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ABSTRACT

In the context of e-commerce, personalization system provides customers with recommendations on what products to buy. Grounded on social exchange theory, this study empirically examines and theoretically articulates the effects of willingness to share information and adaptive personalization on willingness to repurchase products. A survey was conducted and PLS was used demonstrating that adaptive personalization fully mediates the relationship between willingness to share information and willingness to repurchase products. The results suggest that online customers might take risks to provide their information to online retailers in exchange of offerings, and that continuous capturing of customer's preferences throughout their interaction time with the system can lead to better recommendations from the system, thus providing more incentives for them to repurchase products.

Keywords: Adaptive personalization, willingness to share information, repurchase intention, online shopping.

INTRODUCTION

To increase profit, many firms have instituted personalized services based on information about customer. They typically integrate a large amount of transaction data, customer's preferences and customer's personal information into data mining and business intelligence tools to provide better service and product offering. Many studies (i.e. Allen, Yaeckel and Kania, 1998; Ho, Bodoff and Tam, 2011) indicated that using personalization system enhance firms' ability to individualize offerings and services to customers more effectively, thus achieving profitable growth. According to Parkes (2001), firms that use personalized technology in their ecommerce websites tend to increase revenue by 52%. Even though personalization has been used in many different areas such as education and knowledge management, our study focuses on the e-commerce context where personalization is involved in product brokering (i.e. matching the best preferred products for customers).

Success in personalization depends on the ability to capture customer's preferences and translate them into product offerings. In our study, we consider content-based personalization, which recommends items similar to their past preferences, rather than collaborative personalization, which recommends items that other people with similar tastes liked in the past (Adomavicius and Tuzhilin, 2005). According to Ho et al. (2011), there are two common content-based personalization systems: static personalization and adaptive personalization. Static personalization corresponds to the assumptions that customers' preference is static and do not change overtime. Hence, this approach allows online retailers to capture only basic needs of customers, usually at the time when customers join the services and provide their profile information (Ho et al., 2011). As opposed to the static personalization, adaptive personalization is a real-time system that captures the current preferences and individualizes contents matching with their preferences, which are based on the amount of customers' interactions overtime and the timing to present the contents to customers (Ho et al., 2011). Many previous studies have been focused on static personalization such as

usage and characteristics of a recommendation system (Xiao and Benbasat, 2007), and trust as a central base of input (Weiquan and Benbasat, 2005, 2007), while failing to appropriately indicate the important factors leading to the success of adaptive personalization.

In this study, our goal is to investigate adaptive personalization in the context of online shopping. More specifically, the purpose of our research is to delineate the impact of willingness to share information on adaptive personalization and on the willingness to repurchase products. We believe that willingness to share information is an important construct for adaptive personalization because it relies on intensively acquiring information from customer overtime, and the better you learn about customers' overtime and act on this information, the more like they will repurchase. Therefore, knowing the impact of all three constructs together can provide a broader picture of how personalization system can benefit customers in long-term. As such, the research questions to be solved in this paper are:

1. Is customers' willingness to repurchase related with their willingness to share information?
2. What is the role of adaptive personalization in the relationship between willingness to share information and willingness to repurchase products?

Our research model draws its theoretical foundation from social exchange theory (SET). By using SET, we use a cost-benefit perspective to explain the impacts of adaptive personalization on both willingness to share information and willingness to repurchase products.

The paper is organized as follow. First, we present our literature review of three constructs and how SET ties those three constructs together. Then, we propose our hypotheses and our logics supporting our ideas. Next, we present our model resulting from our hypotheses and the methodology section. Finally, the last section discusses the findings and provides concluding comments.

THEORICAL BACKGROUND

Willingness to Share Information

Willingness to share information has been recently studied extensively in IS literature, particularly in static personalization. Most of the previous papers concerning willingness to share focus on online perceived risk (i.e. Dinev and Hart, 2006) and online privacy concerns (i.e. Awad and Krishnan, 2006). However, in terms of personalization literature, willingness to share information has not been studied as an independent variable because the construct usually is considered as a goal in static personalization, in which customer preferences are captured in the beginning of usage (Ho et al., 2011). Based on the context of this study, our research focus on willingness to share information as an independent variable (a precondition) and we define the construct as the intention to provide personal information (Awad and Krishnan, 2006).

