Demographics, psychographics, price searching and recall in retail shopping

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Retailing environments have gone through physical changes and the Internet revolution which intensifies price search and comparison behaviour, however, what customer characteristics – demographics or psychographics – affect price searching and recall? Further, what changes the relationship between the price-searching tendency and price recall? This research develops a framework that integrates the views of the economics of information and psychosocial returns to address these questions. Through point-of-purchase surveys, this study finds that psychographics affect the price-searching tendency directly while demographics do so indirectly through psychographics. In addition, the price-searching tendency has a positive effect on price recall and this relationship is stronger when consumers buy discounted products. Finally, in contrast to previous research, consumers’ high tendency to search for price and price recall accuracy and confidence are found.

Keywords: demographics; psychographics; price-searching tendency; price recall; price promotion

Introduction

In recent decades, retailing environments have gone through physical changes, such as the increased concentration of retailing stores, intensified competition among stores, the development of self-service, the growth of supermarkets, and the spread of nationwide chain stores (De Kervenoael, Hallsworth, & Clarke, 2006; Greenly & Shipley, 1988) and the use of the internet channel (Donthu & Garcia, 1999). These changes have clearly altered consumer behaviour (De Kervenoael et al., 2006) and make shopping a complex human activity (Greenly & Shipley, 1988). Consumers have to deal with a variety of information from retailers, especially price promotion information. For example, Wal-Mart’s ‘Always low prices’ strategy, and Carrefour’s ‘Low price every day’. These companies extensively advertise their price promotion programmes. Specifically, the prevalent use of the Internet makes price search and comparison more easy and widespread. As a result, consumer price search and comparison becomes an ever important shopping activity in the intensified competitive retailing environments.

Some research questions have arisen as the consumers’ price-searching behaviours become more important. Is price information searched for and remembered by all consumers? If not, what customer characteristics – demographics or psychographics – affect...
price search and recall? Do consumers with a stronger price-searching tendency remember the product prices better? What will change the relationship between price-searching tendency and price recall? The answers to these questions are useful for retail managers in order to target the right customer segments to whom they should offer price promotion programmes.

Consumers’ demographics and psychographics are frequently employed to predict their price-searching behaviour (Avery, 1996; Kolodinsky, 1990; Urbany, Kalapurakal, & Dickson, 1996). Although those studies provide evidence that some consumer demographic and psychographic characteristics influence price-searching tendencies, they separately test the direct effects of demographics and psychographics on consumers’ price-searching behaviour. Urbany et al. (1996) propose that while demographics may be correlated with most of the psychographics that influence price searching, demographics do not directly influence price searching. However, they neither specifically show nor empirically test the ways in which demographics correlate with psychographics. Thus, this research attempts to examine whether the effects of demographics on price-searching tendencies are through psychographics and, further, how demographics correlate in detail with psychographics.

Although much previous research examines the relationship between price searching and price recall (Dickson & Sawyer, 1990; Mazumdar & Monroe, 1992), the results are not consistent. Some research shows that consumers’ price recall may vary with product characteristics such as purchase frequency, consumer involvement, the amount of price advertising in the media, and price variability (Dickson & Sawyer, 1990; Estelami, 1998). Thus, product characteristics may be an important influence on the relationship between price search and price recall. To our knowledge, no study has yet examined the moderating effect of price promotion (i.e. discounted versus regularly priced products) on the relationship between price-searching tendency and price recall. Thus, we propose that price promotion may play a moderating role in the relationship between the price-searching tendency and price recall. The examination of a possible moderating role of price promotion expands the knowledge within price recall research.

In summary, the main purposes of this research are to examine the mediating effects of psychographics between demographics and price-searching tendency, to verify the relationship between price-searching tendency and price-recall and to investigate the moderating effects of price promotion on the relationship between price-searching tendency and price recall. In order to achieve these goals, this study first develops the conceptual framework concerning the effects of demographics and psychographics on price-searching tendency and, in turn, on price recall. Also, the study incorporates the moderating effects of price promotion on the relationship between price-searching tendency and price recall. Next, after a review of the related literature, research hypotheses are proposed. Then, the data collection procedures are described, hypotheses tested, and the research results explained. Finally, a summary of findings and their implications for researchers and retail managers concludes the paper.

Literature review and hypothesis development

Price-searching tendency

Price searching is important for consumers in making purchase decisions because they can save effort by such searching (Krishna, Currim, & Shoemaker, 1991). Based on Urbany et al. (1996), this study defines a price-searching tendency as the tendency to obtain and compare the product prices of competitive brands and stores. Mazumdar and Monroe (1992) indicate two kinds of price-searching behaviours, namely inter-store and in-store
price comparison. They further state that the objective of the former is to remember a certain store’s price and to compare it with prices at other stores, while the latter is to check prices in order to make purchase decisions. This study examines both kinds of price searches because both stimulate the processing of price information.

