UNFULFILLED OBLIGATIONS IN RECOMMENDATION AGENT USE

Completed Research

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Abstract

We examine whether psychological contract theory and social response theory can explain users’ responses to e-commerce recommendation agents (RAs). Theories of social response to technology, trust in technology, and technology adoption are used to adapt psychological contract theory to explain user-RA relationship. We theorize that a psychological contract breach will cause a negative emotional reaction, called a psychological contract violation, which, via trust and usefulness perceptions, will influence users’ intentions to follow an RAs’ recommendation. We tested our theory using a sample of 426 participants across three studies. Using a sample of 103 participants, Study 1 elicited perceived user-RA obligations, which form the basis for the posited psychological contract. Using a sample of 102 participants, Study 2 demonstrated a significant effect of breaching these obligations on theorized emotional, cognitive, and behavioral reactions to the RA using experimental RAs. Using a sample of 221 subjects, Study 3 confirmed our findings.

Keywords: Recommendation agents, psychological contracts, obligations, technology use
Introduction

Recommendation agents (RAs) are software tools provided on electronic-commerce (e-commerce) websites that attempt to understand individual users’ preference functions implicitly or explicitly and make product recommendations accordingly (Xiao and Benbasat 2007, 2011). The trade press shows an increasing interest in the development of RAs by major web vendors. The New York Times and BusinessWeek reported that online movie rental service, Netflix Inc., paid $1 million to a team for improving the accuracy of its movie recommendations (Hafner 2006; MacMillan 2009). The central motivation in these investments is that “[RAs] hold out the promise of making shopping on the internet better not just by finding lower prices but by matching products to the needs of the customers” (Aggarwal and Vaidyanathan 2003, p. 159). But, use of RAs to provide recommendations is not entirely without risk. Unfulfilled promises by an RA may cause negative consequences not only for the RA user but also for the web vendor associated with the RA. For example, Wal-Mart Inc., the world’s largest retailer, was forced to permanently remove a movie recommending RA from its website when the RA provided customers with incorrect and offensive recommendations (Flynn 2006). Moreover, incorrect or misleading recommendations provided by RAs may also result in a class-action lawsuit against the web vendors (Heckman and Wobbrock 1999). Therefore, understanding the impact of unfulfilled promises would help researchers, as well as practitioners, design more effective RAs and explain when and why users follow the recommendations of an RA and purchase the recommended products.

This research uses psychological contract theory (for a review, see Robinson et al. 1994) and the theory of social response (Reeves and Nass 1996) as theoretical lenses to investigate and better understand the human-recommendation agent relationship. A vast body of marketing and consumer research (e.g., Haubl and Murray 2006) as well IS research (e.g., Al-Natour et al. 2008; Komiak and Benbasat 2006; Wang and Benbasat 2007; Wang and Benbasat 2009) has examined the factors that influence consumer decision-making in online shopping. A consistent theme in this stream of research is that RAs have the potential to support and improve the quality of decisions consumers make. Moreover, these RAs reduce the problems associated with information overload and complexity of online searches while searching for and selecting products (Xiao and Benbasat 2007). It is also well documented that using a decision aid does not always result in improved decision quality and increased effectiveness (see Lilien et al. 2004; Xiao and Benbasat 2011). The negative influence of unmet obligations—i.e., when an RA fails to deliver what it promised—is still largely under-researched. There is strong evidence in the management, organizational behavior, and IS literature that suggests that when psychological contracts between humans and agents are not fulfilled, the consequences are very intense as the reaction is not only attributable to the unmet expectations but also to other beliefs such as codes of conduct and respect for the relationships (Koh et al. 2004; Pavlou and Gefen 2005; Robinson and Brown 2004; Rousseau 1995). Therefore, examining why and how unmet obligations would influence consumer decision-making in online stores will help researchers better understand the human-RA relationship.

Xiao and Benbasat (2007) used the expectation-disconfirmation paradigm (see also, Venkatesh and Goyal 2010) to propose that the confirmation (experiences meeting expectations) or the positive disconfirmation (experiences exceeding expectations) would increase user satisfaction with a technology whereas the negative disconfirmation (expectations exceeding experiences) would decrease the user satisfaction with a technology (see also, Xiao and Benbasat 2011). While rich insights have emerged from their (Xiao and Benbasat 2007) proposition, the impact of psychological obligations that an RA has towards the user is still not well understood. Management and organizational behavior literature (e.g., Morrison and Robinson 1997; Robinson et al. 1994), has shown that obligations are distinct from expectations as expectations are general beliefs about what an employee will find in their job whereas obligations are what employees believe they are entitled to receive because their employer conveyed promises to deliver those things. Further, Robinson (1996) argues that “not all expectations emanate from perceived promises and expectations can exist in the absence of perceived promises” (p. 575). For example, a user may expect an RA to recommend him or her with the least expensive product based on a wide variety of sources such as past experiences or observations by friends. However, if the RA explicitly or implicitly promises to recommend the least expensive product (e.g., www.pricegrabber.com), it creates not only an expectation but also an obligation that is a part of users’ psychological contract.

