

Decisions, Decisions, Decisions: Multiple Pathways to Choice

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Abstract

This paper details an alternate methodology that permits the consumer decision process to be observed without the constraint of model phases or 'sets'. A new custom-developed computerised process tracing methodology is utilised, identifying the decision wave boundaries in a durable product purchase scenario. The electronic process tracing methodology reveals multiple pathways to consumer choice for a durable purchase decision and that consumers choose an air conditioning alternative using up to ten decision waves, forty percent of which may be outside out current decision models. This research suggests that most consumers do not construct a choice set to make a purchase decision which has impact on product positioning and differentiation decisions and stress the importance of being the 'last alternative standing'. There are three pathways to consumer choice and marketing tactics must address the informational requirements of each decision and pathway to become a candidate for the final choice. From a research perspective, this paper is the first to provide empirical evidence of up to ten decision waves within a consumer decision process. It also quantifies the frequency of consumer decisions without the formation of a consideration and/or choice set and reveals the three pathways to a consumer decision.

Introduction

Consumers make choice decisions with every purchase. Understanding the decision process is central to effective deployment of marketing resources. For example, in the UK consumers spend an average £443 per week (UK National Statistics Online, 2006) while expenditure rates in America appear to be higher with reports that Americans are spending more than they earn (Abate, 2006). Australians spent \$18.621 billion in retail outlets in December 2006 (Anonymous, 2006) or more than \$900 for each Australian. The range of choice decisions varies, with some being small, while others involve considerable resource and financial commitment.

Given the importance of the phenomena researchers have been wrestling with consumer decisions for over 30 years and we continue to build an understanding of how consumers make purchase decisions. One of the primary reasons for the sustained interest is the desire to accurately predict the brand or product that consumers will choose in a given choice scenario. The ability to accurately predict choice in a given scenario will enable marketers to reliably predict return on investment for marketing strategies giving marketers boardroom leverage.

Using process tracing methodologies researchers (see Klein and Yadav, 1989; Russo and Leclerc, 1994) present results, suggesting that consumer decision-making is more complex than previously considered as a single- or two-stage process. While empirical evidence suggests that the consumer decision process is constructive and consists of a series of more or less similar sub-processes, researchers have not been able to clearly identify decision boundaries (e.g. Russo and Leclerc, 1994). Decision phase boundaries may be blurred by consumer adaptivity, therefore we require alternative methodologies to explore multiple decision boundaries outside the current constraints.

In this study we achieve two objectives. First we present views of well-structured decisions, suggesting that alternate views of decision-making should be considered to improve our ability to predict consumer decisions. Second, we present a new application of process tracing methodology to observe decision boundaries as concrete and deliberate decisions made by a consumer and to allow observation of consumer adaptivity within and across these boundaries. This approach departs from the current view of 'stages' or 'phases' in that it is not decision strategy-based.

Literature Review

Decision researchers have approached choice prediction in a variety of ways often imposing a predetermined structure on choice. Yet we are unable to accurately predict consumer choice

decisions. Conceptually the models of consumer decision making can be summarised as a process involving one stage, that is, choice, or two stages, screening and choice.

Choice

Traditional consumer decision research is based on a single-stage choice model (Bettman *et al.*, 1998; Savage, 1954). This stream of research seeks to understand the relationship between attributes and decision outcomes (Kivetz and Simonson, 2000; Malholtra, 1982; Nowlis and Simonson, 1996).

Screening and choice

Expanding product choice and a proliferation of information has increased decision complexity leading to the empirical validation of two-stage decision processes (Andrews and Srinivasan 1995; Bettman and Park, 1980; Payne, 1976; Svenson, 1979). The two-stage process approach (Andrews and Srinivasan, 1995; Fader and Hardie, 1996; Gensch, 1987; Hauser and Wernerfelt, 1990; Olshavsky, 1979; Payne, 1976; Roberts and Lattin, 1991; Svenson, 1979; Swait and Adamowicz, 2001) suggests that decision makers first screen or eliminate alternatives. This screening stage is followed by the consideration of alternatives resulting in a choice decision.

In the literature, 'stage' has a specific definition meaning completely different sub-processes and the stage boundary is marked by the shift from a screening strategy to a choice strategy. The concept of 'stages' is a refinement of the funnel view (Lapersonne *et al.*, 1995) that consumers filter out alternatives to finally arrive at a choice set from which the final choice is made. The funnel view implies that consumers progress through stages such as awareness, consideration and choice set stages.

