Un journal de asfae chile

mbr Multidisciplinary Business Review

A WORK-FUN MODEL OF SHOPPING BEHAVIOUR: EXPLAINING WHEN CONSUMERS BUY ON IMPULSE

UN ENTRETENIDO MODELO DE COMPORTAMIENTO DE COMPRA: EXPLICANDO CUÁNDO LOS CONSUMIDORES COMPRAN POR IMPULSO

Francesco Massara[a]

Classification: Empirical paper – research
Received: May 12, 2020 / Revised: July 18, 2020 / Accepted: July 19, 2020

Abstract

A study was conducted that implemented a computer-based research vehicle to capture microscopic aspects of shopping and to permit a moment-by-moment analysis of consumer-environment interactions. Participants shopped in a virtual grocery store with a fixed budget. Analysis of shopping behaviour revealed a significant relationship between the time spent in the store, the shopping path taken, and the number of unplanned purchases made. Temporal analysis indicated that unplanned purchases were very unlikely during the first 25% of the time spent in the store, but became very likely during the last 25% of in-store time. This relationship is characterized as a "work-fun model of shopping behaviour". Decision time was shown to increase steadily throughout the shopping trip; affective product features had a greater impact on difficult choices during the latter part of the shopping trip. The results fit with expectations derived from self-control theories and suggest an extension of the traditional exposure theory of in-store decision making.

Keywords: Shopping behavior, impulse purchases, hedonic, utilitarian, self-control

Resumen

Se realizó un estudio por medio de un vehículo de investigación basado en computadora para capturar aspectos microscópicos de las compras y permitir un análisis momento a momento de las interacciones entre el consumidor y el entorno. Los participantes compraron en una tienda virtual con un presupuesto fijo. El análisis del comportamiento de compra reveló una relación significativa entre el tiempo pasado en la tienda, la ruta de compra tomada y el número de compras no planificadas realizadas. El análisis temporal indicó que las compras no planificadas eran muy poco probables durante el primer 25% del tiempo pasado en la tienda, pero se volvieron muy probables durante el último 25% del tiempo en la tienda. Caracterizo esta relación como un "modelo divertido de comportamiento de compra". Se demostró que el tiempo de decisión aumenta constantemente durante el viaje de compras. Las características afectivas del producto tuvieron un mayor impacto en las decisiones difíciles durante la última parte del viaje de compras. Los resultados se ajustan a las expectativas derivadas de las teorías de autocontrol y sugieren una extensión de la teoría de exposición tradicional de la toma de decisiones en la tienda.

Palabras clave: Comportamiento de compra, compras impulsivas, hedónico, utilitario, autocontrol

[a] Università IULM, Department of Business. Milano, Italy. Email: francesco.massara@iulm.it

Introduction

The Point-Of-Purchase Advertising Institute's (1995) survey of consumer buying habits for groceries from about 25 years ago indicated that 70% of decisions about what to buy when shopping occur at the point of purchase, which divides into 6% planned purchases (e.g., plan the product but not the brand), 4% switches (e.g., plan Gatorade, buy Powerade), and 60% unplanned purchases. That figure has not declined today, as reports provide evidence that 71% of respondents admit they purchase on impulse in grocery stores, and that the total amount spent on impulse purchases yearly, including all product categories, may round up to about 84% of the annual credit card (negative) balance (O'Brien, 2018). The phenomenon seems therefore important, irrespective of whether the type of purchase has a higher or lower opportunistic trigger (e.g. responding to promotions) (see Massara, Melara & Liu, 2014). As consumers rely on their own plans for only 30% of their purchases, there is an inherent interest in understanding the cognitive processes that influence the remaining 70% of purchases.

As impulse buying happens and has triggers in the context of purchase, research has tried to investigate its "sources" in physical or online environments. Research on store and service environments, including industry studies, draws attention to the role that the physical setting of the store (e.g., music, layout, colour, lighting levels, advertising, odours, product display) plays in shopping outcomes (Baker, Parasuraman, Grewal, & Voss, 2002; Inman & Winer, 1998; Inman, Winer, & Ferraro, 2005; Turley & Milliman, 2000), including the volume of purchases (Milliman, 1982), the rate of purchasing (Bellizzi & Hite, 1992), the proportion of unplanned purchases (Donovan, Rossiter, Marcoolyn, & Nesdale, 1994; Heilman, Nakamoto, & Rao, 2002), the time spent in the store (Areni & Kim, 1993; Spangenberg, Crowley, & Henderson, 1996), judgments of brand (Akhter, Andrews, & Durvasula, 1994), perceptions of price (Babin, Hardesty, & Suter, 2003; Smith & Burns, 1996), and merchandise quality (Baker et al., 2002). More than retailing factors, such as the promotional strategy (Hultén & Vanyushyn, 2014), product characteristics influence impulse purchases, with hedonic products apparently exerting the highest influence (Kacen, Hess, & Walker, 2012). Newer studies focusing on online environments have investigated online cues triggering impulse purchases (Dawson & Kim 2010; Park, Kim, Funches & Foxx, 2012). Traditionally, another stream of literature has investigated impulse purchases as characteristics of the "organism" including situational, dispositional and socio-demographic variables (Amos, Holmes, & Keneson, 2014; Baumeister, 2002; Beatty & Ferrel, 1998; Bellini, Cardinali, & Grandi, 2017; Rook, 1987; Rook & Fisher, 1995; Sundström, Hjelm-Lidholm, & Radon, 2019). Personal and situational characteristics have been shown to influence the outcome of the shopping trip. The type of shopping trip (Kahn & Schmittlein, 1992; Kollat & Willet, 1967), the strategies of in-store navigational searches (Titus & Everett, 1996), the use of shopping lists (Block & Morwitz, 1999; Spiggle, 1987), the knowledge of the store environment, the perceived time pressure (Inman & Winer, 1998; Iyer, 1989; Park, Iyer, & Smith, 1989), self-regulation (Vohs & Faber, 2007), as well as social factors (Mattila & Wirtz, 2008) and shopper mood (Ozer & Gultekin, 2015) have each been found to influence the composition of the final basket in terms of planned and unplanned purchases and switches.

Such studies have enriched our knowledge of impulse purchases, from the perspective of the "stimulus" (i.e., the store/online environment), or the "organism" (i.e., the consumer). An S-O-R imprint (Chang, Eckman, & Yan, 2011), while useful, has inhibited the perspective of the experience; that is, the perspective relative to how and when impulse purchases are made during a shopping trip, as well as the fact that person, environment and situation are interacting elements. A recent research, for example, has found that dispositional tendencies to buy on impulse affect visual attention to in-store signs and displays; therefore, the "organism" may be influencing the way in which the "stimulus" is perceived (Khachatryan et al., 2018). Little is known about how a consumer engages with the store environment, or with the products that are purchased on impulse, during the whole duration of the shopping trip. One reason is that the process of collecting data to examine the microscopic relationships between shoppers and the store environments can be too expensive (Inman, Winer, & Ferraro, 2005; Underhill, 1999), although recently eye-tracking technologies have become more affordable and a few studies on in-store interactions –usually limited to visual attention – have been carried out (Huddleston, Behe, Driesener, & Minahan, 2018). Consequently, few studies have examined the interactive influences between the store environment and consumer decision making (Hendrickson & Ailawadi, 2014; Inman, Winer, & Ferraro, 2005; Khachatryan et al., 2018; Peck & Childers, 2006).

The purpose of the present study is to present the results of an analytic tool permitting analysis of moment-by-moment aspects of grocery shopping, revealing when impulse purchases are made during a shopping trip. The study employs three existing theories – exposure theory, delayed gratification theory, and resource depletion theory – to develop new predictions about in-store shopping behaviour, subsequently tested using

micro-analytic techniques. The study contributes substantively to understanding the nature of impulse purchases from a perspective of the shopping experience, advancing a theory with potentially relevant operational implications.

