行政院國家科學委員會專題研究計畫 成果報告

情境參考價格對消費者注意力與價格判斷之影響
研究成果報告(精簡版)

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報 告 附 件 ：出席國際會議研究心得報告及發表論文

公 開 資 訊 ：本計畫涉及專利或其他智慧財產權，2 年後可公開查詢

中 華 民 國 100 年 12 月 21 日

中 文 摘 要 ： 在本研究中，我們檢視了情境參考價及其相關性對消費者價格判斷的影響。在實驗進行時，30 位大學生受測者的眼動歷程被記錄下來。情境參考價被分配在網頁的不同位置中。結果顯示，參與者使用相關的情境參考價來估算目標品牌的價格。從眼動資料得知，比起無關的廣告參考價，相關的廣告參考價得到較多的注意力資源。進一步的分析顯示，參與者能有效率地調整他們的搜尋策略，以便能更快地找到決策相關資訊，特別是當相關的廣告被配置在較不利的廣告位置時。

中文關鍵詞： 情境參考價, 注意力, 價格判斷, 廣告位置, 廣告相關性

英 文 摘 要 ： In this paper, we report the results of a study that examines the influence of contextual reference prices (CRPs) and their relevance on consumers' price judgments. Ten undergraduate students participated in this study, and their eye movements were recorded during the experimental session. The CRPs were arranged at different positions within a Web page. The results showed that participants used relevant CRPs to estimate the prices of target brands. This was evident by the allocation of higher attentional resources to relevant versus irrelevant advertised prices, regardless of their positions within a Web page. Further analyses indicated that participants adjusted their search strategy toward relevant advertisements efficiently, especially when relevant advertisements were placed at less favorable positions.

英文關鍵詞： contextual reference prices, attention, price judgment, advertisement position, advertisement relevance

行政院國家科學委員會補助專題研究計畫 ☑成果報告 □期中進度報告

情境參考價格對消費者注意力與價格判斷之影響

The impacts of contextual reference prices on consumers' attention and price judgments

計畫類別：☑個別型計畫　□整合型計畫
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情境參考價格對消費者注意力與價格判斷之影響

摘要

在本研究中，我們檢視了情境參考價及其相關性對消費者價格判斷的影響。在實驗進行時，30 位大學生受測者的眼動歷程被記錄下來。情境參考價被分配在網頁的不同位置中。結果顯示，參與者使用相關的情境參考價來估算目標品牌的價格。從眼動資料得知，比起無關的廣告參考價，相關的廣告參考價得到較多的注意力資源。進一步的分析顯示，參與者能有效率地調整他們的搜尋策略，以便能更快地找到決策相關資訊，特別是當相關的廣告被配置在較不利的廣告位置時。

關鍵字

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The impacts of contextual reference prices on consumers' attention and price judgments

ABSTRACT

In this paper, we report the results of a study that examines the influence of contextual reference prices (CRPs) and their relevance on consumers' price judgments. Ten undergraduate students participated in this study, and their eye movements were recorded during the experimental session. The CRPs were arranged at different positions within a Web page. The results showed that participants used relevant CRPs to estimate the prices of target brands. This was evident by the allocation of higher attentional resources to relevant versus irrelevant advertised prices, regardless of their positions within a Web page. Further analyses indicated that participants adjusted their search strategy toward relevant advertisements efficiently, especially when relevant advertisements were placed at less favorable positions.

KEYWORDS

contextual reference prices, attention, price judgment, advertisement position, advertisement relevance

1. INTRODUCTION

Prior research on comparative price advertising (Biswas et al. 1993; Compeau and Grewal 1998; Krishna et al. 2002) concludes that retailers, by providing advertised reference prices (ARPs) in their advertisements, can raise consumers' internal reference prices (IRPs) and improve consumers' perceptions of the offered prices. The use of ARPs and even exaggerated ARPs is effective in influencing consumer behavior in offline shopping (Biswas 1992) as well as in online shopping (Lii and Lee 2005). The advantage of providing a reference price in an advertisement is that not only does it increase consumers' price evaluation but it also deters consumers from conducting additional searches for lower prices (Wolk and Spann 2008).

Because consumers are likely to use multiple sources of price information in their purchase decisions (Mayhew and Winer 1992), the effectiveness of APRs depends on additional price cues being available to consumers. Accessible price cues may come from internal or external sources. For instance, an IRP based on prices that consumers have seen in the past or consider fair is likely to play an important role (Chandrashekaran and Grewal 2006). However, consumers may feel uncertain about their IRPs or may not have IRPs at all (Dickson and Sawyer 1990). Research shows that buyers' ability to recall prices is generally poor and recalling prices requires cognitive efforts (Urbany and Dickson 1991). As a result, consumers may lack an internal benchmark for their price determination process (Chernev 2003).

External contextual price cues, in addition to internal reference prices, influence the process of price formation. Prior studies have proposed that reference prices are likely to get updated when consumers face new price information (Lii and Lee 2005; Klein and Yadav 1989). Following the concept of previous work, contextual price cues include information such as the prices of competitive products presented in the decision-making environment (Rajendran and Tellis 1994). Because of the salience and convenience, prices for similar alternatives at the point of purchase may alter consumers' subjective price perceptions (Klein and Yadav 1989).

A review of the literature shows a considerable amount of research examining the effect of ARPs on consumers' price perceptions in both online and offline shopping environments (Chandrashekaran and Grewal 2006; Jensen et al. 2003; Wolk and Spann 2008). Yet, little research has investigated how consumers respond to contextual reference prices (CRPs), especially in online shopping contexts (Wolk and Spann 2008). For managers, it is thus of great importance to understand the process of how contextual price information shapes online shoppers' price judgments. Specifically, in the current study we investigated the effects of advertisement relevance and position in a Web page on attention allocation and subsequent price judgments. The knowledge of this process may enable managers to design an interface so as to increase their profits if they can manipulate the reference price information available to online shoppers.

2. LITERATURE REVIEW AND HYPOTHESES FORMULATION

2.1 Attention on contextual reference prices and price judgments

How do consumers evaluate prices for products that interest them? IRPs, if they exist, are used by consumers as information in the judgment process (Epley and Gilovich 2001). In comparison, under ambiguous situations, consumers are prone to use externally available information to adjust their own estimates (Rajendran and Tellis 1994). Thus, CRPs exert stronger effects on price judgments if consumers are less certain about their IRPs.

One interesting question concerns whether any reference value that appears in a context or in a Web page influences consumers' price estimates of target products. Wilson et al. (1993) and Brewer and Chapman (2002) indicated that judgments are influenced by a certain value (i.e., an anchoring effect) if people pay sufficient attention to this value, even if they are not explicitly asked to compare this value with the target value. Wu et al. (2008) found that while shopping online participants' price estimates were anchored by repeatedly high or low values embedded in the Web page of the product description. The magnitude of assimilation towards a reference price depends on how elaborately consumers engage in a process of selectively activating CRP-consistent information about the target brand (Chapman and Johnson 1999). The more consumers elaborate on a CRP, the stronger the resulting assimilation effect should be because they have a biased set of information in active memory (Mussweiler and Strack 1999, 2000). Since assimilation occurs spontaneously during information encoding (Meylers-Levy and Tybout 1997), we expect that attention resources devoted to the contextual price information would predict the extent to which price judgments are affected.

Hypothesis 1: The attention allocated to the CRP is highly correlated with the extent to which price judgments are assimilated towards the CRP.