Two perspectives can explain why consumers search for price information. One is the economics of information (EOI) proposed by Stigler (1961) and the other is the view of psychosocial returns (Avery, 1996; Kolodinsky, 1990; Urbany et al., 1996). In the assumptions of classic economics, all consumers are rational and have complete information to make their purchase decisions. However, in reality no single consumer has complete information about market prices. Thus, the EOI framework emphasises that not all consumers will be perfectly informed about marketplace alternatives because each consumer places a different value on the costs of, and returns from, searches (Urbany, 1986). It further indicates that consumers will continue to search for price information until the marginal cost of gathering more information equals or exceeds the marginal return.

Although the EOI framework provides an important foundation for understanding consumers’ price-searching behaviours, there are still some limitations in applying it. First, the framework assumes that consumer search behaviour is primarily driven by both cost and benefit factors and does not incorporate many non-economic factors (Avery, 1996; Kolodinsky, 1990; Urbany et al., 1996). Second, the application of the EOI framework to less structured purchase decisions (e.g. frequently purchased and non-durable goods) lacks clear theoretical predictions (Avery, 1996). Besides the costs/benefits consideration, some consumers derive great pleasure from shopping (Jin & Sternquist, 2004). Price searching brings consumers psychological happiness and satisfaction (Urbany et al., 1996). Those psychosocial returns include shopping enjoyment (Kolodinsky, 1990; Marmorstein, Grewal, & Fishe, 1992) and social returns from providing information to others (Feick & Price, 1987; Urbany et al., 1996). Thus, the psychosocial return is another important driver that encourages consumers to search for price information (Avery, 1996; Kolodinsky, 1990; Urbany et al., 1996).

The relationships among demographics, psychographics, and price-searching tendency

Based on previous studies (Kolodinsky, 1990; Urbany et al., 1996), this research uses household income, age, and gender as indicators of demographics. As for psychographics, Ailawadi, Neslin, and Gedenk (2001) divide these into two groups. One concerns economic/utilitarian benefits from searches, such as price consciousness and perceived financial constraints. Based on prior research, price consciousness can be defined as the degree to which the consumer focuses exclusively on paying low prices (Lichtenstein, Ridgway, & Netemeyer, 1993). Perceived financial constraints are the extent to which consumers feel that their budgets are always tight and they have problems making ends meet (Ailawadi, et al., 2001; Urbany et al., 1996).

The other group of psychographics is associated with hedonic/psychosocial benefits from searches, such as being a market maven and enjoying shopping activities. Previous research, however, (Grewal & Marmorstein, 1994; Urbany et al., 1996) shows that shopping enjoyment does not significantly influence price searching because it correlates with economic benefits and its influence is diluted (Urbany et al., 1996). Thus, this research chooses only market mavenship as the indicator of psychographics. Market mavens are persons with a tendency to collect marketplace information and share information with other people (Feick & Price, 1987; Lichtenstein et al., 1993; Urbany et al., 1996).
The influences of demographics on psychographics

Both Ailawadi et al. (2001) and Urbany et al. (1996) indicate that some demographics highly correlate with psychographics. These relationships between demographics (e.g. household income, age, and gender) and psychographics (e.g. price consciousness, perceived financial constraints, and market mavenship) are discussed as follows. First, this research expects income to have a negative relationship with price consciousness and perceived financial constraints. Lower-income consumers do not have enough money to spend. Thus, they will be more sensitive to price variations and have greater price consciousness. In addition, lower-income consumers’ living expenditures comprise a larger proportion of their income, so they always have tight budgets and problems making ends meet. Thus, lower-income consumers’ perceived financial constraints will be greater than those of higher-income consumers (Hoch, Kim, Montgomery, & Rossi, 1995).

Second, Urbany et al. (1996) indicate that consumers of different ages vary in their search costs, economic returns, attitudes toward thrift, and vigilance in shopping. Moreover, on average, wages and disposable income are positively associated with age. Thus, we propose that young consumers’ perceived financial constraints will be greater than those of older consumers.

Third, we expect that females have a greater tendency to be market mavens than males. Research shows that females are more likely to enjoy shopping than males (Ailawadi et al., 2001; Feick & Price, 1987). In addition, females gain more social returns from sharing price information with one another.

The influences of psychographics on price searching tendency

The effects of price consciousness, perceived financial constraints, and market mavenship on price-searching tendency are discussed as follows. First, consumers with high price consciousnesses are sensitive to prices and regard purchasing low-priced products as being important (Ailawadi et al., 2001; Monroe, 1990). Therefore, this research expects that highly price-conscious consumers are eager to search for price information in order to save money.

