

PURVI SHAH AND ADRIENNE HALL-PHILLIPS

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## Antecedents and Implications of Expiration Date Search Effort

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**When consumers search for and check expiration dates, the risk of purchasing and consuming a stale and denigrated quality product reduces. Since checking expiration dates has a significant impact on consumers' purchase and consumption decision making, the authors investigate what motivates consumers to search for expiration dates while shopping for and before consuming perishable grocery products. This research adapts and extends the information search model (Schmidt and Spreng 1996) by providing new insight on information search as not only a pre-purchase but also a consumption stage activity. Findings suggest that expiration date search effort is influenced by perceived risk, time pressure while grocery shopping, and the motivation of checking expiration dates. These findings provide several implications for consumers and policymakers.**

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Understanding consumer decision making about the purchase and consumption of products, although extremely challenging, has been important for marketers and policymakers.

For over 45 years, consumer researchers have been interested in understanding and explaining consumer choice behavior (Bettman 1979; Bettman, Luce, and Payne 1998; Howard and Sheth 1969; Schmidt and Spreng 1996). Prepurchase information search (internal and external) plays a very important role in all purchase decisions (Srinivasan 1990). One such piece of external information consumers search for while shopping for perishable grocery products is an expiration date.<sup>1</sup> It provides information about the shelf life and freshness of perishable grocery products such as

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1. For the purpose of this research, to avoid confusion, the researchers use a common term "expiration date" to represent the various types of freshness dates found on perishable products.

Purvi Shah (pshah@wpi.edu) is Assistant Professor of Marketing at the Foisie Business School, Worcester Polytechnic Institute. Adrienne Hall-Phillips (ahphillips@wpi.edu) is Assistant Professor of Marketing at the Foisie Business School, Worcester Polytechnic Institute.

P. Shah and A. Hall-Phillips contributed equally to this work.

milk, bread, eggs, meat, or packaged vegetables. The expiration date is an indicator that the product is fresh and at its best quality. It is advisable to buy and consume a grocery product before the expiration date mentioned on the package (USDA 2015). Search for expiration dates is aimed at reducing the uncertainty and risk of purchasing and consuming a stale and denigrated quality product that could negatively affect consumers' health and safety (Tsiros and Heilman 2005).

Thus, this information has significant impact on consumers' purchase and consumption of perishable groceries. Despite the importance of this information in understanding consumer behavior, expiration date research has received limited attention (e.g., Hall-Phillips and Shah 2017; Harcar and Karakaya 2005; Sen and Block 2009; Tsiros and Heilman 2005). Consumers' understanding, motivation to check, and purchase and consumption effects of expiration date labels are research questions that deserve greater consideration for two reasons: (1) from the micro-level point of view of consumers' personal health and safety and (2) from the macro-level social and public policy aspect of consumer protection and food waste reduction (Brody 2008). Therefore, the purpose of this research is to investigate what motivates or demotivates consumers to check expiration dates while shopping for and before consuming perishable grocery products.

To achieve this purpose, we adapt the external information search model proposed by Schmidt and Spreng (1996) with variables relevant in the context of grocery shopping, such as time pressure during grocery shopping as perceived cost of information search, perceived risk, and health consciousness representing the benefits of information search, motivation of checking expiration dates representing motivation to search, and the amount of expiration date search effort exerted while shopping for and before consuming perishable products representing external information search activity. The duration of external information search is generally assumed to start when a consumer considers a purchase and ends when an actual purchase is made (Punj and Staelin 1983; Srinivasan 1990). However, we extend this external information search model a step further and also include expiration date information search effort before consumption.

This paper is structured as follows. In the next section, the authors discuss the theoretical background of the proposed conceptual model. Next, hypotheses and methodology are presented. This is followed by a discussion of the findings. The final section explains theoretical and practical implications of the findings, limitations of this research, and ultimately directions for future research.

## CONCEPTUAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

### Perishable Products and Expiration Dates

Researchers have studied perishable groceries in terms of pricing (Rajan, Steinberg, and Steinberg 1992), inventory (Hariga 1997), ordering and restocking policies (Fujiwara, Soewandi, and Sedarage 1997), store choice (Krider and Weinberg 2000), food labels (Jahn, Schramm, and Spiller 2005; Lenahan et al. 1973; Mackey and Metz 2009; Wansink and Chandon 2006), and health and safety (Dodd and Morse 1994; Michaelidou and Hassan 2008; Rydén, Sydner, and Hagfors 2008). Although these studies provide insights into the various factors affecting the management and purchase of perishable grocery products, a void still exists in terms of understanding consumers' motivation to search for expiration dates while shopping for and before consumption of perishable products. This distinguishes the current study from the existing research on perishable grocery products.

In this small but emerging field of research that seeks to understand and illuminate the role of expiration dates in consumer behavior, few researchers (Cardello and Schutz 2003; Harcar and Karakaya 2005; Miranda and Kónya 2006; Wansink and Wright 2006) focused their attention on consumers' awareness and perceptions of expiration dates. One of the most important contributions has been the investigation of consumers' frequency of checking expiration dates and their willingness to pay for perishable products in six important grocery categories as they approach their expiration dates (Tsiros and Heilman 2005). This study developed a base for future research in this field by investigating the consumers' willingness to pay for an aging perishable product and the impact of perceived risk on this behavior. Some researchers took this area of research a step further by examining the role of endowment in the consumption of products past their freshness dates (Sen and Block 2009). Although this body of research provides insight into why people consume expired products, a gap in the research remains around why consumers care about checking expiration dates in the first place.

To our knowledge, the present study is the only endeavor to date that aims to answer the question—*What are the underlying factors that motivate or demotivate consumers to check expiration dates while shopping for and before consuming perishable grocery products?* This is important to understand because the motivation to search for this information directly influences search activity (Schmidt and Spreng 1996), and thereby leads to more informed decision making and satisfaction with the decision (Loibl

et al. 2009). If marketers and policymakers understand what motivates or demotivates consumers to search for expiration dates, they can develop informative consumer education programs about food dating and storage to facilitate better consumer decision making and thus reduce food wastage.

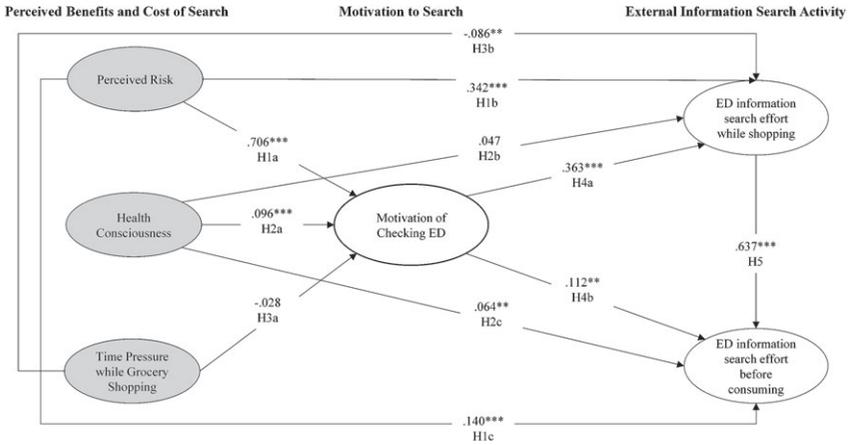
### External Information Search

The conceptual model in this research presents antecedents of expiration date search activity while shopping for and before consuming perishable grocery products. External search begins with an intention to purchase a product and is also influenced by the information consumers have in their memory from past experiences (Manfredo 1989). However, in the context of expiration dates on perishable grocery products, internal search from memory does not apply because it is a dynamic piece of external information and is different every time a consumer intends to buy a grocery product. Consumers need to check the date each time before consumption to ensure that the purchased product is still fresh and at its peak quality. Thus, checking expiration dates is a conscious prepurchase and preconsumption goal-directed information search activity.