In the present research, we use the theory of social response (Moon 2000; Moon and Nass 1996) to
explain how and why psychological contract theory, which has been used to explain inter-personal relationships, can also be used to better understand the human-RA relationship (hereafter referred to as the user-RA relationship). We then present obligations that users may perceive the RA has towards them. Finally, we develop and test a theoretical model that explains how and why an online consumer's perception that an RA breached their psychological contract by not fulfilling its obligations and how this would influence their decision making and key beliefs of trust and usefulness.

Given this backdrop, the current work uses psychological contract theory to:

1. Investigate the role of obligations in a human-RA relationship; and
2. Develop and empirically test a research model that explains an online consumer's perception and behavior.

Theoretical Background

A psychological contract refers to individuals' perceptions of what they owe to the other party and what the other party owes to them (Rousseau 1995; Zhao et al. 2007). A psychological contract breach refers to subjective perception that other party has failed to adequately fulfill promised obligations (Koh et al. 2004; Robinson and Brown 2004; Rousseau 1998). The emotional reaction to the interpretation of the breach experience is termed psychological contract violation (Robinson and Brown 2004). It is important to note here that the psychological contract lies in the “eyes of the beholder” (Rousseau 1995) such that both the parties in the contract do not necessarily share the common understanding of the contract terms or share the perception that an actual contract breach took place (Morrison and Robinson 1997; Robinson 1996). Therefore, in the present study, the focal point of interest is not actual breach of the psychological contract, but the users' perception of the psychological contract breach and the behavioral and attitudinal consequences of this breach.

Theory

Extant RA literature shows that, unlike generic information technology, the central aim of an RA is to provide personalized advice (for a review, see Xiao and Benbasat 2007). Personalized advice is the extent to which the RA understands and represents users' personal needs (Komiak and Benbasat 2006). This personalization may involve design elements such as designing an RA with a personality similar to the decision-maker's personality (Al-Natour et al. 2006; Al-Natour et al. 2008; Hess et al. 2006). The overall aim of these e-commerce sites is to personalize RAs so that they present a human face to automated responses (Aggarwal and Vaidyanathan 2003).

According to the theory of social response, humans attribute human-like characteristics and social behaviors to the technology despite knowing that the technology is not human (Hess et al. 2006; Nass and Moon 2000; Nass et al. 1999; Reeves and Nass 1996). This attribution has been explained by mindless behavior that has been observed in a wide variety of social situations (Langer 1992). Mindless behavior occurs as a result of attention to a subset of cues that trigger various scripts based on the past experience. This in turn focuses attention on certain information diverting attention from other, possible relevant, information (Moon 2000; Moon and Nass 1996; Nass and Moon 2000). So, rather than performing behaviors based on the relevant features of the current situations, individuals commit to overly simplistic scripts drawn from the past (Al-Natour et al. 2006; Nass et al. 1999). Because, RAs are personalized by e-commerce websites, when they demonstrate human-like characteristics, users of RA are likely to attribute human-like characteristics and apply social rules to these RAs (see Xiao and Benbasat 2011). In the context of a RA-user relationship, the theory of social response would suggest that: (1) users form a relationship with the RA; and (2) this relationship is governed by the same social rules that govern social relationships (Moon 2000; Moon and Nass 1996).

RAs make several promises explicitly (e.g., lowest price by www.pricegrabber.com) and implicitly (e.g., privacy protection by www.yahoo.com) with a user. Because of limited cognitive ability, users believe that RAs would provide them with accurate and timely information (Xiao and Benbasat 2007) so that they can make better product choices with minimum effort (Häubl and Trifts 2000; Todd and Benbasat 1999). Further, users may in some instances consider these RAs to be altruistic such that these RAs do not have
any vested interest in what users do with the information they provide (Haubl and Murray 2006). So, they expect RAs not to act in an opportunistic way and provide honest and unbiased recommendations (Kramer 2007). Users also expect RAs to reduce overall price and product search cost (Xiao and Benbasat 2007) while respecting their privacy. We believe that because of these obligations in the user-RA relationship, users will develop a psychological contract with an RA.

**Hypotheses Development**

The theoretical model for the study is presented in Figure 1. This research model suggests that the effect of a psychological contract breach and a psychological contract violation with an RA on intentions to reuse an RA or repurchase recommended products is partially mediated by trust in an RA and usefulness of an RA. Consistent with the prior business-to-consumer e-commerce research (e.g., Choudhury and Karahanna 2008), we use intentions to repurchase recommended products as a final dependent variable that explains consumer decision making in online markets (see also, Koufaris 2002). Moreover, Pavlou and Fygenson (2006) argue that users should not only use the information system but also follow the advice provided for the desired managerial outcomes. So, we also include intentions to reuse an RA as key online consumer behavior.

