A Study on the Influence of External Stimuli and Psychological Processes on Stationery Purchase Behavior Based on SOR

Yiqi Li*
WLSA Shanghai Academy, Shanghai 200433, China

*Corresponding author: Yiqi Li, ls7791@126.com

Copyright: © 2022 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: Based on the SOR (stimulus–organism–response) model to obtain 534 survey data from the MTurk platform, the relationship between external stimuli, psychological processes, and consumers' stationery purchasing behavior was empirically analyzed using a multivariate ordered logistic regression model. In terms of marketing stimuli, consumers’ recognition of product quality and price as well as the convenience of purchasing channels significantly and positively influenced purchasing behavior; in terms of social stimuli, self’s opinion of needs and the positive evaluation of peers significantly and positively influenced purchasing behavior; in terms of psychological process, consumers’ knowledge, trust, willingness to know, and preference for stationery products significantly and positively influenced purchasing behavior. Accordingly, it is proposed that, in order to promote the purchase of stationery products, the production and operation links should ensure the quality of stationery products, promote price control in a reasonable range, guarantee a healthy, orderly, and convenient stationery market environment, as well as strengthen the multi-sensory promotion of stationery products.

Keywords: External stimulus; Psychological process; Purchase behavior; Stationery; SOR theory

Online publication: August 18, 2022

1. Literature review
In the context of new retail and consumption upgrading, consumers’ lifestyles and consumption habits are changing with the times, and the stationery industry has also ushered in a new round of reconstruction and innovation. According to the forecast data of the global stationery consumption market in 2007, the global stationery consumption reached 200 billion. The increase in self-expression and leisure time is a sign of a cultural shift, which is one of the reasons for the differences between European countries and developed countries, such as the United States. This growing trend of interest is established through the global market for toys, hobbies, and stationeries. Of the global share of these markets, China is the largest regional market in 2020, with revenues of $310.2 billion and has the highest market growth rate of 7.9% per year. Although China has been one of the world’s exporters in the retail sector, the Chinese market for pens and inks is largely dependent on imports from major brands, such as Japan’s Sailor and Germany’s Montblanc. Chinese brands are deemed unattractive when compared to more sophisticated foreign brands because top domestic manufacturers, such as FYT, Star Ink, Taiwan Ink Research Institute, and PenBBS, give the impression that their prices are cheap, with a substantial amount of supply. The Chinese market has not yet fully adopted effective strategies due to little research in the field of stationery marketing.
The advice of others can also influence the initial decision of consumers in the process of making purchase decision. This is how consumers lose self-control and change their initial purchase decision out of trust for their friends \(^1\). Rook and Fisher \(^2\) noted in their study that peer advice may lead to bad psychological purchase when buyers feel that their impulse buying behavior is inappropriate. Lee and Kacen \(^3\) stated that consumers’ impulse buying behavior is influenced by the advice of their accompanying partners during consumption and consumers who shop alone implement lower impulse buying behavior when they are shopping alone compared to when they are spending with a partner.

In his study, Stern \(^4\) confirmed that large scale advertising campaigns can promote consumer purchase behavior. Agee and Martin \(^5\) stated in their study that merchants use advertising to disseminate information to raise consumers’ awareness of the existence of a product and how it differs from other products, which in turn stimulates shoppers’ demand. The degree of influence of a brand has an impact on consumers’ purchase behavior. Previous scholars have studied the influence of brand on consumers’ purchase behavior from various aspects, including brand image, brand preference, and quality of brand relationship. Yan Liu \(^6\) argues that the brand image of a product is an intangible asset of a company, and there is a significant influence relationship between brand image and consumers’ purchase behavior.

“Visual stimuli (products) can lead to a mental simulation of motor activity (interaction with the product),” which may have an impact on purchase intentions or intentions to perform more behaviors \(^7\). In the context of color marketing, a study focused on the link between emotional responses and interior colors as well as restaurant dining preferences \(^8\). Each of the 496 participants was asked to view computer-generated images of restaurants with different interior colors. The results of the study showed that “higher pleasure scores for restaurant scenes with high-value colors and warm tones” were associated with an increased willingness to consume. However, in most cases \(^9\), consumers were able to correctly identify and respond to the design intent. From the aforementioned studies, it is clear that visual stimuli are an important influence on consumer behavior.

