Consumption attitudes and adoption of new consumer products: a contingency approach

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Abstract
Purpose – The purpose of this paper is to further current understanding of the relationship between consumption attitudes and new product adoption and how the relationship may be contingent upon consumers’ other characteristics.

Design/methodology/approach – Following a contingency framework, five consumption attitudes derived from Schwartz’s value systems framework were examined, along with demographic variables, for their associations with consumer new product adoption (NPA). Negative binominal regression models were estimated using syndicated data from a large urban Chinese consumer sample to test the main and interactive effect hypotheses.

Findings – Consumption attitudes have significant effects on NPA. Consumers’ adoption of market innovations is associated negatively with their attitude toward existing products and positively with independent decision making and preference for high-tech products. Further, the magnitude of the effects of consumption attitudes depends on consumers’ demographic characteristics. The effects are stronger among consumers who are older and have lower income.

Originality/value – Using syndicated data from a large random sample of urban Chinese consumers, this study offers a deeper understanding of the attitudinal and personal antecedents of consumer new product adoption.

Keywords New products, Consumer behaviour, Target markets, China

Paper type Research paper

Introduction
Consumers’ new product adoption (NPA) behavior is of fundamental interest to marketing managers and researchers alike because of its role in the new product diffusion processes (Rogers, 1995). Understanding what differentiates visionary customers who adopt products earlier in the process from more pragmatic customers in
the mainstream market has been suggested as the key to new product marketing in today’s high-tech era (Moore, 1999a, b). A major stream of research has focused on the influence of personal characteristics such as demographics and social-psychographics on NPA behavior, which has important implications for the practices of market segmentation and targeting, as well as product positioning and marketing communication. Understanding the key determinants of NPA helps companies identify target markets, position their new products accurately, and design more effective communication strategies.

Empirical research has demonstrated that social-demographic characteristics have significant influence on NPA behavior and suggests that younger, higher income and better educated consumers tend to accept market innovations more quickly (Gatignon and Robertson, 1985). Certain social-psychographic characteristics, such as innovative predisposition, opinion leadership, and risk-taking attitude, have also been shown to be related to NPA (Gatignon and Robertson, 1991; Midgley and Dowling, 1978; Rogers, 1995). While this literature has provided important insights into the individual characteristics of innovative consumers, our understanding is limited in two ways.

First, findings regarding the effects of these personal characteristic variables have not been consistent across studies (e.g. Rogers and Shoemaker, 1971; Gatignon and Robertson, 1985; Steenkamp et al., 1999). For example, Ostlund (1974) found the effect of demographics was rather weak; Foxall (1995) reported that innate consumer innovativeness and NPA were positively related in the software product category but not in the food product category; and Steenkamp and colleagues (1999) failed to find a relationship between a major value dimension and consumer innovativeness. As a result, researchers have called for contingency models to better account for NPA (e.g. Midgley and Dowling, 1978, 1993; Mudd, 1990). The basic premise of a contingency model is that the influence of some personal variables on NPA may depend upon other personal variables or situational factors (Midgley and Dowling, 1978). Despite its appeal, to date, empirical research testing the contingency hypotheses has been very limited, and evidence supporting the contingency model is scarce and mixed. For instance, Midgley and Dowling’s (1993) longitudinal study of the women’s evening wear category provides good support for their contingency model, where the effect of predispositions on NPA varies due to the social interaction process. Yet, in a study of a set of household appliances, Im et al. (2003) found that demographic variables did not moderate the relationship between consumer predisposition and NPA behavior as the contingency approach hypothesized. Clearly, more research is needed to further substantiate the validity of the contingency approach.

Second, past NPA research has paid limited attention to consumption-level attitudes as a group of consumer characteristics, despite the important role of attitude in consumer behavior research in general. A few recent studies have started to examine the effect of culture and values on consumer innovativeness and new product adoption (Daghfous et al., 1999; Steenkamp et al., 1999). Consumer values, which can be applied in a variety of life situations (Kahle, 1983; Kamakura and Mazzon, 1991; Sheth et al., 1991), are at a higher level of abstraction than consumption behaviors such as NPA, whereas consumption-level attitudes are at a level of abstraction much closer to that of consumption behaviors. From a means-end chain theoretical perspective, NPA may be affected more by situation-specific consumer attitudes than abstract goal states, i.e. personal values (Brunso et al., 2004). Given the prominent status of attitude in
consumer behavior research, it is surprising that only a few studies have investigated the relationship between consumption-specific attitudes and NPA (e.g. Steenkamp et al., 1999), and virtually no research has examined the role of consumption attitudes in NPA behavior within a contingency framework.