This research adapts Schmidt and Spreng's (1996) conceptual model of external consumer information search, which integrates psychological and economic paradigms of information search by presenting ability and motivation with perceived costs and benefits of information search. They proposed that (1) ability and motivation to search positively influence external information search, (2) perceived benefits of search (e.g., perceived risk, satisfaction, and desire for optimum decision) positively influence motivation to search, and (3) perceived costs of search (e.g., time pressure, product complexity, and information accessibility) negatively influence motivation to search.

Adapting Schmidt and Spreng's (1996) model for external information search, this study presents a model that also combines the psychological/motivational approach and the economic cost-benefit approach to explain what motivates or demotivates consumers to search for expiration dates on perishable grocery product packages (see Figure 1). The psychological/motivational approach is applied by including the motivation of checking expiration dates and the economic perspective is reflected by including perceived benefits (represented by health consciousness and perceived risk) and perceived cost (represented by time pressure while grocery shopping) of the expiration date search effort. Other researchers have attempted to measure external search activity (Srinivasan 1990), acknowledging its complexity and difficulty. The model presented in this paper

FIGURE 1  
A Structural Model of Expiration Date Information Search



\*\* $p < 0.01$ , \*\*\* $p < 0.001$ ;  $\chi^2$  (df = 195) = 606.153,  $p < .000$ ,  
RMSEA = .046, SRMR = .0309, CFI = .97, IFI = 0.973, NFI = .961, ED = expiration dates.

measures external search activity by the information search effort exerted when consumers search for expiration dates while shopping for and before consuming perishable grocery products.

Perceived Benefits of Search (Perceived Risk and Health Consciousness)

Perceived benefits of search increase utility or provide value by enabling attainment of higher-level goals (Bettman 1979; Gutman 1982). Perceived benefits of search are strongly and positively related to information search activity (Duncan and Olshavsky 1982; Srinivasan and Ratchford 1991). In the context of expiration dates, perceived risk in purchasing and consuming expired products, as well as a consumer’s health consciousness provide value by facilitating a higher-level goal of informed decision making. Therefore, perceived risk and health consciousness representing perceived benefits of search are positively related to the motivation of checking expiration dates as well as to expiration date search effort.

Perceived Risk

Perishable food scares such as mad cow disease in meat or salmonella in eggs have raised the perceived risk associated with the purchase and consumption of perishable grocery products (Mitchell 1998; Ransom 2005; Yeung and Morris 2001). In many instances, media reports have stated that retail sales and stock prices of manufacturing companies (Tsiros

and Heilman 2005) of such products were negatively affected due to these types of health scares. The prime reason for this behavior is the perceived risk connected with purchasing and consuming a product of deteriorating quality that could threaten consumers' health and safety. According to the Food Marketing Institute, "54% of consumers believed that eating food past its sell-by/use-by-date constituted a health risk" (Ransom 2005, 1763).

As risks associated with the purchase increase, with the goal of risk minimization, consumers believe it is important to seek more information before making the purchase decision and therefore are more motivated to do so (Beatty and Smith 1987; Blackwell, Miniard, and Engel 2001; Dowling and Staelin 1994; Greenleaf and Lehmann 1995; Klerck and Sweeney 2007; Moore and Lehmann 1980; Murray 1991; Peterson and Merino 2003). Perceived risk is defined as the uncertainty with respect to the outcome of a decision (Pratt 1998). In the case of perishable products, an expiration date is a relevant piece of information indicating the freshness of the product. Uncertainty involved with the decision of not checking an expiration date could lead to negative consequences in terms of purchase of a product of degraded quality (if expired product does not meet quality and freshness expectations), financial loss (if unused expired product is discarded), and negative impact on health (if expired product infested with harmful bacteria is consumed). Thus, consumers are more motivated to check expiration dates when they perceive a higher risk involved with expired grocery products. Therefore,

**H1a:** Perceived risk associated with not checking expiration dates on perishable grocery products positively influences the motivation of checking expiration dates on perishable grocery products.

Consumers who perceive higher risk likelihood and unfavorable consequences with their purchase decisions tend to be more motivated to reduce this risk and prevent mistakes (Mitchell 1999; Yeung and Morris 2001). Checking expiration dates on perishable grocery products can reduce risk and prevent the purchase and consumption of a denigrated quality grocery product. Therefore, the following hypotheses are proposed:

**H1b:** Perceived risk associated with not checking expiration dates on perishable grocery products positively influences the expiration date information search effort while shopping for perishable grocery products.

**H1c:** Perceived risk associated with not checking expiration dates on perishable grocery products positively influences the expiration date information search effort before consuming perishable grocery products.

### *Health Consciousness*

Today consumers are becoming increasingly aware of how food choices influence their health. According to the Centers for Medicare and Medicaid

Services (<http://www.cms.gov/>), in 2014, the national health expenditure of the United States reached \$3 trillion, or \$9,523 per person, and accounted for 17.5% of the GDP. These numbers and the growing volume of health-related activities reveal the importance consumers place on health-related issues. Health consciousness is an “individual difference variable that assesses the degree to which a person plays an active role in maintaining his or her health” (Naylor, Droms, and Haws 2009, 223). This characteristic encourages consumers to engage in preventive health care (Jayanti and Burns 1998; Michaelidou and Hassan 2008), regularly examine their health, undertake activities necessary to improve their health (Gould 1988; Moorman and Matulich 1993), and actively search for health-related information (Moorman and Matulich 1993).

In the context of perishable grocery products, consumers believe eating perishable grocery products past their expiration dates can jeopardize their health (Ransom 2005). Thus, expiration dates become important health-related information for consumers and they are motivated to check the dates regularly. Therefore,

**H2a:** Health consciousness positively influences the motivation of checking expiration dates on perishable grocery products.

Health-conscious individuals are more evaluative, monitoring, and precautionary as compared to those who are less health conscious and therefore exhibit several health preservation behaviors (Gould 1988; Pellegrini and Farinello 2009; Pino et al. 2012). Since these consumers are so conscious about their health, they consider it important to check expiration dates on perishable grocery products and are motivated to do so regularly. For these consumers, checking expiration dates becomes a routine health behavior while shopping for and before consuming perishable grocery products. Based on this, the following hypotheses are presented:

**H2b:** Health consciousness positively influences expiration date information search effort while shopping for perishable grocery products.

**H2c:** Health consciousness positively influences expiration date information search effort before consuming perishable grocery products.