Theories of Shopping Behaviour: Exposure Theory, Delayed Gratification Theory, and Resource Depletion Theory

In-store stimuli enact search behaviour, which can yield unplanned purchases (Beatty & Farrel, 1998; Inman & Winer, 1998; Inman, Winer & Ferraro, 2005). Unplanned purchases arise incidentally, either by exposure to a stimulus and subsequent in-store need recognition (Inman & Winer, 1998) or they can be decided on the spot, due to an emotional urge to purchase (Babin, Darden, &Griffin, 1994; Rook, 1987; Rook & Fisher, 1995), one that tends to disrupt ongoing decisional activities. In both cases, exposure to a product is the trigger of the purchase decision and physical proximity to the product is a precondition to the purchase decision (Beatty & Ferrel, 1998; Hoch & Loewenstein, 1991). In this paper this view is referred as to the *exposure theory*. Given that only 30% of purchases seems to be planned, it is expected that shoppers intentionally increase their exposure to products, perhaps as a way to avoid forgetting purchases; therefore, it can be assumed that shoppers maximize their use of the store's shelves as external memory aids. In the context of the present study, such activity implies that shoppers are generally non-optimal in how they navigate through the store environment, allowing the momentary exposure to products to guide their navigational choices - a passive search style (Titus & Everett, 1996). On the other hand, increased exposure to products while shopping, increases the probability that a shopper will deviate from his or her shopping plans. Unplanned buying may occur after attention is disrupted from stimuli encountered in the external environment (Strack, Werth, & Deutsch, 2006), and merchandising variables that make products more or less noticeable within the store environment (e.g., the display products, shelf markers, etc.) shift consumers' attention toward planned or unplanned purchases (Iyer & Ahlawat, 1987). Thus, exposure theory indirectly supports the "environmental determinism" standpoint (Bonnes, Lee, & Bonaiuto, 2003) which maintains that in-store decision making is strongly influenced by consumer perceptions and behaviour within the environment. However, the exposure theory does not help to make precise predictions about when unplanned purchases are expected to occur. One could, at best, predict that unplanned purchases are expected to occur randomly throughout a shopping trip, in response to the momentary urges wrought by product exposure. *Delayed gratification theory* holds that consumers enact cognitive strategies to avoid or suppress their immediate impulses (Wertenbroch, 1998). On this account, impulse purchases and pleasurable consumptions are indulgences, which can be justified only after effort. They represent a self-control failure in which desire overcomes willpower (Hoch & Loewenstein, 1991). Consistent with this view, consumer choices often show forms of debt aversion, tending to prefer early payment – a form of self-rationing – in exchange for future benefits (Prelec & Loewenstein, 1998; Wertenbroch, 2001). This tendency is especially strong for hedonic consumptions, which induce higher sensitivity to costs (Kivetz & Simonson, 2002b), evoke feelings of guilt (Kivetz & Simonson, 2002a), and lead to a stronger "pain of paying" (Prelec & Loewenstein, 1998). By adopting strategies that limit exposure to unwanted products, as demonstrated by results from intertemporal choice studies (Inman, Winer, & Ferraro, 2005; Wertenbroch, 1998), delayed gratification theory suggests that shoppers will be reasonably efficient in their search behaviour, largely restricting store travel to areas containing sought-after items. Thus, delayed gratification theory predicts that shoppers will tend to take optimal paths when navigating through the store. In the current study, the differing predictions of the two theories is evaluated by performing analyses of both optimal and preferred navigational paths.

Resource depletion theories posit that self-control resources regulate consumer strategies and, therefore, determine their success or failure (Vohs, Baumeister, & Tice, 2007; Vohs & Faber, 2007). It implies that impulses do not disrupt ongoing activities per se, but emerge inexorably as cognitive resources are exhausted (Baumeister, 2002). Consistent with this point of view are the findings that urges to buy and willingness to spend are higher when self-regulatory resources are low (Vohs & Faber, 2007). Moreover, repeatedly making choices drains the self-regulatory resources needed to activate consumer strategies (Vohs, Baumeister, & Tice, 2007). Similarly, affective product features increase their influence on decisions after a series of active choices deplete self-control resources (Bruyneel, Dewitte, S., Vohs, K. D., & Warlop, 2006; Shiv & Fedorikhin, 1999).

According to resource depletion theories, the continued exercise of self-control through the shopping trip progressively depletes inhibitory resources, thereby gradually increasing the probability of an unplanned purchase. In the context of the current study, one should observe the greatest number of unplanned purchases toward the end of a shopping trip. Moreover, since

Multidiscip. Bus. Rev. | *Vol. 13, N° 2, 2020, pp. 1-16, ISSN 0718-400X*
DOI: *https://doi.org/10.35692/07183992.13.2.2*

shopping decisions become more difficult as resources are depleted, the susceptibility to affective product features and the time needed to make choices should increase as the trip progresses. These three predicted correlates of shopping duration – increased deliberation time, greater susceptibility to hedonic consumption, and higher occurrence of unplanned purchases – are three underlying assumptions of the resource depletion theory and of the delayed gratification theory. In the present study, these predictions are evaluated by analysing product selections and features as a function of the time spent shopping. Hence, it is proposed that:

> **HP1:** As the shopping trip progresses, and particularly towards the end of the shopping trip, deliberation time, hedonic consumption, and unplanned purchases tend to be higher.

A Virtual Reality Research Tool

In former research (Massara, Liu, & Melara, 2010; Massara, Melara, & Liu, 2014) I developed a research tool that allows the real-time capture of consumer-environment interactions during the shopping process, an enhanced version of a virtual reality system first reported by Massara and Pelloso (2006). By integrating photographic hardware, computer graphics software, and computer programs, the research tool monitors and reports detailed shopping activities, allowing a 3-D photo-realistic replication of a real store environment through integrated 360° panoramic photography. The existent computer research software tracks and captures exact paths, purchases (planned and unplanned), and time spent on the computer. Therefore, the tool allows for the continual monitoring of shopping behaviour, while maintaining strict experimental control over the physical characteristics of the store environment.

In the current study, participants explored a virtual grocery store, shopping for a week's provisions under a specified budget. The tool was used to evaluate the prediction above referred to as HP1. First, the patterns of planned and unplanned purchases made during the course of the shopping trip were analysed. According to both the resource depletion theory and delayed gratification theory, unplanned purchases – seen either as failures of self-control or as indulgences – should predominate during the latter part of the shopping trip, when decision times are prolonged. Second, the particular navigational path shoppers took was analysed to determine whether the shopping trip was navigated optimally, as supposed by the delayed gratification theory. In the remainder of this paper, the specific experimental design used, the results of the empirical investigation, and discussions of the implications of the results for understanding the psychological bases of planned and unplanned purchases shall be described in greater detail.

Methodology

Subjects

Thirty-nine undergraduate and graduate participants (20 males, 19 females; average age 25 years) were recruited by means of flyers distributed throughout of a northern American university. All participants were given written informed consent according to institutional guidelines prior to testing.

Stimuli and Apparatus

Panoramic photographs were used to create a virtual reality environment of a small (4000 square feet) grocery store. The store contained 62 different product categories (for a complete list of categories see Appendix A), with an average of 24 different products per category. Photographs were taken at the beginning, middle, and end of every aisle and in each corner. The distance between every two station points was calibrated to ensure that each product was clearly visible while avoiding redundant depictions across station points. The map of the store layout represented the blueprint of the virtual environment, with dots indicating station points. A total of 46 panoramas were sufficient to capture in detail the entire layout of the store.

A database was created to store information on 1463 displayed products (about 95% of products in the store). The panoramic photographs and the dataset were integrated, linking every product represented in the virtual environment with the corresponding information in the database. A web interface linked the database with a computer graphics plug-in featuring a web-enabled virtual store used in previous studies (e.g., Massara, Melara, & Liu, 2014). In the virtual store, the user could choose to view several products at once and could select items, placing them into a shopping cart, as well as access a previously filled out shopping list, or check out. Product information, where provided, included product category, product/brand name, type and weight of the SKU, and specific caloric content. Participants interacted with the interface on a laptop computer.

Procedure

Participants first completed a tutorial that provided practice in using the application interface. The experimental task was then described: Participants were asked to shop for one week's worth of food for a single person

and to indicate the destination meal for each product purchased. They were given a spending limit of $50 to $60, a range determined in pilot testing. They were told that the purpose of the research was to investigate the nutritional value of the products selected for each meal. Participants were asked to create a shopping list from a panel of selectable categories and specific products within each category. The resulting list thus contained only items actually sold in the store, a procedure that facilitated subsequent calculations and permitted the tracking of planned and unplanned purchases. After compiling the list, participants were asked whether they typically use a list when shopping. If they answered "no", then the shopping list was not made available during the shopping trip.