Second, consumers with financial constraints have to spend their money carefully for fear of incurring debt. In addition, Urbany et al. (1996) indicate that consumers will have greater incentives to search for lower prices when their financial constraints are high. Thus, this research expects that perceived financial constraints are positively related to price-searching tendency.

Third, psychosocial returns motivate consumers to be market mavens (Urbany et al., 1996). In other words, by collecting price information to share with other people, market mavens gain social returns and happiness. In addition, market mavens are positively associated with some price-searching behaviours such as greater coupon use (Price, Feick, & Guskey-Federouch, 1988) and greater direct mail and local advertisement reading (Higie, Feick, & Price, 1987). Thus, this research expects that market mavenship positively influences price-searching tendency. This research proposes the following hypotheses:

H1: Psychographics mediate the relationship between demographics and price-searching tendency.

H1a: Household income is negatively related to price consciousness and perceived financial constraints.

H1b: Age is negatively related to perceived financial constraints.

H1c: Females have a greater tendency to be market mavens than males.
Price consciousness is positively related to price-searching tendency.

Perceived financial constraint is positively related to price-searching tendency.

Market maven tendency positively relates to price-searching tendency.

Price-searching tendency and price recall
Price recall is usually composed of price recall accuracy and price recall confidence (Biehal & Chakravarti, 1986; Mazumdar & Monroe, 1992; Turley & Cabaniss, 1995). The former is objective price recall, whereas the latter is subjective price recall. Based on Mazumdar and Monroe (1992), this research defines price recall accuracy as the extent to which there are differences between recalled and actual prices. Moreover, price recall confidence is defined as the degree to which consumers are confident about the correctness of the prices they recall.

Although consumers have opportunities to acquire price information, not every consumer pays full attention to price information. Consumers who attend to and process price information more elaborately will have price information more readily accessible at the time of retrieval (Mazumdar & Monroe, 1992). In addition, based on Dickson and Sawyer (1990), the long-term storage of psychological price (i.e. price recall) is affected by the outcome of comparing, contrasting, and assimilating psychological price with the internal reference price and other items’ prices. Thus, this research expects that price-searching tendency positively influences price recall. This research proposes the following hypothesis:

H2: Price searching tendency has positive effects on price recall.

The moderating effects of price promotions
Previous research on price memory (Jacoby & Olson, 1977; Lindsay & Norman, 1972; Shiffrin & Atkinson, 1969) suggests that exposure to repeated price information increases the likelihood of elaboration and rehearsal of price information. In general, the prices of discounted products are frequently advertised (e.g. fliers or in-store advertisements). Research by Dickson and Sawyer (1990) indicates that consumers who buy discounted products have been exposed to prices more frequently because they do more price checking than consumers who buy regularly priced products. In addition, they mention that if the price is constrained and viewed as very low, the price will be evaluated positively and remembered better. They further state, based on a classic behavioural premise, that anything unusual in a choice environment will attract more attention. Hence, a low price will attract consumers’ attention and be enlarged in the consumers’ memories. In summary, the repeated exposure effect and the enlargement effect of discounted prices in consumers’ memories strengthen the relationship between price-searching tendency and price recall when consumers buy discounted products. The following hypothesis is proposed for testing.

H3: Price promotions (discounted versus regular priced products) moderate the effects of price-searching tendency on price recall.

Methodology

Research framework
This research examines the effects of demographics and psychographics on price-searching tendency and, in turn, on price recall. In addition, this research considers
price promotion as a moderator of the relationship between price-searching tendency and price recall. The framework is shown in Figure 1.

**Procedures**
This research conducted an intercept consumer survey to obtain data. Subjects were sampled from a global retailer, namely Carrefour. Following Dickson and Sawyer’s (1990) data collecting procedure, shoppers were interrupted after they had placed their products to be purchased in their cart so as to eliminate any time lag when asking the shopper to recall the price. Observers with clipboards were stationed in retail stores at the point of purchase for particular items. Every 10 min, the observer targeted the first shopper who had chosen one of the target brands. The interviewer first asked whether the shopper was willing to participate in the interview. If s/he agreed, the interviewer asked the subject to recall the price of the product to be purchased and their confidence in recalling the price. After that, they filled in the remaining questionnaire about their price-searching tendency, psychographics and demographics. Finally, the subjects received gifts in return for their participation.

**Product selection**
In order to test the moderating effects of price promotions, this research chose the target products that had some brands that were on sale (i.e. discounted products) and other brands that were not (i.e. regularly priced products) during the same period. After discussion with the wholesale store’s regional and advertising managers, this research chose shampoo and tissue paper as the target product categories because both products are often on sale and bought by everyone.

**Measurement**
Four constructs were measured in this research, namely demographics, psychographics, price searching, and price recall. Most measurement items were adapted from previous research. Table 1 shows the measurement information.