Willingness to Repurchase Products

Contrasting to willingness to share information, willingness to repurchase products is little known in the online settings (Hong-Youl, Muthaly and Akamavi, 2010; Qureshi, Fang, Ramsey, McCole, Ibbotson and Compeau, 2009; Tsai and Huang, 2007). Past studies (e.g. Hellier, Geursen, Carr and Rickard, 2003; Voss, Godfrey and Seiders, 2010) primarily have researched the antecedents and components of willingness to repurchase products in offline settings. Other studies (i.e. Hong-Youl et al., 2010; Qureshi et al., 2009; Tsai and Huang, 2007) attempted to contextualize the construct to e-commerce. However, their efforts stopped at defining antecedent variables such as trust and web quality leading to a willingness to repurchase products, thus lacking the linkage between willingness to repurchase products and usage of personalization system (Qureshi et al., 2009). Consequently, in our paper we attempt to fill that gap in the literature by using the construct as a dependent variable to show how adaptive personalization plays on the relationship between willingness to share information and willingness to repurchase products. Based on the context of our research, we define willingness to repurchase products as the intention to repeat purchase from the same vendors (Bansal, Irving and Taylor, 2004; Burnham, Frels and Mahajan, 2003; Tsai and Huang, 2007).

Adaptive Personalization

Adaptive personalization is relatively new concept in e-commerce. It has been selectively used in computer science (e.g. Brusilovsky and Maybury, 2002; Kazienko and Adamski, 2007) but not frequently in IS literature.

Our review of adaptive personalization confirms that previous research tends to mix findings between static personalization and adaptive personalization and that timing issues are not appropriately mentioned in the context of personalized services (Ho et al., 2011). Many past studies investigated the impact of recommendation system to online customers such as reducing information overload (Murray and Häubl, 2006), providing convenience (Sinha and Swearingen, 2002), and saving time (Hostler, Yoon and Guimaraes, 2005). Those studies, however, proposed findings for general recommendation system rather than for a specific type of personalization technology, thus they might have produced some unexpected results when applied in the wrong context.

In IS literature, most of the research deals with static personalization (e.g. Awad and Krishnan, 2006; Komiak and Benbasat, 2008) rather than with adaptive personalization. However, recently Ho et al. (2011) introduced the concept by investigating the relationship between presenting contents to a customer and recommendation type. They found that the quality of presenting content for adaptive personalization improves while the probability of customer acceptance of the content diminishes overtime; suggesting that the sooner adaptive personalization provides recommended items for online shoppers, the higher chance they will accept them (Ho et al., 2011). In our research, we define adaptive personalization as the individuals' perception that online retailer can be able to capture the current preferences of customers by acquiring information from them overtime (Ho et al., 2011).

Social Exchange Theory (SET) in Adaptive Personalization

SET provides a cost-benefit perspective to predict the voluntary exchange of resources (Cook, 1977; Hall, 2003). SET suggests a framework to explain that online customers may choose to continue to use the same services because they feel that "the service is offer value or they simply feel looked in" (Kim and Son, 2009). In the context of adaptive personalization, the theory suggests that individuals voluntarily interact with personalization because the benefits outweigh the cost over time, leading to the creation of long-term relationship between online shoppers and personalization systems. In essence, even though using personalization means that online customers have to sacrifice their privacy and time (Awad and Krishnan, 2006), it can help them to reduce information overload and improve decision making (Häubl and Trifts, 2000), leading them to repurchase products. Using SET as its theoretical framework, our research model describes the causal chain in Figure 1 below.
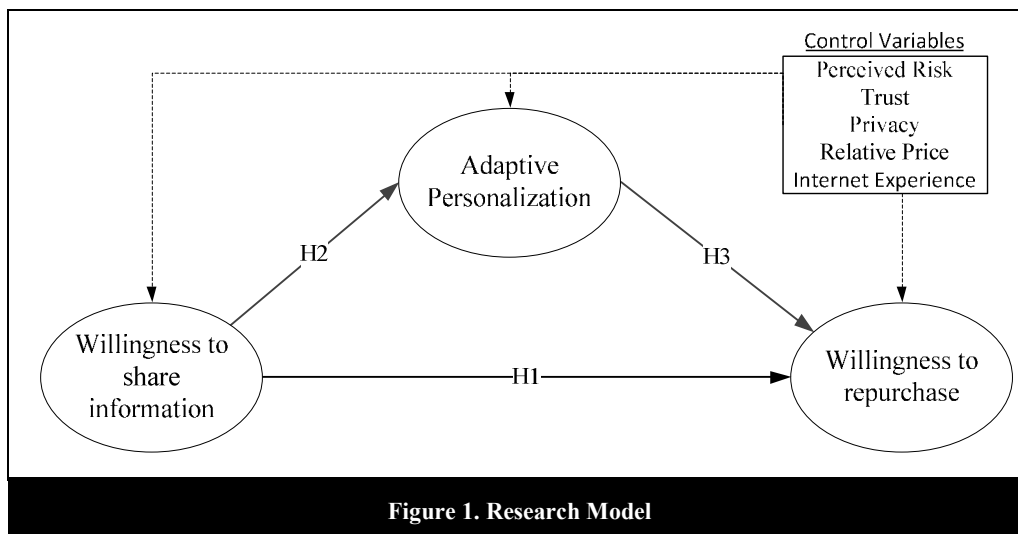