Once the participant completed the shopping trip, he or she completed a short questionnaire probing details about the physical environment of the store and about planned and purchased products. The overall nutritional value of the items in the basket at checkout was computed automatically, displayed to participants on the computer screen, and compared with information about "ideal" nutritional needs. If the nutrition score of the selected items deviated from suggested USDA values, the participant was asked to return to the virtual store and substitute more nutritious items for the items currently in the basket. The data from the second shopping trip were stored separately from those of the first trip. Measures included exact paths, purchases (planned and unplanned), and time spent on the computer.

Results

Validity Checks

Table 1 summarizes several of the behavioural measures tracked on-line. Each shopping trip lasted 15 minutes on average (SD = 5). The average shopping cart contained 15 products (SD = 4) and the average bill was $42 (SD = $9), slightly below the spending limit. These averages correspond to expectations from an ordinary shopping trip (Block & Morwitz, 1999). Shoppers dwelt before store shelves for 20 seconds per shelf on average (SD = 6). They selected the first item one minute and forty-three seconds after entering the virtual store (SD = 88 secs), and averaged 53 seconds between product selections (SD = 17 secs). 44% of their shopping trip was spent browsing and moving to and from different parts of the store (SD = 12%).

Participants rated familiarity with the store environment at an intermediate level (M = 3.9 on a 7-point scale, SD = 1.8), though none reported having visited the (real) store. They rated their familiarity with the brands on the shelves to be high (M = 5.5 on a 7-point scale, SD = 1.8). The average shopping list contained 15 products (SD = 7), as did the average shopping cart. On average, 43.8% of the products in the cart were planned purchases, 37.6% were unplanned purchases, and 17.6% were switches. These figures are in line with the estimates from the Point-Of-Purchase Advertising Institute (1995).

Analysis of Purchase Types

A stepwise multinomial logistic regression was employed to identify patterns of purchases at distinct stages of the shopping trip. The dependent variable was the type of purchase (unplanned vs. planned); the independent variables were the use of a shopping list (dichotomous) and the stage of the shopping trip when the purchase was made (continuous). A chi-square likelihood ratio test of the model was significant ($\chi^2 = 41.645$, $df = 2$, $p < 0.001$); all of the coefficients in the likelihood function were significantly different from zero.

The stage of the shopping trip in which purchases were made provided the greatest power in predicting the type of purchase (see Table 2). As the shopping trip unfolded, unplanned purchases became increasingly more likely than planned purchases. The probability of making an unplanned purchase was maximal toward the end of the shopping trip. As depicted in Figure 1, unplanned

Table 1. Descriptive Statistics On Shopping Diagnostics (N = 39)

	Mean	Std. Deviation
Pace of the Shopping Trip (seconds)	19.79	6.46
Average Purchase Rate (seconds)	52.76	17.06
Average Time Shopping (seconds)	103.27	88.47
Time Spent in the Store (seconds)	893.62	330.23
Browsing and Commuting Time (% of the total time spent)	44%	12%
Number of Second Thoughts	2.08	2.49
Number of Products on the Shopping List	15.59	6.77
Number of Products in the Shopping Cart	14.87	4.57
Number of Planned Purchases	6.58	4.63
Number of Unplanned Purchases	5.64	4.10
Number of Switches	2.64	2.15
Number of Omissions	6.35	4.99
Store Familiarity (1 to 7 scale, 7 = very familiar)	3.85	1.83
Brand Knowledge (1 to 7 scale, 7 = very familiar)	5.54	1.79
Average Price per Product in the Shopping Cart	2.90	0.68
Total Grocery Bill (Dollars)	42.15	11.81
Usage of the Shopping List (% of the sample)	33%	

Multidiscip. Bus. Rev. | *Vol. 13, N° 2, 2020, pp. 1-16, ISSN 0718-400X*
DOI: *https://doi.org/10.35692/07183992.13.2.2*

purchases were less likely than planned purchases at the beginning of the shopping trip, and during the first 80% of the trip. The probabilities reversed during the last 20% of the trip, when unplanned purchases were relatively more likely. This result is consistent with the resource depletion model (Vohs, Baumeister, & Tice, 2007) and with HP1 in showing that participants avoided unplanned purchases throughout most of the shopping trip, but then yielded to their buying impulses toward the end of the trip.

Table 2. Parameter Estimate and Odds Ratios for the Multinomial Logistic Regression (Unplanned Purchases Compared to Planned Purchases) (N= 477)

	Estimate	Std. Error	Wald Chi Square	df	p <	Odds Ratios
Absence vs. Presence of Shopping List	0.89	0.20	19.06	1	0.001	2.43
Stage of the Shopping Trip	1.47	0.35	17.41	1	0.001	4.35

Additional analyses demonstrated that shopping list users did not differ significantly from non-users either in the pattern of planned purchases ($F(1, 18) = 0.206$, *ns*) or in unplanned purchases ($F(1, 18) = 1.528$, *ns*), a finding that serves as cross-segment validation of the pattern of purchases. No interaction was found between shopping list usage and the stage of the shopping trip. Thus, even those participants who shopped by strictly controlling their shopping plans made proportionally more unplanned purchases by the end of the shopping trip. Nevertheless, in the absence of a shopping list, the odds of an unplanned purchase or a brand switch were almost twice that of a planned purchase. This might mean that customers without a shopping list engaged in a passive search within the environment (Titus & Everett, 1996). In line with previous research (Inman & Winer, 1998; Inman, Winer, & Ferraro, 2005), the results show that planned purchases were more likely with a shopping list than without.

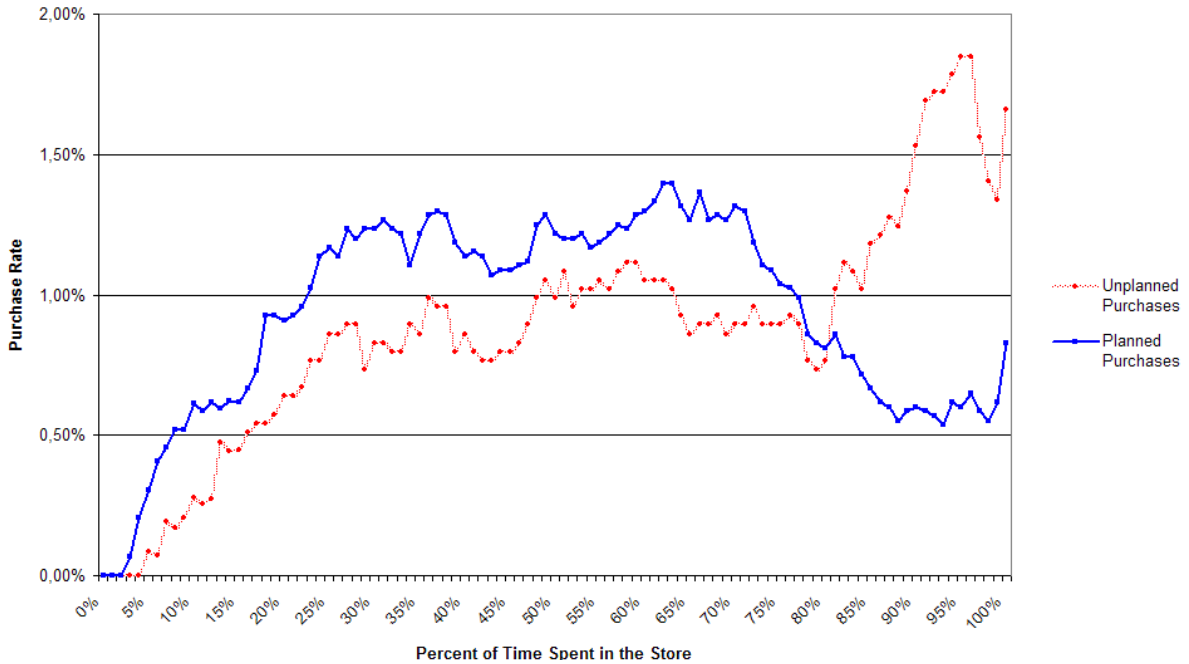
Analysis of Choice Time

Further support for HP1 was found in analyses of the time spent deliberating over purchases. A two-way ANOVA of deliberation time with purchase type (planned vs. unplanned) and the stage of the shopping trip (categorized into quartiles) as factors uncovered significant main effects for both factors, but no interaction effect ($F_{purch\text{-}type}(1, 469) = 7.019$, $p < 0.008$; $F_{stageshop}(3, 469) = 7.621$, $p < .001$; $F_{interaction}(3, 469) = 0.359$, *ns*). As depicted in Figure 2, decisions about purchases were progressively prolonged as the shopping trip unfolded. In line with resource depletion, this finding suggests that shoppers found decision making progressively more taxing, as one might expect if self-control resources gradually eroded over time. Figure 2 also shows that shoppers deliberated longer over planned than unplanned purchases. This is in line with previous theorizing on impulse buying, which maintains that the rapidity of decisions is a behavioural symptom of impulsiveness (D'Antoni & Shenson, 1973).