Wang and Benbasat (2007) argue that the trust in an RA is based on three beliefs: (1) the RA adheres to a set of principles that the user finds acceptable (integrity); (2) the RA cares about the user and acts in his or her interests (benevolence); and (3) the RA has the skill and expertise to perform effectively (competence). Much prior research (e.g., Kim and Benbasat 2003) has viewed trust as a trustor’s rational choice motivated by conscious calculations of advantages. However, recent advances in the literature (e.g., Komiak and Benbasat 2006) have argued that without the emotional trust, cognitive trust is inadequate to explain consumer decision-making. Komiak and Benbasat (2006) define emotional trust as the extent to which one feels secure and comfortable about relying on the trustee. Because trust incorporates both the cognitive and the emotional components, we propose that both a psychological contract breach (a cognitive awareness) and a psychological contract violation (an emotional experience) will negatively influence trust.

Lim et al. (2006) argue that both adherence to and acceptability of the set of principles that the user finds acceptable in a relationship are required for a trusted agent to be perceived to exhibit integrity. When users perceive a psychological contract breach with an RA, they perceive an inconsistency in what the RA promised and what it actually delivered. As a result, users experience psychological contract violation, or the emotional experience emanating from this contract breach, and lose confidence that the RA would adhere to principles that users consider acceptable resulting in a decreased level of trust. Furthermore, in order to exhibit benevolence, the RA is believed to act in the interest of the user rather than the interest of any external entity (e.g., web vendor). In social exchanges, people tend to assume that others will behave in a trustworthy manner (McKnight et al. 1998) although this may not always be the case for human-
computer interactions (Muir 1987; Muir 1994). If users interact with an RA based on the assumption that the RA would behave in a trustworthy manner, experiences of psychological contract breach with an RA would force them to consciously question this initial assumption. On the other hand, if users interact with the RA on the assumption that they do not believe that the RA would exhibit trustworthy behavior, psychological contract violation with the RA would confirm their initial belief of low trust.

Further evidence that psychological contract violation with an RA can undermine trust in the RA is available in the automation failure literature (e.g., Madhavan et al. 2006). Using cognitive psychology literature, Madhavan et al. (2006) show that information that contradicts individuals’ cognitive schemas is likely to be well remembered and play an unduly large role in information processing. When users perceive psychological contract breach with an RA, they believe that the RA failed to fulfill its obligations of providing honest and effective recommendations. This failure of the RA would cause users to rely more on their own knowledge to make effective decisions and distrust the available RA. Therefore we hypothesize that:

H1: Psychological contract breach with an RA will decrease users’ trust in RA.

H2: Psychological contract violation with an RA will decrease users’ trust in RA.

Much prior research in technology acceptance literature has shown that perceived usefulness is one of the most dominant variables in predicting intentions to perform a behavior (Davis 1989; Davis et al. 1989; Venkatesh et al. 2003). Result demonstrability, defined as “tangibility of the results of using innovation”, is known to be a key antecedent of perceived relative advantage (i.e., usefulness) (Moore and Benbasat 1991, p. 203). If the system fails to produce effective job relevant results, users are likely to have low perceived usefulness of the system (Venkatesh et al. 2003). Similarly, Lilien et al. (2004) show that if users of a DSS fail to recognize the intrinsic quality of the DSS or the value of recommendations it generates, they are likely to be less satisfied. Because perceptions of psychological contract breach with an RA involve user perceptions that the RA is not faithfully fulfilling their obligations of providing effective recommendations, psychological contract breach is expected to reduce perceived usefulness of the RA.

Traditional technology acceptance literature (e.g., Davis et al. 1989; Venkatesh et al. 2003) has emphasized perceived usefulness as cognitive perceptions with a complete exclusion of affective evaluation as a driving force. However, recent developments (e.g., Bagozzi 2007) have called for including affective determinants in order to strengthen this extant technology acceptance literature. For example, Limayem et al. (2007) has proposed how habit can result in automatic behavior with less conscious attention. Similarly, Dimoka et al. (2007) show how cognitive neuroscience theory has the potential to expand technology acceptance theories beyond controlled conscious processes. Consistent with this prior literature, we expect that a psychological contract violation with an RA will affectively color users’ evaluative frame and will bias their usefulness perceptions. Therefore, we expect that:

H3: Psychological contract breach with an RA will decrease users’ perceived usefulness of an RA.

H4: Psychological contract violation with an RA will decrease users’ perceived usefulness of an RA.

Higher turnover, lower performance, and lower citizenship behaviors are some of the key behavioral consequences of psychological contract violation (Robinson and Rousseau 1994; Rousseau 1990). When users perceive a psychological contract breach with RA, they are predicted to experience feelings of injustice and betrayal (Robinson and Morrison 2000; Rousseau 1990). Because users seek to maintain equity between cost and benefits in exchange relationships, with the feelings of injustice and betrayal in the case of a psychological contract violation (Robinson and Morrison 2000), they are likely to recoup the costs by reducing their obligations and decreasing their intentions to reuse an RA or accept its recommendations. Therefore, we expect that:

H5: Psychological contract violation with RA will decrease users’ intentions to reuse an RA.

H6: Psychological contract violation with RA will decrease users’ intentions to repurchase recommended products.

Much prior literature on trust in RAs (e.g., Wang and Benbasat 2007) has shown that the higher the customer’s trusting beliefs of an RA, the more likely they are willing to consider following their advice (see also, Lim et al. 2006). The underlying rationale is that trust in an entity would not only affect people’s
beliefs about the entity, but also their willingness to take action (Pavlou and Gefen 2005). Therefore, we expect that:

H7: Trust in an RA will increase users’ intentions to reuse an RA.