**Demographics**
To measure age, gender, and income, this research used single items (see Table 1).
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<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Measurement and scale</th>
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<tbody>
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<td>Demographics</td>
<td>Age</td>
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<td>Gender</td>
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<td></td>
<td>Income</td>
<td>Open question</td>
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<tr>
<td>Psychographics</td>
<td>Price consciousness ($\alpha = 0.68$)</td>
<td>I would never stop at more than one store to find low price (reverse) (Lichtenstein et al., 1993)*</td>
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<td>It is important to me to get the best price for the products I buy (Ailawadi et al., 2001)*</td>
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<td>I find myself checking the prices even for small items (Ailawadi et al., 2001)*</td>
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<td>I usually purchase the cheapest items (Donthu &amp; Gilliland, 1996)</td>
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<td>I usually purchase items on sale only (Donthu &amp; Gilliland, 1996)</td>
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<td>I often find myself checking prices. (Donthu &amp; Gilliland, 1996)</td>
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<td></td>
<td>Perceived financial constraints ($\alpha = 0.92$)</td>
<td>I frequently have problems making ends meet (Avery, 1996)</td>
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<td>My budget is always tight. (Avery, 1996)</td>
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<td>I often have to spend more money than I have available. (Avery, 1996)</td>
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<td>Market maven ($\alpha = 0.79$)</td>
<td>I like introducing new brands and products to my friends. (Feick &amp; Price, 1987)</td>
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<td>I like people to ask me for information about products, prices, sales, and places to shop. (Feick &amp; Price, 1987; revised form)</td>
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<td>I like to tell people where to get the best buy on several types of products (Feick &amp; Price, 1987; revised form)</td>
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<td>Price searching tendency</td>
<td>Inter-store search ($\alpha = 0.85$)</td>
<td>I always compare prices between stores</td>
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<td>I always compare information about special price between stores</td>
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<td>I always read advertisements or fliers to compare prices between stores (Avery, 1996; revised form)</td>
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<td>I always surf prices of different stores on the web*</td>
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<td>I always pay attention to the sales information on the TV or broadcast*</td>
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<td>I always ask others about product price information (Avery, 1996; revised form)*</td>
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<td></td>
<td>In-store search ($\alpha = 0.69$)</td>
<td>I always make price comparisons between brands of to-be-purchased products (Avery, 1996; revised form)</td>
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<td></td>
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<td>I always make price comparisons between sizes of to-be-purchased products (Avery, 1996; revised form)</td>
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(Continued)
Psychographics

The psychographics include three variables: price consciousness, perceived financial constraints, and market mavenship. They were measured on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The three measurement items of price consciousness were based on the scales of Lichtenstein et al. (1993) and Ailawadi et al. (2001). Perceived financial constraints are measured by three items revised from Avery (1996). The measurement of market mavenship was revised from Feick and Price (1987). All items of the psychographics are shown in Table 1.

Price-searching tendency

The construct of price searching in this research includes both inter-store and in-store price searches. This research developed items according to Mazumdar and Monroe’s (1992) concept and Avery’s (1996) scales (Table 1).

Price recall

Two constructs were used to measure consumers’ price recall in this study: price recall accuracy and price recall confidence. The measurement of price recall accuracy was carried out by asking the subjects, ‘What is the price of the product you have chosen?’ Following Mazumdar and Monroe (1992) and Zeithaml (1982), price recall accuracy was computed as an absolute deviation from the recalled price to the actual price, expressed as a percentage of the actual price. The formula has a corollary, namely that a 5% recall error equals 95% recall accuracy. Table 1 shows the formula. The measurement of price recall confidence was adapted from Mazumdar and Monroe (1992) by asking, ‘Are you sure that the price you that you recall is correct?’ In order to combine the measurement of price recall accuracy and price recall confidence, this research revised Mazumdar and Monroe’s (1992) measurement scales into the percentage form (Table 1).

Results of the pre-test

Forty-nine shoppers were sampled at a Carrefour wholesale store. The reliability test result showed that the Cronbach α of inter-store price comparison increased to 0.87 after deleting
three items. Thus, this research kept the other three items to measure the inter-store price searches. The $\alpha$ of perceived financial constraints and market mavenship items are all higher than 0.68, close to Nunnally’s (1978) cut-off of 0.70. Thus, the internal consistency is acceptable. However, the $\alpha$ of price consciousness items is far below 0.70. Therefore, this research substituted the original items for a set of new ones (Table 1) developed by Donthu and Gilliland (1996).

Data analysis and results

Data description

In total, 245 adults were intercepted after they placed the products to be purchased in their carts. This research obtained 203 (82.86%) usable questionnaires. Among these 203 respondents, 110 bought discounted products, while 93 bought regular priced products. Overall, ~75% of respondents’ ages were from 21 to 50. About 65.5% of the respondents were female. The median of household incomes per month was $US 2238, close to the average national household incomes of $US 2305 per month.