Analysis of Affective Product Features

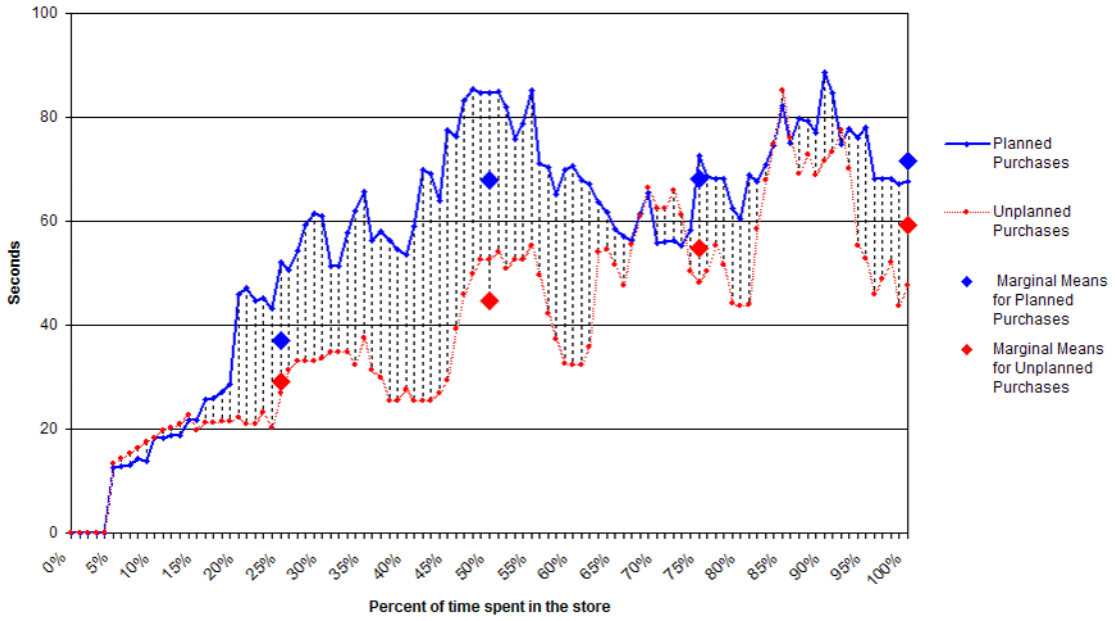
The prediction of the affective influence on impulse buying was tested by assuming that food with higher fat

Figure 1. Average Purchase Rate for Planned and Unplanned Purchases Observed Throughout Grocery Shopping Trips (477 Purchases)



Multidiscip. Bus. Rev. | *Vol. 13, N° 2, 2020, pp. 1-16, ISSN 0718-400X*
DOI: https://doi.org/10.35692/07183992.13.2.2

Figure 2. Deliberation Time for Planned and Unplanned Purchases Observed Throughout Grocery Shopping Trips (477 Purchases)



content is closely linked to hedonic consumption (e.g., it is tastier) and associated more strongly with affect than cognition (Desai & Ratneshwar, 2003; Shiv & Fedorikhin, 1999). A specific database query provided the total calories and the calories from fat for every food purchase, which was used to calculate the fat ratios (i.e., the percentage of calories from fat). A two-way ANOVA of fat ratios with purchase type (planned vs. unplanned) and the stage of the shopping trip (categorized into quartiles) as factors revealed a significant main effect only for the stage of the shopping trip and a significant interaction ($F_{purchtype}(1, 448) = 0.356$, *ns*; $F_{stageshop}(3, 448) = 6.661$, $p < .001$; $F_{interaction}(3, 448) = 2.643$, $p < 0.05$). Again, the results of the analyses fit with expectations of the resource depletion model. As shown in Figure 3, participants tended to register selections with higher fat ratio toward the end of their shopping trip, at least when making unplanned purchases ($r = 0.248$, $p < 0.001$, between shopping lifecycle and fat ratio). Thus, shoppers' susceptibility to affective product features increased across the shopping lifecycle, as one would expect if self-control resources are progressively depleted.

Analysis of Optimal Path

A measure of the minimum theoretical distance between products in the shopping list (i.e., the optimal shopping path), that is, the minimum necessary distance to be navigated in order to fulfil all of the planned purchases, was calculated by means of the Kruskal's minimum spanning tree algorithm (Kruskal, 1956). To apply Kruskal's algorithm, the store layout was visualized as a set of arcs and nodes (i.e., as a graph) (Diestel, 2005). The nodes are points where the shopper stops; the arcs are the distance between every two nodes. The distance between every two points in the store was calculated using the *city-block* metric, obtained through the first order Minkowski generalized metric distance (i.e., $k = 1$):

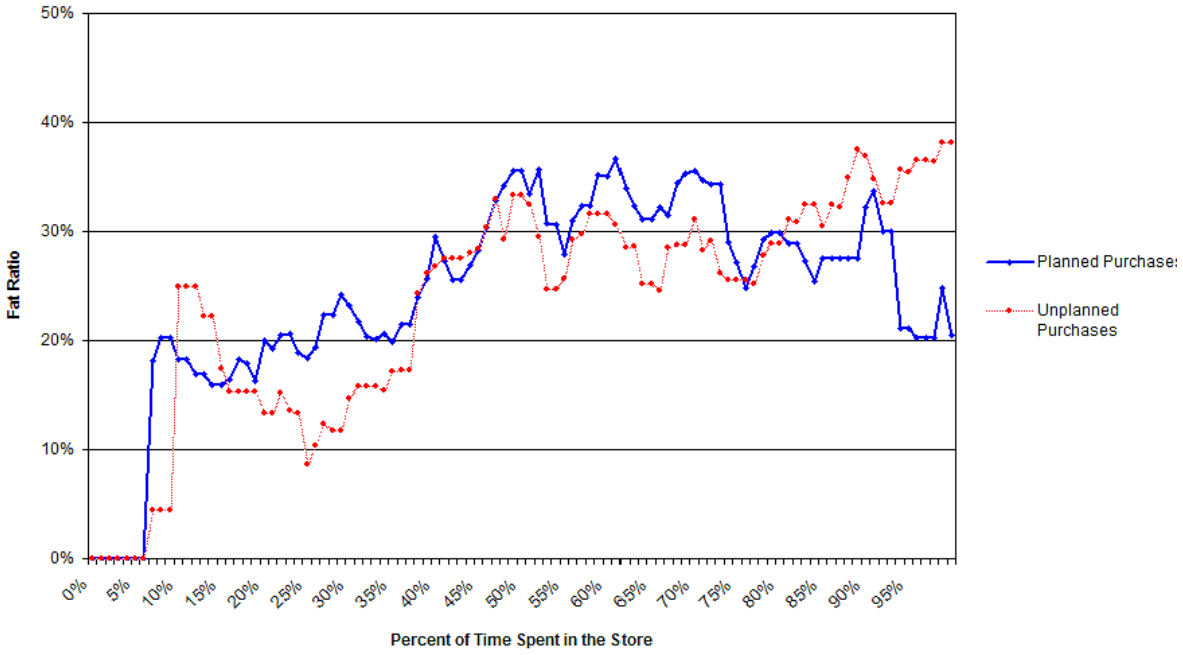
$$dij = \left\{ \sum_{l=1}^{m} \left| x_{li} - x_{lj} \right|^{k} \right\}^{1/k}$$

where i and j are the two different objects in the space (e.g., two products located in two different station points), x is the value of the coordinates for objects i and j, and m is the number of coordinates per point (in this case the spatial map representation is planar [i.e., two dimensional], therefore $m = 2$). The optimal shopping path measure is a theoretical index that corresponds to the distance a shopper would cover by planning purchases to minimize the distance to be traversed in the store. By comparing this measure with the actual distance traversed in the store, the degree of deviation was derived from the minimum theoretical path length, a measure of "shopping inefficiency".