H8: Trust in an RA will increase users’ intentions to repurchase recommended products.

According to the extant technology acceptance literature, more useful technologies are employed more readily (Davis 1989; Davis et al. 1989). Therefore, consistent with prior studies on technology acceptance and online shopping behaviors (e.g., Davis et al. 1989; Gefen et al. 2003; Venkatesh et al. 2003), we hypothesize that increased usefulness of an RA would increase intentions to reuse the RA and purchase recommended products. Therefore, we hypothesize that:

H9: Perceived usefulness of an RA will increase users’ intentions to reuse an RA.

H10: Perceived usefulness of an RA will increase users’ intentions to repurchase recommended products.

We propose that intentions to use an RA would increase users’ intentions to purchase recommended products because: (1) product purchasing is contingent upon using an RA to get information about the product (Pavlou and Fygenson 2006); (2) using an RA would facilitate purchasing (Kim and Benbasat 2003); and (3) the higher the exposure to product information obtained from using an RA, the more likely are users to purchase products (Choudhury and Karahanna 2008). Therefore, we expect that:

H11: Intentions to reuse an RA will increase users’ intentions to repurchase recommended products.

Much prior organizational behavior literature has made a distinction between the perceived contract breach, which is a cognitive perception, and the psychological contract violation, which is an affective reaction, that may or may not follow breach (Robinson and Morrison 2000; Zhao et al. 2007). The central idea is that immediately after experiencing a psychological contract breach, a user of an RA is likely to experience affective reactions such as frustration or anger towards an RA. Therefore, consistent with the prior literature, we expect that:

H12: Psychological contract breach with an RA will increase the likelihood of a psychological contract violation.

Research Methodology

We conducted three studies. In Study 1, we elicited perceived obligations in the user-RA relationship following the methodology adopted by Koh et al. (2004) and Robinson (1996). We did not have an a priori list of obligations that users perceive RAs have towards them, because this was, to the best of our knowledge, the first Study to identify obligations in user-RA relationship or system-user relationship. In doing so, we first identified psychological contract obligations in user-RA relationship. Then, we determined the most important perceived obligations in the user-RA relationship. In studies 2 and 3, we assessed effects of unfulfilled obligations by an RA. In these two studies, we used different means of creating psychological contract breach perceptions to have a more realistic perceptions of a user-RA relationship. In Study 2, we used vignettes, which are often viewed as a simulation of real world events (Robert et al. 2009), to create psychological contract breach perceptions. In Study 3, we used real consumer reviews for the products to create psychological contract breach perceptions.

Study 1: Identifying Psychological Contract Obligations

To elicit obligations that users perceive an RA has towards them, we first conducted personal interviews using open-ended questions and then conducted two surveys with open-ended and closed ended questions. In all, a total of 103 participants participated through the three stages of this obligation elicitation Study. In the first stage we conducted personal interviews. For an initial list of participants, several doctoral and graduate students in two major North American universities were contacted. The main criterion for selecting interviewees was that they should have at least one year of experience using a recommendation agent such as www.myproductadvisor.com. In total, we interviewed eighteen participants. The average age of the interviewees was 29 (S.D. = 2.87). Twenty-one percent were women. The average computer experience was 7.6 years (S.D. = 1.32) and the average experience with RA was 2.3
years (S.D. = 0.43). Following Rousseau (1990), we probed the interviewees to describe the obligations that they perceive RA has towards them. We took extensive field notes at each interview session. These notes were examined in detail for components representing obligations in the user-RA relationship. The authors then discussed these components and categorized them into major user-RA obligations.

Next, we determined an even broader set of obligations and also assessed the obligations that users deemed to be most important. To do so, we surveyed undergraduate students in two Information Systems courses at a major North American university. The survey was presented to participants in two steps. First, a survey with open-ended questions was handed out where students were required to indicate obligations that they perceive an RA has towards them. Second, participants were provided with a closed-ended survey where they were asked to indicate the extent to which the RA was obligated to provide a set of items to them. This set of instructions read, “Please indicate the extent to which you believe the RA will be obligated to owe you, based on an implicit or explicit promise or understanding, the following:……” Participants were provided with a seven-point Likert-type scale, ranging from “not at all obligated” to “very obligated” along with a list of obligations drawn from the interview conducted earlier. Thus, a high score indicated high perceived obligation, and a low score indicated low perceived obligation in the user-RA relationship.

In total, thirty-eight usable responses across two classes were received. These participants belonged to a variety of majors such as accounting, management, finance, economics, and information systems. Thirty-five percent were women. The average age was 21.8 years (S.D. = 1.8), the average computer experience was 6.4 years (S.D. = 0.64), and the average experience with RA was 2.1 years (S.D. = 0.76). Based on the open-ended responses, we compiled a list of the most commonly reported obligations. Interestingly, all the obligations determined in personal interviews were also reported by participants in their open-ended responses along with some additional obligations.

