

行政院國家科學委員會專題研究計畫 成果報告

決策歷程成本對連續價值判斷的影響 研究成果報告(精簡版)

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中文摘要：在重覆選擇的情境中，人們的後續選擇傾向忠於先前所做的選擇。雖然‘心力即資訊’及‘可運用資源’兩者的解釋產生相似的結果，但其心力資源支出的方式意味著對後續決策有不同的因應策略。本研究檢視先前的決策歷程所產生的決策成本對後續決策的影響。研究結果發現，當資訊重新排列造成決策所需資源增加，前後決策一致性將下降。決策一致性下降表示可運用資源在連續決策環境中扮演重要的角色。此外，做出困難的決策（較長的反應時間）會減損自我調節的資源，加上資訊重新排列干擾資訊處理流暢度，將造成後續決策不一致性的可能性提高。本研究的管理意涵為，在線上購物情境中大量使用動態網頁，很可能因產品擺放位置改變造成處理成本增加，進而影響消費者決策判斷。消費者及管理者都應意識到這種被低估的影響。

中文關鍵詞：決策成本，價值判斷，心力即資訊，可運用資源

英文摘要：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.

英文關鍵詞：decision costs, value judgment, effort-as-information, resource availability

行政院國家科學委員會補助專題研究計畫

期中進度報告
期末報告

決策歷程成本對連續價值判斷的影響

Process-induced decision costs on sequential value judgments

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中 華 民 國 101 年 9 月 15 日

決策歷程成本對連續價值判斷的影響

摘要

在重覆選擇的情境中，人們的後續選擇傾向忠於先前所做的選擇。雖然“心力即資訊”及“可運用資源”兩者的解釋產生相似的結果，但其心力資源支出的方式意味著對後續決策有不同的因應策略。本研究檢視先前的決策歷程所產生的決策成本對後續決策的影響。研究結果發現，當資訊重新排列造成決策所需資源增加，前後決策一致性將下降。決策一致性下降表示可運用資源在連續決策環境中扮演重要的角色。此外，做出困難的決策（較長的反應時間）會減損自我調節的資源，當資訊重新排列阻礙資訊處理流暢度，將造成後續決策不一致性的可能性提高。本研究的管理意涵為，在線上購物情境中大量使用動態網頁，很可能因改變產品擺放位置造成處理成本增加，進而影響消費者決策判斷。消費者及管理者都應意識到這種被低估的影響。

關鍵字

決策成本，價值判斷，心力即資訊，可運用資源

Process-induced decision costs on sequential value judgments

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 influenced 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

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.

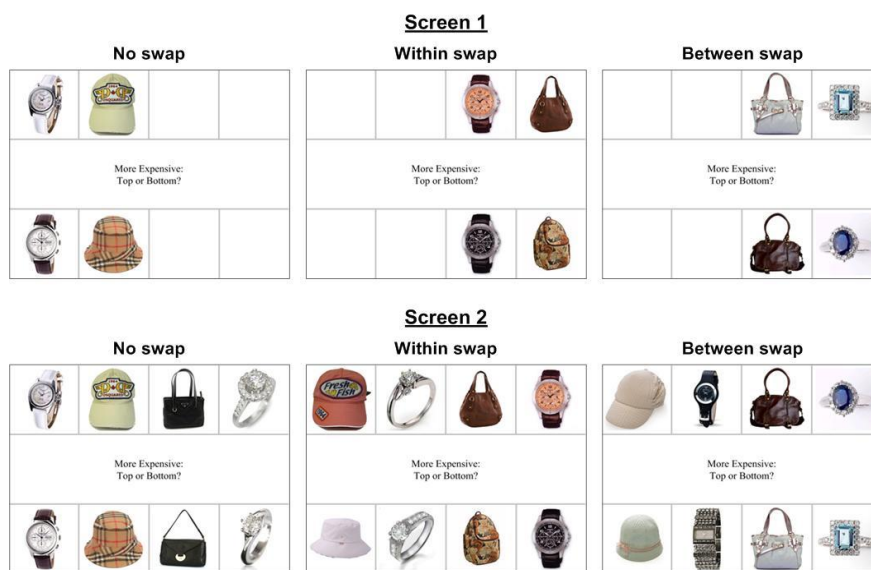


Figure 1. An illustration of the value judgment task and the layout change manipulation (see text for details).

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 $t_s > 4.58$, both $p_s < 0.001$).

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 $t_s > 2.12$, both $p_s < 0.05$). 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.