Table 3 summarizes correlations between the deviation from the optimal path (i.e., how far in distance the actual shopping path was from optimal) and other shopping diagnostics. The greater the deviation from the minimal path, the longer the time spent in the store ($r = 0.656$, $p < 0.000$), particularly in terms of time moving around the store and browsing ($r = 0.450$, $p < 0.004$). However, the deviation from the optimal path was also associated with both the greater time spent deliberating about

Multidiscip. Bus. Rev. | *Vol. 13, N° 2, 2020, pp. 1-16, ISSN 0718-400X*
DOI: *https://doi.org/10.35692/07183992.13.2.2*

Figure 3. Fat Ratio for Planned and Unplanned Purchases Observed Throughout Grocery Shopping Trips (456 Purchases)



purchases ($r = 0.426$, $p < 0.007$) and a faster overall pace on the shopping trip itself ($r = -0.336$, $p < 0.037$).

Contrary to expectations, the distance from the optimal path did not correlate significantly with the number of unplanned purchases; however, it did correlate negatively with the number of omissions ($r = -0.398$, $p < 0.012$), suggesting that the extra time was spent looking for products that the shopper intended to buy. In fact, shoppers seemed to control well the allocation of their attention in the store. Those shoppers who spent relatively more time in the store, and hence were subjected to more stimuli, remained focused on the task at hand. They successfully avoided encounters with distracters, and their search strategy entailed minimizing deviations from the shopping plan.

Analysis of Preferred Path

Interestingly, most participants navigated through the store using a stereotypical path, which actually maximized their exposure to products. Consumers divided their time among three areas of the store, spending one third of their time in what is called the "outer loop", the second third in the "middle loop", finally ending up in the "centre loop". Figure 4 superimposes the consumers' customary path on the store map. One can see that customers initially moved clockwise through the perimeter of the store (i.e., the shaded part of the path), corresponding to the outer and middle loops. The usual path was unidirectional, with few backtracks. It is noteworthy that customers actually could have taken any other path direction (e.g., counter-clockwise), but preferred to move instead through the perimeter clockwise, and to converge in the middle sections of the store (i.e., the aisles) only during the final leg of the trip. This behaviour voluntarily maximizes exposure to products, though consumers were apparently able to control for the exposure effect. Therefore, although consumers appear to maximize incoming stimuli, agreeing with exposure theory, they also enact strategies to limit unnecessary purchases, in line with intertemporal choice studies (delayed gratification theory). Moreover, in line with resource depletion, most of the unplanned purchases were made in the centre loop, which is the terminus of the stereotypical path (see Table 4). Thus, product categories found in the final loop of the shopping trip tended coincidentally to be the object of buying impulses (Table 5), despite the fact that products with higher fat ratios were disproportionately stocked in the middle loop ($M_{middleloop} = 37\%$; $M_{outerloop} = 21\%$; $M_{centerloop} = 23\%$).

Discussion

The current study applied a temporal analysis to shopping behaviour to uncover moment-by-moment changes in purchase decisions. The principle finding was that unplanned purchases became increasingly more likely when compared with planned purchases as the shopping trip unfolded, even when controlling for deviations from an optimal navigational path. It was found that the time required for purchase selections also increased as the shopping trip evolved. Finally, hedonistic decisions,

DOI: https://doi.org/10.35692/07183992.13.2.2

Table 3. Pearson Correlation and Significance Level (in Parentheses) Between the Deviation From the Minimum Theoretical Path Length and Other Shopping Diagnostics (N = 39)

	Deviation from the Minimum Theoretical Path Length
Minimum Theoretical Path Length	-0.096
	(0.560)
Pace of the Shopping Trip	-0.336*
	(0.037)
Average Purchase Rate	0.426**
	(0.007)
Average Time Shopping	0.249
	(0.126)
Browsing and Commuting Time	0.450**
	(0.004)
Number of Second Thoughts	0.438**
	(0.005)
Time Spent in the Store	0.656**
	(0.000)
Number of Unplanned Purchases	0.121
	(0.462)
Number of Switches	0.127
	(0.442)
Number of Omissions	-0.398*
	(0.012)
Number of Planned Purchases	0.272
	(0.094)
Number of Products on the Shopping List	-0.061
	(0.714)
Number of Products in the Shopping Cart	0.473**
	(0.002)
Usage of the Shopping List	0.324*
	(0.045)
Store Familiarity	0.356*
	(0.026)
Total Grocery Bill	0.304
	(0.060)
Number of cases	39

* $p < 0.05$

** $p < 0.01$

defined operationally as the unplanned purchase of items with a high fat ratio, also increased toward the end of the shopping trip.

Table 4. Cross-Tabulation Between Place in the Store Layout Where the Purchase Happened, the Type of Purchase, and the Stage of the Shopping Trip

Type of Purchase			Shopping Trip Stage			Total
			0%-33%	33%-66%	66%-100%	
Planned	Place in the Store Layout	Outer Loop	33	28	3	64
		Middle Loop	15	116	9	140
		Centre Loop	0	30	23	53
		Total	48	174	35	257
		$\chi^2 = 106.417$, df = 4, sig. 0.000				
Switch	Place in the Store Layout	Outer Loop	10	6	0	16
		Middle Loop	0	58	5	63
		Centre Loop	0	11	14	25
		Total	10	75	19	104
		$\chi^2 = 89.961$, df = 4, sig. 0.000				
Impulse	Place in the Store Layout	Outer Loop	18	22	4	44
		Middle Loop	2	73	31	106
		Centre Loop	2	26	42	70
		Total	22	121	77	220
		$\chi^2 = 82.492$, df = 4, sig. 0.000				

Impulse Purchases Resulting from Depleted Inhibition

On a functional account of grocery shopping, impulse purchases at the end of the shopping trip are either wanted/needed items not included on the shopping list, and – perhaps mainly – prizes that consumers award themselves at the end of a procurement activity. The hypothesis supported in this study is that impulsivity is higher towards the end of the shopping trip, allegedly triggered by affective reactions when consumer self-control resources are at the lowest level. Such a conclusion is consistent with the view of consumer impulsivity as a self-control problem (Prelec & Loewenstein, 1998; Wertenbroch, 1998), especially using the framework of resource depletion (Vohs, Baumeister, & Tice, 2007; Vohs & Faber, 2007). Specifically, the results support the view that in-store decision making depletes the resources needed to resist the affective lures that lead to impulses purchases. The finding that deliberation time actually increased as the shopping trip progressed counters the claim that choices are made more easily when repeated. Instead, the results suggest that shoppers are forced to make compromises with each purchase decision, and these compromises mount up as the trip develops, depleting resources

Table 5. Cross-Tabulation Between Place in the Store Layout Where the Purchase Happened, the Type of Purchase, and the Name of the Category

Place in the Store Layout			Type of Purchase			
			Planned	Switch	Unplanned	Total
Outer Loop	Category name	Dried Fruits	2	0	0	2
		Fruits	32	2	15	49
		Nuts	3	1	1	5
		Ranch & Salad Dressing*	0	0	1	1
		Vegetables	27	10	26	63
		Wine	0	3	1	4
	Total		64	16	44	124
$\chi^2 = 25.460$, df = 10, sig. 0.005						
Middle Loop	Category name	Bread	19	11	9	39
		Butter & Margarine	3	0	2	5
		Canned Vegetables	3	2	10	15
		Cheese	13	5	13	31
		Cheese Dips	0	0	1	1
		Chips & Popcorns	6	6	6	18
		Deli	8	8	8	24
		Deli Food	0	0	6	6
		Eggs	14	6	3	23
		Fruit Juice	6	3	3	12
		Meat (Beef)	6	4	3	13
		Meat (Chicken)	14	1	5	20
		Meat (Pork)	4	1	9	14
		Milk	19	1	11	31
		Pasta	6	0	4	10
		Pastries & Cakes	0	0	2	2
		Peanut Butter, etc.	8	2	1	11
		Preserves	0	0	2	2
		Ranch & Salad Dressing	3	5	5	13
		Sauces & Ketchup	7	3	1	11
		Soft Drinks	0	1	1	2
		Water	0	4	0	4
		Yogurt and Cream	1	0	1	2
	Total		140	63	106	309
$\chi^2 = 92.854$, df = 44, sig. 0.000						
Centre loop	Category name	Beer/Alcohol	7	3	3	13
		Candies	0	0	3	3
		Canned Fish	0	0	2	2
		Canned Meat	0	0	8	8
		Canned Pasta & Soup	2	1	3	6
		Canned Vegetables	1	0	3	4
		Cereals	14	5	4	23
		Cheese Dips	0	1	0	1
		Chips & Popcorns	2	0	0	2
		Cleaning	0	1	0	1
		Coffee & Tea	3	3	2	8
		Cookies	0	0	6	6
		Crackers & Snacks	2	1	9	12
		Frozen Food Salted	0	0	5	5
		Fruit Juice	2	1	0	3
		Ice Cream	0	4	2	6
		Jelly	0	0	1	1
		Kitchenware	0	0	1	1
		Oral Care	0	0	1	1
		Pastries & Cakes	0	0	1	1
		Personal Care	1	0	0	1
		Rice	2	0	1	3
		Sauces & Ketchup	0	1	3	4
		Seasonings & Toppings	6	0	0	6
		Soft Drinks	10	2	9	21
		Water	0	2	2	4
		Wine	1	0	1	2
	Total		53	25	70	148
$\chi^2 = 100.617$, df = 56, sig. 0.000						