The result shows that consumers have a high inter-store price-searching tendency ($M = 5.08, STD = 1.58$) and in-store price-searching tendency ($M = 5.19, STD = 1.35$). However, their differences are not significant ($t = 1.09, p > 0.05$). About 67% of the subjects have 100% price recall accuracy and over 85% of subjects have 90% accuracy in price recall. About 64% of the subjects have 100% price recall confidence and 75% of subjects have 90% confidence in price recall. Table 2 shows the correlation matrices of the constructs.

Measurement model

To test the hypothesised models, this research used Anderson and Gerbing’s (1988) two-step approach. First, the reliability and validity of the constructs were assessed using confirmatory factor analysis. Then, multiple items were consolidated into a single indicator, and the hypotheses using the structural equation model were tested.

Measurement assessment

Table 1 shows the reliability statistics and demonstrates that the Cronbach $\alpha$’s of perceived financial constraints ($\alpha = 0.92$), market mavenship ($\alpha = 0.79$), and inter-store price search ($\alpha = 0.85$) are high. But the $\alpha$ of price consciousness ($\alpha = 0.68$) and in-store price search ($\alpha = 0.69$) fall near Nunnally’s (1978) cut-off of 0.7. This research assesses the convergent validity and the discriminant validity of the constructs using confirmatory factor analysis (CFA) and specifies two confirmatory factor analysis models. One is for the 6 items related to two kinds of price-searching tendency and the other is for the 13 items related to three psychographic variables.

As for the convergent validity, the fit of both models is good. The chi-square ($\chi^2$) of both models is not statistical significant ($p > 0.05$). The goodness-of-fit index (GFI), adjusted GFI (AGFI), and root mean square error of approximation (RMSEA) of price-search measurement models are 0.991, 0.974, and 0.015, respectively, and those of the psychographics measurement models are 0.980, 0.961, and 0.000, respectively. The GFI, AGFI, and RMSEA values of the two models show good overall fit because their GFIs are above 0.95, AGFIs are above 0.90 (Rigdon, 1998), and RMSEA are between 0.00 and 0.05 (Browne & Cudeck, 1993). Therefore, the two models approximately fit
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<td>0.01</td>
<td>0.07</td>
<td>0.51</td>
<td>1.00</td>
<td></td>
<td></td>
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<tr>
<td>12.</td>
<td>MM3</td>
<td>0.06</td>
<td>-0.17</td>
<td>0.02</td>
<td>0.30</td>
<td>0.19</td>
<td>0.16</td>
<td>0.11</td>
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<tr>
<td>13.</td>
<td>PS1</td>
<td>-0.03</td>
<td>-0.15</td>
<td>-0.17</td>
<td>0.33</td>
<td>0.33</td>
<td>0.26</td>
<td>0.14</td>
<td>0.13</td>
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<td>0.38</td>
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<tr>
<td>14.</td>
<td>PS2</td>
<td>0.13</td>
<td>-0.06</td>
<td>-0.12</td>
<td>0.47</td>
<td>0.20</td>
<td>0.49</td>
<td>0.18</td>
<td>0.28</td>
<td>0.26</td>
<td>0.09</td>
<td>0.23</td>
<td>0.36</td>
<td>0.42</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>PRA</td>
<td>-0.03</td>
<td>0.07</td>
<td>-0.05</td>
<td>0.29</td>
<td>0.13</td>
<td>0.13</td>
<td>0.08</td>
<td>0.11</td>
<td>0.12</td>
<td>-0.08</td>
<td>0.07</td>
<td>0.06</td>
<td>0.14</td>
<td>0.12</td>
<td>1.00</td>
</tr>
<tr>
<td>16.</td>
<td>PRC</td>
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<td>0.02</td>
<td>-0.12</td>
<td>0.24</td>
<td>0.13</td>
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<td>0.15</td>
<td>0.15</td>
<td>0.06</td>
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<td>0.20</td>
<td>0.14</td>
<td>0.25</td>
<td>0.58</td>
</tr>
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</table>

Note: AGE, Age; INC, household income; GE, gender; PC1–PC3, price consciousness; PFC1–PFC3, perceived financial constraints; MM1–MM3, market maven; PS1, inter-store price-searching tendency; PS2, in-store price searching tendency; PRA, price recall accuracy; PRC, price recall confidence.

*Spearman correlations.
the data, and each scale presents convergent validity for price-searching behaviour and psychographics measurement.

This research assesses the discriminant validity of the constructs using a procedure suggested by Anderson and Gerbing (1988, p. 416). This research compares the $\chi^2$ statistic for the latent constructs of price search and psychographics, respectively. Because demographics and price recall were measured by single item, they do not need to be assessed. The $\chi^2$ difference tests of the pairs of the price search ($\Delta \chi^2 = 50.40, p < 0.01$) and the six pairs of the psychographics ($\Delta \chi^2 \geq 81.14, p < 0.01$) are significant. Therefore, the latent constructs of price search and psychographics demonstrate discriminant validity.