The current study attempts to address these two limitations and examine the relationship between consumption-specific attitudes and new product adoption within a contingency framework. The contributions of this study are three-fold. First, it provides a theoretical understanding of a possible link between consumption attitudes and NPA as a special consumption behavior. Because fundamental personal values are important determinants of consumption attitudes (Rokeach, 1968), we derive our consumption attitudes from a universal values framework (Schwartz, 1992). Second, we examine the relationship between consumption attitudes and new product adoption in a contingency framework by investigating the interaction between consumption attitudes and socio-demographic variables. We employ a large-scale syndicated dataset that contains thousands of Chinese consumers’ personal characteristics and consumption information to test the validity of the contingency hypothesis. Third, the knowledge gained about the complex relationship between consumption attitudes and new product consumption behavior provides a sound theoretical and empirical foundation for more refined segmentation, targeting, and positioning strategies in planning and launching new products.

In this article, we first develop hypotheses based on a review of the current literature on personal values, consumption attitudes, and new product diffusion and adoption. We then report an empirical study to test the hypotheses. Finally, we discuss theoretical and managerial implications.

**Conceptual background and hypotheses**

New product adoption behavior has been defined as the degree to which an individual adopts a new product relatively earlier than other members in his or her social system (Rogers and Shoemaker, 1971). This behavioral construct has been operationalized in empirical work in three ways, namely, new product ownership in a given category (e.g. Foxall, 1988), purchase intention (e.g. Holak and Lehmann, 1990), and the relative time of adoption for a particular product (e.g. Midgley and Dowling, 1993). Many studies demonstrate that innovators can be characterized by demographic and psychographic variables (Dickerson and Gentry, 1983; Gatignon and Robertson, 1991; Labay and Kinnear, 1981; Martinex et al., 1998; Midgley and Dowling, 1993; Ostlund, 1974; Summers, 1971). Demographically, consumer innovators typically have higher income and education, and are younger (Gatignon and Robertson, 1985). Among various psychographic variables, personal values and consumption attitudes are considered to have a direct impact on specific consumer behavior such as NPA (Brunso et al., 2004; Burgess, 1992; Kamakura and Mazzon, 1991; Smith and Schwartz, 1997).

Following Eagly and Chaiken (1993), we define a consumption attitude as a psychological tendency that is expressed by evaluating a particular consumption-related entity with some degree of favor or disfavor. Because consumption attitudes are specific to the consumption domain, they are more predictive of consumption behavior than other more general factors (Brunso et al., 2004). However, consumption attitudes are governed and guided by the more overarching value systems, which encompass central dispositions applicable to a wide
range of situations, contexts, and behaviors (Brunso et al., 2004; Steenkamp et al., 1999). In other words, consumption attitudes are consumer context-specific dispositions that link personal values to actual consumption behaviors.

We draw on Schwartz’s (1992) personal values framework to develop hypotheses that relate consumption attitudes to NPA. The personal values framework, which contains a universally applicable personal value typology, builds on and extends Rokeach’s (1973) work and has received empirical support from samples that included thousands of respondents from more than 40 countries (Schwartz, 1992; Schwartz and Sagiv, 1995). The typology includes ten distinctive values that reflect different motivational goals. These ten values are organized in four higher order value domains that form two bipolar dimensions: openness to change versus conservation, and self-transcendence versus self-enhancement.

The dimension of openness to change versus conservation pertains to values that “motivate people to follow their own intellectual and emotional interests in unpredictable and uncertain directions versus to preserve the status quo and the certainty it provides in relationships with close others, institutions, and traditions” (Schwartz, 1992, p. 43). Three value types, i.e. conformity, security, and tradition, underlie the conservation pole, while the values of self-direction and stimulation form the openness to change pole. The second dimension, self-enhancement versus self-transcendence, encompasses values that motivate people to enhance personal interests as opposed to transcending selfish concerns and promoting the welfare of others or nature. Universalism and benevolence underlie self-transcendence while power and achievement underlie the self-enhancement domain. The final value type, hedonism, is suggested to be related to both openness to change and self-enhancement.