Figure 1. Research Model

HYPOTHESES DEVELOPMENT

Willingness to Share Information and Willingness to Repurchase Products

For the experienced users of adaptive personalization, continuing to share personal information after the first purchase is likely to be a sign of intention to repurchase products. Their interactions with online retailers indicate that they are satisfied with the products previously offered to them through adaptive personalization, leading them continually to use the recommendation system (Hong-Youl et al., 2010). For example, after the purchase, an online customer can be asked to share more information about other preferred products or even to rate the previous purchased products. In this case, the customer provides his/her preferences or evaluations to adaptive personalize so the online retailer's system captures the current preferences and translate them into recommended products.

Subsequently, the more that existing customers give out their information, the better recommended items are offered to them from the retailer, leading to the intention to repurchase products. This process would iterate until the customer stops repeatedly buying products from the retailer. As the result, we postulate that:

Hypothesis 1: Higher willingness to share information leads to higher willingness to repurchase products

Willingness to Share Information and Adaptive Personalization

We assert that willingness to share information increases adaptive personalization because providing more information is associated with higher perception of an effective recommendation system. Previous studies (i.e. Hostler et al., 2005; Sinha and Swearingen, 2002) show that when customers are more willing to share information, the system obtains more useful information on the customers' preferences for them to analyze. According to Hostler et al. (2005), online shoppers prefer to use adaptive personalization since it helped them to reduce alternatives and waiting times. Consequently, when providing more information, the adaptive personalization can better analyze user's interests, thus displaying more current and relevant choices, and reducing response time when matching customer's preferences. In addition, Sinha et al. (2001, 2002) found that users expressed willingness to provide more input to the system in return for more effective recommendations. When consumers use adaptive personalization, they often received new and unexpected recommended items. Therefore, in order to get the best matched products, customers are willing to interact more often with the system in exchange for better recommendations. More willingness to provide information indicates a higher perception of the effectiveness of the recommendation system. Thus, we hypothesize that:

Hypothesis 2: Higher willingness to share information leads to higher adaptive personalization.

Adaptive Personalization and Willingness to Repurchase Products

We argue that adaptive personalization increases customers' willingness to repurchase products because adaptive personalization is related to perception of high quality service. Past studies (i.e. Murray and Häubl, 2006; Sinha and Swearingen, 2001) have shown that using personalization system increases customer's decision quality. For example, (Murray and Häubl, 2006) found that when the customer is overloaded with information, using personalization systems help customers find and select products with lower prices by reducing search effort. Other studies (Sinha and Swearingen, 2002) suggest that using personalization systems is more helpful and generated more confidence for users than a traditional recommender system. Thus, it is believed that adaptive personalization shows higher performance of provided service. As the result, we propose that:

Hypothesis 3: Higher adaptive personalization leads to higher willingness to repurchase products.