Awareness/consideration/choice sets

The fact that consumers go through successive stages to obtain a final choice set is not new to marketing. The general funnel view of decision-making includes a universal, evoked, awareness, retrieval, consideration and choice set. Within this model the existence of more than one stage is supported by Andrews and Manrai (1998) who note that the choice set varies little in size even when the 'universal set' varies significantly. Research has focused on the consideration and choice set composition and choice outcomes, developing utility maximization models (Hauser and Wernerfelt, 1990), log-linear models and ANOVA (Nedungadi, 1990), logit models (Andrews and Srinivasan, 1995; Kardes *et al.*, 1993; Roberts and Lattin, 1991) and structural models (Nelson, 2004). This research is outcome focused, calculating utility maximization and predicting the choice set composition.

Stages, phases and decisions

The concept of ‘phases’ is different to the concept of ‘stages’. In the literature, phases encompass both qualitatively different and the same sub-processes. Consider a consumer who entered into an electronic superstore and was confronted with a vast selection of televisions, scanning the selection and eliminating the smaller and very large models, then rescanning the remaining selection and eliminating models with unfavourable colour mix until a few televisions sets were left for choice, which were compared before a choice was made. This decision process is a two-*stage* process involving screening and choice, but it is also a process encompassing three *phases*, including two screening phases using the same screening strategy followed by a choice phase using an explicit trade-off strategy. Thus, ‘stage’ and ‘phase’ describe different aspects of the same decision process.

The similarity between the two concepts is that they both are based on strategy use, that is, stages and phases are determined by the consistent execution of a decision strategy until another strategy is utilised. ‘Stages’ or ‘phases’ are hard to determine if consumers execute partial strategies or use multiple strategies as they process through the decision process. This concern has been raised by researchers (Russo and Leclerc, 1994) who argue that consumer adaptivity may blur decision boundaries.

The challenge of determining decision boundaries raises is important if our understanding of consumer decisions is to be anchored in objective criteria, allowing researchers to depend on concrete decisions such as rejection, acceptance, or choice instead of using strategies to determine decision boundaries. Diagrammatically, the existing decision models are conceptually represented by the first three ‘stage’ models in Figure 1. In this research we have removed the ‘stage’ constraints and we are not using decision strategies to identify ‘phase’ boundaries. To accurately describe our focus on the decision process (model 4 in Figure 1), inclusive of the decisions leading to the final choice, we use the term ‘waves’ avoiding confusion with decision ‘stages’ or ‘phases’.

[Take in Figure 1 about here]

Hypotheses development

This research proposes that in a ‘complex’ decision situation where consumers are faced with many alternatives, the decision process tends to encompass multiple waves (Lye *et al.*, 2005) because “eliminations are clearly done in more than one phase” (Klein and Yadav, 1989, p. 418). Thus, our hypothesis is:

H₁ – Consumers utilise multiple decision waves to select a consumer durable product.

The multiple decision waves represent consumers who are trying to reduce the complexity of the decision task through multiple screening decisions which may lead to choice of a single

alternative. In the literature, researchers model the decision process as a single choice compensatory process. This research argues that screening instead of choice will be used by consumers in complex decisions. In a single wave scenario, a screening decision, that is, to accept or to reject should be differentiated from a choice decision, that is, to choose directly from among many alternatives. Thus, our second hypothesis challenges the single decision as a choice phase concept:

H₂ – A single wave decision process is a choice-based model.

Methodology

There are various process tracing methodologies and the appropriate method depends on the desired research goal. Process tracing research has employed verbal protocols; retrospective verbal protocols (Russo and Rosen, 1975; Svenson, 1979); simultaneous verbal protocols (Bettman and Park, 1980); The Active Information Search (AIS) method (Huber and Klein, 1991); and, conversational approach to decision making verbal protocol capture (Williamson *et al.*, 2000). These methods rely on the capture of verbal cues to track decision processes. Eye-fixation recordings capture the eye movements of the respondent as they compare choice alternatives when they are visually presented. The eye movements are interpreted to be comparative and repeated patterns of comparison are analysed to determine the decision process, however researchers could not clearly identify the phase boundaries through eye movement interpretation (Russo and Leclerc, 1994).