Finally, using another set of participants, we wanted to assess a list of the most important obligations in the user-RA relationship. In contrast with the last survey, participants were only provided a closed-ended survey and were asked to rate the importance of obligations. A high score indicated high perceived obligation, and a low score indicated low perceived obligation in the user-RA relationship. A total of forty-seven usable responses were received. The demographics of this group were similar to the previous group. As shown in Table 1, we found six obligations that were considered as high perceived obligations in the user-RA relationship.

<table>
<thead>
<tr>
<th>Obligations</th>
<th>Score</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA should find me products that best fit my needs</td>
<td>6.50</td>
<td>0.83</td>
</tr>
<tr>
<td>RA should find me lowest price for products that best fit my needs</td>
<td>6.26</td>
<td>0.92</td>
</tr>
<tr>
<td>RA should use all the information I provide while searching for products</td>
<td>6.32</td>
<td>0.80</td>
</tr>
<tr>
<td>RA should respect my privacy</td>
<td>6.29</td>
<td>1.18</td>
</tr>
<tr>
<td>RA should provide products that serve my interests and not the interests of e-commerce site</td>
<td>6.18</td>
<td>1.08</td>
</tr>
<tr>
<td>RA should be honest and not hide any information from me</td>
<td>6.68</td>
<td>0.66</td>
</tr>
<tr>
<td>RA should have correct information</td>
<td>6.71</td>
<td>0.56</td>
</tr>
<tr>
<td>RA should be unbiased</td>
<td>6.74</td>
<td>0.50</td>
</tr>
<tr>
<td>RA should help me find what I am looking for</td>
<td>6.71</td>
<td>0.51</td>
</tr>
</tbody>
</table>

**Study 2: Assessing Effects of Unfulfilled Obligation on User Perceptions Using Vignettes**

An experimental RA that helped participants choose a digital camera based on their preferences and needs was designed. Digital cameras were considered appropriate for this Study because of the following two reasons. First, there is a large variety of digital camera products available in the market, increasing the likelihood of participants requiring external help in making their decision. Second, informal surveys in many prior studies (e.g., Wang and Benbasat 2007; Wang and Benbasat 2009) have shown that undergraduate students have considerable interest in digital cameras and most of them do not own one. The experimental RA was designed to simulate well-known commercial digital camera RAs such as...
www.MyProductAdvisor.com. In order to elicit user preferences and needs, the experimental RA presented an RA-user dialogue. The dialogues used were similar to the dialogues presented in prior studies (e.g., Komiak and Benbasat 2006; Wang and Benbasat 2009).

A total of 197 students at a large North American university were recruited to participate in the experiment. Of the total 148 participants that participated in the Study, 26 owned or purchased a digital camera in the past. These participants were removed from the Study so that their prior experiences do not influence the findings of this Study. Of the remaining 122 participants, 20 indicated that they had moderate to high level of knowledge about the digital cameras (4 or greater measured on a seven-point likert scale). These participants were also removed from the Study, resulting in final sample of 102. Student participants were from a variety of majors, such as information systems, marketing, and supply chain. The average age of the participants was 21.86 years (s.d. = 4.22 years) and about 70% were males. The average computer use and internet use for the participants was 11.98 years (s.d. = 3.23 years) and 3.08 years (s.d. = 0.81 years) respectively. All the participants had used the internet for at least 2.5 years. This group of participants was a relevant subject group because their demographic characteristics were similar to the participants in the prior studies (e.g., Komiak and Benbasat 2006; Wang and Benbasat 2009).

The experiment proceeded as follows. Upon arriving at the lab, each participant was assigned to a computer in an individual cubical. After completing a background questionnaire, participants were presented with the experimental RA tutorial. A research assistant trained users on how to use the experimental RAs and answered questions, if any. Participants were asked to go through the tutorial as many times as they needed to feel comfortable with the experimental RA. Participants were then asked to complete the two tasks, the order for which was systematically reversed from one participant to the other.

The first task was to purchase a digital camera as a wedding gift for a close friend. Participants were told that this friend was a photography enthusiast. The cost of the digital camera would be shared by four other friends. The second task was to purchase a digital camera for a close family member. Participants were told that this family member was an amateur photographer and the participant could make as many assumptions as they wished. These tasks were adapted from recent research on RAs (see Wang and Benbasat 2009). Participants were allowed to use as much time as they needed. Also, the experimental RA allowed users to reiterate through the RA-user dialogue boxes.

The two tasks allowed sufficient interaction with the experimental RA. Participants received class credit as a compensation for their participation. Participants were also told that, based on their performance, they could also win additional prizes such as iPods, flash drives etc. To measure their performance, participants were informed at the beginning that they would be asked to provide justifications for their decisions. A more convincing justification, as determined by a digital camera expert, would increase their likelihood of winning an additional prize.

At the end of the tasks, after the participants have provided their justification for their decisions, systems randomly assigned participants to one of two treatment vignettes—i.e., one that would breach the psychological contract and one that would not breach the psychological contract.