### Comparison of competing models

In order to test whether demographics directly or indirectly influence price search, this research specifies three models (Figure 2). Model A contains the direct effects of demographics and psychographics on price searching. However, no path exists between demographics and psychographics. In Model B, psychographics have direct effects on price searching, but demographics have only indirect effects. The influence of demographics on price searching is through psychographics. Model C shows both direct effects and indirect effects of demographics on price search and direct effects of psychographics on price searching. Note that Model A is not nested within Model C even though Model C is the most general. This is because the psychographic variables are exogenous in Model A,

![Figure 2. The sketch charts of Models A–C.](image-url)
whereas they are endogenous in Models B and C. Model B, however, is nested within Model C.

Table 3 summarises the fit measures of Models A–C. Four measurements are used to compare and rank-order non-nested models, apart from the $\chi^2$ statistic, GFI, and AGFI. These measurements are RMSEA, Akaike information criterion (AIC), corrected AIC (CAIC), and the expected cross-validation index (ECVI). The latter three measurements penalise models with large parameters. The lower the values of AIC, CAIC, and ECVI are, the better the fitness of the model. All the definitions of these measurements are referenced in recent books on structural equation models (Maruyama, 1998).

All the models show good fit because the $\chi^2$ statistics are not significant (Table 3). First, we compare Models A and B. Because all the fitness measurements for Model B are better than for Model A (see fit measures in Table 3), Model B is superior to Model A. Next, to determine whether this research should include both direct and indirect effects or only the indirect effects of demographics on price-searching tendency, we compare Models B and C. Almost all the measurements of Model B such as GFI, AGFI, RMSEA, AIC, and ECVI are better than Model C (see fit measures in Table 3). Thus, this research concludes that Model B is superior and more parsimonious than Model C. The results show that psychographics play a mediating role between demographics and price-searching tendency. Then, this research proceeds with results from Model B.

Table 3. Fitness and standardised estimation of the Models A–C.

<table>
<thead>
<tr>
<th>Hypotheses and expected sign</th>
<th>Standardised estimate ($t$-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model A (direct only)</td>
</tr>
<tr>
<td><strong>Paths</strong></td>
<td></td>
</tr>
<tr>
<td>INC $\rightarrow$ PS</td>
<td>$H1a$ ($-$)</td>
</tr>
<tr>
<td>AG $\rightarrow$ PS</td>
<td>$H1b$ ($+$)</td>
</tr>
<tr>
<td>GE $\rightarrow$ PS</td>
<td>$H1c$ ($-$)</td>
</tr>
<tr>
<td>PC $\rightarrow$ PS</td>
<td>$H2a$ ($+$)</td>
</tr>
<tr>
<td>PFC $\rightarrow$ PS</td>
<td>$H2b$ ($+$)</td>
</tr>
<tr>
<td>MM $\rightarrow$ PS</td>
<td>$H2c$ ($+$)</td>
</tr>
<tr>
<td>INC $\rightarrow$ PC</td>
<td>$H3a$ ($-$)</td>
</tr>
<tr>
<td>INC $\rightarrow$ PFC</td>
<td>$H3a$ ($-$)</td>
</tr>
<tr>
<td>AGE $\rightarrow$ PFC</td>
<td>$H3b$ ($-$)</td>
</tr>
<tr>
<td>GE $\rightarrow$ MM</td>
<td>$H3c$ ($-$)</td>
</tr>
<tr>
<td>PS $\rightarrow$ PR</td>
<td>$H4$ ($+$)</td>
</tr>
</tbody>
</table>

**Fit measures**

<table>
<thead>
<tr>
<th>$\chi^2/dfp$</th>
<th>GFI</th>
<th>AGFI</th>
<th>RMSEA</th>
<th>AIC</th>
<th>CAIC</th>
<th>ECVI</th>
</tr>
</thead>
<tbody>
<tr>
<td>133.51/96/0.01</td>
<td>0.93</td>
<td>0.90</td>
<td>0.04</td>
<td>213.51</td>
<td>386.04</td>
<td>1.06</td>
</tr>
<tr>
<td>114.11/95/0.32</td>
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<td>0.91</td>
<td>0.03</td>
<td>196.11</td>
<td>372.95</td>
<td>0.97</td>
</tr>
<tr>
<td>109.15/92/0.11</td>
<td>0.94</td>
<td>0.91</td>
<td>0.03</td>
<td>197.15</td>
<td>386.93</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Note: AGE, age; INC, household income; GE, gender; PC, price consciousness; PFC, perceived financial constraints; MM, market maven; PS, price-searching tendency; PR, price recall.