### Perceived Cost of Search (Time Pressure while Grocery Shopping)

Perceived costs of information search, like perceived benefits of information search, also represent the economics aspect of Schmidt and Spreng's (1996) model. These costs include perceived monetary expenditure, physical effort, psychological sacrifice, and time sacrifice (Bettman 1979). Today, consumers are so busy with important tasks and the multiple

roles they play in their life that they hardly find time for grocery shopping. Thus, time pressure, felt during grocery shopping, can be defined as the degree to which consumers consider themselves busy and pressed for time when carrying out their grocery shopping (Srinivasan and Ratchford 1991). This time pressure experienced by shoppers represents the cost of searching for expiration dates while shopping for grocery products.

Maher, Marks, and Grimm (1997) proposed that time pressure is negatively related to shopping enjoyment and positively related to the importance of convenience. Some consumers delay their buying decisions because they have no time to devote to that decision and other obligations have higher time priority (Greenleaf and Lehmann 1995). Such time pressure consequently reduces consumers' motivation to search (Bettman 1979; Farley 1964; Schmidt and Spreng 1996). Even in the context of expiration dates, consumers who feel pressed for time during grocery shopping will be less motivated to check expiration dates because of time pressure. Therefore,

**H3a:** Time pressure during grocery shopping negatively influences the motivation of checking expiration dates on perishable grocery products.

Time pressure during grocery shopping attenuates a consumer's motivation to search for information during grocery shopping and thereby ultimately decreases the amount of consumers' information search activity (Beatty and Ferrell 1998; Punj and Staelin 1983; Putrevu and Ratchford 1998; Schaninger and Sciglimpaglia 1981; Sprott and Miyazaki 1995). Applying this to the context of expiration dates, consumers who are pressed for time are not motivated to check expiration dates and this negatively influences the search effort to check expiration dates. Given the previous discussion, the following hypothesis is proposed:

**H3b:** Time pressure during grocery shopping negatively influences expiration date information search effort while shopping.

### Motivation to Search (Motivation of Checking Expiration Dates)

One significant factor influencing a consumer's information search activity is the level of motivation to process information during search activity (Lutz, McKenzie, and Belch 1983; Petty and Cacioppo 1984; Rotfeld 2009). Motivation has been defined as goal-directed desire (Petty and Cacioppo 1984), willingness (Roberts and Maccoby 1973), readiness (Moorman 1990), and interest or importance (Bates et al. 2009; Celsi and Olson 1988; Zaichkowsky 1985) in performing a task. It represents the inclination to expend effort on performing a goal-oriented task (Bettman

1979; Park and Mittal 1985). A high level of motivation means the consumer is more willing to seek out information (MacInnis, Moorman, and Jaworski 1991; Schmidt and Spreng 1996).

Motivation has been measured in three ways in the literature as: (1) importance of the task or decision (Celsi and Olson 1988; Maheswaran and Sterthal 1990), (2) outcomes from motivation (Petty and Cacioppo 1984; Roberts and Maccoby 1973), and (3) a goal-directed arousal (MacInnis, Moorman, and Jaworski 1991; Moorman 1990). In this study, motivation to check expiration dates is defined as the importance of checking expiration dates for a consumer. That is, if consumers believe that expiration dates play an important role while shopping for and before consuming perishable grocery products, they are more motivated to check expiration dates and therefore they will check expiration dates while shopping for as well as before consuming perishable grocery products. Thus, the following hypotheses are presented:

**H4a:** Motivation of checking expiration dates positively influences expiration date information search effort while shopping for perishable grocery products.

**H4b:** Motivation of checking expiration dates positively influences expiration date information search effort before consuming perishable grocery products.

Furthermore, consumers who make an effort to check expiration dates while shopping for a perishable grocery product also tend to make an effort to check them before consuming that product as a sequential routine task (Foxall 1993; Ji and Wood 2007).

**H5:** Expiration date information search effort while shopping positively influences expiration date information search effort before consuming.

## METHOD

### Sample and Data Collection

Respondents were recruited via an online panel, Amazon Mechanical Turk, using a web survey. This method of data collection was appropriate due to its ability to produce a sample, i.e., an accepted, diverse representation, not limited to the college age population, and one, that is, viable for producing publishable and valid data for the social sciences (Buhrmester, Kwang, and Gosling 2011; Goodman, Cryder, and Cheema 2013). Data were collected from 1,062 United States consumers who purchase perishable grocery products for their households. A multiple-choice screening question was used to measure this frequency of purchase: "How often do you purchase perishable grocery products such as milk, bread, eggs, meat, ... for your household?" The options they had to choose from were as

follows: never, once a month, more than once a month, once a week, and more than once a week. Six respondents who chose “never,” were taken to the end of the survey because respondents who had no grocery shopping experience were considered ineligible to participate in the survey and therefore were excluded from further analysis.

The remaining 1,056 eligible respondents, who passed the screening question, were then asked to answer questions about their general grocery shopping behavior, personality and demographic characteristics, and motivation of checking expiration dates. Out of these individual responses collected, 73 responses were excluded from the final data set based on the following steps: (1) responses from six respondents who failed the instructional manipulation check (Hauser and Schwarz 2016) were removed. This check was used to measure respondents’ attentiveness to survey questions. It was measured using a question that could be easily answered if the respondent was paying attention to the question and to the provided choices. We asked, “Everyone has hobbies. Nevertheless, we would like you to skip this question to show that you are reading carefully. Do not click any of the boxes below.” Respondents were not supposed to mark any choices provided and move on to the next question. Therefore, responses of those who marked any of the provided choices, due to lack of attentiveness, were removed from the final usable sample; (2) after that, 15 incomplete responses of respondents who dropped out of the survey were excluded; (3) next, since response time impacts the quality of responses (Zhang 2013), 10 respondents who took less than one minute to complete the survey were believed to have sped through the survey and could not have read the questions fully to provide high-quality responses (Revilla and Ochoa 2015). Hence, these responses were excluded from further analysis. Likewise, it was deemed that three additional respondents should be removed because they took more than one hour to complete the survey and potentially did not complete the survey in one sitting. This indicates distractions and disruption in the flow of thought while responding to the questions. These responses were considered as outliers based on the time taken to complete the survey and were therefore excluded from further analysis; and (4) lastly from the remaining respondents, 39 respondents took less than half the average time (9 minutes 44 seconds) to complete the survey. This was considered as being shorter than the optimal response time required to complete the survey (Zhang 2013). Therefore, these were also excluded from further analysis for quality reasons.

Finally, 983 usable responses were retained. The respondents’ ages ranged from 18 to 77 years (mean = 34 years old). The sample was comprised of 51% female respondents. They were well educated, with

89.7% having some college education. Most of the sample (70%) reported a household income of less than \$60,000 per year and 80% were White/Caucasian.