2.2 Relevance of advertisements and attention allocation

A majority of advertisements do not receive any active processing (Webb and Ray 1979), due in part to advertising clutter and consumer involvement in other tasks that occupy attention and limit processing (MacInnis and Jaworski 1989). The motivation to process the advertisement information is important for advertising effectiveness (Wang 2006). Grounded in the theory of information relevancy (Baker and Lutz 2000), the contextual relevance between an advertisement and its surroundings can initiate consumers' motivation to process an advertisement (Shamdasani et al. 2001).

Advertising contextual relevance speaks to consumers' interests (Ephron 2005). While consumers are involved in reading the content related to the product, an advertisement may trigger consumer attention and activate processing of the advertisement due to contextual relevance. Harvey (2006) showed that a contextually relevant editorial environment can increase attention to advertisements and advertising awareness. Baker and Lutz (2000) proposed a relevance-accessibility model and found that a message is most likely to influence consumers' decision when it is both relevant and accessible. Thus, an advertisement that is contextually relevant with its surroundings increases the amount of involvement with the message. Subsequently, the higher message involvement increases the amount of attention to the advertisement and the intensity of cognitive processing of the advertisement (Celsi and Olson 1988; Wang 2006).

In the present study, the task is to estimate a target brand's price based on the product description while no posted price of the target brand is included in the Web page. To achieve the final price judgments, participants could integrate several price cues (e.g., IRPs, the prices of similar products, etc.). Therefore, prices for the advertised products that appear in the same Web page provide contextual reference prices. As mentioned earlier, an advertisement that is contextually relevant elicits heightened attention and cognitive elaboration. Hence, we expect that the advertised products that are relevant to the target brand to have a higher processing times compared to those advertisements that are irrelevant.

Hypothesis 2：The processing time is greater for relevant compared to irrelevant advertisements.

2.3 Position of advertisements and attention allocation

Consumers are exposed to advertisements in the context of Web pages rather as stand-alone advertisements. Therefore, the position of advertisements on the page may influence the advertising effectiveness. It has been proposed that advertisements placed on the upper half of the page are likely to receive more fixations and higher percentages of being seen than advertisements placed on the lower half of the page (Barrett 1997; Wilson et al. 1993; Garcia et al. 2000). Advertisements present on the top of a Web page have better recall (Razzouk and Seitz 2003) and higher click-through rate (Doyle et al. 1997) compared to when they are placed on the bottom. Lim & Wogalter (2000) found participants better recognized the content of advertisements positioned on the top left and bottom right corners than the top right and bottom left corners. However, Calisir and Karaali (2008) did not find any recognition difference between top left and top right advertisements on a Web page. The inconsistent findings in prior research may result from the layout and the type of websites. In this study, a shopping scenario is created and advertised products are consistently displayed on the right side of the Web page. In doing so, we may investigate whether attention allocation differs between top right and bottom right advertisements. Due to its favorable position, an advertisement placed on the top right might receive more attention than an advertisement placed on the bottom right.

Hypothesis 3: The positions of advertisements influence attention allocation. We expect greater attention allocation on the top right advertisement than on the bottom right advertisement.

2.4 Interaction between advertisement relevance and position on attention allocation

Few studies have directly examined the separate and interactive effects of position and relevance of advertised contextual reference prices on attention allocation and subsequent price judgments. Calisir & Karaali (2008) found that the recognition performance is strongly affected by advertisement content but not by advertisement position. They suspect that in their goal-oriented search paradigm participants performed better in recognizing advertisements combining service information with a company's URL address than recognizing advertisements with only a company's URL address or only a company's name. When an advertisement is relevant to participants' current goals or media context, it is more engaging and should receive more attention. As a result, we expect while advertisement position influences attention allocation, this relationship is moderated by advertisement relevance.

Hypothesis 4: Advertisement relevance moderates the effects of advertisement position on attention allocation.

3. METHODOLOGY

3.1 Participants

Thirty undergraduate students (15 male and 15 female) from Sun Yat-sen University, Taiwan voluntarily participated in this study. All participants had previous experience with the internet, normal vision or corrected-to-normal vision, and no color-blindness. They were paid $100 NTD for compensation.

3.2 Experimental design and design of the experimental Web pages

One pervasive interface design of shopping websites is to combine several advertised products with a target brand on the same Web page. The target brand may share the same category as the advertised products; thus, shoppers can evaluate the relative advantages of the target brand. Alternatively, the advertised products may encompass different categories, providing various choices for shoppers. In this study, the experimental Web page was a combination of both types of product categories.

As shown in Figure 1, each experimental Web page was comprised of one target brand, presented on the left side of the Web page, and four advertised products, presented on the right side of the Web page. The target brand consisted of a brand name, a brand illustration, and a product description. Each advertised product contained a product name, an illustration, and a product sale price. One advertised product was of the same category as the target brand; thus, it was contextually relevant. Other advertised products were chosen from three different categories; thus, they were contextually irrelevant. Several online shopping websites were used to extract the information (name, illustration, description, and sale price) of the target brands and the advertised products. Eight different target brands (health capsule, watch, tent, bicycle, coffee maker, bag, refrigerator, and GPS system) were used to create the eight experimental trials.

The experiment was designed with the contextually relevant advertisement position as a within-subject factor. Two different layouts of advertisement position were considered: Contextually relevant advertisements were located an equal number of trials on the “Top right” and “Bottom right” position of a Web page.

Figure 1. An example of the experimental Web page. Here, the contextual relevant advertisement is located on the “Top right” of the Web page.

3.3 Apparatuses and experimental procedure

The eye tracker employed in this research was an SR Research Ltd. EyeLink II system. Stimulus displays were presented on a 17-in. Viewsonic monitor. The participants’ monitor was set to a resolution of 1024 x 768 and a refresh rate of 75 Hz. The participants were seated 60 cm from the display.

Participants were shown one Web page at a time. The task was to estimate the target brand’s price based on the information shown on the Web page. Participants were allowed free viewing (thus, the task was self-paced). Once the participants reached their price judgments, they pressed “Enter” to continue. This was followed by a second Web page where participants entered by keyboard their price judgment for the target brand. Each participant completed two practice trials followed by 8 experimental trials. Each participant was debriefed after completion of the experiment.

3.4 Attention measures

Fixation number and viewing time are common indices for attentional resource allocation. Specifically, an increase in the number of fixations in a particular area suggests an increase in its importance to the viewer (Poole et al. 2004), and an increase in viewing time suggests deeper processing (Garcia et al. 2000; Johnson and Tversky 1983) and higher engagement of attention (Kruger et al. 2004). Due to individual differences and variations across different products, our study relied on the ratio of viewing times and the ratio of fixation numbers in each trial as attention indicators.

4. RESULTS

4.1 Attention on contextual reference prices and price judgments

To compare price estimates across different products, we transformed each price estimate into a z-score. The resulting score thus reflects deviations from the relevant CRP in units of the pertinent standard deviation.

Two separate regression analyses were used to test for attention on relevant CRPs and assimilating effects of price estimates. The z-transformed price estimates were regressed against the ratio of total viewing times (β = -0.216), F = 11.655, p < 0.01, and the ratio of fixation numbers (β = -0.205), F = 10.482, p < 0.01. The results revealed that the greater the ratio of viewing times and the ratio of fixation numbers, the smaller the deviation between the price estimate and relevant CRP. Thus, Hypothesis 1 is supported. The findings suggest that attention can bias the price estimates toward to relevant contextual price cues.