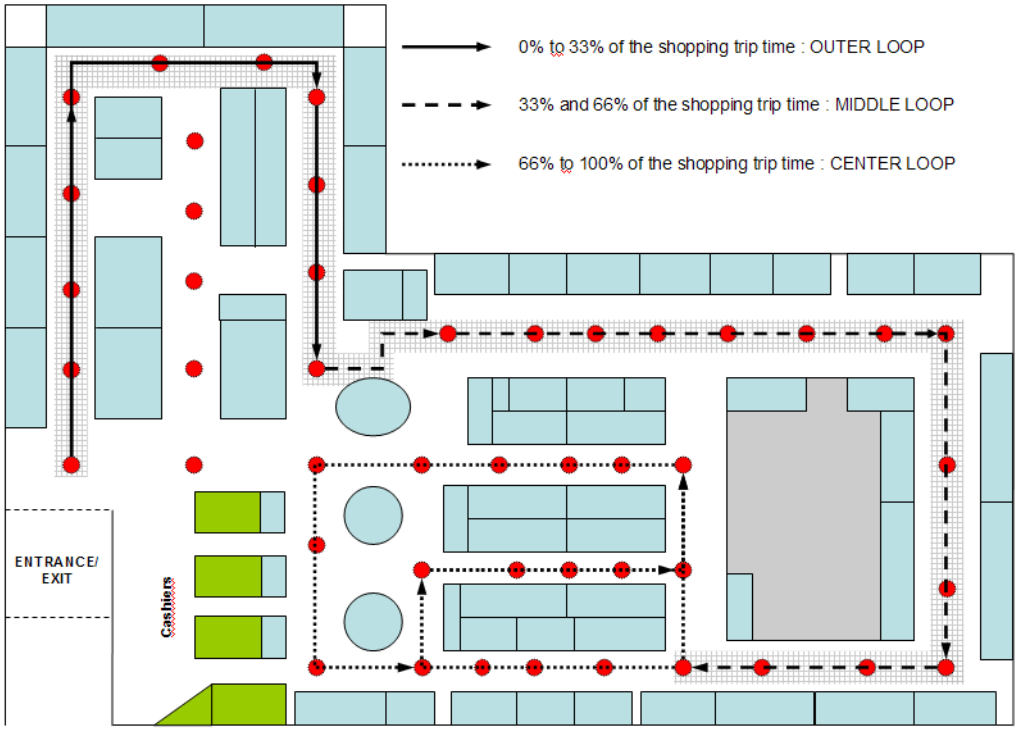
* Highlights indicates that unplanned purchases are more than planned purchases for the given category in the given area.

at a progressively faster rate. On this account, the shopping experience is a losing battle between the forces that induce unplanned purchases through hedonistic product features and the forces of resistance that are progressively eroded as decisions are reached and compromises made.

The fact that an affective trigger is a necessary component of impulsivity may explain why certain types of goods are associated with impulsivity more than others. In fact, hedonic product features may moderate the

DOI: https://doi.org/10.35692/07183992.13.2.2

Figure 4. A View of the Typical Shopping Pattern Through the Store Layout



	N° of Purchases	Average Stage of the Shopping Trip	Std. Deviation
Outer Loop	124	26%	22%
Middle Loop	309	53%	22%
Centre Loop	148	76%	20%
Total	581		
F (2, 578) = 183.388, sig. 0.000			

relationship between self-control depletion and the negative consequences of choices (e.g., amount of bad cholesterol in food). As self-control resources deplete, consumers are less able to resist temptations and, instead, demonstrate a tendency to favour the immediate rewards offered by hedonic and vicious alternatives over virtuous ones (Prelec & Loewenstein, 1998; Shiv & Fedorikhin, 1999; Wertenbroch 1998).

Exposure to In-Store Stimuli as Memory Aids

The results support the general view that shoppers take an active role in their relationship with the store environment, although the environment itself indirectly affects the type of purchases they make. Shoppers may be aware that distracters and merchandising techniques are used at the shelf level, but may be less cognizant of influences at higher levels of environmental organization. Thus, effects of the environment on purchase patterns may largely be relegated to the macro level, with store layout and merchandise placement determining which products are purchased at the beginning of a trip, and which at the end.

Shoppers' use in this study of a stereotypical path (i.e., clockwise perimeter-to-centre) may indicate a strategy of maximizing exposure to in-store stimuli, while avoiding encounters with distracters. The upshot of this strategy is that shoppers are able to highlight use of the store's shelves as external memory aids, thereby lessening the risk of incurring losses due to omissions (Block & Morwitz, 1999). The alternative, building a cognitive map of the store layout, would be too costly for shoppers, and it would be even more costly to remember the absolute location of the merchandise in the store to minimize the path. Thus, the stereotypical path makes economic sense, since consumers consider grocery shopping a routine household procurement activity and, as such, try to economize the use of resources devoted to shopping (Bell, Ho, & Tang, 1998). Of course, it is

conceivable that shoppers took this path primarily because of their unfamiliarity with the specific store setting used in the study. Nevertheless, the fact that participants followed an orderly unidirectional path through the store environment again underscores their active role in the consumer-environment interaction.

A Model of Shopping Behaviour

Considering the main result of this study and its interpretations – (1) the shoppers' pattern of planned and unplanned purchases as evidence of systematically depleted inhibitory resources, a more comprehensive model of how the shopping trip evolves into a lifecycle is proposed. The model comprises four stages:

1. *Transition*: In the earliest stage, corresponding roughly to the first 20% of time in the store, shoppers familiarize themselves with the store environment and remember or organize their ideas about what to buy (e.g., remember items or revise the shopping list). This stage is comparable to what Underhill (1999) refers to as a "transition zone," except in terms of time. As this stage progresses, purchase rates increase for both planned and unplanned items, but unplanned selections, and especially impulse purchases, are unlikely.
2. *Procurement (work)*: In the second stage, corresponding to 20% to 70% of the shopping lifecycle, the core activity of shopping is carried out. Here, shoppers complete functional buying activities (i.e., the working portion of shopping), with attention devoted to necessities, and with little concern for luxury purchases. Purchases of both planned and unplanned items proceed at a constant rate. Unplanned selections are more likely than in the previous stage, but remain low; the proportion of impulse purchases among the unplanned selections is still low.
3. *Checkup*: The penultimate stage marks the end of the working activity, approximately 70% to 80% of the shopping trip time. With the shopping cart full of essential groceries, the shopper checks the cart to ensure that most of the shopping activity has been completed. Now, purchase rates decrease dramatically, whether for planned or unplanned purchases. Unplanned selections remain proportionally lower than planned selections. Repeated compromises in the course of decision making have effectively depleted much of the consumer's cognitive resources.
4. *Relaxation (fun-and-impulse)*: During the final stage, the last 20% of the trip, consumers yield to temptation and are influenced by affective product features. With required shopping duties completed and inhibition weakened, shoppers are more prone to give in to pure impulse purchases, buying urges with an affective trigger. Consequently, the unplanned purchase rate increases noticeably, whereas the rate of planned purchases decreases. In this latter stage, consumers are more predisposed to fall victim to vicious consumption.

Implications of Current Findings and Limitations of the Research

The pattern of results uncovered in the present study has direct implications for manipulating impulse purchases. Managers or marketers may wish to take advantage of the tendency of consumers to yield to temptation in the latter part of the shopping trip, for example, by placing merchandise with the higher margins in the "centre loop" of their stores. Of course, consumers may counter by adopting alternative strategies, such as a "pulse" strategy in which small gratifications are heeded throughout the shopping trip, obviating a large gratification at the end. Nevertheless, the store layout can be analysed and organized to encourage consumers to enter a specific area of the store, one that can be filled with promotions, advertising, or in-store media. In my view, and from an ethical standpoint, marketers and retailers should use this knowledge responsibly, because it may lead to a generalized increase in vice consumption with negative long-term consequences for society as a whole.