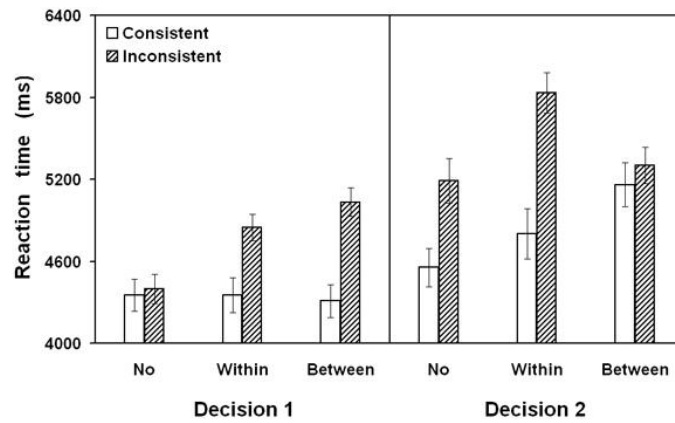


Figure 2. Reaction times for Decision 1 and 2 by consistency and layout change conditions.

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 $t_s > 2.26$, both $p_s < 0.05$), 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 $t_s > 2.80$, both $p_s < 0.05$). 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 (2011). "Process-induced decision costs on sequential value judgments." IADIS International Conference on Interfaces and Human Computer Interaction 2011, Rome, Italy. (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）

網路消費者的資訊收集及購買決策受到電子商務供應商所提供的流程之影響。隨著線上購物消費者的快速成長，購物流程對決策品質的影響是一重要的實務課題。在資訊過多、資源有限的線上消費情境中，許多商務網站採用動態網頁以吸引消費者的注意力，卻忽略了動態畫面將增加資訊處理的複雜度、進而改變消費者的決策。

本研究的結果發現，在進行連續決策時，決策一致性會受到決策難易程度與資訊動態改變的影響，決策一致性的變化表示可運用資源在連續決策環境中扮演重要的角色。儘管動態資訊或可達到吸引消費者注意力的效果，卻可能引發消費者對動態訊息處理的負面情緒反應，影響消費者的決策一致性。因此，在實務上應考慮消費者處理訊息的可用與所需資源，以順暢的流程便利消費者進行資訊收集、比較與決策，以提升決策品質。未來的研究可嘗試探討在連續決策過程中，如何改善資訊流程降低決策難度以幫助消費者進行決策。

國科會補助專題研究計畫出席國際學術會議心得報告

日期：100年8月29日

計畫編號	NSC 100-2410-H-343-003		
計畫名稱	決策歷程成本對連續價值判斷的影響		
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8月21日 至 100年8月25日	會議地點	Marseille, France
會議名稱	(中文) 16屆歐洲眼動會議 (英文) 16th European Conference on Eye Movements 2011		
發表論文題目	(中文)動態畫面中斷決策歷程及改變決策結果 (英文)Dynamic display changes interrupt decision process and alter decision outcome		

一、參加會議經過

European Conference on Eye Movements (ECEM)為跨領域之國際研討會，其研究領域雖不同，皆以追蹤眼動歷程為其研究工具，基於眼動資料發展神經生理學、知覺、認知層次的模式。本屆會議地點為法國馬賽，會議時間為8月21日至8月25日。本次 poster 題目為”Dynamic display changes interrupt decision process and alter decision outcome”，會議期間也積極參加不同主題的 session 及 poster presentation，包含 Memory & Attention、Bottom-up & Top-down processes、Interacting with electronic and mobile media、Faces & Emotions、Eye-Movement Software、Objects & Categories、Perception of dynamic scenes、Web Search & Applied、以及 Communication。

二、與會心得

1. 這是一場研究深度與集中度都相當高的國際研討會，由於全部的研究(不分領域)皆使用眼動歷程資料分析為研究方法，有別於其他的學術會議，在這裡大家有著相同

的語言，討論著視覺化的世界，如何以科學研究建構出視覺訊息的知覺、理解及認知。每日從早到晚會場有上百份 poster 展示著，令人無時不感受到科學研究的深奧，而研究者積極互動交流的態度，不僅深深吸引著我，更激起自己內在的研究熱情。這真的是一場很值得進行眼動研究的學者參與的研討會。

2. 在 poster presentation 中，因能與研究者進行直接面對面的互動，而能深入了解研究的動機及重要性，並從中快速學習不同主題的研究者如何進行數據分析、結果呈現。儘管研究主題不同，一樣可以從其他研究者的方法中學習他人的智慧。
3. 專家與生手的差異(visual pattern 不同、訪談資料反應視覺訊息處理方式的差異)、訊息表現方式對訊息處理速度的影響(positivity bias)、動態場景切換(visual and narrative continuity 對視覺訊息處理的影響)、畫家資訊(知名、病人、無名)影響作品評價及涉入程度、Avatar 對虛擬互動的任務表現及知覺社會臨場感之效果(被注視對任務表現具有反效果)，從靜態到動態、從文字到圖畫，凡此等等都是個人於此研討會上所習得之廣泛性使用眼動儀進行之研究。