4.2 Relevance of advertisements and attention allocation

To assess whether advertisement relevance influences attention allocation, two independent ANOVA tests with advertisement relevance as the independent variable and each of the two attention indicators (i.e., the ratio of viewing times and the ratio of fixation numbers) as the dependent variable were conducted. As illustrated in Table 1, the analysis revealed significant main effects of advertisement relevance on the ratio of viewing times (F = 153.087, p < 0.001) and the ratio of fixation numbers (F = 143.939, p < 0.001). The results support Hypothesis 2, indicating greater attention was directed to contextual relevant advertisements.

Table 1. Advertisement relevance on attention allocation.

	Relevant Ad	Irrelevant Ad	F	p-value
% of viewing times	11.79 (7.66)	6.52 (4.90)	153.087	0.000**
% of fixation numbers	10.70 (6.84)	6.13 (4.37)	143.939	0.000**

** p < 0.001; () standard deviation

4.3 Position of advertisements and attention allocation

To investigate whether attention allocation differs between top right and bottom right advertisements, two independent ANOVA tests with advertisement position as the independent variable and each of the two attention indicators as the dependent variable were conducted. As illustrated in Table 2, the analysis revealed significant main effects of advertisement position on the ratio of viewing times (F = 4.167, p < 0.05) and the ratio of fixation numbers (F = 4.272, p < 0.05). The results support Hypothesis 3, indicating greater attention was directed to top right versus bottom right position.

Table 2. Advertisement position on attention allocation.

	Top right Ad	Bottom right Ad	F	p-value
% of viewing times	9.55 (6.97)	8.24 (7.13)	4.167	0.042
% of fixation numbers	8.70 (6.32)	7.53 (6.15)	4.272	0.039

** p < 0.001; () standard deviation

4.4 Interaction between advertisement relevance and position on attention allocation

As shown in Table 3, a 2 (relevance) x 2 (position) ANOVA revealed a significant interaction between advertisement relevance and position on the ratio of viewing times (F = 96.750, p < 0.001) and the ratio of fixation numbers (F = 98.980, p < 0.001), in support of Hypothesis 4. The top right advertisement had a higher ratio of viewing times (t =

8.941, $p < 0.001$) and a higher ratio of fixation numbers (t =8.779, $p < 0.001$) when the top right advertisement was contextually relevant. In contrast, the bottom right advertisement had a higher ratio of viewing times (t = 5.151, $p < 0.01$) and a higher ratio of fixation numbers (t = 5.347, $p < 0.01$) when the bottom right advertisement was contextually relevant. The interactive effects are depicted in Figure 2(a) and 2(b). The significant moderating effect of advertisement relevance with the absence of an effect of advertisement position on attention allocation indicates that attention resources were driven primarily by contextual relevance in this study.

Table 3. Interaction between advertisement relevance and position on attention.

	Relevant Ad	Ad position		F	p-value
		Top right	Bottom right		
% of viewing times	Top right	12.34 (7.37)	5.24 (4.61)	96.750	0.000**
	Bottom right	6.77 (5.25)	11.24 (7.92)		
% of fixations	Top right	11.22 (6.87)	4.88 (3.93)	98.980	0.000**
	Bottom right	6.18 (4.51)	10.17 (6.81)		

** p < 0.001; () standard deviation

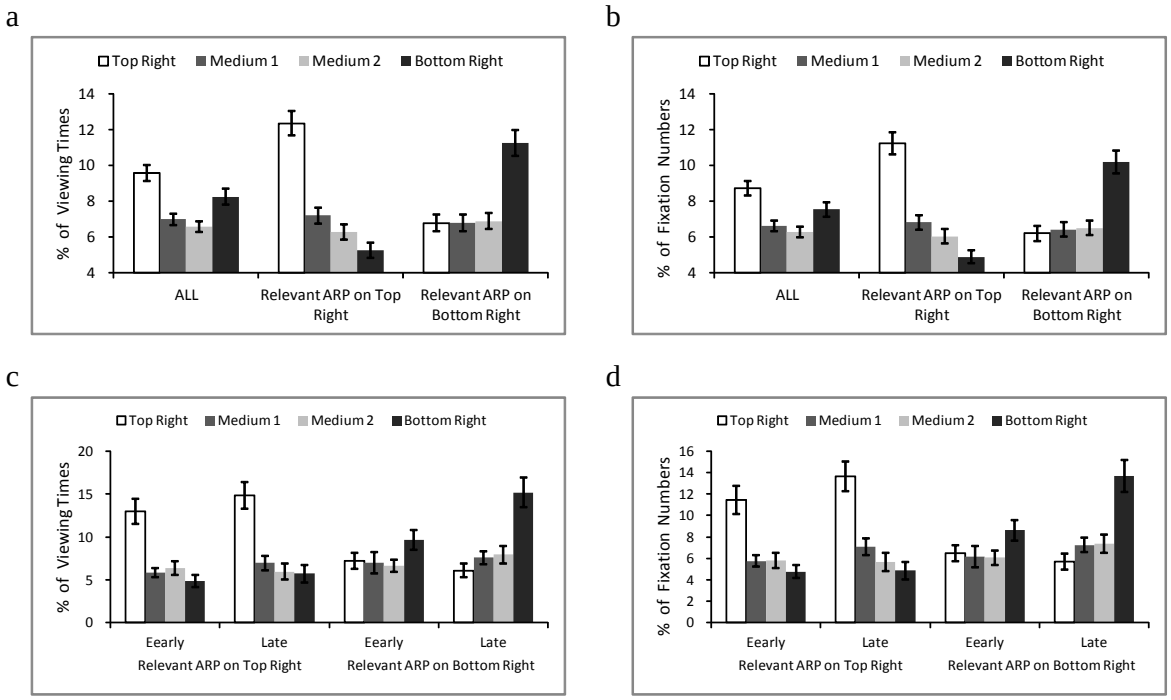

Figure 2. Attention on advertisements by relevance and position conditions. Panel a) Ratio of total viewing times for over all, relevant CRP on Top right and on Bottom right conditions. Panel b) Ratio of fixation numbers for over all, relevant CRP on Top right and on Bottom right conditions. Panel c) Ratio of total viewing times for Early and Late experimental stages. Panel d) Ratio of fixation numbers for Early and Late experimental stages (see text for details).

4.5 Adaptation of information processing strategy

To explore how users' experiences affect their information processing strategy, the experimental session was divided into "early" and "late" stages. We analyzed participants' attention pattern in a 2 (relevance) x 2 (stage) x 2 (position) ANOVA analysis. The results are summarized in Table 4. As illustrated in Figure 2(c) and 2(d), when the top right advertisement was relevant, the pattern of viewing times and fixation numbers was qualitatively similar across the early and late stages. A 2 x 2 ANOVA revealed no significant interaction between stage and position (both Fs < 1). In marked contrast, when the bottom right advertisement was relevant, the pattern of viewing times and fixation numbers differed qualitatively across the early and late stages. This pattern produced a significant stage and position interaction (for ratio of viewing times, F = 7.429, p = 0.007, and for ratio of fixation numbers, F = 8.136, p = 0.005). The results indicate that participants adapted their information processing strategy efficiently.

Table 4. Adaptation of information processing strategy.