While both bipolar dimensions and most of the value types may potentially influence consumer behavior, the motivational goals underlying the value types suggest that the dimension of openness to change versus conservation and the related value types are especially pertinent to consumers’ innovativeness and NPA behavior. Adopting new products in general means embracing new ideas, changing present lifestyles, and taking and accepting risks. These are the qualities closely related to whether and to what degree a consumer is open to the changes introduced by market offerings. Although certain new products may help enhance the consumer’s feeling of achievement and power, the relevance of self-enhancement and self-transcendence may be more product category specific, and the value of hedonism may be only applicable to a limited number of product categories. Empirical research has also demonstrated that the effect of the self-enhancement versus self-transcendence dimension on consumer innovativeness may be limited compared with that of the other dimensions (Steenkamp et al., 1999).

Because the purpose of our research is to examine the relationship between consumption attitudes and NPA that can be generalized across product categories, we focus on the openness to change versus conservation dimension; thus, we derive the consumption attitude variables that reflect the underlying five value types (conformity, security, and tradition, self-direction, and stimulation) in the consumption context. Our central argument is that consumers’ NPA behavior is either positively or negatively affected by their consumption attitudes, and that such effects may vary due to their demographic characteristics. These relationships are depicted in Figure 1.
Conformity: attitude toward personal advice

The value of conformity emphasizes self-restraint in everyday interactions, manifested in such qualities as obedience, self-discipline, politeness, and honoring parents and elders (Schwartz, 1992). People with a high level of conformity value tend to make decisions that conform to the expectations of their close social environment, while those with a low level of conformity value are likely to focus more on their own personal needs and care less about others’ expectations (Bearden et al., 1989). In a consumption context, conformity is associated with consumers’ information acquisition, a key step in the new product adoption process (Rogers, 1995). High conformity consumers are more restrictive in their information inflow and rely more on personal sources such as friends and neighbors for product information and purchase advice in order to conform to the expectations from one’s social environment (Clark and Staunton, 1994; Kaplan, 1991; Van de Van, 1993). They are less likely to process and accept new product information from advertisement and other impersonal promotions and are less open to new ideas and novel market offerings (Gatignon and Robertson, 1985; Rogers, 1995). Further, information from one’s personal sources tends to be more limited in scope, content, and variety. As such, consumers with a more favorable attitude toward personal advice are expected to be less innovative and adopt fewer new products. Therefore, we expect:

\[ H1. \text{ Consumers’ NPA is negatively related to their attitude toward personal advice.} \]

Security: attitude toward savings

Schwartz’s (1992) security value is concerned with people’s needs for safety, predictability, and stability. Research has shown that high levels of security value hamper the adoption of new products among international consumers (Daghfous et al.,...
Likewise, the uncertainty avoidance dimension of national culture has been shown to have a negative effect on consumer innovativeness (Lynn and Gelb, 1996; Steenkamp et al., 1999). In a consumption context, consumers' concern for future security can be in part answered by prudent financial planning (Johnson, 1999), which, in turn, is reflected in their attitude toward savings (Cui and Liu, 2000). Consumers with a more favorable attitude toward savings tend to save more money for future use. As consumers put a higher proportion of their income into savings accounts, their purchasing power and actual consumption of market innovations for the current period may be adversely affected. Thus, we hypothesize:

**H2.** Consumers' NPA is negatively related to their attitude toward savings.

*Tradition: attitude toward existing products*

The tradition value is related to one's favorable attitude towards the past and the present and shows one's respect for culture, social norms, and traditions (Schwartz, 1992). In the consumer context, the tradition value implies a favorable attitude toward the products that consumers are currently using. Consumers with such a favorable attitude will be unwilling to replace their old but still functional products with new market offerings. At present, with the fast pace of new product development and great market competition, existing technologies often become outdated very quickly and prematurely. As a result, consumers have plenty of opportunities to abandon what they already have, but those with a strong, favorable attitude toward existing products will resist new products and keep using what they already have till the products fail to function. Therefore, we hypothesize:

**H3.** Consumers' NPA is negatively related to their attitude toward existing products.

*Self-direction: attitude toward independent decision making*

The self-direction value in the openness to change domain reflects one's needs for independence and autonomy in daily life. In the consumption arena, self-direction is reflected in the attitude toward making independent consumption decisions. Several authors emphasize that consumer innovativeness involves a tendency to make judgments and initiate new behaviors independently of others (Midgley, 1977; Midgley and Dowling, 1978). At the national culture level, Lynn and Gelb (1996) and Steenkamp et al. (1999) found that individualism is correlated positively with consumer innovativeness. We thus expect more innovative consumers to be more independent decision makers:

**H4.** Consumers' NPA is positively related to their attitude toward independent decision making.

*Stimulation: attitudes toward high-tech products*

Stimulation is a value type within the openness to change domain that reflects the need for variety, novelty, and excitement (Schwartz, 1992). Consumers' need for stimulation may be fulfilled by their acquisition and consumption of new products. Empirical research shows that need for stimulation is positively associated with consumer innovativeness (Joachimsthaler and Lastovicka, 1984; Roehrich, 2004; Venkatesan, 1973). Thus, new products can often serve as stimuli or sources of excitement to
consumers as they come with new and unique benefits, features, functions, looks, packages, or other bells and whistles. Often, these new features, functions, and attributes that attract the consumer are made possible by new advances in technology. In the consumption context, the need for stimulation can thus be reflected in consumers’ attitude toward high technology and high-tech products (Hirschman, 1981). Consumers who are constantly looking for stimulation and excitement in the marketplace are more likely to be attentive to and attracted by products with more novel and better functions and attributes that frequently come with new technologies. In turn, a more favorable attitude toward high technology may translate into better reception for and adoption of new market offerings that have new features and technology (Mittelstaedt et al., 1976; Shih and Venkatesh, 2004). Thus, we hypothesize:

\( H5 \). Consumers’ NPA is positively related to their attitude toward high-tech products.

**Interaction between consumption attitudes and consumer demographics**

Demographic variables, most notably, income, education, and age, are often examined in empirical research on NPA. A general recognition among researchers is that innovators tend to be younger and have higher levels of income and education (Im et al., 2003; Midgley and Dowling, 1993; Venkatraman and Price, 1990). This is especially true for high-involvement products such as consumer durables (Gatignon and Robertson, 1985). Higher income indicates greater financial ability to afford new products, while higher levels of education are suggestive of open-mindedness and ability to process new information. Age, on the other hand, can be indicative of risk-avoidance and conservativeness, and thus can be negatively associated with innovativeness.

A contingency approach would suggest an interactive effect such that the effect of consumption attitudes on NPA may also be dependent on consumers’ demographic characteristics. While conservative consumption attitudes tend to be associated with fewer new product adoptions, it would be reasonable to suggest that, if consumers are young, well educated, and have a high income level, even consumers with more conservative consumption attitudes may adopt a variety of new products. In other words, consumption attitudes may matter less among the young than among the old, among those with higher education than those with lower education, and among the more affluent than among the less affluent. For instance, one’s attitude toward savings, which determines whether and how much one puts money in a savings account, may not have too much of an impact if one’s income is substantially high. However, such attitude should have much more significant consequences for someone who has very limited discretionary income. Thus, we hypothesize:

\( H6 \). Consumption attitudes interact with demographics to affect consumers’ NPA such that the effects of consumption attitudes are stronger for older consumers, consumers with lower education, and consumers with lower income.

**Method**

**Sample and data**

We acquired syndicated secondary data from the China National Readership Survey (CNRS) that involved thousands of consumer respondents living in 22 major cities
across China. CNRS is one of the most comprehensive consumer surveys in China today and is used by many leading multinational corporations (Huichong Net, 2004). The data used this study were collected between 1999 and 2000 via personal interviews with 11,029 consumers aged 21 to 70. The respondents were randomly selected from each city using the probability proportional to sizes method, thus establishing sample representativeness of the urban Chinese consumer population.

**Measures**

New product adoption is commonly measured with one of the three approaches: time of adoption, the cross-sectional method, or some form of self-report on purchase intention. We use the “cross-sectional” method based on the number of products owned in a specific category at the time of the survey, which has been used in numerous research studies (e.g. Foxall, 1988, 1995; Im et al., 2003; Midgley and Dowling, 1978; Robertson and Myers, 1969; Rogers, 1995). This method has been recommended as a practical measure of NPA since it engenders fewer problems of respondent recall, reliability, validity, and generalizability than other methods of measuring NPA (Lastovicka and Joachimsthaler, 1988; Midgley and Dowling, 1978). We measured NPA as the total number of products owned by the respondent in the consumer electronics category, because the category is technology driven and has shown considerable product innovation and variation in consumers’ product adoption behavior. The ten products we chose to be included in the category were cellular phone, personal computer, printer, hand-held computer, electronic English-Chinese dictionary, hi-fi entertainment system, camcorder, microwave oven, vacuum, and cordless phone, all of which were considered new and innovative in China at the time of the survey. The legitimate range for this measure was 0-10.