## Measures

All measures were assessed using established scales. Perceived risk was assessed using five items adapted from Cox and Cox (2001). Health consciousness was measured using six items originally developed by Gould (1988) but adapted from Michaelidou and Hassan (2008). Time pressure while grocery shopping was measured using a 5-item scale adapted from Putrevu and Ratchford (1998). Expiration date information search effort while shopping and before consuming were both measured using 3-item scales from Breivik and Thorbjørnsen (2008). These two established scales had the third item reverse-coded in order to avoid extreme response bias and acquiescence bias (Nunnally 1978). All items were measured using a 5-point Likert-type scale where 1 = strongly disagree and 5 = strongly agree. Finally, the motivation of checking expiration dates was measured using a 6-item semantic differential scale adapted from Zaichkowsky (1985) and Mano and Oliver (1993) (see Table 1). To control for common method bias, Harman's single factor test was applied and no common method variance was found (Harman 1976; Podsakoff et al. 2003).

## RESULTS

### Measurement Model

The measurement properties of the variables were tested using confirmatory factor analysis (CFA) with six constructs and 28 items using AMOS 21.0. The initial model was modified based on theoretical considerations and the examination of standardized residual covariance ( $>|2.0|$ , Anderson and Gerbing 1988), resulting in the removal of six items. The final measurement model demonstrated a good model fit ( $\chi^2(194) = 596.267, p < .000$ , RMSEA = .046, CFI = .974, IFI = .974, Hair et al. 2009). Construct reliability estimates, which ranged from 0.83 to 0.93, confirmed the reliability of the measurement. Before calculating Chronbach's alpha, the third item in both scales measuring the expiration date information search effort while shopping and before consuming, was reverse-coded. From the final measurement model, convergent and discriminant validity was assessed. All standardized factor loadings of the observed variables on their respective latent constructs met the requirements outlined by Anderson and Gerbing (1988). The average variance extracted (AVE) for all latent constructs was

TABLE 1  
*Items, Reliabilities, Validity Tests*

Constructs and items	CR	AVE	Loading
Perceived risk	0.85	0.58	
Not checking expiration dates on perishable grocery products is risky			0.86
Not checking expiration dates on perishable grocery products can lead to bad results/unexpected problems			0.75
Not checking expiration dates on perishable grocery products makes me feel anxious			0.71
Not checking expiration dates on perishable grocery products would cause me to worry <sup>a</sup>			
There is too much uncertainty associated with not checking expiration dates on perishable grocery products			0.72
Health consciousness	0.83	0.62	
I reflect about my health a lot <sup>a</sup>			
I'm very self-conscious about my health <sup>a</sup>			
I'm alert to changes in my health			0.79
I'm usually aware of my health <sup>a</sup>			0.82
I take responsibility for the state of my health			
I'm aware of the state of my health as I go through the day			0.75
Time pressure while grocery shopping	0.89	0.67	
I find myself pressed for time when I do my grocery shopping			0.94
I am in a hurry when I do my grocery shopping			0.84
I have only a limited amount of time available to do my grocery shopping			0.83
I try to finish my grocery shopping as quickly as possible because I have other things to do <sup>a</sup>			
I generally do not have enough time to complete my weekly grocery shopping			0.64
Motivation of checking expiration dates	0.93	0.73	
Are unimportant/are important			0.84
Are of no concern/are of concern			0.87
Are irrelevant/are relevant			0.84
Mean nothing/mean a lot			0.87
Doesn't matter to me/matter to me <sup>a</sup>			
Are insignificant/are significant			0.85
Expiration date information search effort while shopping	0.92	0.80	
I often check expiration dates while buying perishable grocery products			0.93
I have been checking expiration dates since a long time while buying perishable grocery products			0.91
I seldom check expiration dates while buying perishable grocery products <sup>b</sup>			0.84
Expiration date information search effort before consuming	0.90	0.76	
I often check expiration dates before using perishable groceries			0.91
I have been checking expiration dates before using perishable groceries for a long time			0.93
I seldom check expiration dates before using perishable groceries <sup>b</sup>			0.76

Note: CR = composite reliability; AVE = average variance extracted.

<sup>a</sup>Items removed from the final measurement model.

<sup>b</sup>Reverse-coded item.

TABLE 2  
Means, Standard Deviations, and Correlations

Construct	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Perceived risk	3.68	.859					
2. Health consciousness	3.93	.669	.173**				
3. Time pressure while grocery shopping	2.66	.941	.102**	-.054			
4. Motivation of checking expiration dates	4.37	.746	.632**	.215**	.039		
5. ED information search effort while shopping	4.10	1.03	.525**	.182**	-.040	.574**	
6. ED information search effort before consuming	4.07	.976	.548**	.220**	-.078*	.573**	.749**

Note: ED = expiration date.

\*Correlation significant at the .05 level.

\*\*Correlation significant at the .01 level.

greater than .50, and greater than the squared correlations between each pair of constructs, supporting convergent and discriminant validity (Fornell and Larcker 1981) (see Tables 1 and 2).

### Structural Model and Hypotheses Testing

Structural equation modeling (SEM) with a maximum likelihood estimation method was used to test the hypothesized relationships (see Figure 1). The path model revealed a good model fit ( $\chi^2(df = 195) = 606.153$ ,  $p < .000$ , RMSEA = .0309, CFI = .973, IFI = .973, NFI = .961, Hair et al. 2009). H1a proposed a positive relationship between perceived risk (PR) associated with not checking expiration dates on perishable grocery products and the motivation of checking expiration dates (MOT). Whereas H1b posited a positive relationship between PR and the expiration date information search effort while shopping (ISEwS). Both relationships were positive and significant, supporting H1a and H1b. H1c proposed a positive relationship between PR and expiration date information search effort before consuming (ISEbC). This was also supported, yielding a positive and significant result.

Next, the impact of health consciousness (HC) was examined. H2a, H2b, and H2c proposed a positive influence of HC on MOT, ISEwS, and ISEbC, respectively. A positive and significant relationship was found to support H2a and H2c only, showing no significant relationship between HC and ISEwS.

Next, H3a and H3b proposed a negative influence of time pressure while grocery shopping (TPGS) on MOT and ISEwS, respectively. The model

TABLE 3  
*Standardized Parameter Estimates, Standard Errors, and t-Values*

Causal Path	Parameter Estimates	Standard Error	t-Value	Results
H1a: PR → MOT	.706***	.027	20.657	Supported
H1b: PR → ISEwS	.342***	.054	7.459	Supported
H1c: PR → ISEbC	.140***	.039	3.655	Supported
H2a: HC → MOT	.096***	.031	3.339	Supported
H2b: HC → ISEwS	.047	.047	1.585	Not supported
H2c: HC → ISEbC	.064**	.033	2.662	Supported
H3a: TPGS → MOT	-.028	.029	-1.048	Not supported
H3b: TPGS → ISEwS	-.086**	.045	-3.129	Supported
H4a: MOT → ISEwS	.363***	.066	8.146	Supported
H4b: MOT → ISEbC	.112**	.047	3.006	Supported
H5: ISEwS → ISEbC	.637***	.031	17.745	Supported

Note: Model fit:  $\chi^2(df = 195) = 606.153$ ,  $p < .000$ , RMSEA = .046, SRMR = .0309, CFI = .973, IFI = .973.

PR = perceived risk; MOT = motivation of checking expiration dates; HC = health consciousness; TPGS = time pressure while grocery shopping; ISEwS = information search effort while shopping; ISEbC = information search effort before consuming.