	Relevant Ad	Stage	Ad position		F	p-value
			Top right	Bottom right		
% of viewing times	Top right	Early	12.99 (8.01)	4.88 (3.75)	0.171	0.680
		Late	14.85 (8.38)	5.73 (5.69)		

	Bottom right	Early	7.24 (5.13)	9.67 (6.46)	7.429	0.007*
		Late	6.10 (4.48)	15.16 (9.46)		
% of fixations	Top right	Early	11.46 (7.23)	4.76 (3.29)	0.933	0.336
		Late	13.67 (7.68)	4.86 (4.38)		
	Bottom right	Early	6.46 (3.99)	8.63 (5.27)	8.136	0.005*
		Late	5.70 (4.10)	13.69 (8.03)		

** $p < 0.001$; () standard deviation

5. DISCUSSION

The formation of consumers' reference price is important to business practitioners and researchers. Creating congruence between Web content and advertisements has been proposed to raise the effectiveness of Web advertisements (Wang 2006). In this study, the effect of contextual reference prices on price judgments in an online shopping scenario was examined. The study contributes to advertising research by investigating advertisement relevance and advertisement position on attention, which in turn influences consumers' price judgments.

First, the findings suggest that sufficient attention to contextual prices can influence price estimates. For a target brand, participants in our study had to recall the reference price from memory (Epley and Gilovich 2005) or infer it from contextual price cues (Mussweiler and Strack 2000). The process of internal and external information seeking leads to assimilation effect, and the assimilating magnitude correlates with elaborating efforts. In this study, the assimilation effect is derived by analyzing participants' browsing behaviors. Consistent with our inference and prior study (Wu et al. 2008), this study reveals that the intensity of visual consideration is highly correlated with the assimilating process of reference price formation.

Second, the findings suggest that visual attention was directed to contextually relevant advertised prices. Consistent with the relevance-accessibility model (Baker and Lutz 2000), a message is most likely to influence consumers' decision when it is both relevant and accessible. Thus, managers can use contextually relevant advertisements to have consumers compare their brands to these advertised products. Through this comparative process managers can generate better product evaluation and a higher premium (Rajendran and Tellis 1994). The strategic implication lies in the manipulation of CRPs available to online shoppers so as to make the target brand more appealing.

Third, our results showed that participants adapted their information processing strategy depending on Web page layout and content. Initially, an advertisement placed on the top right received more attention due to its favorable position. This advantage disappeared with more experience and the task-relevant information became the main driver of attention. Overall, attention was driven primarily by context as well as task relevance in this online shopping environment.

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附件二

國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

☑ 達成目標

☐ 未達成目標（請說明，以 100 字為限）

☐ 實驗失敗

☐ 因故實驗中斷

☐ 其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文：☐已發表 ☐未發表之文稿 ☑撰寫中 ☐無

專利：☐已獲得 ☐申請中 ☑無

技轉：☐已技轉 ☐洽談中 ☑無

其他：已發表於國際學術研討會

(Conference) Mei-Chun Wu, and Feng-Yang Kuo (2010), "The impacts of contextual reference prices on consumers' attention and price judgments", IADIS International Conference e-Commerce 2010, Freiburg, Germany. (EI-Compendex)

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）（以 500 字為限）

在資訊過多、注意力有限的線上消費情境中，如何提高網路廣告溝通的有效性，以增進零售業者的獲利及提高消費者對產品的價格評價，是一重要的實務課題。購物網站經常於同一網頁中提供許多相關產品的橫幅廣告，雖然相關的訊息可以增加消費閱讀廣告的動機，但這麼做卻會引起注意力資源競爭、造成消費者對廣告訊息及訴求產生混淆。

本研究的結果發現，提供少量的相關訊息可有效集中消費者的注意力，進而影響消費者的產品價格估計，因此，在實務應用上應將消費者處理訊息的資源及能力納入考量，期真正達到網路零售業的獲利。此外，本研究的眼動歷程分析也發現，消費者的資訊處理策略受網頁的版面設計及任務相關訊息的直接影響，因此若要有效吸引消費者的注意力，則必須變動版面設計，未來的研究可嘗試探討網頁版面變動對資訊注意力分布與廣告訊息溝通效果，及是否對網站態度造成影響。

附件四

國科會補助專題研究計畫項下出席國際學術會議心得報告

日期：100年8月9日

計畫編號	NSC 99-2410-H-343-015		
計畫名稱	情境參考價格對消費者注意力與價格判斷之影響		
出國人員 姓名	吳梅君	服務機構 及職稱	南華大學資訊管理學系 助理教授
會議時間	100年7月24日 至 100年7月26日	會議地點	Roma, Italy
會議名稱	(中文)國際資訊社會發展協會-介面與人機互動2011 (英文)IADIS IHCI 2011		
發表論文 題目	(中文)決策歷程成本對連續價值判斷的影響 (英文) Process-induced decision costs on sequential value judgments		

一、參加會議經過

本屆 IADIS Multi Conference on Computer Science and Information Systems (MCCIS)乃是由15個不同研究主軸所構成的國際研討會。會議地點為義大利羅馬，會議時間為7月24日至7月26日。本次報告題目為" Process-induced decision costs on sequential value judgments"，除參與報告的session外，也參加不同主題的session，包含Usability、以及Methodological Implications of Emotional User Studies。

二、與會心得

1. 由於與會者來自不同領域，本次的口頭報告採用幾個報告技巧，以便增加聽眾的參與度，例如，(1)簡潔扼要的投影片，以提綱契領的方式讓台下的聽眾不因閱讀大量文字而無法專注於報告者的演說內容；(2)在重要且複雜的實驗研究方法部分，採用圖形來呈現，讓聽眾一目瞭然；(3)內容深度適中，只提及核心的研究概念、研究發現，省去旁枝末節避免聽眾無法理解。本次的報告因此得到許多聽眾的提問，在應答部分也能分別給予適切的回應，並得到聽眾的讚賞，令個人感到很榮幸。此外，在聆聽及回應聽眾提問時，向提問者的位子靠近不但能有助於了解提問，更能令提問者感受到你對他的尊重。誠然，事前充份的準備、演練很重要，臨場反應更需要穩住，很感謝這次報告的 session chair－Katherine Blashki，她給予我信心、支持及幫忙，讓我能在國際學術場合中，有超乎個人預期的表現。
2. 此外，Keynote Presentation "Interactive Numbers – A Grand Challenge" 提出有關人機互動的重大議題：資訊系統的設計以為使用者會正確地照系統預設的使用方式操作，忽略人在實際情境中會出現的情況（不看說明書、壓力、不專注、重覆輸入）。在醫療領域，如此的系統設計已證實會危及病人的生命安全，在金融運算領域會造成錯誤的預算估計。Andreas Holzinger 以有趣恢諧的方式帶出互動情境中不可預期的錯誤，實際操作你我日常生活中常用的計算機，呈現出人機互動系統設計待解決的議題，透過這場精彩的演說，讓我了解到還有更多值得關注的研究議

題，特別是今日互動介面已在你我生活中扮演不可或缺的角色。

三、考察參觀活動(無是項活動者略)

無是項活動，省略

四、建議

IADIS Multi Conference on Computer Science and Information Systems 目前邁入第 5 年(自 2007 年開始)，由於包含主題相當廣泛，同時進行多個主題，並可讓與會者自由參加任何一場研討會，因此，對我們來說是一個不錯的觀摩。唯可惜的是，目前未能在研討會開始前於網站上提供論文摘要，讓與會者能在出席研討會前先行研究要聽取的報告場次。

