized by the individuals who provided the information.

When people give personal information to a company for some reason the company should never use the information for any other reason.

Companies should never sell the personal information in their computer databases to other companies.

Companies should never share personal information with other companies unless it has been authorized by the individuals who provided the information.

#### **Risk Perceptions**

How would you characterize the decision of whether to buy a product from this Web retailer (Amazon.com/Half.com)? (Anchors: Very significant risk to Very Significant opportunity)

How would you characterize the decision of whether to buy a product from this Web retailer (Amazon.com/Half.com)? (Anchors: Very high potential for loss to Very high potential for gain)

How would you characterize the decision of whether to buy a product from this Web retailer (Amazon.com/Half.com)? (Anchors: Very negative situation to Very positive situation)

#### **Willingness to Transact**

I intend on using Amazon.com/Half.com for some of my future purchases.

I am inclined to purchase Amazon.com's/Half.com's goods and/or services.

I am likely to utilize the goods/services provided by Amazon.com.

**Familiarity**

I am familiar with Amazon.com/Half.com.

I am familiar with inquiring about book ratings at Amazon.com/Half.com.

**Trust**

Amazon.com/Half.com has the skills and expertise to perform transactions in an expected manner.

Amazon.com /Half.com has access to the information needed to handle transactions appropriately.

Amazon.com/Half.com is fair in its conduct of customer transactions.

Amazon.com/Half.com is fair in its customer service policies following a transaction.

Amazon.com/Half.com is open and receptive to customer needs.

Amazon.com/Half.com makes good-faith efforts to address most customer concerns.

Overall Amazon.com/Half.com is trustworthy.

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