\*\* $p < .01$ , \*\*\* $p < .001$ .

yielded negative and significant relationship supporting H3b only. This shows that whether a consumer is motivated to check expiration dates or not, the consumer would reduce the expiration date search effort while shopping under time pressure.

Next, H4a and H4b proposed a positive relationship between MOT and ISEwS as well as MOT and ISEbC. Again, the model yielded positive and significant relationships, supporting H4a and H4b. Finally, H5 proposed that ISEwS positively influences ISEbC. This relationship was positive and significant, supporting H5. Table 3 presents all of the hypotheses test results.

Lastly, a cross validation procedure was conducted to ensure the validity of the results. The full sample was randomly divided into a calibration sample ( $n = 491$ ) and a validation sample ( $n = 492$ ) and the measurement and structural model were analyzed for each of these samples again. The results showed no significant differences between the two samples, proving similar fit statistics, therefore confirming the validity of the sample.

#### Post Hoc Analysis: Mediation Effects

After hypothesis testing, mediation for three different mediating variables was tested (see Table 4). Both the procedure by Baron and Kenny (1986) and the bootstrapping methods outlined by Cheung and Lau (2008)

TABLE 4  
*Test of Mediation Effect*

Relationship	Direct	Indirect	Mediation
PR-MOT-ISEwS	.354***	.262*	Partial
HC-MOT-ISEwS	.054n.s.	.036*	Full
TPGS-MOT-ISEwS	-.088**	-.011n.s.	None
PR-MOT-ISEbC	.348***	.244***	Partial
HC-MOT-ISEbC	.1**	.033***	Partial
MOT-ISEwS-ISEbC	.217*	.422*	Partial

Note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ ; n.s. = not significant.

PR = perceived risk; HC = health consciousness; TPGS = time pressure while grocery shopping; MOT = motivation of checking expiration dates; ISEwS = information search effort while shopping; ISEbC = information search effort before consuming.

were used to determine mediation effects. Confidence intervals (CI) and standard errors (SE) for the estimated parameters for indirect effects generated by the bootstrapping method in AMOS were used to determine significance. The indirect effects were tested using the bootstrapping estimation approach with 2,000 samples.

First, the relationships between PR and ISEwS as well as HC and ISEwS were mediated by MOT. PR had a significant indirect effect on ISEwS through MOT ( $\beta = .262$ ,  $p < .05$ ) and a significant direct effect ( $\beta = .354$ ,  $p < .01$ ). Thus, MOT partially mediated the impact of PR on ISEwS. Likewise, HC had a significant indirect effect on ISEwS through the MOT ( $\beta = .036$ ,  $p < .05$ ) and a nonsignificant direct effect ( $\beta = .054$ , n.s.), which is consistent with full mediation. Thus, the impact of HC on ISEwS is fully mediated through MOT. Finally, for TPGS, the indirect effect on ISEwS through MOT was not significant ( $\beta = -.011$ , n.s.), with the direct effect being significant ( $\beta = -.088$ ,  $p < .01$ ). Therefore, there is no mediation of MOT between TPGS and ISEwS.

Second, the relationships between PR and ISEbC as well as HC and ISEbC were mediated by MOT. PR had a significant indirect effect on ISEbC through MOT ( $\beta = .244$ ,  $p < .001$ ) and a significant direct effect ( $\beta = .348$ ,  $p < .001$ ). Thus, MOT partially mediated the impact of PR on ISEbC. Next, HC had a significant indirect effect on ISEbC through MOT ( $\beta = .033$ ,  $p < .001$ ) and a significant direct effect ( $\beta = .1$ ,  $p < .01$ ). Thus, the impact of HC on ISEbC is partially mediated through MOT.

Finally, the mediation of ISEwS was tested. MOT had a significant indirect effect on ISEbC through ISEwS ( $\beta = .422$ ,  $p < .05$ ) and a significant direct effect ( $\beta = .217$ ,  $p < .05$ ). Thus, the relationship between MOT and ISEbC is partially mediated by ISEwS.

## DISCUSSION

This study proposed an information search model as a way to understand the factors influencing expiration date information search effort while shopping for and before consuming perishable grocery products. The findings demonstrate expiration date search effort while shopping is influenced by three constructs: perceived risk, time pressure while grocery shopping, and the motivation of checking expiration dates. In addition, expiration date search effort before consuming is influenced by perceived risk, health consciousness, and the motivation of checking expiration dates. The results highlight three important findings: (1) the sizable impact of perceived risk on expiration date information search effort while shopping and before consuming, (2) the high likelihood of checking expiration dates while shopping can lead to checking expiration dates before consumption, and (3) the mediating role of motivation of checking expiration dates. Overall, the findings support the application of the information search model in the context of checking expiration dates on perishable grocery products and provide several implications for theory and practice.

### Theoretical Implications

This study makes several contributions to the information search literature. First, it extends previous research in this area to the context of expiration dates. The results indicate that when consumers believe there is risk associated with not checking expiration dates, they are more motivated to check the dates and tend to exert more search effort when shopping for and before consuming perishable grocery products. Consumers who are health conscious are more motivated to check expiration dates. Just as Schmidt and Spreng (1996) proposed, the findings from this study empirically show that the perceived cost of search in terms of time pressure has a negative impact on motivation of checking expiration dates, albeit not significant.

Second, in addition to risk, health consciousness was introduced to the model as a perceived benefit of search. The results of the current study show consumers who are aware of their health and are mindful of the state of their health on a daily basis tend to be more motivated to check expiration dates of perishable food items. Adding this variable allowed for a greater understanding of the impact of a psychographic variable as a driver for motivation. Health-conscious consumers typically undertake health preventive behaviors (Forthofer and Bryant 2000) and checking for expiration dates on perishable products is one such behavior. Previous research has

demonstrated that health consciousness can predict several health attitudes and behaviors (e.g., Gould 1988; Iversen and Kraft 2006; Michaelidou and Hassan 2008). Furthermore, the relationship between health consciousness and information search effort while shopping is fully mediated by the motivation of checking expiration dates and the direct relationship is not significant. This shows that health-conscious consumers are more motivated to check expiration dates and therefore exert more expiration date search effort while shopping for those products. Motivation of checking expiration dates also partially mediated the relationship between health consciousness and expiration date search effort exerted before consumption of grocery products.

Finally, the results from this study extend the information search model by testing a model that includes not only prepurchase but also preconsumption stage behaviors. Information search is generally regarded as a prepurchase activity. However, in this model information search is not restricted to the prepurchase stage; it also includes information search prior to consumption. The findings show that consumers who are motivated to check expiration dates on perishable grocery products tend to check these dates not only while shopping, but also before consuming at home. An expiration date is a dynamic piece of information that carries significance. Its significance changes daily, which continuously influences the perceived shelf life of a product and consequent consumption decision. Including consumption into the model extends beyond the existing boundaries of information search literature, providing new insight that information search is not just a prepurchase activity; it also extends into preconsumption stage.