五、攜回資料名稱及內容

1. (CD) Conference Proceedings of IADIS Multi Conference on Computer Science and Information Systems 2011, Rome Italy, 20-26 July
2. (Poster) IADIS MCCSIS 2012 call for paper (Lisbon Portugal, 17-23 July, 2012)

國科會補助專題研究計畫項下赴國外(或大陸地區)出差或研習心得報告

日期： 100年 8月 9日

計畫編號	NSC 99－2410－H－343－015		
計畫名稱	情境參考價格對消費者注意力與價格判斷之影響		
出國人員 姓名	吳梅君	服務機構 及職稱	南華大學資訊管理學系 助理教授
出國時間	100 年 7 月 24 日 至 100 年 7 月 26 日	出國地點	Rome, Italy

一、國外(大陸)研究過程

本屆 IADIS Multi Conference on Computer Science and Information Systems (MCCIS)乃是由 15 個不同研究主軸所構成的國際研討會。會議地點為義大利羅馬，會議時間為 7 月 24 日至 7 月 26 日。本次報告題目為" Process-induced decision costs on sequential value judgments"，除參與報告的 session 外，也參加不同主題的 session，包含 Usability、以及 Methodological Implications of Emotional User Studies。

二、研究成果、與會心得

1. 由於與會者來自不同領域，本次的口頭報告採用幾個報告技巧，以便增加聽眾的參與度，例如，(1)簡潔扼要的投影片，以提綱契領的方式讓台下的聽眾不因閱讀大量文字而無法專注於報告者的演說內容；(2)在重要且複雜的實驗研究方法部分，採用圖形來呈現，讓聽眾一目瞭然；(3)內容深度適中，只提及核心的研究概念、研究發現，省去旁枝末節避免聽眾無法理解。本次的報告因此得到許多聽眾的提問，在應答部分也能分別給予適切的回應，並得到聽眾的讚賞，令個人感到很榮幸。此外，在聆聽及回應聽眾提問時，向提問者的位子靠近不但能有助於了解提問，更能令提問者感受到你對他的尊重。誠然，事前充份的準備、演練很重要，臨場反應更需要穩住，很感謝這次報告的 session chair－Katherine Blashki，她給予我信心、支持及幫忙，讓我能在國際學術場合中，有超乎個人預期的表現。
2. 此外，Keynote Presentation "Interactive Numbers – A Grand Challenge" 提出有關人機互動的重大議題：資訊系統的設計以為使用者會正確地照系統預設的使用方式操作，忽略人在實際情境中會出現的情況（不看說明書、壓力、不專注、重覆輸入)。在醫療領域，如此的系統設計已證實會危及病人的生命安全，在金融運算領域會造成錯誤的預算估計。Andreas Holzinger 以有趣恢諧的方式帶出互動情境中不可預期的錯誤，實際操作你我日常生活中常用的計算機，呈現出人機互動系統設計待解決的議題，透過這場精彩的演說，令我了解到還有更多值得關注的研究議題，特別是今日互動介面已在你我生活中扮演不可或缺的角色。

三、建議

IADIS Multi Conference on Computer Science and Information Systems 目前邁入第 5 年(自 2007 年開始)，由於包含主題相當廣泛，同時進行多個主題，並可讓與會者自由參加任何一場研討會，因此，對我們來說是一個不錯的觀摩。唯可惜的是，目前未能在研討會開始前於網站上提供論文摘要，讓與會者能在出席研討會前先行研究要聽取的報告場次。

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2. (Poster) IADIS MCCSIS 2012 call for paper (Lisbon Portugal, 17-23 July, 2012)

4/30/2011
Mei-chun Wu
Nanhua University, Taiwan
No. 55, Sec. 1, Nanhua Rd., Chiayi County, Taiwan

Dear Mei-chun Wu,

It is a great pleasure to inform you that the Scientific Committee of IADIS Interfaces and Human Computer Interaction 2011 organized by the International Association for Development of the Information Society (IADIS) after *refereed review* by international experts in the area has decided to **ACCEPT** your paper entitled "PROCESS-INDUCED DECISION COSTS ON SEQUENTIAL VALUE JUDGMENTS" for presentation.

We hope that you would be able to attend *IADIS International Conference IADIS Interfaces and Human Computer Interaction 2011* during 24 - 26 July 2011 in Rome, Italy and your presence should be of great benefit for the success of this conference.

We hope you will actively participate at all other conference activities in addition to your *presentation.* Please visit our website at http://www.ihci-conf.org/ for registration rates, logistics, hotel, travel and other conference information.

We sincerely look forward to welcoming you to IADIS Interfaces and Human Computer Interaction 2011 in Rome, Italy, in 24 - 26 July 2011 .

Sincerely yours,

Ana Rodrigues
Responsible for the Conference Organisation
IADIS International Conference IADIS Interfaces and Human Computer Interaction 2011
E-mail: secretariat@iadis.org

PROCESS-INDUCED DECISION COSTS ON SEQUENTIAL VALUE JUDGMENTS

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ABSTRACT

In repeated-choice situations, people tend to stick to the previously chosen alternative in their subsequent decision. While "effort-as-information" and "resource availability" produce similar results, the manner of resource expenditure involves different coping strategies in subsequent decisions. We investigated the impact of process-induced decision costs of previous decision on subsequent decision. Lower consistency rate occurred when additional resources caused by layout change were required. The decreased consistency rate implies that resource availability play a significant role in sequential decision-making situations. Further, making a difficult preliminary decision (as reflected by longer response times) can deplete self-regulation resources, producing a higher likelihood of a decision inconsistency when fluent processing was impeded by layout change. The research findings suggest that the popular use of dynamic web pages in online shopping situations is likely to increase processing costs by changing product locations which may potentially influence consumer judgments. Both consumers and managers should be aware of such underestimated effects.

KEYWORDS

decision costs, value judgment, effort-as-information, resource availability

1. INTRODUCTION

The choices are often made repeatedly, rather than made isolated from previous choices. In repeated-choice situations, consumers' prior choices have been shown to impact their current choice processes and outcomes (Chen and Rao 2002; Monga and Rao 2006; Thaler and Johnson 1990). According to the explanations of "effort-as-information" (Arkes and Blumer 1985; Kruger et al 2004; Loewenstein and Issacharoff 1994) and "resource availability" (Bettman et al 1998; Meyers-Levy and Tybout 1997), people will tend to stick to the previously chosen alternative in their subsequent decision. The concept of "effort-as-information" suggests that effort spending on initial decisions is deemed as a source of information for subsequent decisions. The other notion concerns "resource availability". After depleting resources in initial decisions, people will use simple decision heuristics in making subsequent decisions. Although these two explanations produce similar results, the manner of resource expenditure involves different coping strategies in subsequent decisions.

Expending resources on a previous task has the potential to interfere with cognitive activities which could result in biased judgments (Vohs and Schmeichel 2003). However, existing research on consumer behavior usually attempts to find significant independent or moderating variables toward that choice. How the prior decision processes or outcomes influence subsequent decision-making has yet to produce a great deal of empirical research (Kim 2008). To gain further understanding of consumer decision-making, in this study we investigate the impact of process-induced decision costs of previous decision on subsequent decision.