* $p < 0.05$.

** $p < 0.01$.

†Gender was coded as dummy variable; 0 = female, 1 = male.
The relationship among demographics, psychographics and price-searching tendency

As shown by Model B in Table 3, household income, age, and gender are associated with psychographic variables. First, household income negatively influences both price consciousness ($\beta = -0.20, p < 0.01$) and perceived financial constraints ($\beta = -0.21, p < 0.01$). Hence, the result supports $H1a$. Next, as this research expected, older consumers have lower perceived financial constraints than young consumers ($\beta = -0.17, p < 0.01$). Hence, the result supports $H1b$. Finally, gender significantly relates to market mavenship ($\beta = -0.16, p < 0.01$). That is, females have a stronger tendency to be market mavens than males. Thus, the result supports $H1c$.

Regarding the influence of psychographics on price-searching tendency, they are all significant. Price consciousness ($\beta = 0.68, p < 0.01$), perceived financial constraints ($\beta = 0.28, p < 0.01$), and market mavenship ($\beta = 0.21, p < 0.01$) are positively related to price searching tendency. Hence, $H1d$, $H1e$, and $H1f$ are supported.

The relationship between price searching tendency and price recall

Price-searching tendency significantly influences price recall ($\beta = 0.27, p < 0.01$). That is, consumers can recall the price more correctly and confidently when they have higher price searching tendency. Thus, the result supports $H2$.

The moderating role of price promotions

To examine the moderating effects of price promotion on the relationship between price searching tendency and price recall, this study used the multigroup analysis of structural equation modelling (SEM). Table 4 shows the results. The effect of price searching on price recall for regularly priced products is not significant ($\beta = -0.70, p > 0.05$), while the effect for discounted products is positively significant ($\beta = 0.95, p < 0.05$). The results of model comparison indicate that the difference between regular priced and discounted products is significant ($\Delta \chi^2 = 13.77 > \chi^2_{1,0.05} = 3.84, p = 0.00$). Thus, the result supports $H3$.

Discussion and implications

This research empirically verified that psychographics play a mediating role between demographics and price-searching tendency, which responds to the suggestion of Urbany et al. (1996) which propose that demographics are highly correlated with psychographics. To our knowledge, however, no research has empirically tested the relationships. In addition, this study tested the moderating effects of price promotions (discounted versus

Table 4. Results of moderating effect of price promotions.

<table>
<thead>
<tr>
<th>Moderating variables</th>
<th>Standardised coefficients between PS and PR</th>
<th>Chi-square value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price promotion</td>
<td></td>
<td>$\chi^2 = 13.77$ ($df = 1$), $p = 0.00$</td>
</tr>
<tr>
<td>Discounted products</td>
<td>0.95 ($p = 0.01; n = 110$)</td>
<td></td>
</tr>
<tr>
<td>Regular-priced</td>
<td>-0.69 ($p = 0.25; n = 93$)</td>
<td></td>
</tr>
</tbody>
</table>

Note: PS, price search; PR, price recall.
regularly priced products) on the relationship between price-searching tendency and price recall. Overall, this study provides a relatively comprehensive framework for understanding the antecedents (demographics and psychographics) and consequences (price recall) of consumers’ price-searching tendency as well as tests this framework with data from a survey conducted in a real shopping context. The major findings of this research are discussed as follows.

First, although price-searching tendency is not directly influenced by demographics but by psychographics, demographics are highly correlated with psychographics. For example, higher-income consumers reveal low price consciousness and are less likely to perceive themselves as having financial constraints, and therefore tend to do less price searching. Next, younger consumers perceive higher financial constraints, and thus tend to search for more price information than older consumers. Finally, females, who are more likely to be market mavens, have greater tendencies to search price information.

Second, consumers with a stronger price searching tendency recall product prices more accurately and confidently than those with a weaker tendency. This result is consistent with that of Mägi and Julander (2005) who find that the degree of price searching has positive effects on objective and subjective price recall. Finally, consumers’ price-searching tendencies have stronger impacts on price recall when they purchase discounted products than when they purchase regular priced products. Thus, this research verifies the moderating effect of price promotions between price searching and price recall and expands the literature substantially.

Theoretical implications

Some theoretical implications can be derived from this study. First, this research has shown that, although demographics may not be effective for directly predicting a price searching tendency, they do have indirect effects on price-searching tendency through psychographics. The findings verify what Urbany et al. (1996) suggest, that demographics are associated with psychographics and demographics will have an indirect effect on price searching. Further, this research specifically indicates in detail the ways in which demographics correlate with psychographics to influence price-searching tendency.