### Practical Implications

The findings in this study provide several implications for consumers and policymakers. For consumers, an expiration date is an important piece of information facilitating decision making as a freshness or quality indicator while shopping for and before consuming perishable grocery products. Checking an expiration date is vital because the date provides a promise and assurance to the consumer that the food in the package is fresh and of high-quality, facilitating consumer decision making. Consumers who perceive high risk in not checking expiration dates tend to have increased information search effort. They believe it will reduce risks and mitigate uncertainty involved in shopping and consuming perishable products.

Consumers who perceive risk in not checking expiration dates and consumers who are motivated to check expiration dates, tend to frequently

check expiration dates while shopping for and before consuming perishable grocery products. Furthermore, the findings show that consumers who are pressed for time tend to exert diminished expiration date search effort. Hence, it becomes important for marketers and retailers to make the expiration date search effort more time-efficient for such consumers in a way that the expiration date information is easily comprehensible and readily accessible on grocery product packages.

Understanding how consumers search for external information is essential for policymakers because an efficient and competitive market economy is driven by consumers' awareness of price, quality, and product differences (Srinivasan 1990). "Consumption is the sole end and purpose of all production; and the interest of the producer ought to be attended to only so far as it may be necessary for promoting that of the consumer" (Smith 1904, IV.8.49). In order to promote the interest of the consumer, policymakers also need to understand what motivates consumers to search for expiration date information so they can develop consumer education programs that provide instruction on food dating, food storage and handling, and proper food disposal. Ultimately, such practices will not only will enhance consumer decision making, but also reduce the risk and time involved at the shelf.

## LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

While the present study provides implications for theory, consumers, and policymakers, it is not without limitations. First, the study mainly focused on the self-reported antecedents to the external search activity of checking expiration dates on perishable grocery products from the psychological/motivational approach combined with the economics cost-benefit perspective—rather than focusing on actual behavioral data. Future studies could examine consumers in the act of shopping for groceries in supermarkets and before consuming those grocery products at home. This can lead to a more holistic examination of the factors influencing this information search process.

The study did not find significant support for two relationships (1) health consciousness and search effort while shopping and (2) time pressure while grocery shopping and motivation of checking expiration dates. First, motivation to check expiration dates fully mediates the relationship between health consciousness and search effort while shopping. This full mediation explains the insignificant direct relationship between health consciousness and search effort while shopping. Health-conscious consumers are more motivated to check expiration dates and this motivation further encourages

them to exert search effort while shopping. Motivation to check expiration dates plays an important mediating role in this context. Second, we believe that the relationship between time pressure while grocery shopping and motivation of checking expiration dates did not receive significant support because time pressure while grocery shopping is a situational variable. Many situational variables require situational investigation for intraindividual variability (Belk 1975). We believe that investigating this relationship in an experiment where time pressure is manipulated could provide significant support as compared to self-reported measures. Future research could further investigate these relationships.

Next, the present study was limited to individual and situational factors in the context of checking expiration dates. Nevertheless, the usability of the information cannot be undermined. Label characteristics such as format, type, and location could affect this information search activity. Lack of usable information and an insufficient understanding of alternatives and their implications can make consumers feel dissatisfied and less empowered (Hibbard and Peters 2003). Future studies could consider the role of various formats of expiration dates and the associated confusion with them in the context of the motivation to check expiration dates.

Likewise, studies focusing on the comprehension of expiration dates and how this impacts future food consumption behavior and grocery shopping strategies would be of value. Consumer perceptions and motivations for checking expiration dates are not limited to the U.S. food market. Future studies can replicate this research in other countries and cultures and find interesting differences and similarities.

## REFERENCES

- Anderson, James C. and David W. Gerbing. 1988. Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, 103 (3): 411.
- Baron, Reuben M. and David A. Kenny. 1986. The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology*, 51 (6): 1173–1182.
- Bates, Kenneth, Scot Burton, Elizabeth Howlett, and Kyle Huggins. 2009. The Roles of Gender and Motivation as Moderators of the Effects of Calorie and Nutrient Information Provision on Away-from-Home Foods. *Journal of Consumer Affairs*, 43 (2): 249–273.
- Beatty, Sharon E. and M. Elizabeth Ferrell. 1998. Impulse Buying: Modeling Its Precursors. *Journal of Retailing*, 74 (2): 169–191.
- Beatty, Sharon E. and Scott M. Smith. 1987. External Search Effort: An Investigation across Several Product Categories. *Journal of Consumer Research*, 14 (1): 83–95.
- Belk, Russell W. 1975. Situational Variables and Consumer Behavior. *Journal of Consumer Research*, 2 (3): 157–164.
- Bettman, James R. 1979. An Information Processing Theory of Consumer Choice. *Journal of Marketing*, 43 (3): 124–126.

- Bettman, James R., Mary Frances Luce, and John W. Payne. 1998. Constructive Consumer Choice Processes. *Journal of Consumer Research*, 25 (3): 187–217.
- Blackwell, Roger D., Paul W. Miniard, and James F. Engel. 2001. *Consumer Behavior*. 9th edition. Mason, OH: South-Western Thomas Learning.
- Breivik, Einar and Helge Thorbjørnsen. 2008. Consumer Brand Relationships: An Investigation of Two Alternative Models. *Journal of the Academy of Marketing Science*, 36 (4): 443–472.
- Brody, Aaron L. 2008. How Green Is Food Waste? *Food Technology*, 62 (6): 121, 123–126.
- Buhrmester, Michael, Tracy Kwang, and Samuel D. Gosling. 2011. Amazon's Mechanical Turk a New Source of Inexpensive, yet High-Quality, Data? *Perspectives on Psychological Science*, 6 (1): 3–5.
- Cardello, Armand V., and Howard G. Schutz. 2003. The Concept of Food Freshness: Uncovering Its Meaning and Importance to Consumers. In *Freshness and Shelf Life of Foods*, H. Weenen and K.R. Cadwallader (22–41). Washington, DC: American Chemical Society.
- Celsi, Richard L. and Jerry Olson. 1988. The Role of Involvement in Attention and Comprehension Processes. *Journal of Consumer Research*, 15 (2): 210–224.
- Cheung, Gordon W. and Rebecca S. Lau. 2008. Testing Mediation and Suppression Effects of Latent Variables Bootstrapping with Structural Equation Models. *Organizational Research Methods*, 11 (2): 296–325.
- Cox, Dena and Anthony D. Cox. 2001. Communicating the Consequences of Early Detection: The Role of Evidence and Framing. *Journal of Marketing*, 65 (3): 91–103.
- Dodd, Tim H. and Steve Morse. 1994. The Impact of Media Stories Concerning Health Issues on Food Product Sales: Management Planning and Responses. *Journal of Consumer Marketing*, 11 (2): 17–24.
- Dowling, Grahame R. and Richard Staelin. 1994. A Model of Perceived Risk and Intended Risk-Handling Activity. *Journal of Consumer Research*, 21 (1): 119–134.
- Duncan, Calvin P. and Richard W. Olshavsky. 1982. External Search: The Role of Consumer Beliefs. *Journal of Marketing Research*, 19 (1): 32–43.
- Farley, John U. 1964. "Brand Loyalty" and the Economics of Information. *The Journal of Business*, 37 (4): 370–381.
- Fornell, Claes and David F. Larcker. 1981. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, 18 (1): 382–388.
- Forthofer, Melinda S. and Carol A. Bryant. 2000. Using Audience-Segmentation Techniques to Tailor Health Behavior Change Strategies. *American Journal of Health Behavior*, 24 (1): 36–43.
- Foxall, Gordon R. 1993. A Behaviourist Perspective on Purchase and Consumption. *European Journal of Marketing*, 27 (8): 7–16.
- Fujiwara, Okitsugu, Hanijanto Soewandi, and Dayani Sedarage. 1997. An Optimal Ordering and Issuing Policy for a Two-Stage Inventory System for Perishable Products. *European Journal of Operational Research*, 99 (2): 412–424.
- Goodman, Joseph K., Cynthia E. Cryder, and Amar Cheema. 2013. Data Collection in a Flat World: The Strengths and Weaknesses of Mechanical Turk Samples. *Journal of Behavioral Decision Making*, 26 (3): 213–224.
- Gould, Stephen J. 1988. Consumer Attitudes toward Health and Health Care: A Differential Perspective. *Journal of Consumer Affairs*, 22 (1): 96–118.
- Greenleaf, Eric A. and Donald R. Lehmann. 1995. Reasons for Substantial Delay in Consumer Decision Making. *Journal of Consumer Research*, 22 (2): 186–199.
- Gutman, Jonathan. 1982. A Means-end Chain Model based on Consumer Categorization Processes. *The Journal of Marketing*, 46 (2): 60–72.
- Hair, Joseph F., William C. Black, Barry J. Babin, and Rolph E. Anderson. 2009. *Multivariate Data Analysis*. 7th edition. Upper Saddle River, NJ: Prentice Hall.
- Hall-Phillips, Adrienne and Purvi Shah. 2017. Unclarity Confusion and Expiration Date Labels in the United States: A Consumer Perspective. *Journal of Retailing and Consumer Services*, 35: 118–126.
- Harcar, Talha and Fahri Karakaya. 2005. A Cross-Cultural Exploration of Attitudes toward Product Expiration Dates. *Psychology & Marketing*, 22 (4): 353–371.