The consumption attitude variables were measured with five-point Likert scale items (“strongly agree” to “strongly disagree”). Attitude toward personal advice was measured with the statement: “I prefer to buy products recommended by friends and neighbors.” Attitude toward savings was measured with the item: “It is important to reduce expenses and put money in my savings account.” Attitude toward existing products was assessed with the item: “If things can still function, I will not buy new ones to replace them.” Attitude toward independent decision making was measured with three items: “I never care about other people’s opinions on the products I buy;” “I will buy products I love despite negative opinions from friends and family members;” and “I will buy what I feel good about and never care about others’ opinions.” Cronbach’s alpha was 0.75 for the three-item scale. Finally, attitude toward hi-tech products was measured with two items: “I prefer to buy high-tech products,” and “I prefer to try new high-tech products.” Cronbach’s alpha was 0.68 for the two-item measure. Summated scales were created for the last two variable measures before hypothesis testing.

Education was recorded as an ordinal variable in three categories: 1 = “high school or below,” 2 = “some university education,” and 3 = “4-year university degree or above.” Monthly family income in local currency Renminbi (RMB) was recorded as an ordinal variable in 12 categories from 1 = “less than RMB 200” to 12 = “more than RMB10,000.” Age was measured in years as a ratio variable. For our sample, the mean age was 43 years old, the median monthly family income was in the RMB 1,500-1,999 range, and the respondents had on average some college education. Our sample profile
is similar to the profile of Chinese consumers reported in other national studies (e.g. Cui and Liu, 2000). In Table I we present the descriptive statistics for all the variables.

**Analysis and results**

To test our hypotheses, we estimated negative binomial regression models with the number of new product adoptions as the dependent variable and the consumption attitudes and demographics as independent variables. Our dependent variable (number of new product adoptions) is a set of nonnegative integers that included responses of zero adoptions; the distribution of this variable is highly skewed. The traditional linear regression model (e.g. ordinary least square) would not be appropriate because of violation of the normality assumption. The Poisson regression model is generally used to handle such non-negative count data (Cameron and Trivedi, 1998). The Poisson model assumes the dependent variable has a Poisson distribution where the mean and variance are equal. The range for our NPA measure was from 0 to 10, with a mean of 1.54 and a variance of 3.24. The difference between the mean and variance suggests there may be an over-dispersion problem arising from cross-section heterogeneity. We estimated Poisson regression models and indeed found deviances and Pearson Chi-squares per degree of freedom were greater than 2, suggesting the Poisson model did not provide adequate fit. Based on Greene’s (2003) recommendation, we turned to negative binomial regression, a generalized form of Poisson regression, in order to solve the over-dispersion problem. The deviance per degree of freedom was 1.11 and the Pearson chi-square per degree of freedom was 1.07. Since both measures were close to 1, the potential problem of over-dispersion did not appear to exist, and the use of the negative binomial regression model was deemed appropriate (Cameron and Trivedi, 1998; Greene, 2003).

Following the standard procedure for moderated regression analysis (Sharma et al., 1981), we first estimated the main effect model with consumption attitudes and demographics as predictors of NPA, and then estimated the interaction model with the addition of product terms of consumption attitudes and demographics. The interaction model would be compared with the main effect model statistically, and if the interaction model is significantly different from the main effect, we can conclude the existence of interaction effects.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td>43.0</td>
<td>11.5</td>
<td>1.00</td>
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<td></td>
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<tr>
<td>2. Education</td>
<td>1.43</td>
<td>0.66</td>
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<td></td>
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</tr>
<tr>
<td>3. Income</td>
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<td>0.13</td>
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<td></td>
<td></td>
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<tr>
<td>4. ATPA</td>
<td>3.03</td>
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<td>0.02</td>
<td>-0.02</td>
<td>1.00</td>
<td></td>
<td></td>
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<tr>
<td>5. ATS</td>
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<td>1.14</td>
<td>-0.13</td>
<td>0.05</td>
<td>0.03</td>
<td>0.04</td>
<td>1.00</td>
<td></td>
<td></td>
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<tr>
<td>6. ATEP</td>
<td>3.75</td>
<td>0.97</td>
<td>0.27</td>
<td>-0.18</td>
<td>-0.20</td>
<td>0.02</td>
<td>-0.07</td>
<td>1.00</td>
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<td>7. ATIDM</td>
<td>3.59</td>
<td>1.00</td>
<td>0.04</td>
<td>-0.02</td>
<td>-0.02</td>
<td>-0.07</td>
<td>0.04</td>
<td>0.12</td>
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<td>8. ATHTP</td>
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<td>0.08</td>
<td>-0.09</td>
<td>0.04</td>
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</table>