MOUSELAB captured the decision process electronically (Payne *et al.*, 1995; Payne *et al.*, 1988). Respondents were presented with a matrix of alternatives and outcomes and they ‘paused’ the computer mouse/pointer over a cell in the matrix to reveal the value of the outcome. When the mouse moved the value disappeared. The respondents were asked to choose between 4 ‘gambles’ based on the possible values of four different outcomes within each option and the probability of each outcome, a normative, utility-based comparison scenario. The information displayed was tracked and recorded by the program, along with the duration ‘hovering’ over each piece of information. Computer tracing has the advantage of detail records and precise time stamping of actions. The major criticism of MOUSELAB is the presentation of data in a matrix format, partially solving the decision through structuring what is otherwise an ill-structured problem (Brucks, 1985).

Our research expands on the MOUSELAB approach, using computer-based process tracing while addressing the ‘structuring’ concerns in an Internet-style decision format.

The research stimuli

The research scenario is a consumer durable purchase, in this instance an air conditioner, with the respondent requested to decide between nine alternatives based on data for six attributes. Cooling capacity (CC), energy efficiency (EE), and indoor noise level (IN) are ‘intrinsic’ attributes (Rao and Sieben, 1992); direct indicators of product performance (van Osselaer and Alba, 2000). Price (PR), Timer (TI) and Warranty (CW) are ‘extrinsic’ attributes (Rao and Sieben, 1992); they are not quality determining attributes although they may imply quality (van Osselaer and Alba, 2000). The scenario requests the selection of an air conditioner for an 18 m² room, with information available on the appropriateness of each model for a room of that size.

The product attributes were determined through a qualitative purchase decision attribute analysis of a convenience sample in the same market as the primary research. A list of 20 attributes was derived from promotional material and websites, with the six attributes selected based on unprompted verbal responses from interviewing shoppers considering air conditioner purchases and identifying the attributes they considered most important in their purchase decision.

The nine alternatives were arranged in three groups with the first group having ‘extreme’ attribute values, the second with higher prices for equivalent attribute values and the final group as the ‘capacity’ alternatives for possessing the appropriate cooling capacity for the specified room size. The product attributes, by alternative, are summarised in Figure 2.

[Take in Figure 2 about here]

The extreme value alternatives have the highest value on at least one attribute. The higher price alternatives have a mix of attribute values that are negatively correlated with the attribute values of the capacity group. Importantly, only the three capacity alternatives had the appropriate cooling capacity for the specified room. The specifications included in the research scenario are from actual air conditioners available in the sample market, modified to eliminate brand recognition. Brands were removed to eliminate ‘blocking effects’ (van Osselaer and Alba, 2000) and brand names were replaced by girls’ names (herein referred to by the first letter of the name).

Data collection tool

This research utilises a custom-developed computer program to capture the data acquisition pathways and track decisions in a simulated purchase of a consumer durable. This method has several advantages over its predecessors in that the computerized data capture is objective in the manner it gathers data, data collection is automated and time stamped, and the data capture equipment is transportable to the respondent. Computer simulations have been shown to be representative of actual purchase scenarios, with research proving that the result “... demonstrates how well the simulated environments can predict aggregate choice behaviour across all product categories” (Burke *et al.*, 1992, p. 77).

The computer program was designed to allow easy movement between the screens while providing the respondent with the flexibility to indicate, or avoid indicating, their screening or choice process. The primary focus of this research is on identification of decisions to determine if multiple decision waves exist. Therefore, the program design avoided forcing a respondent decision and allowed the respondent full navigation without indicating a decision, except for a final choice of alternative (see Figure 3).

[Take in Figure 3 about here]

The software was initially programmed in English in Visual Basic and beta tested by the research team. The program was pilot tested on a convenience sample of postgraduate university students and improvements were made based on how respondents used and understood the initial version of the software. The revised software was beta tested then translated into Mandarin Chinese by a NATTI (National Accreditation Authority for Translators and Interpreters Ltd) accredited Mandarin translator. This translation was verified for contextual validity by a qualified senior lecturer at the Tianjin Foreign Language Institute in China. The translated software was then tested on a convenience sample of native Mandarin speakers and additional refinements were made to eliminate ambiguity in respondent instructions and scenario navigation. The revised program was beta tested and retested on a separate convenience sample until the respondents could effectively complete the purchase decision without researcher intervention.

The continuous presentation of the requested data is representative of the consumer using Internet searches (Häubl and Murray, 2003), seeking information and recording that information (either on a note pad or other form of written notation) or the display of information on the product tags at a retail store. To avoid the structuring of information and partially solving the decision (Brucks, 1985) we have presented information on multiple screens with flexibility in the access methods.