三、考察參觀活動(無是項活動者略)

無是項活動，省略

四、建議

在本次的會議上認識了許多來自台灣的研究者(交大、師大、中央、中正等)，多為來自心理系或認知科學的研究者，承如前述，這是一個研究深度相當高的研討會，會場上有許多知名的資深學者，近來台灣有愈來愈多的學者投入眼動的研究，其中不乏行銷或資訊應用相關的研究者，這是相當值得推薦給本地進行眼動研究的國際研討會。

五、攜回資料名稱及內容

1. 16th ECEM Conference Program
2. 16th ECEM Conference Abstracts

Dear Participant,

We hereby confirm receipt of your abstract entitled "Dynamic display changes interrupt decision process and alter decision outcome" that you submitted for a Poster presentation at ECEM 2011 in Marseille. We will notify whether your abstract has been accepted for presentation by the end of May 2011, and at this occasion, we will ask Master and PhD students as well as post-docs presenting a poster, to identify themselves and to let us know whether they want to participate to the poster award contest.

We will do our best to respect your presentation preference, but given the high number of submissions, we may not be able to do so for every participant.

There is no need for you to reply to this email.

We are looking forward to seeing you this summer in Marseille,

Best regards,

Françoise Vitu-Thibault (on behalf of the ECEM 2011 Organizing Committee)

The ECEM 2011 Scientific Organizing Committee:

Françoise Vitu-Thibault (Chair)

Eric Castet & Laurent Goffart (Scientific co-organizers)

Stéphanie Desous & Stéphane Dufau (Local co-organizers)

Dynamic display changes interrupt decision process and alter decision outcome

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ABSTRACT

To attract consumer attention, shopping websites often involve the use of dynamic displays such as flashing or rotating text. While some experimental evidence supports the effectiveness of dynamic displays on capturing attention, dynamic changes might also distract the user and hinder task performance. We attempted to examine the influence of display changes on sequential visual decision making tasks.

In 2 experiments, participants' eye movements were monitored while they chose between 2 alternatives, each represented by a set of visual images, with one set placed on the top of the screen and the other on the bottom. Immediately prior to this decision, participants performed one or more binary decisions based on subsets of these images. On some trials, images were spatially swapped in the display presented during the final decision as compared to a prior presentation. In the critical condition, this swap caused images to be linked to different alternatives (top or bottom) during the initial decision versus the final decision. By analyzing behavioral and eye movement measures, we documented evidence that participants flexibly and effectively accommodated to a variety of display changes. However, there was cost associated with display changes in the form of longer viewing times and decision reversal.

國科會補助計畫衍生研發成果推廣資料表

日期:2012/08/08

國科會補助計畫	計畫名稱: 決策歷程成本對連續價值判斷的影響
	計畫主持人: 吳梅君
	計畫編號: 100-2410-H-343-003- 學門領域: 行銷
無研發成果推廣資料	

100 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：100-2410-H-343-003-					
計畫名稱：決策歷程成本對連續價值判斷的影響							
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	4	4	100%	人次	另有一位大學生參與執行計畫。
		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%			

<p>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。)</p>	無。
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	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 (2011). ' Process-induced decision costs on sequential value judgments.' IADIS International Conference on Interfaces and Human Computer Interaction 2011, Rome, Italy. (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）

網路消費者的資訊收集及購買決策受到電子商務供應商所提供的流程之影響。隨著線上購物消費者的快速成長，購物流程對決策品質的影響是一重要的實務課題。在資訊過多、資源有限的線上消費情境中，許多商務網站採用動態網頁以吸引消費者的注意力，卻忽略了動態畫面將增加資訊處理的複雜度、進而改變消費者的決策。

本研究的結果發現，在進行連續決策時，決策一致性會受到決策難易程度與資訊動態改變的影響，決策一致性的變化表示可運用資源在連續決策環境中扮演重要的角色。儘管動態資訊或可達到吸引消費者注意力的效果，卻可能引發消費者對動態訊息處理的負面情緒反應，影響消費者的決策一致性。因此，在實務上應考慮消費者處理訊息的可用與所需資源，以順暢的流程便利消費者進行資訊收集、比較與決策，以提升決策品質。未來的研究可嘗試探討在連續決策過程中，如何改善資訊流程降低決策難度以幫助消費者進行決策。