On the research side, this study contributes to an understanding of the relationship between hedonic and utilitarian value in shopping. Results presented here support a view of "fun after work". Although consumers may dislike utilitarian activities per se, they may learn to enjoy working activities carried out within a self-reinforcing system of promised rewards (i.e., one in which a prize is given at the completion of the working task). Such a mechanism would be sustained in the long run by a peak-end rule heuristic, one in which an experience is evaluated only using information about the *peak* (pleasant or unpleasant) and the *end* of the experience (Kahneman, 1999). Use of this heuristic might explain the correlation between utilitarian and hedonic value (Babin, Darden, & Griffin, 1994), suggesting a more formal definition of the two constructs in relation to each other. According to one account, ordinary work may lead naturally to hedonism, and therefore to noxious forms of consumption, thereby evoking a formal relationship between hedonism and consumption. Social marketers and academics interested in the social effects of marketing may be interested in pursuing this account.

Future investigations of consumer-environment interactions should distinguish the influence of the differing scales of the environment (Everett, Pieters, & Titus, 1994). Within an environmental determinism framework (Bonnes, Lee, & Bonaiuto, 2003), the micro level –including merchandising and display variables– is nested inside and influenced by the macro level –which includes the form of the layout and the placement of the merchandise within the layout. While micro-level effects have been widely investigated (e.g., see Inman & Winer, 1998), macro-level effects have been largely neglected, primarily because of measurement difficulties. The current paper provides an approach that may overcome many of these measurement hurdles. The fact that the consumers in this study were greatly influenced at the macro level indicates the need for more macro-level analysis of shopping behaviour and should give greater impetus to such research efforts in the future. It is shown here that a temporal analysis of the shopping trip is able to highlight such layout and placement effects, and their interaction with micro-level effects. Given the amount of money devoted to in-store forms of communication, this relationship is one which is surely worth investigating.

As noted by one reviewer, a limitation of this study may be the imposed limit of $50 for expenditure. On the other hand, considering that the trip simulated a filler shopping expedition, such a limit was considerably above the average expenditure for this type of shopping trip (Massara, Liu, & Melara, 2014).

Conclusion

The main contribution of the current study is in uncovering several of the root causes of impulse purchasing though a careful temporal analysis of the relationship between the consumer and the environment. Theories which, overall, produce a unified view about this relationship were evaluated: exposure theory, delayed gratification theory, and resource depletion theory. General support was obtained for the view that impulse purchases are due to changes in cognitive resources available to consumers during the course of shopping. The results were not well explained by exposure or conditioning effects. Instead, the research shows that the affective lure of products, when present under conditions of weakened inhibition, can lead consumers to indulge into hedonistic behaviour, in this case, in the form of unplanned purchases.

References

Akhter, S.H., Andrews, J.C., & Durvasula, S. (1994). The influence of retail store environment on brand related judgements. *Journal of Retailing and Consumer Services*, *1*(1), 67-76.

Amos, C., Holmes, G. R., & Keneson, W. C. (2014). A meta-analysis of consumer impulse buying. *Journal of Retailing and Consumer Services*, *21*(2), 86-97.

Areni, C., & Kim, D. (1993). The influence of background music on shopping Behaviour: Classical versus top-forty music in a wine store. In L. McAlister and M.L. Rothschild (Eds.), *Advances in Consumer Research* (pp. 336-340). Provo, UT: Association for Consumer Research.

Babin, B. J., Hardesty, D. M., & Suter, T. A. (2003). Colour and shopping intentions: The intervening effect of price fairness and perceived affect. *Journal of Business Research*, *56*(7), 541-51.

Babin, B. J., Darden, W. R., &-Griffin, M. (1994). Work and/or fun: Measuring hedonic and utilitarian shopping value. *Journal of Consumer Research*, *20*(4), 644-56.

Baker, J. A., Parasuraman, A, Grewal, D., & Voss, G. B. (2002). The influence of multiple store environment cues on perceived merchandise value and patronage intentions. *Journal of Marketing*, *66*(2), 120-41.

Baumeister, R. F. (2002). Yielding to temptation: Self-control failure, impulsive purchasing, and consumer behaviour. *Journal of Consumer Research*, *28*(4), 670-76.

Beatty, S. E., & Ferrel, E. M. (1998). Impulse buying: Modelling its precursors. *Journal of Retailing*, *74*(2), 169-91.

Bell, D. R., Ho, T. H., & Tang, C. S. (1998). Determining where to shop: Fixed and variable costs of shopping. *Journal of Marketing Research*, *35*(3), 352-69.

Bellini, S., Cardinali, M. G., & Grandi, B. (2017). A structural equation model of impulse buying behaviour in grocery retailing. *Journal of Retailing and Consumer Services*, *36*, 164-171.

Bellizzi, J. A., & Hite, R. E. (1992). Environmental colour, consumer feelings, and purchase likelihood. *Psychology and Marketing*, *9*(5), 347-63.

Block, L. G. & Morwitz, V. G. (1999). Shopping lists as an external memory aid for grocery shopping: Influences on list writing and list fulfilment. *Journal of Consumer Psychology, 8*(4), 343-75.

Bonnes, M., Lee, T., & Bonaiuto, M. (2003). *Psychological theories for environmental issues*. Wiltshire, UK: Antony Rowe Ltd.

Bruyneel, S., Dewitte, S., Vohs, K. D., & Warlop, L. (2006). Repeated choosing increases consumers' susceptibility to affective product features. *International Journal of Research in Marketing, 23*(2)*,* 215-25.

Chang, H. J., Eckman, M., & Yan, R. N. (2011). Application of the Stimulus-Organism-Response model to the retail environment: The role of hedonic motivation in impulse buying behaviour. *The International Review of Retail, Distribution and Consumer Research*, *21*(3), 233-249.

D'Antoni, J. S., & Shenson, H. L. (1973). Impulse buying revisited: A behavioural typology. *Journal of Retailing*, *29*(1), 63-76.

Dawson, S., & Kim, M. (2010). Cues on apparel web sites that trigger impulse purchases. *Journal of Fashion Marketing and Management*, *14*(2), 230-246.

Desai, K. K., & Ratneshwar, S. (2003). Consumer perceptions of product variants that are positioned on atypical attributes: The joint effects of benefit segmentation, brand familiarity, and shelf display. *Journal of the Academy of Marketing Science*, *31*(1), 22-35.

Diestel, R. (2005). *Graph Theory.* Heidelberg: Springler-Verlag.

Donovan, R. J., Rossiter, J. R., Marcoolyn, G., & Nesdale, A. (1994). Store atmosphere and purchasing behaviour. *Journal of Retailing*, *70*(3), 283-94.

Everett, P. B., Pieters, R. G. M., & Titus, P. A. (1994). The consumer-environment interaction: An introduction to the special issue. *International Journal of Research in Marketing*, *11*(2), 97-105.

Heilman, C. M., Nakamoto, K., & Rao, A. G. (2002). Pleasant surprises: Consumer response to unexpected in-store coupons. *Journal of Marketing Research*, *39*(2), 242-52.

Hendrickson, K. & Ailawadi, K. L. (2014). Six lessons for in-store marketing from six years of mobile eye-tracking research. In *Shopper marketing and the role of in-store marketing*. Emerald Group Publishing Limited.

Hoch, S. J., & Loewenstein, G. F. (1991). Time-inconsistent preferences and consumer self-control. *Journal of Consumer Research*, *17*(4), 492-507.

Huddleston, P. T., Behe, B. K., Driesener, C., & Minahan, S. (2018). Inside-outside: Using eye-tracking to investigate search-choice processes in the retail environment. *Journal of Retailing and Consumer Services*, *43*, 85-93.

Hultén, P. & Vanyushyn, V. (2014). Promotion and shoppers' impulse purchases: The example of clothes. *Journal of Consumer Marketing*, *31*(2), 94-102.

Inman, J. J., & Winer, R. S. (1998). Where the rubber meets the road: A model of in-store consumer decision making. *Marketing Science Institute.* Reports 98-122.