According to literature review relating to repeated-choice, two weaknesses exist in the current research status. First, current research does not focus on the specific impact of the previous choice on subsequent ones. This research stream has failed to scrutinize the underlying mechanism of the impact of previous choice.

Second, the existing research has failed to break down previous choice into a subordinate concept (e.g., process and outcomes). Existing studies have focused mainly on the choice outcomes themselves. These studies ignore that the process (e.g., the amount of effort) of previous choices can also affect subsequent choices.

The objective of the present study was to investigate the accountability (i.e., "effort-as-information" or "resource availability") of the impact of previous decision. We examined under what kind of situations and to what extent increasing processing costs (i.e., require more resources) alters the tendency of the subsequent decision to go with the previous decision. To control possible contaminations, the increased decision costs were generated by engaging in the processing activities themselves, rather than the costs associated with the information evaluation.

Specifically, the process-induced decision costs were manipulated by varying the required resources through changing the locations of objects that were seen in the first stage of judgment. As the objects were exchanged across two judgment stages, we expected the resources required to make the overall judgment to increase. Changing object locations increased the magnitude of processing effort that we were able to examine. Furthermore, when more resources were expended on the preceding judgment, changing object locations allowed us to test whether the proposed effects of processing difficulty on the subsequent judgment would be magnified.

Overall, this study investigated the influence of process-induced decision costs on sequential judgments. We expected that layout re-arrangement makes the judgment more demanding by increasing the cognitive workload and will influence the likelihood of the previously chosen alternative being selected. Additionally, we examined the interplay of information re-arrangement and decision costs expended in the preceding judgment in subsequent decision making behavior. Throughout, we attempted to address the accountability ("effort-as-information" or "resource availability") of how the prior decision processes or outcomes influence subsequent decision making.

2. CONCEPTUAL BACKGROUND

2.1 Processing difficulty on decision

Judgments are influence by experiences related to the mental effort (Schwarz and Clore 2006; Von Helversen et al 2008). The notion that the process of processing may generate affect, in addition to affective reactions generated by processing the (conflict) information itself (Luce 1998), has gained an increasing attention in consumer behavior research (Garbarino and Edell 1997; Im et al 2010; Loewenstein 1996). The process-induced affect argues that negative affect can be elicited by a process that requires more deliberate thinking.

Process-induced negative affect by expending more cognitive effort was shown to influence choice of equivalent alternatives. Garbarino and Edell (1997) demonstrated that when people exerted more cognitive effort in processing an alternative, they experienced more negative affect. If the evaluations of the alternatives were equivalent, then the alternative that had less negative affect associated with it was chosen. The effort adversely affected choice of the more difficult to process alternatives, lowering the likelihood of difficult alternative being selected.

Processing difficulty due to visual presentation variables that impede fluent processing can produce deferral choices. In Novemsky et al (2007) study, consumers were presented with descriptions of two cordless phones and asked to choose the one they prefer, allowing them to defer choice if they had no clear preference. They found more than twice as many participants deferred choice when the font was difficult rather than easy to read. Also, Song and Schwarz (2008) demonstrated that the readability of a print font can have a profound impact on consumer judgment and choice. In their study, participants were provided with a description of an exercise routine, printed in an easy or difficult to read font. When the font was easy to read, participants reported higher willingness to make the exercise part of their daily life. In a second study, when the recipe was printed in a difficult to read font, participants inferred that preparing a Japanese lunch roll would require more effort and skill and were less inclined to prepare that dish at home. Throughout, the difficulty of information processing was mistaken as indicative of the difficulty of performing the described

behaviors. These studies shed a light on that minor aspects of the visual display can significantly influence judgment and defer choice.

2.2 Trade-off vs. dominance decision

Making trade-off decisions requires more effort than that of making dominance decisions. That is, a decision-making involving a trade-off relationship requires more decision-related efforts or costs than one involving a dominance relationship. Quick response times point to dominance decisions where at least one of the alternatives is outstanding and slow response times point to trade-off decisions where the alternatives are equally attractive. For example, Klein and Yadav (1989) found that participants spend less time on decision-making when dominated alternatives were included. Luce (1998) found that in a high trade-off difficulty condition, decision-makers may choose to defer decision and avoid trade-off conflicts. Thus, dominance relationships provide decision-makers with an easy way of choosing among alternatives.

As environments require more cognitive effort to process information, decision makers often switch to decision heuristics. However, these heuristics may generate less accurate decisions, biased responses and preference reversals (Johnson et al 1988). Garbarino and Edell (1997) noted that people are willing to let go some benefits to conserve cognitive effort.

2.3 Effort-as-information

The "effort-as-information" perspective suggests that after expending efforts, people attempt to preserve the decision outcome associated with previous effort in their subsequent tasks. Once an investment in money, time or effort has been made, people has greater tendency to continue an endeavor, termed escalation of commitment (Arkes and Blumer 1985). Several explanations for escalation of commitment include the desire not to appear wasteful (Arkes and Blumer 1985), the need to justify one's previous decision (Brockner 1992; Staw 1981), and previous belief structure and involvement in the previous decision (Biyalogorsky et al 2006).

Expending resources in a previous decision promotes higher motivation to maintain resources by sticking with the preceding decision. Furthermore, decision difficulty increases the magnitude of maintaining one's previous decision (Luce 1998; Samuelson and Zeckhauser 1988). Briefly, the previous decision process or commitment can influence the current decision by continuing or repeating the course of action. In a repeated-choice situation, people are more likely to retain their previous decision, due to the fact that a trade-off choice requires more effort than a dominance choice. As noted by Samuelson and Zechkhauser (1988, p. 37), "the larger the past resource investment in a decision, the greater the inclination to continue the commitment in subsequent decisions."

Regarding the consequence of effort involving in the decision process, people have a tendency to use "effort" as a cue for their evaluations or judgments (Godek et al 2001; Kruger et al 2004). In Kruger et al. (2004) study, participants evaluated a poem more favorably when they thought that the poet took more time (i.e., 18 hours) to write the poem than when they thought the poet took less time (i.e., 4 hours). Godek et al (2001) showed that participants were happier with their choices and were willing to pay more for their chosen options when they made a choice with more effort than when they made a choice with less effort.

2.4 Resource availability (The cost of decision-making)

There are three different types of decision-related costs. Cognitive cost has been regarded as a basic cost of decision-making by many researchers (Bettman et al 1990; Shugan 1980). Emotional cost results from facing emotion-laden choices (Luce 1998). Trade-off difficulty can produce negative emotions. High trade-off difficulty (i.e., multiple goals cannot be achieved at the same time) produces highly negative emotions (Luce 1998).

Recently, researchers have proposed that choices are related to expending self-regulation resources. Self-regulation is defined as "the self exerting control to change its own responses in an attempt to pursue goals and standards" (Vohs and Baumeister 2004, p. 2). Self-regulation resources are limited (Baumeister and Heatherton 1996). Hence, performing one act of regulating the self can impair performance on a subsequent, apparently unrelated act of self-control.

Making a choice can deplete self-regulation resources, which then impairs the self's ability to manage cognitive activity (Schmeichel et al 2003). In other words, the process of choosing can expend some resources, thereby leaving the executive functioning less capable of carrying out other activities. In Vohs et al (2008) study, in the self-regulation-resource-depleted condition participants were instructed to make a binary choice between varieties of consumer products, such as magazines, colored pens, and t-shirts; in the self-regulation-resource-no-depleted condition participants were instructed to rate products. After the task, the participants were asked to drink as much of an ill-tasting beverage as they could. The results showed that participants making binary choices between several products drank fewer ounces of the ill-tasting beverage than those who merely rated the products. Vohs et al (2008) indicate that there is a hidden cost to choosing, which is different from merely thinking about options.