**Notes:** *p < 0.10; p < 0.05 for all other correlations; ATPA = Attitude toward personal advice; ATS = Attitude toward savings; ATEP = Attitude toward existing products; ATIDM = Attitude toward independent decision making; ATHTP = Attitude toward high-tech product
Main effect model

The three demographic variables were entered in the main effect model as control variables so that the effects of consumption values can be interpreted as beyond the effect of demographics. The results, as presented in Table II, were consistent with prior research on demographic variables. Age showed a negative relationship with NPA ($\beta = -0.012, \exp(\beta) = 0.988, \chi^2 = 207.5, p < 0.01$). Education showed a positive effect on new product adoption ($\beta = 0.234, \exp(\beta) = 1.264, \chi^2 = 253.15, p < 0.01$). Finally, income showed a significant positive effect on new product adoption ($\beta = 0.456, \exp(\beta) = 1.578, \chi^2 = 1674.41, p < 0.01$).

Three of the five main effect hypotheses on consumption attitudes were supported while the other two were not. H1 posited that consumers’ attitude toward personal advice from friends and neighbors on purchasing new products is negatively related to NPA. The regression coefficient was not significant ($\beta = -0.008, \chi^2(1) = 0.78$). H2 hypothesized that NPA is negatively related to attitude toward savings. Contrary to our expectation, we found that perceived importance of savings increased the number of new product adoptions ($\beta = 0.041, \exp(\beta) = 1.042, \chi^2(1) = 22.30$). H3, which posited that attitude toward existing products is negatively related to consumers’ NPA, was supported ($\beta = -0.099, \exp(\beta) = 0.906, \chi^2(1) = 93.06$). Consumers who are reluctant to replace existing functional products with new ones adopt fewer new market innovations. H4 proposed that independent decision making in purchasing new products is positively related to NPA. The results show a statistically significant positive relationship ($\beta = 0.033, \exp(\beta) = 1.034, \chi^2(1) = 10.71$). As hypothesized in H5, consumers’ attitude toward high-tech products showed a positive relationship with new product adoptions ($\beta = 0.088, \exp(\beta) = 1.092, \chi^2 = 72.86$).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>$H$</th>
<th>$B$</th>
<th>SE</th>
<th>exp($\beta$)</th>
<th>$\chi^2$ (1)</th>
<th>$\beta$</th>
<th>SE</th>
<th>exp($\beta$)</th>
<th>$\chi^2$ (1)</th>
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<tr>
<td>Age</td>
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<td>207.5</td>
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<td>1674.41</td>
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<td>0.056</td>
<td>1.314</td>
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<td>0.009</td>
<td>1.042</td>
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<td>0.024</td>
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<td>0.028</td>
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<td>ATIDM</td>
<td>0.088</td>
<td>0.01</td>
<td>1.092</td>
<td>72.86</td>
<td>-0.133</td>
<td>0.038</td>
<td>0.875</td>
<td>12.06</td>
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<td>Age*ATEP</td>
<td>-0.004</td>
<td>0.001</td>
<td>0.996</td>
<td>21.32</td>
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<tr>
<td>Age*ATHEP</td>
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<td>0.001</td>
<td>1.005</td>
<td>34.91</td>
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</tr>
<tr>
<td>Income*ATEP</td>
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<td>0.01</td>
<td>1.094</td>
<td>78.89</td>
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<tr>
<td>Income*ATIDM</td>
<td>-0.023</td>
<td>0.01</td>
<td>0.977</td>
<td>4.84</td>
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<tr>
<td>Income*ATS</td>
<td>-0.02</td>
<td>0.009</td>
<td>0.980</td>
<td>4.89</td>
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<tr>
<td>Dispersion</td>
<td>0.328</td>
<td>0.015</td>
<td>-6018.37</td>
<td>-5938.49</td>
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Notes: ATPA = Attitude toward personal advice; ATS = Attitude toward savings; ATEP = Attitude toward existing products; ATIDM = Attitude toward independent decision making; ATHTP = Attitude toward high-tech product
The main effect model has a log likelihood ratio of $-6018.37$. As the null model with no explanatory variables has a log likelihood ratio of $-7741.28$, we computed McFadden’s Pseudo $R^2$ to be 0.22 for the main effect model, roughly equivalent to the coefficient of determination of 22 percent in linear regression.