Vignettes are defined as “stories about individuals, situations and structures which can make reference to important points in the Study of perceptions, beliefs and attitudes” (Hughes 1998, p. 381). Vignettes can be viewed as a simulation of real world events. They have been used in much prior IS research (e.g., Robert et al. 2009) and psychological contract research (e.g., Pfeifer 2007). This approach concentrates on the hypothetical scenarios where impartial spectators (i.e., participants in the Study) are questioned.

After the participants completed reading the vignette, a questionnaire was presented to measure the influence of psychological contract breach on usefulness in RA, trust in RA, and intentions to purchase recommended products. Measurement items were based on existing scales. Items for usefulness of RA were adapted from Davis (1989), trust in RA were adapted from Wang and Benbasat (2006), and intentions to repurchase recommended products from Choudhury and Karahanna (2008). We used both the composite and the global measure, as adapted from Robinson and Morrison (2000) of the psychological contract breach, as described in Study 1. Measures for psychological contract violation were adapted from Robinson and Morrison (2000). Measures for intentions to reuse an RA were adapted from Wang and Benbasat (2009). In order to have a parsimonious model, we controlled for a number of variables that prior research had shown to have an impact on consumer decision making.
Study 2: Results

A manipulation check was conducted for the two treatments—i.e., vignette that causes a psychological contract breach and vignette that does not cause a psychological contract breach. A significant value of a t-test on the psychological contract breach measure indicated that the experiment had a successful manipulation of the contract breach. We also checked for convergent and discriminant validity. Results of a CFA demonstrated that all items loaded well on their respective factors. Square root of all AVEs was greater than 0.70, much larger than the largest cross-correlation.

The hypotheses presented in our research model were tested using PLS and the results are presented in Figure 2. Most of the hypothesized relationships were found to be significant at the .01 significance level. Psychological contract breach significantly predicted trust in an RA ($\beta = -0.36$; H1), psychological contract violation with an RA ($\beta = 0.44$; H12), and perceived usefulness ($\beta = -0.49$; H3). The magnitude and the direction of the relationship between psychological contract breach and psychological contract violation was found be consistent with the prior literature (for a review, see Zhao et al. 2007), thus providing validity to the Study.

![Figure 2: Study 2 Results](image)

Psychological contract violation significantly predicted trust in an RA ($\beta = -0.25$), thus supporting H2. However, the psychological contract violation did not significantly direct effects on perceived usefulness with an RA ($\beta = 0.04$), intentions to reuse an RA ($\beta = -0.05$), or intentions to repurchase recommended items ($\beta = -0.06$). Thus H4, H5, and H6 were not supported indicating that the influence of psychological contract violation on the dependent variables of intentions to reuse an RA and intentions to repurchase recommended items was mediated by perceived usefulness and trust perceptions. Moreover, psychological contract violation does not have a significant influence on the perceived of usefulness of an RA.

Trust in an RA significantly predicted both intentions to reuse an RA ($\beta = 0.36$) and intentions to repurchase recommended items ($\beta = 0.44$), thus supporting H7 and H8. Consistent with the extant technology acceptance literature, perceived usefulness of an RA predicted intentions to reuse an RA ($\beta = 0.52$) and intentions to repurchase recommended items ($\beta = 0.39$), supporting H9 and H10. Finally, the results present the evidence of positive influence of intentions to reuse an RA on intentions to repurchase recommended products ($\beta = 0.25$), thus supporting H11.

Discussion and Follow-up Study

The results of Study 2 supported hypotheses H1, H2, and H3 among others. In particular, the results of the Study supported our theoretical arguments that a consumer’s perception that an RA breached their psychological contract would influence their decision-making and their key beliefs of trust and usefulness. Hypothesis H4 claimed that psychological contract violation will have a negative influence on the
consumer’s perceived usefulness perceptions of an RA was not supported. We believe that this might be due to the following three reasons: First, the non-significant relationship between violation and usefulness can be attributed to the use of vignettes. Vignette sometimes do not serve as a powerful manipulation as a traditional experiments (Robert et al. 2009). Therefore, despite users in the treatment group realizing that the RA did not fulfill its obligations, they did not have a very strong affective reaction. So, we observed non-significant relationship. Second, psychological contract breach is a cognitive evaluation that something promised has not been delivered whereas psychological contract violation is an affective reaction (Morrison and Robinson 1997; Robinson and Morrison 2000; Zhao et al. 2007). Although there are recent calls for examining how affective reactions influence usefulness perceptions (Bagozzi 2007), perhaps the variance explained by an affective determinant may not be highly significant in the presence of a cognitive determinant of perceived usefulness. Finally, although Study 2 had sufficient sample size, as indicated by the power analysis, the sample may not be large enough to partial out the affective component of perceived usefulness in the presence of a cognitive component.

Although Robert et al. (2009) argue that vignettes are “a valid experimental technique for the Study of perceptions, beliefs, and attitudes” (p. 251), some studies have suggested researchers to be cautious (e.g., Greenberg Don 1993). However, because of our significant manipulation checks, we do not believe that our Study suffered from this problem. In order to further develop and go beyond the current Study, we conducted a follow-up Study where real consumer reviews, instead of hypothetical scenarios were used to create breach perceptions.