- Hariga, Moncer. 1997. Optimal Inventory Policies for Perishable Items with Time-Dependent Demand. *International Journal of Production Economics*, 50 (1): 35–41.
- Harman, Harry H. 1976. *Modern Factor Analysis*. Chicago: University of Chicago Press.
- Hauser, David J. and Norbert Schwarz. 2016. Attentive Turkers: MTurk Participants Perform Better on Online Attention Checks than do Subject Pool Participants. *Behavior Research Methods*, 48 (1): 400–407.
- Hibbard, Judith H. and Ellen Peters. 2003. Supporting Informed Consumer Health Care Decisions: Data Presentation Approaches that Facilitate the Use of Information in Choice. *Annual Review of Public Health*, 24 (1): 413–433.
- Howard, John A. and Jagdish N. Sheth. 1969. *The Theory of Buyer Behavior*, vol. 14. New York: Wiley.
- Iversen, Anette C. and Pål Kraft. 2006. Does Socio-Economic Status and Health Consciousness Influence How Women Respond to Health Related Messages in Media? *Health Education Research*, 21 (5): 601–610.
- Jahn, Gabriele, Matthias Schramm, and Achim Spiller. 2005. The Reliability of Certification: Quality Labels as a Consumer Policy Tool. *Journal of Consumer Policy*, 28 (1): 53–73.
- Jayanti, Rama K. and Alvin C. Burns. 1998. The Antecedents of Preventive Health Care Behavior: An Empirical Study. *Journal of the Academy of Marketing Science*, 26 (1): 6–15.
- Ji, Mindy F. and Wendy Wood. 2007. Purchase and Consumption Habits: Not Necessarily What You Intend. *Journal of Consumer Psychology*, 17 (4): 261–276.
- Klerck, Deon and Jillian C. Sweeney. 2007. The Effect of Knowledge Types on Consumer-Perceived Risk and Adoption of Genetically Modified Foods. *Psychology & Marketing*, 24 (2): 171–193.
- Krider, Robert E. and Charles B. Weinberg. 2000. Product Perishability and Multistore Grocery Shopping. *Journal of Retailing and Consumer Services*, 7 (1): 1–18.
- Lenahan, Ryan J., James A. Thomas, Doug A. Taylor, D.L. Call, and Daniel I. Padberg. 1973. Consumer Reaction to Nutritional Labels on Food Products. *Journal of Consumer Affairs*, 7 (1): 1–12.
- Loibl, Căzilia, Soo Hyun Cho, Florian Diekmann, and Marvin T. Batte. 2009. Consumer Self-Confidence in Searching for Information. *Journal of Consumer Affairs*, 43 (1): 26–55.
- Lutz, Richard J., Scott B. McKenzie, and George E. Belch. 1983. Attitude toward the Ad as a Mediator of Advertising Effectiveness: Determinants and Consequences. *Advances in Consumer Research*, 10 (1): 532–539.
- MacInnis, Deborah J., Christine Moorman, and Bernard J. Jaworski. 1991. Enhancing and Measuring Consumers' Motivation, Opportunity, and Ability to Process Brand Information from Ads. *The Journal of Marketing*, 55 (4): 32–53.
- Mackey, Mary A. and Marilyn Metz. 2009. Ease of Reading of Mandatory Information on Canadian Food Product Labels. *International Journal of Consumer Studies*, 33 (4): 369–381.
- Maher, Jill K., Lawrence J. Marks, and Pamela E. Grimm. 1997. Overload, Pressure, and Convenience: Testing a Conceptual Model of Factors Influencing Women's Attitudes toward, and Use of, Shopping Channels. In *NA – Advances in Consumer Research*, edited by Merrie Brucks and Deborah J. MacInnis, vol. 24 (490–498). Provo, UT: Association for Consumer Research.
- Maheswaran, Durairaj and Brian Sterthal. 1990. The Effects of Knowledge, Motivation, and Type of Message on Ad Processing and Product Judgments. *Journal of Consumer Research*, 17 (1): 66–73.
- Manfredo, Michael J. 1989. An Investigation of the Basis for External Information Search in Recreation and Tourism. *Leisure Sciences*, 11 (1): 29–45.
- Mano, Haim and Richard L. Oliver. 1993. Assessing the Dimensionality and Structure of the Consumption Experience: Evaluation, Feeling, and Satisfaction. *Journal of Consumer Research*, 20 (3): 451–466.
- Michaelidou, Nina and Louise M. Hassan. 2008. The Role of Health Consciousness, Food Safety Concern and Ethical Identity on Attitudes and Intentions towards Organic Food. *International Journal of Consumer Studies*, 32 (2): 163–170.
- Miranda, Mario J. and László Kónya. 2006. Promoting Brands of Perishable Items on the Promise of Generous Availability of Consumption Time. *Journal of Targeting, Measurement and Analysis for Marketing*, 14 (3): 238–248.