In a review of existing literatures \(^10\)–\(^15\), although there are many studies on consumers’ purchase behavior of various goods, few studies have been conducted on consumers’ purchase behavior of stationery products. In addition, previous studies have mainly chosen product marketing mix and consumption habits as the main variables to study consumers’ purchase intention or behavior, but they have neglected the influence of social factors and consumer psychology on purchase behavior; furthermore, consumers’ purchase behavior of stationery products has not been examined from the combined aspects of marketing mix, social factors, and consumer psychology. In view of this, based on the SOR (stimulus–organism–response) theoretical framework, this paper examines consumers’ stationery purchase behavior from two levels: external stimulus and psychological state.

2. Study design
2.1. Theoretical model construction
The SOR theoretical model provides a reasonable explanation for the consumer purchase behavior path, and through this framework, the consumer purchase decision process can be divided into three parts: external stimulus (S), psychological process (O), and purchase behavior response (R). First, the external environment stimulates the consumer’s consciousness, subsequently, a set of psychological processes that reflect the consumer’s characteristics leads to the decision process and ultimately to the purchase behavior. From a marketing perspective, external stimuli come from marketing stimuli and social stimuli, in which marketing stimuli include quality, price, channel, and promotion stimuli, while social stimuli can be divided into macro-environmental stimuli, such as economic and cultural stimuli, and micro-environmental stimuli generated by family, peers, and other related groups. The psychological effects of macro environment, such as culture and economy, on consumers cannot be measured directly but can be reflected indirectly through...
individual consumer and family characteristics.

In addition, consumer psychological processes are manifested in specific psychological characteristics, such as perception, trust, willingness, and preference. Therefore, based on the SOR model, this paper constructs an empirical research framework of marketing stimuli, social stimuli, psychological states, and consumers’ stationery purchase behavior.

2.2. Data source
The study was conducted using online research, and the sample data were obtained from March 2022 to June 2022, with 534 participants recruited from MTurk (an online platform). The basic demographic information of the participants includes gender and income. Following inquiries about their demographics, the participants were asked a wide range of questions, including their habits of writing handwritten notes, whether they know anyone who writes handwritten notes, their interest in buying stationeries, their impressions of the features of pens and inks, their willingness to buy after seeing advertisements, whether they are able to persuade others to buy stationeries, their associated emotions with brand attributes, and others.

2.3. Variable descriptions
2.3.1. Dependent variable
The dependent variable in the study is the consumers’ purchase behavior of stationery products. In order to accurately measure their purchase behavior, two questions were designed in the questionnaire: (1) “What is the average monthly frequency of stationery purchased?” (purchase frequency); (2) “What the average monthly quantity of stationery purchased?” (purchase quantity). The selection of answers was as follows: “once a month or lesser,” “twice a month,” “three times a month,” “four times a month,” “five times a month or more.” The higher the score, the higher the degree of purchase behavior.

2.3.2. Independent variables
External stimuli and psychological processes are the two core independent variables of interest in the study, but both are considered latent variables that cannot be observed directly. Two indicators, peer stimulus and evaluation, were used to measure social stimuli. In consumers’ purchase behavior of stationeries, consumer psychological processes (O) generally include cognition and emotion. According to David Myers’ social cognitive theory and existing studies, consumers’ product cognition includes the cognition of needs, the cognition of concepts, and the cognition of values [10]. In the study, the cumulative results were recorded as consumers’ cognitive level by setting three questions, each of which was measured on a five-point Likert scale; the affective aspects include trust, willingness to know, and preference for the product; each of the above indicators was also measured on a five-point Likert scale, with each indicator being assigned a value of 1 to 5; the higher the value, the higher the degree of psychological response generated by the consumer (Table 1).

Table 1. Variable definitions and assigned value descriptions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Variable</th>
<th>Code</th>
<th>Definition and assigned value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase</td>
<td>Purchase</td>
<td>Y1</td>
<td>Frequency of purchase</td>
</tr>
<tr>
<td>intentions</td>
<td>frequency</td>
<td></td>
<td>1 time and below (1); 2 times (2); 3 times (3); 4 times (4); 5 times (5)</td>
</tr>
<tr>
<td>Purchase</td>
<td>Quantity of</td>
<td>Y2</td>
<td>Quantity of purchase</td>
</tr>
<tr>
<td>quantity</td>
<td>purchase</td>
<td></td>
<td>1 and below (1); 2 (2), 3 (3), 4 (4), 5 (5)</td>
</tr>
</tbody>
</table>