The Mediation Effect of Adaptive Personalization on the Relationship between Willingness to Share Information and Willingness to Repurchase Products

The relationship among adaptive personalization, willingness to share information and willingness to repurchase products fit well with the cost-benefits perspective suggested by SET. In the context of online shopping, the SET suggests that when online shoppers are willing to give out their information as costs, they are expected to get back personalized information as benefits. They would know the benefit (i.e. personalized information) would outweigh the costs (i.e. security risks, privacy issues, or time consuming) in the long-term, and eventually help them to choose better products. The more information they disclose, online shoppers have higher expectations and anticipate better-matched recommendations in return. The process will continue until the online shoppers are satisfied with the results they are getting from adaptive personalization, that is, the recommended items that satisfy the customers. Thus, it eventually leads to the intention to buy products. Hence, we propose that:

Hypothesis 4: Adaptive personalization mediates the relationship between willingness to share information and willingness to repurchase products

METHODOLOGY

Data Collection

Surveys were distributed to 300 undergraduate students enrolled in two northeastern public universities in the U.S. They voluntarily participated in the surveys. Since it is important for participants to recall their shopping experience, it was required for them to complete online transactions before they completed the questionnaires. In addition, in

order to ensure evidence of actual transactions, we asked participants to provide specific shopping items and transaction dates as proof. All participants were assured of the confidentiality and anonymity before beginning the surveys.

Data Analysis

Partial Least Squares (PLS), as implemented in PLS Graph version 3.0, was used for data analysis. The PLS approach allows researchers to assess the measurement model parameters and structural path coefficients simultaneously (Barclay, Higgins and Thompson, 1995). It focuses on a prediction-oriented and data-analytic method, seeking to maximize the variances that are explained in constructs (Barclay et al., 1995).

Constructs	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Sharing Intention	**0.947**							
(2) Personalization	0.230	**0.883**						
(3) Repurchase Intention	0.168	0.265	**0.838**					
(4) Trust	0.135	0.177	0.389	**0.792**				
(5) Privacy Concerns	-0.219	-0.167	-0.124	-0.377	**0.869**			
(6) perceived risk	0.035	-0.082	-0.249	-0.193	0.190	**1.000**		
(7) Perceived Price	-0.070	-0.067	-0.061	-0.143	0.199	0.107	**1.000**	
(8) Vender Experience	-0.072	-0.143	-0.228	0.022	-0.023	0.107	-0.142	**1.000**
Mean	3.24	4.75	4.64	5.25	3.86	2.86	3.15	1.13
S.D.	1.79	1.30	1.40	1.00	1.57	1.21	1.45	.34
Cronbachs' α	0.885	0.859	0.858	0.925	0.935	1.000	1.000	1.000
AVE	0.896	0.779	0.703	0.627	0.755	1.000	1.000	1.000
Composite R	0.945	0.914	0.904	0.938	0.949	1.000	1.000	1.000
Note: The bolded numbers on the diagonal are the square root of the average variance extracted (AVE). Off diagonal elements are correlations among constructs.								

Table 1. Correlation and Reliability of Variables

Table 1 shows the psychometric properties of the items. The recommended threshold value for Cronbachs' α is 0.70 (Nunnally, 1978) and AVE measures are above 0.50 (Hair, Anderson, Tatham and Black, 1998). Most items exhibit high-AVE and indicate adequate reliability and statistically significant t-value, reflecting unidimensionality and convergent validity. All items are significantly related to their specified constructs; the data supports the convergent validity of the CFA model.

RESULT

Testing the Structural Model

Willingness to share information showed 10% explained variance for the effect to antecedents, which seems to be a relatively low level of explanatory power. However, regarding this issue, according to Falk and Miller (1992), the predictive power of the structural model can be evaluated from the arithmetic average of the R^2 values for all the endogenous variables. Based on their suggestion, the arithmetic mean of the five R^2 values in Figure 2 was over the 0.10, indicating that the model demonstrates acceptable predictive power. Figure 2 presents the path coefficients for sample to show the magnitude of each path coefficient of the constructs. First, for the effect of willingness to share information on adaptive personalization (H2) in Figure 2, willingness to share information was significantly related to personalization ($\beta = 0.188$, p < 0.01). Second, for the hypothesis 3, adaptive personalization statistically affected willingness to repurchase products ($\beta = 0.153$, p < 0.05).