### Full model with interactions between attitudes and demographics

The last hypothesis, $H6$, posited that demographic variables and consumption attitudes interact with each other such that the attitudes affect NPA more strongly among older, less educated, and less affluent consumers. The hypothesis was tested through exploring the potential interactions between consumption attitudes and demographics by adding product terms to the main effect model. Five interactions were found to be significant:

1. attitude toward existing products by age ($\beta = -0.004$, $\exp(\beta) = 0.996$, $\chi^2 = 21.32$);
2. attitude toward high-tech products by age ($\beta = 0.005$, $\exp(\beta) = 1.005$, $\chi^2 = 34.91$);
3. attitude toward existing products by income ($\beta = 0.090$, $\exp(\beta) = 1.094$, $\chi^2 = 78.89$);
4. independent decision making by income ($\beta = -0.023$, $\exp(\beta) = 0.977$, $\chi^2 = 4.84$); and
5. attitude toward savings by income ($\beta = -0.020$, $\exp(\beta) = 0.980$, $\chi^2 = 4.89$).

We did not find any significant interaction between education and consumption attitude variables. McFadden’s Pseudo $R^2$ is 0.23 for the full model with five interaction terms. The Chi-square difference between the main effect model and the full model is 79.88 ($df = 5$, $p < 0.001$). Thus, the full model is deemed significantly better than the main effect model.

As the coefficients for age, attitude toward existing products, and their interaction were all negative, we conclude that the negative effect of attitude toward existing products was stronger among older consumers. Preference for high-tech products interacted with age, and the interaction effect was positive. As attitude toward hi-tech had a positive main effect on NPA, a positive interaction coefficient indicated that the positive effect of hi-tech preference is, again, stronger for older consumers. $H6$ was supported for the interactions related to age.

Attitude toward existing products interacted positively with family income. As income had a positive effect and attitude toward existing products had a negative one, the positive interaction indicated that the effect of attitude toward existing products will decrease as income gets higher. Independent decision making and income had a negative interaction coefficient. As both income and independent decision making were positively related to NPA, the negative interaction suggested that the effect of independent decision making will become less apparent as income increases.

The same can be concluded about the savings by income interaction. Both savings and income had a positive effect on NPA, yet the interaction was negative, indicating the impact that attitude toward savings decreases as income increases. All these three interactions between consumption attitudes with income support $H6$. 

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Discussions
Using syndicated data from a large random sample of urban Chinese consumers, our study offers a deeper understanding of the attitudinal antecedents of consumer new product adoption. While the current literature provides somewhat equivocal evidence for interactions among antecedent variables of NPA, our results offer support for the contingency approach as depicted in Figure 1. In general, our results confirm from a contingency perspective that demographics and psychographics together can be effective discriminating variables for new product adoption. While previous studies have had inconsistent findings regarding the effects of demographic variables, we found that consumers’ NPA was related negatively to age and positively to income and education. Among the consumption attitudes, we show that consumers’ adoption of market innovations was associated negatively with their attitude toward existing products (unwillingness to replace old, still functional products with new products) and positively with independent decision making and preference for high-tech products. The effects of the consumption attitudes were above and beyond those of demographics.

Two hypotheses did not receive empirical support, which require additional explanations. Attitude toward personal advice, which reflects the conformity value, was not found to be significantly related to new product adoption, although the coefficient was negative as hypothesized (H1). In retrospect, however, this result may not appear completely surprising given our study context of Chinese consumers. In a collective society like China, the inner circle of family members, relatives, and friends may remain as an important information source for innovators and non-innovators alike. Further, perceived risk of adoption is a significant factor in the NPA decision process, especially among Asian consumers (Wee, 2003). Chinese consumers have been found to be more risk averse than Western consumers (Zhou et al., 2002). This factor looms even larger in the presence of a still inefficient market structure in China where not enough information is available from mass media or other impersonal channels. As such, personal channels of information exchange may remain to be used by both early and late adopters of new products. It seems that social influence and the desire to conform to social expectations remains relevant and strong in China.