(Continued on next page)
(Continued from previous page)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Variable</th>
<th>Code</th>
<th>Definition and assigned value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotion messages</td>
<td>Quality</td>
<td>Quality</td>
<td>Recognition of stationery quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Strongly disapprove (1); relatively disapprove (2); average (3); relatively approve (4); strongly approve (5)</td>
</tr>
<tr>
<td>Price</td>
<td>Price</td>
<td></td>
<td>Recognition of price</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Strongly disapprove (1); relatively disapprove (2); average (3); relatively approve (4); strongly approve (5)</td>
</tr>
<tr>
<td>Channels</td>
<td>Channels</td>
<td></td>
<td>Recognition of channels</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Strongly disapprove (1); relatively disapprove (2); average (3); relatively approve (4); strongly approve (5)</td>
</tr>
<tr>
<td>Promotion</td>
<td>Promotion</td>
<td></td>
<td>Recognition of promotion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Strongly disapprove (1); relatively disapprove (2); average (3); relatively approve (4); strongly approve (5)</td>
</tr>
<tr>
<td>External stimuli</td>
<td>Online</td>
<td>Evaluation</td>
<td>Recognition of professional evaluation</td>
</tr>
<tr>
<td></td>
<td>commentaries</td>
<td></td>
<td>Strongly disapprove (1); relatively disapprove (2); average (3); relatively approve (4); strongly approve (5)</td>
</tr>
<tr>
<td>Peer</td>
<td>Peer</td>
<td></td>
<td>Peer recognition</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Strongly disapprove (1); relatively disapprove (2); average (3); relatively approve (4); strongly approve (5)</td>
</tr>
<tr>
<td>Psychological processes</td>
<td>Recognition</td>
<td></td>
<td>Degree of recognition of stationery needs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very unclear (1); relatively unclear (2); average (3); relatively clear (4); very clear (5)</td>
</tr>
<tr>
<td>Trust</td>
<td>Trust</td>
<td></td>
<td>Trust in stationery brands</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very distrustful (1); relatively distrustful (2); generally trusting (3); relatively trusting (4); very trusting (5)</td>
</tr>
<tr>
<td>Willingness</td>
<td>Willingness</td>
<td></td>
<td>Willingness to know more about stationery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very reluctant (1); relatively reluctant (2); average (3); relatively willing (4); very willing (5)</td>
</tr>
<tr>
<td>Preference</td>
<td>Preference</td>
<td></td>
<td>Preference for stationery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very little preference (1); less preference (2); average (3); greater preference (4); very great preference (5)</td>
</tr>
</tbody>
</table>

2.4. Model selection
Considering that the frequency and quantity of stationery purchased by consumers belong to ordered multcategorical variables, the study selected the ordered multivariate logistics regression model to analyze the factors affecting consumers’ purchase behavior of stationaries. The expression of the ordered logistics model is as follows:

\[
p = \left( y = j \mid X_i \right) = \frac{1}{1 + e^{(\alpha + \beta X_i)}}
\]

where \(X_i\) denotes the \(i\)-th independent variable index and \(y\) denotes the probability of the frequency and quantity of stationery purchased by consumers. The cumulative logistics model is as follows:

\[
\text{logit}(P_j) = \ln[P(y \leq j)] = \alpha j + \beta X
\]
In equation (2), $P_j = P(y = j)$, where $j = 1, 2, 3, 4,$ and $5$; $X$ denotes a series of independent variables (marketing stimuli, social stimuli, and psychological processes) that influence consumer purchase behavior. $\beta$ is a set of estimated coefficients corresponding to $X$, and $\alpha_i$ is the intercept term of the regression equation. After obtaining the estimated results of $\alpha_i$ parameters of $\beta$, the probability of occurrence of any $y$ in condition $j$ can be obtained by equation (3).

$$P = (y \leq j | X) = \frac{e^{-(\alpha + \beta X_i)}}{1 + e^{-(\alpha + \beta X_i)}}$$

(3)

3. Empirical analysis

3.1. Descriptive statistics

In the recovered sample data, 48.1% of the respondents were female and 51.9% were male. The respondents were asked if they filled the questionnaire seriously, of which only 93.4% of them gave a positive response, indicating that 93.4% of the questionnaires were valid. In terms of personal income, 23% of the respondents earned less than $40,000, 65% earned between $40,000 and $100,000, while 2% earned above $100,000, indicating that the income level of the majority of respondents is reasonable. When purchasing stationeries, the price, the quality, and the convenience of stationery purchase are the most important factors considered by the respondents, suggesting that the marketing stimuli (price and quality) set by the study are reasonable. The participants were asked how much they would spend on purchasing stationaries from the following four options: 6.1% said that they would spend more than $75, 42.4% would spend between $50 and $75, 38.4% would spend between $25 and $50, and 13.1% would spend between $10 and $25.