- Mitchell, Vincent-Wayne. 1998. A Role for Consumer Risk Perceptions in Grocery Retailing. *British Food Journal*, 100 (4): 171–183.
- . 1999. Consumer Perceived Risk: Conceptualisations and Models. *European Journal of Marketing*, 33 (1/2): 163–195.
- Moore, William L. and Donald R. Lehmann. 1980. Individual Differences in Search Behavior for a Nondurable. *Journal of Consumer Research*, 7 (3): 296–307.
- Moorman, Christine. 1990. The Effects of Stimulus and Consumer Characteristics on the Utilization of Nutrition Information. *Journal of Consumer Research*, 17 (3): 362–374.
- Moorman, Christine and Erika Matulich. 1993. A Model of Consumers' Preventive Health Behaviors: The Role of Health Motivation and Health Ability. *Journal of Consumer Research*, 20 (2): 208–228.
- Murray, Keith B. 1991. A Test of Services Marketing Theory: Consumer Information Acquisition Activities. *Journal of Marketing*, 55 (1): 10–25.
- Naylor, Rebecca Walker, Courtney M. Droms, and Kelly L. Haws. 2009. Eating with a Purpose: Consumer Response to Functional Food Health Claims in Conflicting Versus Complementary Information Environments. *Journal of Public Policy & Marketing*, 28 (2): 221–233.
- Nunnally, J.C. 1978. *Psychometric Theory*. 2nd edition. New York: McGraw-Hill.
- Park, C. Whan and Banwari Mittal. 1985. A Theory of Involvement in Consumer Behavior: Problems and Issues. *Research in Consumer Behavior*, 1 (3): 201–232.
- Pellegrini, Giuseppe and Federica Farinello. 2009. Organic Consumers and New Lifestyles an Italian Country Survey on Consumption Patterns. *British Food Journal*, 111 (9): 948–974.
- Peterson, Robert A. and Maria C. Merino. 2003. Consumer Information Search Behavior and the Internet. *Psychology & Marketing*, 20 (2): 99–121.
- Petty, Richard E. and John T. Cacioppo. 1984. The Effects of Involvement on Response to Argument Quantity and Quality: Central and Peripheral Routes to Persuasion. *Journal of Personality and Social Psychology*, 46 (1): 69–81.
- Pino, Giovanni, Alessandro M. Peluso, and Gianluigi Guido. 2012. Determinants of Regular and Occasional Consumers' Intentions to Buy Organic Food. *Journal of Consumer Affairs*, 46 (1): 157–169.
- Podsakoff, Philip M., Scott B. MacKenzie, Jeong-Yeon Lee, and Nathan P. Podsakoff. 2003. Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *Journal of Applied Psychology*, 88 (5): 879–903.
- Pratt, Marlene A. 1998. Information Search for a Service: The Contrast Continues. In *Asia Pacific Advances in Consumer Research*, edited by Kineta Hung and Kent B. Monroe, vol. 3 (220–228). Provo, UT: Association for Consumer Research.
- Punj, Girish N. and Richard Staelin. 1983. A Model of Consumer Information Search Behavior for New Automobiles. *Journal of Consumer Research*, 9 (4): 366–380.
- Putrevu, Sanjay and Brian T. Ratchford. 1998. A Model of Search Behavior with an Application to Grocery Shopping. *Journal of Retailing*, 73 (4): 463–486.
- Rajan, Arvind, Rakesh Steinberg, and Richard Steinberg. 1992. Dynamic Pricing and Ordering Decisions by a Monopolist. *Management Science*, 38 (2): 240–262.
- Ransom, Gerri. 2005. Considerations for Establishing Safety-Based Consume-by Date Labels for Refrigerated Ready-to-Eat Foods. *Journal of Food Protection*, 68 (8): 1761–1765.
- Revilla, Melanie and Carlos Ochoa. 2015. What are the Links in a Web Survey among Response Time, Quality, and Auto-evaluation of the Efforts done? *Social Science Computer Review*, 33 (1): 97–114.
- Roberts, Donald F. and Nathan Maccoby. 1973. Information Processing and Persuasion: Counter-arguing Behavior. In *New Models for Mass Communication Research*, edited by Peter Clarke (269–307). Beverly Hills, CA: Sage Publications.
- Rotfeld, Herbert Jack. 2009. Health Information Consumers Can't or Don't Want to Use. *Journal of Consumer Affairs*, 43 (2): 373–377.
- Rydén, Petra, Ylva Mattsson Sydner, and Linda Hagfors. 2008. Counting the Cost of Healthy Eating: A Swedish Comparison of Mediterranean-Style and Ordinary Diets. *International Journal of Consumer Studies*, 32 (2): 138–146.

- Schaninger, Charles M. and Donald Sciglimpaglia. 1981. The Influence of Cognitive Personality Traits and Demographics on Consumer Information Acquisition. *Journal of Consumer Research*, 8 (2): 208–216.
- Schmidt, Jeffrey B. and Richard A. Spreng. 1996. A Proposed Model of External Consumer Information Search. *Journal of the Academy of Marketing Science*, 24 (3): 246–256.
- Sen, Sankar and Lauren G. Block. 2009. “Why My Mother Never Threw Anything Out”: The Effect of Product Freshness on Consumption. *Journal of Consumer Research*, 36 (1): 47–55.
- Smith, Adam. 1904. An Inquiry into the Nature and Causes of the Wealth of Nations. <http://www.econlib.org/library/Smith/smWN18.html>.
- Sprott, David E. and Anthony D. Miyazaki. 1995. Gift Purchasing in a Retail Setting: An Empirical Examination. Paper read at AMA Winter Educators’ Conference, American Marketing Association, Chicago, IL.
- Srinivasan, Narasimhan. 1990. Pre-Purchase External Search for Information. In *Review of Marketing*, edited by V. E. Zeithaml (153–189). Chicago: American Marketing Association.
- Srinivasan, Narasimhan and Brian T. Ratchford. 1991. An Empirical Test of a Model of External Search for Automobiles. *Journal of Consumer Research*, 18 (2): 233–242.
- Tsiros, Michael and Carrie M. Heilman. 2005. The Effect of Expiration Dates and Perceived Risk on Purchasing Behavior in Grocery Store Perishable Categories. *Journal of Marketing*, 69 (2): 114–129.
- United States Department of Agriculture (USDA). 2015. Food Product Dating. <http://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/food-labeling/food-product-dating/food-product-dating>.
- Wansink, Brian and Pierre Chandon. 2006. Can “Low-Fat” Nutrition Labels Lead to Obesity? *Journal of Marketing Research*, 43 (4): 605–617.
- Wansink, Brian and Alan O. Wright. 2006. “Best If Used by ...” How Freshness Dating Influences Food Acceptance. *Journal of Food Science*, 71 (4): S354–S357.
- Yeung, Ruth M.W. and Joe Morris. 2001. Food Safety Risk: Consumer Perception and Purchase Behaviour. *British Food Journal*, 103 (3): 170–187.
- Zaichkowsky, Judith L. 1985. Measuring the Involvement Construct. *Journal of Consumer Research*, 12 (3): 341–352.
- Zhang, Chan. 2013. Satisficing in Web Surveys: Implications for Data Quality and Strategies for Reduction. Doctoral dissertation, University of Michigan, Ann Arbor, MI.