Although prior research (Schmeichel et al 2003; Vohs et al 2008) has shown that decision-making requires self-regulation resources, in those studies the subsequent tasks (e.g., drinking an ill-tasting beverage or practicing math problems) were to show the effect of the expenditure of self-regulation resources and not directly related to decision-making. Another important aspect of decision-related costs is that depleted resources cannot be restored immediately. Therefore, to study sequential decision-making situations, this aspect of decision-related costs must be taken into consideration.

3. RESEARCH HYPOTHESES

In this study, an alternative's overall value was a combination of the evaluation of its component objects. Respondents had to evaluate between two alternatives and choose the one with higher value in a two-stage value judgment task. We attempted to investigate, on exposure to two-alternatives-choice task, how consumer value judgments were influenced by process-induced decision costs that were generated in a more controlled manner.

To provide evidence for the explanation of "effort-as-information" versus "resource availability", we directly manipulated additional resource consumption in the middle of the first and second stage of value judgments. Specifically, after the first stage of value judgment, the component objects were rearranged either within the same alternative (within-swap) or between alternatives (between-swap). If effort expenditure or resource availability had a strong influence, it may play a role in consistent choice rates of sequential value judgments. The study focused on the additional efforts in the processing activities themselves, rather than the efforts associated with evaluating information, and the effect of this process-induced effort expenditure on value judgments.

This research attempted to investigate whether value judgments were altered by incremental processing difficulty. The logic behind this study was that if resource availability was at work, we should find a significant impact of additional resource expenditure manipulation on subsequent decision-making. Specifically, in the within-swap condition (i.e., component objects were rearranged within the same alternative after the first stage of value judgment), both the resource availability and effort-as-information explanations predict the consistent choice rate to be the same with that of no additional resource expending between the initial judgment and the subsequent one. However, in the between-swap condition (i.e., component objects were rearranged between alternatives after the first stage of value judgment), re-mapping of objects to alternatives generated processing costs. This additional resource expenditure was expected to influence the consistent choice rate. The resource availability explanation predicts the consistent choice rate of between-swap condition should be lower than that of no additional resource expending condition (no-swap). On the contrary, the effort-as-information explanation predicts the consistent choice rate of between-swap condition should be the same with that of no additional resource expending condition. Thus, we propose:

Hypothesis 1: When component objects were rearranged within alternatives, the consistent choice rate will be the same with that of no additional resource expending condition.

Hypothesis 2a: When component objects were rearranged between alternatives, the resource availability explanation predicts the consistent choice rate will be lower than that of no additional resource expending condition.

Hypothesis 2b: When component objects were rearranged between alternatives, the effort-as-information explanation predicts the consistent choice rate will be the same with that of no additional resource expending condition.

In trade-off situations where alternatives are equally comparable based on the evaluation of their component objects, decision-makers may devote more extensive efforts in evaluating objects, resulting in longer response times. According to resource availability, such effort expenses in the initial value judgment may incur resource constraints and impair the self's ability to manage subsequent cognitive activity. Longer response times (i.e., more effortful processing) in the first judgment may interfere with subsequent judgment in the between-swap and within-swap conditions where additional resource expenses were required. Contrarily, based on the effort-as-information explanation there is no such impact of additional resource expenses on subsequent judgment. That is, there should be no difference in response times as a function of swap conditions. We propose:

Hypothesis 3a: The resource availability explanation predicts there is swap condition by consistent value judgment interaction on response time.

Hypothesis 3b: The effort-as-information explanation predicts there is no swap condition by consistent value judgment interaction on response time.

4. METHOD

4.1 Participants

Twenty undergraduate students at the University of Toronto Mississauga participated in the experiment. The participants were paid $10 (Canadian) per hour.

4.2 Materials and design

Stimuli were constructed using an image database containing 192 exemplars from each of 4 everyday object categories (hats, rings, bags and watches) for a total of 768 images. Several online shopping websites were used to extract these images. Each image displayed a product on white background and all images subtended 360 x 360 pixels. For each of the 4 product categories, 96 price-matched object pairs were created. As shown in Fig. 1, four object pairs, one from each category, were then combined to create the display sequence in each of the 96 experimental trials. Specifically, in each display, rows of four cells (each cell subtending 400 x 400 pixels) appeared on the top and the bottom of the screen. In each trial, in the first display (Screen 1), two object pairs were presented (rings & hats, rings & bags, watches & hats, or watches & bags) either on the left or right side of the screen with objects from the same category shown vertically aligned, and participants were asked to choose either the top or the bottom object set as more expensive (Decision 1). After an intervening blank interval, a second display (Screen 2) was presented. In addition to Screen 1 objects, Screen 2 contained two new object pairs from the remaining object categories, and participants chose the four-object set on the top or bottom as more expensive (Decision 2).

To manipulate the additional resource expenditure, in two-thirds of the trials, the objects shown in Screen 1 were spatially rearranged in Screen 2. The 96 experimental trials were divided into 3 groups of 32 trials and assigned to three layout change conditions: no-swap, within-swap and between-swap. As shown in Figure 1, in the no-swap condition, Screen 1 objects were shown in identical spatial locations in Screen 2. In the within-swap condition, Screen 1 objects on the top or bottom of the display maintained their vertical position in Screen 2 but were horizontally swapped across screens. Finally, in the between-swap condition, Screen 1 objects maintained their horizontal position in Screen 2 but were vertically swapped across screens.

For each participant, objects were randomly assigned to layout change conditions. In addition to the 96 experimental trials, four practice trials were created using objects that were not used in the experimental trials.

Figure1. An illustration of the value judgment task and the layout change manipulation (see text for details).

4.3 Procedure

Stimulus displays were presented on a 19-in. Viewsonic monitor. The participants' monitor was set to a resolution of 1600 x 1200 and a refresh rate of 85 Hz. The participants were seated 60 cm from the display. They were instructed to choose the more expensive set of objects in both Screen 1 and 2 in each trial and indicate their choice by pressing the corresponding (top or bottom) button on a button box. A participant initiated the trial sequence in each of the 4 practice trials and the subsequent 96 experimental trials by pressing a button on a button box resulting in the presentation of Screen 1. Following the response by participants, the display was blanked for an interval, and then Screen 2 was shown until the participants indicated their final choice.

4.4 Measures

Choice and response time for each judgment stage were recorded by the computer as dependent measures. Effort expending is frequently measured by examining time spent completing the task (Bettman et al 1990). Additionally, based on participants' choices concerning objects that were presented in both Screen 1 and 2, we distinguished between decisions that were consistent (i.e., the chosen object set in Decision 1 was part of the chosen object set in Decision 2; Decision 1 = Decision 2) and decisions that were inconsistent (i.e., the chosen object set in Decision 1 was not part of the chosen object set in Decision 2; Decision 1 $\neq$ Decision 2).