Inman, J. J., Winer, R.S., & Ferraro, R, (2005). *The interplay between category characteristics and shopping trip factors* (Working Paper). Katz Graduate School of Business, University of Pittsburgh.

Iyer, E. (1989). Unplanned purchasing: Knowledge of shopping environment and time pressure. *Journal of Retailing*, *65*(1), 40-57.

Iyer, E., & Ahlawat, S. S. (1987). Deviations from a shopping plan: When and why do consumers not buy items as planned. In M. Wallendorf and P. Anderson (Eds.), *Advances in Consumer Research* (246-250). Provo, UT: Association for Consumer Research.

Kacen, J. J., Hess, J. D., & Walker, D. (2012). Spontaneous selection: The influence of product and retailing factors on consumer impulse purchases. *Journal of Retailing and Consumer Services*, *19*(6), 578-588.

Kahn, B. E., & Schmittlein, D. C. (1992). The relationship between purchases made on promotion and shopping trip behaviour. *Journal of Retailing*, *68*(3), 294-315.

Kahneman, D. (1999). Objective happiness. In D. Kahneman, E. Diener, and N. Schwarz (Eds.), *Well-Being: The Foundations of Hedonic Psychology* (pp. 3-25). New York: Russel Sage.

Khachatryan, H., Rihn, A., Behe, B., Hall, C., Campbell, B., Dennis, J., & Yue, C. (2018). Visual attention, buying impulsiveness, and consumer behaviour. *Marketing Letters*, *29*(1), 23-35.

Kivetz, R., & Simonson, I. (2002a). Earning the right to indulge: Effort as a determinant of customer preferences towards frequency program rewards. *Journal of Marketing Research, 39*(2), 155-70.

Kivetz, R., & Simonson, I. (2002b). "Self-control for the righteous: Toward a theory of precommitment to indulge. *Journal of Consumer Research*, *29*(2), 199-217.

Kollat, D. B., & Willett, R. P. (1967). Customer impulse purchasing behaviour. *Journal of Marketing Research*, *4*(1), 21-31.

Kruskal, J. B. (1956). On the shortest spanning subtree and the traveling salesman problem. *Proceedings of the American Mathematical Society*, *7*(1), 48-50.

Massara, F., & Pelloso, G. (2006). Investigating the consumer-environment interaction through image modelling technologies: An experimental evidence. *International Review of Retail, Distribution and Consumer Research*, *16*(5), 519-31.

Massara, F., Liu, S. S., & Melara, R. D. (2010). Adapting to a retail environment: Modelling consumer–environment interactions. *Journal of Business Research*, *63*(7), 673-681.

Massara, F., Melara, R. D., & Liu, S. S. (2014). Impulse versus opportunistic purchasing during a grocery shopping experience. *Marketing letters*, *25*(4), 361-372.

Mattila, A. S., & Wirtz, J. (2008). The role of store environmental stimulation and social factors on impulse purchasing. *Journal of Services Marketing, 22*(7), 562-567.

Milliman, R. E. (1982). Using background music to affect the behaviour of supermarket shoppers. *Journal of Marketing*, 46 (3), 86-91.

O'Brien, S. (2018). Consumers cough up $5,400 on impulse purchases. *CNBC.* Published 23 February 2018. Last time accessed 22/06/2020, available at https://www.cnbc.com/2018/02/23/consumers-cough-up-5400-a-year-on-impulse-purchases.html.

DOI: https://doi.org/10.35692/07183992.13.2.2

Ozer, L., & Gultekin, B. (2015). Pre-and post-purchase stage in impulse buying: The role of mood and satisfaction. *Journal of Retailing and Consumer Services*, *22*, 71-76.

Park, E. J., Kim, E. Y., Funches, V. M., & Foxx, W. (2012). Apparel product attributes, web browsing, and e-impulse buying on shopping websites. *Journal of Business Research*, *65*(11), 1583-1589.

Park, C. W., Iyer,E. S., & Smith, D. C. (1989). The effects of situational factors on in-store grocery shopping behaviour: The role of store environment and time available for shopping. *Journal of Consumer Research*, *15*(4), 422-33.

Peck, J., & Childers, T.L. (2006). If I touch it I have to have it: Individual and environmental influences on impulse purchasing. *Journal of Business Research, 59*(6), 765-769.

Point of Purchase Advertising Institute. (1995). *The 1995 POPAI Consumer Buying Habits Study.* Englewood, NJ: Point-of-Purchase Advertising Institute.

Prelec, D., & Loewenstein, G. (1998). The red and the black: Mental accounting of savings and debt. *Marketing Science*, *17*(1), 4-28.

Rook, D. W. (1987). The buying impulse. *Journal of Consumer Research*, *14*(2), 189-99.

Rook, D. W., & Fisher, R. (1995). Normative influences on impulsive buying behaviour. *Journal of Consumer Research, 22*(3), 305-13.

Shiv, B., & Fedorikhin, A. (1999). Heart and mind in conflict: The interplay of affect and cognition in consumer decision making. *Journal of Consumer Research*, *26*(3), 278-92.

Smith, P., & Burns, D. J. (1996). Atmospherics and retail environments: The case of the 'Power Aisle'. *International Journal of Retailing & Distribution Management*, *24*(1), 7-14.

Spangenberg, E. R., Crowley, A. E., & Henderson, P. W. (1996). Improving the store environment: Do olfactory cues affect evaluations and behaviours? *Journal of Marketing*, *60*(2), 67-80.

Spiggle, S. (1987). Grocery shopping lists: What do consumers write? In M. Wallendorf and P. F. Anderson (Eds.), *Advances in Consumer Research* (pp. 241-245). Provo, UT: Association for Consumer Research.

Strack, F., WerthL., & Deutsch, R. (2006). Reflective and impulsive determinants of consumer behaviour. *Journal of Consumer Psychology, 16*(3), 205-16.

Sundström, M., Hjelm-Lidholm, S., & Radon, A. (2019). Clicking the boredom away: Exploring impulse fashion buying behaviour online. *Journal of Retailing and Consumer Services*, *47*, 150-156.

Titus, P. A., & Everett, P. B. (1996). Consumer wayfinding tasks, strategies, and errors: An exploratory field study. *Psychology & Marketing*, *13*(3), 265-90.

Turley, L. W., & Milliman, R. E. (2000). Atmospheric effects on shopping behaviour: A review of the experimental evidence. *Journal of Business Research*, *49*(2), 193-211.

Underhill, P. (1999). *Why We Buy – The Science of Shopping.* New York: Simon and Shuster.

Vohs, K. D., & Faber, R. (2007). Spent resources: Self-regulatory resource availability affects impulse buying. *Journal of Consumer Research*, *33*(4), 537-48.

Vohs, K. D., Baumeister, R. F., & Tice, D. M. (2007). Self-regulation: Goals, consumption, and choices. In C. P. Haugtvedt, P. Herr, and F. Kardes (Eds.), *Handbook of Consumer Psychology.* Mahwah, NJ: Lawrence Erlbaum Associates, (in press).

Wertenbroch, K. (1998). Consumption self-control by rationing purchase quantities of virtue and vice. *Marketing Science*, *17*(4), 317-37.

Wertenbroch, K. (2001). *Self-rationing: Self-control in consumer choice* (Working Paper 2001/63/MKT). INSEAD, Department of Marketing.

Appendix A. List of Product Categories

Batteries	Olive Oil
BBQ	Oral Care
BBQ Utensils	Pasta
Beer/Alcohol	Pastries & Cakes
Bread	Peanut Butter etc.
Butter & Margarine	Personal Care
Candies	Pet Food
Canned Fish	Pharmacy
Canned Meat	Preserves
Canned Pasta & Soup	Pudding
Canned Vegetables	Ranch & Salad Dressing
Cereals	Rice
Cheese	Salad
Cheese Dips	Salt
Chips & Popcorns	Sauces & Ketchup
Cleaning	Seasonings & Toppings
Coffee & Tea	Soft Drink
Cookies	Sugar
Crackers & Snacks	Syrups
Deli	Vegetable Oil
Deli Food	Vegetables
Dried Fruits	Vinegar
Eggs	Water
Flour	Wine
Frozen Food Salted	Yogurt and Cream
Frozen Food Sweet	
Fruit Juice	
Fruits	
Ice Cream	
Jelly	
Kitchenware	
Meat (Beef)	
Meat (Chicken)	
Meat (Pork)	
Milk	
Nuts	

DOI: https://doi.org/10.35692/07183992.13.2.2