3.2. Analysis of regression results

STATA 15.0 was used to conduct an ordered logistic regression on the relationship between external stimuli (marketing stimuli and social stimuli), psychological processes, and consumers’ stationary purchase behavior. In order to determine the robustness of the regression results, purchase frequency ($Y_1$) and purchase quantity ($Y_2$) were set as the proxy variables of consumers’ purchase behavior, and they were regressed separately to obtain Model 1 and Model 2; secondly, in order to reduce the bias in the estimation results caused by heteroskedasticity, both models were regressed using robust standard errors. Overall, the chi-square values of both models were significant at the 1% level, indicating that the overall fit of the two models is good and can be further analyzed. From the comparison, there was no significant difference found between Model 1 with $Y_1$ as the dependent variable and Model 2 with $Y_2$ as the dependent variable, indicating that the estimation results of the models are accurate. The specific model regression results are shown in Table 2.

Table 2. Statistics of the ordered logistics regression results

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Independent variables</th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$\beta$</td>
<td>Exp($\beta$)</td>
<td>$\beta$</td>
<td>Exp($\beta$)</td>
</tr>
<tr>
<td>Marketing messages</td>
<td>Quantity</td>
<td>0.217**</td>
<td>1.243</td>
<td>0.156**</td>
<td>1.117</td>
</tr>
<tr>
<td></td>
<td>Price</td>
<td>0.343**</td>
<td>1.428</td>
<td>0.328**</td>
<td>1.429</td>
</tr>
<tr>
<td></td>
<td>Channel</td>
<td>0.327**</td>
<td>1.363</td>
<td>0.318***</td>
<td>1.313</td>
</tr>
<tr>
<td></td>
<td>Promotion</td>
<td>0.090</td>
<td>1.168</td>
<td>0.079</td>
<td>1.078</td>
</tr>
<tr>
<td>External stimuli</td>
<td>Online evaluation</td>
<td>0.257**</td>
<td>1.253</td>
<td>0.154*</td>
<td>1.232</td>
</tr>
<tr>
<td></td>
<td>Peers</td>
<td>0.158*</td>
<td>1.184</td>
<td>0.187*</td>
<td>1.139</td>
</tr>
</tbody>
</table>

(Continued on next page)
3.2.1. Marketing stimuli and consumers’ purchase behavior of stationery
The marketing mix of product quality, price, and channel has a significant positive impact on the frequency and quantity of consumer purchases, which indicates that the higher the quality of a stationery, the more reasonable the price and the more convenient the purchase channel can stimulate consumers to produce purchase behavior. The reason for this is that, according to the rational economic man hypothesis that emphasizes on the pursuit of utility maximization, high-quality stationery products can better satisfy the basic needs of consumers to meet their desire to purchase; the more the price is in line with the psychological expectations, the higher the perceived value and consumers are more willing to buy; the degree of convenience of purchase also affects the purchase behavior of consumers. In the case of a certain expected return on the purchase of stationery, the purchase channel of convenience reduces the costs of time and effort, which in turn increases the overall value of the consumer to promote purchase behavior.

3.2.2. Social stimuli and consumers’ stationery purchase behavior
Among the social stimuli, both, online professional assessment opinions (Advice) and positive peer evaluations (Opinion) have significant positive effects on consumers’ purchase behavior (purchase frequency and purchase quantity) with corresponding coefficients of 0.257, 0.158 and 0.154, 0.187, respectively (the first two indicate coefficients with purchase frequency as the dependent and independent variables, whereas the latter two indicate coefficients with purchase quantity as the dependent and independent variables, which are also consistent in the latter). This suggests that stationery purchases are not entirely the representative of a consumer’s personal consumption needs and that the consumer’s stationery purchases are based primarily on online evaluations and peer opinions. This explains the complexity of consumers’ purchasing activities. There are many types and brands of stationeries, and without a sufficiently rich consumer experience, the reference opinion of purchasing stationery mainly comes from the performance measurement comparison of professionals on online platforms, which greatly reduces the cost of consumer trial and error, followed by positive peer evaluations, which also have a significant positive impact on stationery purchase behavior. This is attributable to the brand trust established by peers’ word-of-mouth.

3.2.3. Psychological processes and consumers’ stationery purchase behavior
In terms of psychological processes, consumers’ awareness, trust, willingness, and preference for stationery significantly and positively affect the frequency and quantity of purchase, with corresponding coefficients of 0.243, 0.267, 0.353, 0.819 and 0.059, 0.235, 0.338, 0.923, respectively. This indicates that the higher the level of consumer awareness of stationery, the more confidence consumers have in the functional quality of stationery, the stronger their willingness to know about stationery products, the more pronounced their preference for stationery products, and the more the consumers would purchase stationery products. The reason for this is that as rational economic people, consumers have the character traits of profit and risk avoidance; the deeper the knowledge and trust in quality, consumers are likely to make better judgments.