The effect of attitude towards savings on NPA was opposite to what we hypothesized (H2). A favorable attitude toward savings showed a strong positive effect. That is, the more innovative consumers appeared to have a higher propensity to save for the future. Again, a post hoc explanation may be offered in relation to the Chinese context. Due to the relatively low overall income level, and buying on installment or credit being less common, careful financial planning is critical for most Chinese consumers to afford new electronic products. In addition, traditional Chinese culture teaches the values of diligence and frugality (Yau, 1988). For Chinese consumers, it is socially desirable to save money and to be a meticulous shopper (Wang and Rao, 1995). As such, those who save more tend to be more likely and able to adopt market innovations.

Following a contingency approach, we found that while consumption attitudes have significant effects on NPA, the magnitude of such effects depends on consumers’ demographic characteristics, especially income and age. As expected, the interactions we detected suggest that younger and more affluent consumers are less influenced by their consumption attitudes. Instead, their adoption of new market offerings seems to
be driven more by financial ability or something other than their consumption preference and attitudes.

On the other hand, the attitudinal impacts appear stronger among consumers who are older and/or have lower income. This finding has particular implications, suggesting financial ability or age *per se* is not an insurmountable stumbling block. Age by itself is not a reason to accept or reject new market offerings such as the ones in our study. Age has been used as a segmentation variable because of convenience and because of its presumed association with other variables such as open-mindedness, ability to process new information, and willingness to change and accept risk. In addition to the suggestion that consumption attitudes have effects that go beyond the effect of age, the results indicate that if older consumers are willing to change and to replace an old product with a new one even when their old product is still functional, such willingness may defy the presumed negative effect of age. Similarly, their attitude toward high tech products may help lower the stereotypical barrier of age to adopt new products.

We discovered that the attitude toward existing products, independent decision making, and attitude toward savings have stronger influences on low-income consumers than high-income consumers. When limited income presents a constraint, a less favorable attitude toward existing products may provide non-function-related reasons for the consumer to adopt a new product. Consumers may simply want to change their lifestyle associated with the old products for something newer, fancier, or more interesting, or even acquire something that is not absolutely necessary. As such, the low-income constraint may not appear as strong for those that do not favor the products they are using.

Similarly, the positive effects of independent decision making and attitude toward savings are more apparent among lower income consumers. For lower income consumers, putting money into their savings account is especially crucial for them to adopt new appliances. Perhaps because the social circles of the lower income consumers does not favor innovators or early adopters, when making purchasing decisions, an independent mindset seems to be more important for the lower income consumers in order for them to adopt new appliances.

For managers and marketers, such interactions suggest that while demographics provide an easy way to identify early adopters of new products (i.e. young and well-educated consumers with high income), consumers are not homogeneous within each demographic group, and attitude variables can add significant insights for understanding the characteristics of innovative consumers. Marketers aiming at younger consumers with higher income may not have to worry too much about consumption attitudes that we have studied. Education, income, and age provide convenient and effective segmentation tools. However, if marketers are interested in increasing the number of adopters among the older and lower income consumers, understanding the target market’s consumption attitudes will prove to be critical.

**Limitations and future research**

Our results offer strong support for the validity of the contingency approach. In interpreting our findings, however, we must acknowledge a number of limitations in our study, which point to future research directions. First, while we derive the consumption attitudes from Schwartz’s value inventory, the list of consumption
attitudes is not exhaustive. In addition, we only investigated five consumption attitudes derived from one of the two bipolar dimensions (openness to change versus conservation). Future research will benefit from examining a more comprehensive inventory of consumption attitudes, including consumption attitudes that could be identified and derived from the self-enhancement versus self-transcendence dimension. This dimension may be particularly relevant in certain product categories that may suggest status, power, and achievement. The hedonism value, for instance, should be investigated for its potential relationship with NPA as the value is associated with both openness to change and self-enhancement. Second, we were unable to assess the reliability of the three attitude measures, though the single-item measures appear to have acceptable face validity. Although recent measurement studies suggested that single-item measures with face validity could judge favorably against multiple-item measures (Nagy, 2002; Wanous et al., 1997), future research should attempt to use primary data collection methods and established multi-item measures so that sound psychometric properties can be explicitly demonstrated. Lastly, the data we used were cross-sectional in nature. We were able to establish associations between the variables, but cross-sectional data preclude us from concluding on causality. Clearly, longitudinal or experimental studies that investigate the causal relationship between consumption attitudes and NPA are called for. Nevertheless, the size and quality of our representative sample lend to the credibility and general applicability of our findings.

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