Next, for the hypothesis 4, the mediation analysis corresponded to Baron and Kenny (1986)'s mediation test procedures. The first step was to determine whether the independent variable (i.e., sharing intention) was significantly related to the dependent variable (i.e., repurchase intention): This condition was met ($\beta = 0.160$, *p* < .01). The next step was to determine whether the independent variable was significantly related to the mediator; this condition was also satisfied ($\beta = 0.188$, *p* < 0.01). Finally, we identified whether the mediator was significantly related to the dependent variable when the mediator was added to the direct relationship between willingness to share information and willingness to repurchase products. To infer a full mediation effect, the mediator and the dependent variable should be significantly related to each other, and the direct relationship between the independent variable and the dependent variable should be zero. As shown in Figure 2, when adaptive personalization was added

into the direct relationship, this mediator was significantly related to willingness to repurchase ($\beta = 0.153$, $p < 0.01$). The direct effect between willingness to share information and willingness to repurchase products, was insignificant ($\beta = 0.160$, $p < .01$ → $\beta = .095$, $p > 0.05$), indicating the presence of the full mediation effect of perceived personalization in the relationship.
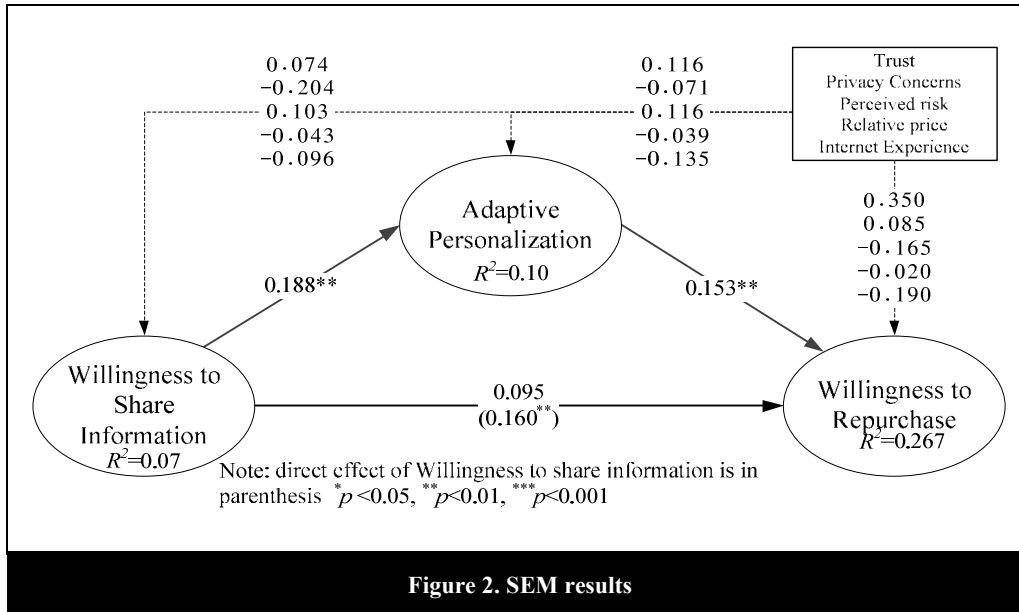

Figure 2. SEM results

In addition, we conducted a nested model and a full model comparison to ensure the mediation effect of adaptive personalization in the relationship. A nested model indicates a pure mediation link via a mediator in the relationship while a full model includes a direct path from an independent variable and a dependent variable to the nested model. The specific procedures of comparison are as follows: (1) we assessed the fit of a nested model; (2) we assessed the fit of a full model by adding a direct path from sharing intention and repurchase intention; and (3) we compared a nested and a full model using their R^2.

Hypothesis		Relationship		β	R^2
Hypothesis 1: The Direct Effect		SHI →(A)→ RI		A = .149*	.135
Hypothesis 4: The Mediation Effect of Personalization	Mediated Regression Analysis	SHI →(A)→ PER →(B)→ RI, SHI →(C)→ RI		A =0.188** B = 0.153** C = 0.095$^{n.s.}$	.267
	SEM: A Nested Model & a Full Model Comparison	Model	R^2	f^2 value	*Pseudo* F (1,191)
		Nested Model	0.260	0.010	1.786
		Full Model	0.267		

Note: SHI: willingness to share information, RI: willingness to repurchase, PER: adaptive personalization.
  *$p < .05$; **$p < .01$.
  Pseudo F: f^2 value is calculated as (R^2full- R^2excluded) / (1- R^2full). The Pseudo F statistic is calculated as f^2*(n-k-1), with l, (n-k) degree of freedom when n=sample size, k=the number of constructs in the model (Subramani, 2004)