(Continued from previous page)
that are consistent with maximum utility. Understanding the willingness and preference will directly affect the final purchase behavior of consumers.

4. Conclusion and recommendations

First of all, there are some limitations in the study. Behavioral intentions were tested rather than real behavior because only online participation was allowed during the pandemic. As a result, the survey failed to simulate a real shopping experience, where consumers could pick items close up and examine them rather than staring at a computer screen, which may have weakened their willingness to buy.

In addition, online participants are prone to biases. The participants may have answered questions too quickly or have been dishonest while answering the questions, in order to “please” the researchers. A larger sample size and/or greater monetary incentive may help overcome these limitations while conducting surveys.

With this limitation in mind, the study concludes that first, in the marketing mix, consumers’ recognition of stationery quality and price as well as the ease of access to purchase would significantly and positively influence consumers’ purchase behavior; that is to say, the higher the recognition of consumers toward stationery quality and price, the more likely consumers will purchase stationeries; the more convenient the purchase channel of stationery, the higher the number and quantity of purchases.

Secondly, social stimuli, online professional assessment opinions, and positive peer evaluations can significantly affect consumers’ purchase behavior. In other words, the better the professional evaluation of stationery, the more consumers will buy stationery with less trial-and-error cost; more positive peer evaluations will engender a more positive attitude among consumers toward stationeries, thus producing more stationery purchase behavior.

Third, psychological processes, including cognition, trust, willingness to search, and preference, can positively influence consumers’ stationery purchase behavior. This indicates that the more knowledgeable consumers are about stationery, the more trust they have in the quality of stationery, the stronger their willingness to know about stationery, and the more likely their preference for stationery increases, which might lead to an increase in purchase behavior among consumers.

Based on the above findings, several suggestions for developing the current stationery market are proposed.

4.1. Increase product quality control, reasonable use of price strategy

The main body of stationery production and sales should ensure the supply of high-quality stationeries. First of all, the quality of stationeries should be improved from the source itself. Enterprises that supply raw materials should ensure the dyes are of high quality and further explore more environmentally friendly bio-based inks. Secondly, the main body of manufacturing and sales should establish a complete and effective stationery supply chain as well as improve the stationery manufacturing process to ensure the quality of product supply. In terms of price, stationery manufacturing enterprises with a certain scale should be encouraged to achieve an integrated transformation from raw material production to manufacturing and eventually to terminal sales, which refers to the establishment of a complete industrial chain model from production to sales. This would help reduce distribution costs and the retail price of stationeries. In terms of purchase channels, retail enterprises should create a good shopping environment and open up online and offline shopping channels to bring convenience to consumers.

4.2. Pay attention to the emotional response of consumers, the implementation of different marketing strategies

It is crucial to pay attention to network professional evaluation and user experience. In the sales process,
the sales body must not only consider the needs of consumers, but also the network professional evaluation recommendations and opinion demands that position stationery products as experience-based upgrade products. At the same time, it is also necessary to pay attention to consumers’ after-sales experience. By taking advantage of the quality of products, it is possible to create a good word-of-mouth effect. Regular customers should be encouraged to boost the product’s image to new customers by word-of-mouth marketing, thus recruiting more buyers. Consolidating primary functional products would be beneficial in creating a rich experience for consumers by matching stationery products, such as the use of color matching to mobilize emotions, changing colors over time, and other methods. Moreover, developing novel multi-sensory experience stationery products would also be an effective marketing strategy, such as the Japanese stationery market in writing music ink and French J. Herbin scented inks that emphasize on writing while adding an olfactory experience to consumers.

4.3. Strengthen the perception of product experience to improve the purchase level
It is important to strengthen the knowledge of consumers about stationery through the matrixed network platform, science education, quizzes, advertisements, and other means. This would help strengthen consumers’ awareness of the “sense of stationery experience,” thus stimulating their willingness and interest to learn more about stationeries. Color marketing or sensory marketing may be attempted to increase sales, but care must be taken to pick the right design.

Acknowledgement
My deepest gratitude to Mrs. Hill Cunnings from Pioneer Research Program for guiding my research as well as Wangruo Lianggu and Eugene for their assistance with the survey and peer review.

Disclosure statement
The author declares no conflict of interest.

References
Citation:


Publisher’s note
Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.