Second, few studies have examined the moderating effect of price promotions on the relationship between price-searching tendency and price recall. This research is the first to demonstrate that the relationship between price searching and price recall is stronger for discounted products than for regularly priced products. This finding contributes to the literature by revealing the moderating effect of price promotions between price-searching tendency and price recall and by supplementing previous studies that lack an explanation for the inconsistent results of the relationships between price-searching tendency and price recall.

Finally, we find that over two-thirds of consumers have high accuracy and confidence in recalling price. The finding contrasts the results of Mazumdar and Monroe (1990) and Urbany and Dickson (1991), which indicate that consumers exhibit poor price recall even at the point-of-purchase. One potential explanation for the different results is that the intensified competition of retailing environment makes consumers have higher tendency to search prices and, in turn, better price recall accuracy and confidence. In addition, this finding could serve as the basis for much price framing research (DelVecchio, Krishnan, & Smith, 2007; Krishna, Briesch, Lehman, & Yuan, 2002) to sustain their results that price presentation frames have effects on consumers’ price perceptions.
Managerial implications

The major managerial implication of this study is that retail managers, in general, should select female, younger, or lower-household-income consumers as the targeted segment when they plan to offer price promotion programmes for frequently purchased products. This is because those consumers are more likely to have higher price consciousness, higher perceived financial constraints, or greater tendencies to be market mavens and, in turn, have stronger price-searching tendencies and better price recall. When consumers’ price recall is better, this implies that they are aware of price changes by firms and that price has a substantial influence on their purchasing decisions. Therefore, retailers could design more attractive flyers and sale setting to attract them when offering a substantial price reduction. In addition, Urbany et al. (1996) show that consumers who search for price information may be inclined to share such information with others. Thus, finding the right target customers is also helpful in spreading promotion information.

Another implication for managers relates to frequency and the discounted levels of price promotions. The study provides evidence that the relationship between price-searching tendency and price recall is stronger when consumers purchase discounted products rather than regularly priced products. That is, the discounted prices are more likely to be transferred and imbedded into consumers’ internal reference prices and then retrieved for later purchases. Therefore, retailers should not frequently change the price without substantial price reduction. Otherwise, consumers who are familiar with marketing tactics may disbelieve the price promotion programs and these programs may lose their effectiveness. This argument is in line with the persuasion knowledge model (Friestad & Wright, 1994).

Finally, according to the results of the data description, the importance of consumers’ inter-store price-searching tendencies and in-store price-searching tendencies show no difference. Consumers show high tendency to search for price information both within store and between stores. This means consumers’ price searching behaviours have been intensified in comparison with the result of Urbany, Dickinson, & Sawyer (2000). Thus, retail managers should both value the in-store decoration of sale signs and distribution of promotion flyers. In addition, since over two-thirds of consumers have high accuracy and confidence in recalling prices, retailers should cautiously present the promotion prices. According to DelVecchio et al. (2007), promotion frame may affect consumers’ future choice, that is, post-promotion choice is higher when high-depth promotions are framed in percentage-off than cents-off terms. Therefore, retailers should present their promotion price in ‘percentage-off’ form instead of ‘cents-off’ form when their customers have high accuracy in remembering the product prices.

Limitations and future research

This study unavoidably has some limitations that provide new avenues for future research. First, three demographic indicators (i.e. age, gender, and household income) and three psychographic indicators (consumers’ price consciousness, perceived financial constraint, and market mavenship) were selected. Those variables are part of the measurements of demographics and psychographics. Future research could incorporate other demographics such as education, the number of children in a household, and employment status (Ailawadi et al., 2001; Mägi & Julander, 2005), and other psychographics such as perceived storage space and time pressures (Ailawadi et al., 2001).

Second, this research use shampoo and tissue paper as our research products. Both are low involvement and low-priced products. Research shows that consumers’ price-searching tendency and price recall for low involvement and low priced products may differ from
high involvement and high priced products (Jacoby & Olson, 1977). Moreover, convenient products are less attractive for consumers to buy through the Internet because marketing distribution channels are very prosperous for convenience products, but the high involvement and high-priced products such as preference and shopping products are frequently purchased on-line. Therefore, future research could compare on-line price-search behaviour with conventional price-search behaviour through studying other product categories such as preference and shopping products.

Finally, some other constructs have been investigated in the literature that might be used to expand the model. For example, consumer involvement, purchase frequency, and price variability might affect the accuracy of consumers’ memories in the case of price recall (Estelami & Lehmann, 2001). These constructs, which may affect the relationship between consumer price searching behaviour and price recall, need further investigation. In addition, incorporating other dimensions of price-related experience, such as word-of-mouth, shopping experience (Mägi & Julander, 2005), information collection experience, and environmental factors (e.g. interest rates, unemployment, and economic growth) (Estelami, Lehmann, & Holden, 2001) could also improve the understanding of how other factors influence consumers’ price recall.

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References