The design of this research is consistent with, but different to, the multi-screen approach which found that consumer “control over the information flow has substantial impact on consumers ability to integrate, remember, and understand inputs to their judgement” (Ariely, 2000, p. 245). It is also consistent with internet search patterns (Ylikoski, 2005) and ComputerShop (Levin *et al.*, 2000), although the latter was constrained to two decision phases.

Respondents were able to complete the decision scenario with the mouse and only required a keyboard to complete questions on the final screen. Respondents indicated that they made a decision by notating (depressing a button) that the alternative was accepted or rejected. This notation was then available throughout the screens. Each action (button selection, screen change, information acquisition) was recorded in a data log that was written during the decision process. Every actionable field in the data capture screens was uniquely identified and coded to provide

readability in the data logs. All actions were time stamped and the times provided in the data logs. This design allowed a log that could be used to recreate the pathway for each respondent's decision process, including the duration of each action.

The sample

The target population was mature age Chinese consumers who were economically capable of purchasing expensive shopping goods such as an air conditioner. Chinese consumers were the primary interest of this research because little is known about consumer behaviour in developing countries (Ouyang *et al.*, 2000). Respondents were identified using a stratified convenience sampling method as random sampling was not practical due to a lack of mailing lists or telephone index of personal households for the selection process.

Respondents were recruited from two major cities in the Special Economic Zone of the People's Republic of China. All respondents were full-time employees and were using computers on a regular or daily basis. Individual appointments were set up for each potential respondent and they completed the simulation at their convenience. Each respondent received a free movie ticket worth approximately \$4~5. Respondents were from educational, governmental, and medical institutions, representing the 'middle-class' of consumers in the Chinese society. The response rate was approximately 40% and most respondents chose their office as the desired place to be interviewed. A total of two-hundred and seventy-two (272) respondents participated in the decision making task. Ten respondents were eliminated from the data set because they failed to complete the scenario, leaving 262 valid responses.

Data analysis

Decision wave boundaries are defined by a positive action by the respondent, that is, the log indicates that the respondent actioned the 'consider' or 'reject' alternative for a specific attribute under consideration. This provided both the decision and the attribute driving the decision for that respondent. Thus a decision is deemed to have occurred when the respondent:

- Positively identified a single alternative as being accepted or rejected on a single attribute; or
- Multiple alternatives being positively accepted or rejected based on multiple attributes.

The final choice to purchase a product was also designated as a decision. Where there was no substantiating evidence of the decision, even though a decision may have been implied by subsequent actions, no decision was included in the data analysis. In this research only a positive action for retention or rejection is identified as a decision, consistent with Kuusela *et al.* (1998) and others.

The data logs for the 262 respondents were printed, then analysed to provide a summary of the respondents' decision process. A sample decision log can be found in Appendix 1. The data log summaries revealed shifts in information processing patterns between alternate and attribute search processes. More importantly, actioning 'doesn't suit my needs' (rejection) and 'suits my needs' (accepting for the choice set) were specifically recorded in the data log summaries. These decisions were highlighted by a dotted line and shading across the summary. Thus, each data log summary provided sufficient detail to reconstruct the respondent decision process and revealed the number of decision waves within the purchase decision.

Results

The sample demographics are reported in Table I. The majority of respondents were aged between 20 and 49 years old and they were married. The number of decision waves is summarised in Table II.

[Take in Table I]

[Take in Table II]

The number of decision waves ranged from one to ten. The data log summaries revealed the use of different decision pathways and a varying number of decision waves to make a purchase decision for the same durable product. Specifically:

1. Four in ten (39.3%) chose a product within a single decision wave.
2. One respondent in five (20.6%) required two decision waves to complete the purchase.
3. Four in ten respondents (40.1%) required multiple decision waves (three or more) to complete the decision scenario.

This research clearly reveals that consumers use more than two decision waves in making a purchase choice for a durable product, thus hypothesis 1 is supported.

The decision logs were analysed to ascertain if single decision wave respondents represent choice only as defined by the screening and choice models. The results are in Table III.

[Take in Table III]

It is incorrect to assume the 103 single wave decisions (Table II) are choice decisions, as only 30 (29%) utilised a choice-based approach to their single wave decision. The remaining 73 utilised a screening technique to choose an alternative and did not create a choice set. Thus hypothesis 2 must be rejected.

Overall, 58% used only screening techniques to choose an alternative, 12% used only choice and 30% used both screening techniques and choice behaviour to choose an alternative. There were 679 screening decisions and 109 choice decisions by the respondents. The different decision pathways utilised by the respondents can be represented diagrammatically (Figure 4).