**Study 3: Assessing Effects of Unfulfilled Obligation and Personality on User Perceptions using Consumer Reviews**

An experimental RA similar to the one developed for Study 2 was designed that provided participants advice on digital cameras based on their needs and preferences. The key difference between the experimental RA in Study 2 and Study 3 is the use of consumer reviews instead of hypothetical vignettes. Two research assistants collected real consumer reviews on various digital cameras used in the experimental RAs. While collecting these consumer reviews, we focused on three key aspects. First, only consumer reviews that had some information about the obligations elicited in Study 1 were retained. Second, three positive and three negative reviews were collected by each research assistant (a total of 12 reviews per digital camera). If such reviews were not available for a digital camera, that camera was removed from the database. Finally, two more research assistant read all the reviews that were collected and ordered these reviews based on the amount of text related to obligations in the consumer review.

A total of 567 students at a major North American university were recruited to participate in this Study. Again, the students were recruited from a variety of courses. A web-based sign-up system was used to prevent students who had participated in Study 1 or 2 to participate in Study 3. Of the total 567 participants, 331 participated in the Study. Of these, 41 participants owned or purchased a digital camera in the past. These participants were removed from the Study. Of the remaining 290 participants, 21 indicated that they had moderate to high level of knowledge about the digital cameras. The level of knowledge was measured on a seven-point Likert scale and any response higher than 4 was considered to be moderate to high. Overall, a total of 269 usable responses were received. The average age of the participants was 21.18 yrs. (s.d. = 2.7 years). The average computer use and internet use for the participants was 11.63 years (s.d. = 2.88 years) and 3.03 years (s.d. = 0.79 years) respectively. Approximately 56% of the participants were male.

The experimental was similar to Study 2. After completing the initial background questionnaire and tutorials, the system randomly assigned participants to one of the two treatment groups. In the first treatment group, breach perceptions were created by showing the participants the three worst reviews, as ranked by the second group of research assistants, for all the recommended products. These bad reviews highlighted how the RA failed to fulfill its obligations. In the second treatment group, no breach perceptions were created. In order to do so, participants were presented with three best reviews for all the products recommended by the experimental RA. Participants were clearly notified that these were real reviews written by consumers who have purchased the digital camera shown. Participants were provided with the option to pick a different product. However, all the products had consistently bad or good reviews depending on the type treatment group. The goal here was to create a sense of anger or
frustration when participants perceive that the RA they are using is not fulfilling its obligations.

**Study 3 Results**

Results of CFA demonstrated that all items load satisfactorily on their respective factors. The square root of AVEs was greater than 0.65, which was much larger than the largest cross-correlation. Therefore, we have sufficient convergent and discriminant validity. The results show that most of the relationships hypothesized were found to be significant as shown in Figure 3. More specifically, the results of this analysis show that the psychological contract breach significantly predicted trust in an RA (β = -0.23; H1), psychological contract violation with an RA (β = 0.48; H12), and perceived usefulness (β = -0.41; H3). Psychological contract violation not only predicted trust in an RA (β = -0.41; H2), but also predicted perceived usefulness with an RA (β = -0.19; H4). However, even in Study 3, psychological contract violation did not directly influence intentions to reuse an RA (β = -0.11) or intentions to repurchase recommended items (β = 0.05). Thus H5 and H6 were not supported again.

![Figure 3: Study 3 Results](image)

Trust in an RA significantly predicted both intentions to reuse an RA (β = 0.45) and intentions to repurchase recommended items (β = 0.64), thus supporting H7 and H8. Consistent with the extant technology acceptance literature, perceived usefulness of an RA predicted intentions to reuse an RA (β = 0.49) and intentions to repurchase recommended items (β = 0.36), supporting H9 and H10. Finally, the results present the evidence of positive influence of intentions to reuse an RA on intentions to repurchase recommended products (β=0.37), thus supporting H11.

**Discussion**

The present research built upon and extended psychological contract research (Robinson and Brown 2004; Rousseau 1995) to further our understanding of the user-RA relationship. First, we investigated whether or not psychological contract theory, which was developed in the human-human context, can serve as a theoretical base to explain the human-recommendation agent relationship. Second, we proposed a theoretical model that explains how and why an online consumer’s perception that an RA breached their psychological contract would influence their decision-making and their key beliefs of trust and usefulness. Finally, in a series of studies, we tested the proposed theoretical model. The results of Study 1 revealed obligations that users perceive RAs have towards them. These obligations form the basis for the posited psychological contract. We conducted two separate studies (Study 2 and Study 3) to test the effect of breaching these obligations on theorized emotional, cognitive, and behavioral reactions to the RA. The results were consistent across both studies. The results of Study 2 and Study 3 explained 57% and 52% variance respectively in intentions to reuse an RA. Finally, the results of Study 2 and Study 3
explained 37% and 44% variance respectively in the final dependent variable intentions to repurchase recommended products.