Table 2. Hypothesis Testing for the Mediation Effect

The results of comparing the nested and full models are presented in Table 2. As shown in the second row of the table, the first mediation by adaptive personalization between willingness to share information and willingness to repurchase products revealed that by including the direct link, there was not a significant difference of R^2 between

the nested and full models, indicating a presence of the full mediation effect. Specifically, 26% of variance in individual impact was initially explained by a nested model. Next, when adding a direct path to the nested model, the explained variance in individual impact was not significantly increased (from 26% to 26.7%) and its f^2 value was 0.01. Based on obtained f^2 value, pseudo F should be calculated in order to determine whether the explanatory power of the direct path on the dependent variable is significant. The results showed pseudo F was identified as non-*significant* (*Pseudo F* = 1.786, *p* > .10), indicating that a direct path has a significant power to explain repurchase intention in adaptive personalization. Therefore, it is concluded that there was a mediation effect of adaptive personalization in the relationship between willingness to share information and willingness to repurchase, supporting hypothesis 4.

DISCUSSION

Findings and Implications

The purpose of this study was to introduce a new perspective on the way that adaptive personalization works in the online shopping context by providing a framework for adaptive personalization in the relationship between willingness to share information and willingness to repurchase products. The findings suggested that our hypotheses were supported; adaptive personalization plays an important role in the relationships between willingness to share information and willingness to repurchase products in online shopping. First, our findings show that adaptive personalization plays a full mediating role in the relationship between willingness to share information and willingness to repurchase. In the online retail context, consumers provide their personal information to transact with online retailers and even though they may be reluctant to provide information on their transactions, they give up this information and opt for convenience based on the trust on online retailers (Pavlou and Gefen, 2004). Further, this study showed that, in addition to the trust, consumers are also looking for a reward (i.e. personalization) increasing the convenience in online shopping by providing their information to online vendors.

The major theoretical contribution of our paper is a new perspective to view adaptive personalization in the online shopping context. It sheds light on the psychological mechanism on why online customers might take risks providing their information to online retailers to repurchase products. Much of previous research consider personalization as the perceived outcomes for transparency issues, privacy or risk related issues (Awad et al. 2006; Pavlou et al. 2004). However, our study shows that adaptive personalization has the mediating impact in the relationship exist between willingness to share information and willingness to repurchase products. In the IS discipline, these three constructs have not been examined simultaneously. In this sense, this study contributes to the literature by theoretically highlighting the role of adaptive personalization as a mediator.

In addition, this study shows that continuous capturing of customer's preferences throughout their interaction time with the system can lead to better recommendations, thus providing more incentives to repurchase products. These finding provides a good example why adaptive personalization can be a better system than static personalization since it can accurately reflect the current customer's interests to the systems. However, implementing adaptive personalization may require additional resources and most importantly careful planning. For example, the information capturing process must be very well engineered to be painless in its information appetite to avoid a complicated website for customers where the pain of information sharing make it too prohibitive. And, the adaptive personalization must leverage well developed capabilities such as those offered by business intelligence and CRM software to better personalize the purchasing process. We hope that future research will continue to focus on how and when to capture customer's interaction and how best to adapt this information to useful personalized interactions of benefit to the consumer and retailer alike.

Limitation

Several limitations are identified in our study. Our data was collected from undergraduate students, which might limit the generalizability of the study to other groups. Future research may consider using other samples to test our model.

In addition, our study assumes that when one engages in multiple interactions with a system, adaptive personalization takes place whereby customers' preferences have been recorded and adapted to refine personalized interactions. However, it must be recognized that this initial study is not longitudinal in design. Future research should measure multiple interactions with system over time to gain even greater insight on the power of adaptive personalization and its position in nomological network to more valuable and frequent purchases.

CONCLUSION

This research suggests the role of adaptive personalization, by using the SET, as a mediator in the relationship between willingness to share information and willingness to repurchase product. Our findings indicates that adaptive personalization can be a better system than static personalization and that adaptive personalization is an important mediator for both customer's intention to share information and intention to repurchase products. Even though limitations exist in our study, we hope that our model in this study will lay a conceptual foundation for future work in this important area.

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