5. RESULTS

5.1 Choice consistency rates

To explore the findings from the present experiment, we began by analyzing consistency rates. In each trial, regardless of the presence or absence of a layout change, the decision sequence was classified as consistent or inconsistent based on whether or not the chosen object pair from Decision 1 was part of the chosen set in Decision 2. That is a decision sequence was defined as consistent when the chosen objects in Decision 1 were part of the chosen set in Decision 2. In contrast, a decision reversal or inconsistency occurred when the chosen objects in Decision 1 were part of the non-chosen set in Decision 2. The average percentage of consistent trials (consistency rate) was then computed for each layout change condition (no-swap: M = 76.02, SD = 7.6; within-swap: M = 75.71, SD = 10.9; between-swap: M = 62.10, SD = 10.6).

In Hypothesis 1, we expect that the consistency rates will be the same across the no-swap and within-swap conditions. The result supported Hypothesis 1. Consistency rates did not differ across the no-swap and within-swap conditions ($t < 1$) indicating that the within-swap layout change did not impact the extent to which participants' preliminary decision (Decision 1) figured in their final choice (Decision 2). While Hypothesis 2a suggests that the consistency rate will be lower in the between-swap condition than in the no-swap condition, Hypothesis 2b predicts no difference. The result supported Hypothesis 2a. Both the no-swap and within-swap conditions produced somewhat higher consistency rates than the between-swap condition (both $ts > 4.58$, both $ps < 0.001$).

5.2 Response times

Next we analyzed RTs in Decision 1 and Decision 2 across the layout change by consistency conditions (see Figure 2). In Decision 1, while in the no-swap condition there was no difference in response time (RT) as a function of consistency ($t < 1$), in both the within-swap and between-swap conditions RTs were significantly longer in inconsistent than consistent decision sequences (both $ts > 2.12$, both $ps < 0.05$). This resulted in a significant layout change by consistency interaction ($F(2,38) = 4.16$, $p < 0.05$). Consistent with Hypothesis 3a, this effect indicates that some aspect of Decision 1 is predictive of the likelihood of a decision reversal in Decision 2. Specifically, a layout change that followed a difficult preliminary decision (i.e., as reflected by longer RTs likely due to a smaller perceived difference between alternatives) was associated with a higher likelihood of a decision reversal or inconsistency, and this finding held regardless of whether or not this layout change occurred within or between alternatives.

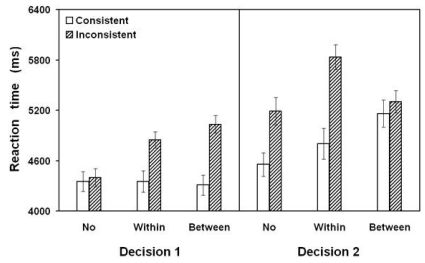

Figure 2. Reaction times for Decision 1 and 2 by consistency and layout change conditions.

In addition, an examination of RTs in Decision 2 revealed that the effects of consistency varied markedly across layout change conditions ($F(2,38) = 6.50$, $p < 0.01$). Specifically, while in the no-swap and within-swap conditions RTs were longer in inconsistent than consistent decisions (both $ts > 2.26$, both $ps < 0.05$), in the between-swap condition there was no difference in RT as a function of consistency ($t < 1$). The absence of a consistency effect on RT in the latter condition does not imply an absence of processing costs associated with a decision reversal. Rather it is due to longer RTs in consistent trials in the between-swap condition as compared to the other conditions (both $ts > 2.80$, both $ps < 0.05$). This slowing of RT in consistent trials in the between-swap condition is likely due to the processing costs involved in re-mapping of objects to decision alternatives (i.e., top or bottom) that is required in this condition.

6. CONCLUSION

In this study, we investigate the impact of process-induced decision costs of previous decision on subsequent decision. The goal of the present study is to examine the accountability (i.e., "effort-as-information" or "resource availability") of the impact of previous decision. In the experiment, after the preliminary judgment, the amount of information was controlled but additional resource expending was imposed. Hence, the effect of layout change, if any, can be attributed to the explanation of resource availability. Lower consistency rate occurred when additional resources were required to re-mapping of objects to decision alternatives. The

decreased consistency rate implies that resource availability play a significant role in sequential decision-making situations.

Further, the amount of effort spending on preceding decisions also influences subsequent decisions. When the first judgment consumed more resources, the performance of subsequent activities was impaired. Meanwhile, the visual display change raises processing difficulty and impedes fluent processing, which may influence consumer judgments. Again, the data supported that the process of making a difficult preliminary decision (as reflected by longer response times) can deplete self-regulation resources, producing a higher likelihood of a decision inconsistency followed by a layout change. In sum, the expenditure of self-regulation resources impacts not only subsequent performance of cognitive activity but also sequential decision-making results.

This study contributes to the consumer behavior research by investigating when and the extent increasing processing costs (i.e., require more resources) alters the tendency of the subsequent decision to go with the previous decision. Most importantly, the management implication of this study indicates the popular use of dynamic web pages in online shopping situations is likely to increase processing costs by changing product locations which may potentially influence consumer judgments. Both consumers and managers should be aware of such underestimated effects.

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國科會補助計畫衍生研發成果推廣資料表

日期:2011/11/22

國科會補助計畫	計畫名稱: 情境參考價格對消費者注意力與價格判斷之影響
	計畫主持人: 吳梅君
	計畫編號: 99-2410-H-343-015- 學門領域: 行銷

無研發成果推廣資料

99 年度專題研究計畫研究成果彙整表

計畫主持人：吳梅君	計畫編號：99-2410-H-343-015-
計畫名稱：情境參考價格對消費者注意力與價格判斷之影響	

成果項目			量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）
			實際已達成數（被接受或已發表）	預期總達成數(含實際已達成數)	本計畫實際貢獻百分比		
國內	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%		
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	1	1	100%	人次	除 1 位研究生外，另有 2 位大學生參與執行本計畫。
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		
國外	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	1	1	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		

其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)	無。

	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與（閱聽）人數	0	

國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

■達成目標

□未達成目標（請說明，以 100 字為限）

□實驗失敗

□因故實驗中斷

□其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文：□已發表 □未發表之文稿 ■撰寫中 □無

專利：□已獲得 □申請中 ■無

技轉：□已技轉 □洽談中 ■無

其他：(以 100 字為限)

已發表於國際學術研討會

Mei-Chun Wu, and Feng-Yang Kuo (2010), ’ The impacts of contextual reference prices on consumers’attention and price judgments’, IADIS International Conference e-Commerce 2010, Freiburg, Germany. (EI-Compendex)

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）(以 500 字為限)

在資訊過多、注意力有限的線上消費情境中，如何提高網路廣告溝通的有效性，以增進零售業者的獲利及提高消費者對產品的價格評價，是一重要的實務課題。購物網站經常於同一網頁中提供許多相關產品的橫幅廣告，雖然相關的訊息可以增加消費閱讀廣告的動機，但這麼做卻會引起注意力資源競爭、造成消費者對廣告訊息及訴求產生混淆。

本研究的結果發現，提供少量的相關訊息可有效集中消費者的注意力，進而影響消費者的產品價格估計，因此，在實務應用上應將消費者處理訊息的資源及能力納入考量，期真正達到網路零售業的獲利。此外，本研究的眼動歷程分析也發現，消費者的資訊處理策略受網頁的版面設計及任務相關訊息的直接影響，因此若要有效吸引消費者的注意力，則必須變動版面設計，未來的研究可嘗試探討網頁版面變動對資訊注意力分布與廣告訊息溝通效果，及是否對網站態度造成影響。