This research makes three key contributions to theory and practice. First, this research contributes to the IS literature by examining the system-user relationship, in general, and the user-RA relationship, in particular, from the psychological contract theory perspective to understand the role of unfulfilled promises. Although much prior psychological contract research (e.g., Robinson 1996; Rousseau 1995) has been used in the context of human-human relationships, there is increasing evidence in the IS as well as the computer science and the consumer research literature that people often consider computers as social actors (Komiak and Benbasat 2006; Moon 2000). Reeves and Nass (1996), using multiple empirical studies, showed that even technologically sophisticated people respond socially and naturally to computers and consider them as social actors rather than simple tools. Even in IS literature, anthropomorphic nature of recommendation agents is receiving increased attention (e.g., Xiao and Benbasat 2007). More specifically, these streams of research argue that, although human characteristics do not exist in computers, they are perceived to exist in these technological artifacts by the users when they interact with them. This research provides evidence that if principles of psychological contract theory can be successfully adapted from the human-human to the human-RA domain, insights can be gained about how to design RAs to achieve important business results and avoid negative side effects.

Second, this research builds upon and extends the current RA literature by explaining the influence of unmet obligations on consumer decision-making in online stores using the underpinnings of the psychological contract theory. Users are likely to create a psychological contract with an RA in which a user perceives that the RA is obligated to provide personalized advice (Aggarwal and Vaidyanathan). This contract may be created explicitly or implicitly. For example, www.dealtime.com promises faster results and lower prices by including “Search fast, Save big” right below its logo. Similarly, www.mypromotadvisor.com promises unbiased results in their preference elicitation interface where they mention “Answer some easy optional questions and get unbiased recommendations of products that fit your needs”. The underlying rationale for a user creating such a contract is that the RA would help them overcome the problems associated with information overload and complexity of online searches. However, use of a decision aid such as an RA does not always result in positive outcomes. For example, users may have an illusion of control over the system that may result in decision aid. Prior decision support system (DSS) research has shown that overreliance on any decision aid such as an RA may result in losses to the users. Such a loss may result in severe cognitive and emotional consequences influencing consumer decision-making using an RA. The results of this Study present evidence of cognitive and emotional consequences of a psychological contract breach and how it would influence consumer decision-making.

Finally, this research contributes to both research and practice by identifying the underlying mechanisms that may lead to a psychological contract breach. More specifically, using the underpinnings of the psychological contract literature, this research examines when and why a psychological contract in a user-RA relationship may be breached. Due to bounded rationality, it is virtually impossible for users to outline all the details of the contract (Rousseau 1995). Often it is difficult for the users to describe what obligations a particular RA can fulfill. In such situations, users fill in the blanks along the way and often do so inconsistently creating incongruence in the mutual obligations (Robinson et al. 1994; Rousseau 1998; Wang and Benbasat 2007). For example, because of the vast knowledge required to understand the RA explanations (Xiao and Benbasat 2007), users may not fully understand the recommendations were made. Ansari et al. (2000) showed that RAs can generate recommendations based on preferences of the user, preferences of other consumers, expert evaluations, item characteristics, individual characteristics, or a statistical combination of these different types of information. Results of this Study outline some of the important dimensions of a psychological contract that users perceive they have with the RA. These dimensions would allow researchers as well as practitioners to design better RAs.

Two of our findings warrant attention. First, we found a lack of support for the psychological contract violation influencing either of our dependent variables. We expected that the psychological contract violation would influence intentions to repurchase recommended products and intentions to reuse an RA over and above its influence through trust in an RA and usefulness of an RA. However, it is likely that when users perceive an emotional reaction to a contract breach, the affective reaction completely drives the trust perceptions that ultimately drive the consumer decision-making. Prior literature has also shown
that affect, to some extent, drives cognitions (Loewenstein et al. 2001). This cognitive component was also channeled through perceived usefulness of an RA as is evident from the significant relationship between the two constructs. Future research should further examine this relationship. Examining this relationship in a different setting may help us better understand the influence of the psychological contract violation. Second, we found a positive and significant moderating influence of conscientiousness on the relationship between the psychological contract breach and the psychological contract violation. It is likely that, on perceiving a psychological contract breach, conscientious individuals perceive that their performance was inhibited. More specifically, although the RA provided high quality recommendations, conscientious individuals may feel that they could have made even a better decision had the RA fulfilled all its obligations.

There are two limitations associated with this research. First, we used a content filtering RA to test our hypothesized model. Researchers as well as practitioner should be cautious while generalizing the effects of this Study. This, however, presents an opportunity for future research to test the findings of this Study in a new context with a collaborative RA. Second, the participants of this Study were students in a major North American university. Although student participants represent the core group of online shoppers, it is important for the future research to test the findings of this Study with actual users of a commercial RA.

Conclusion

Social interactions with RAs have gained significant attention in the IS literature. Integration and adaptation of theories such as psychological contract theory will provide insights about how to design RAs to achieve important business results and avoid negative side effects. The results of this Study indicate that users perceive that the RAs have certain obligations towards them. These obligations, when not fulfilled, are likely to have emotional, cognitive, and behavioral reactions that will influence users’ intentions to follow an RA’s recommendation. Additional studies in this relatively under-researched area will not only help researchers further understand user-system relationships, but also benefit e-tailers by creating a more satisfactory experience for their customers.

References