[Take in Figure 4 about here]

Current decision models do not support the ‘screening only’ approach to decision making, depicted in the diagram. Whilst the existence of screening only decision strategies (e.g.: Satisficing) has been researched, the clear identification of the screening only pathway and the frequency of its occurrence (58%) have not been previously reported. Clearly this is an important omission from the empirical literature.

Discussion and Managerial Implications

A challenge for marketers is to remain in the decision process until the final choice is made, whether through a choice set or directly from the screening process. Current models recognise the existence of more than one decision wave but provide insufficient depth of understanding about the decision process to provide guidance on how to survive the process of elimination to become the chosen alternative. By ignoring the current framework of decision making and concentrating on the underlying process and the decisions the customer makes to select an alternative we have revealed between one and ten decisions within a decision process. Forty percent of the respondents used a multi-wave decision process that is outside our current empirically supported models – a significant group of consumers.

For marketers, the challenge is to understand the consumer decision process sufficiently to identify the attributes that are important for each decision wave within the process so they can survive to the choice set or be ‘last alternative standing’. This may necessitate a change in the manner product attributes are communicated to address the decision criteria for each decision wave within the process, ensuring survival and maintaining the probability of being selected.

The second major finding of this research is empirical support for three different pathways to selecting an alternative. Importantly, the ‘screening only’ pathway is not included in our current models and represents over 50% of the respondents’ solution to our durable product purchase scenario. For these respondents, the choice set is irrelevant and strategies aimed at being the best alternative in the choice set are ineffective. It also implies that researchers must be careful in the analytical approaches used to assign causality in attribute–outcome models. Although statistical significance may be found, it may not represent purchase decision reality for over half of consumers.

The design of this research has raised the question of whether we are measuring an Elimination-By-Aspects (EBA) decision strategy and calling it ‘decision waves’. To address this question we analysed the respondents’ data logs against the unique characteristics of the EBA decision strategy and found that EBA was used on its own in only 3 responses (of 262). This analysis clearly shows that we are measuring something different to an EBA decision strategy and there are other factors influencing the decision process and outcome.

Conclusions and Future Research

While there is considerable empirical support for a single and two-phase consumer decision process involving a screening and choice phase, researchers have only indicated the possibility of more than two decision phases. A new methodology was required to obtain empirical evidence to support and extend our understanding of the number of waves used by consumers in a single decision process. This research utilised a custom-developed computer process tracing method to extend our understanding of how many decision waves consumers used to make a single decision to purchase an air conditioner for an 18m² room. By allowing respondents decision pathway freedom this research provides further empirical evidence to suggest there is heterogeneity in consumer decision making. Importantly, this research reports empirical evidence to suggest that many consumers utilise more than two decision waves. The contribution of this research is the revelation that there may be as many as ten decision waves in a durable goods decision and that 32% of decisions required between 3 and 7 decision waves. Significantly, the results of this research suggest that forty percent of the decisions made by consumers in a durable goods context may not be adequately represented by existing consumer decision models.

A further contribution of this research is to clarify the frequency of the different pathways to a decision. Surprisingly, over half of the respondents utilised only screening techniques to make their decision, avoiding the construction of a choice set. The results of this research suggest that to improve the explanatory power of our decision models we should include multiple decision waves within screening. The inclusion of options for either or both screening and choice may also improve the predictive ability of our models.

This research included nine alternatives and six attributes; far fewer than the air conditioning alternatives that would be available in the marketplace. This may suggest that more screening is likely to occur in the marketplace and that the number of decision waves that were observed in this scenario may be conservative when compared with decision making for air conditioners in a real-world setting. Future research should consider more alternatives and a larger number of attributes to provide a closer representation of information available in a consumers’ choice of air conditioners.

Future research may include brand and visual information for air conditioner alternatives to observe the influence of these variables on the number of decision waves used. Both these attributes have been shown to be significant in the consumer decision process (Brucks *et al.*, 2000; Dawar and Parker, 1994; Rao and Monroe, 1989; Zeithaml, 1988) and should be included in future research. A split sample with included and excluded brand effects and included and excluded visual information could provide additional insight into the influence of brands and visual information on the decision process.

This research has expanded our understanding of consumer decision making by providing empirical evidence of multiple decision waves, indicating that almost half of consumer decisions are beyond the scope of current decision models and that over half of consumers did not create a choice set prior to making their purchase decision.

Figure 1
Conceptual Models of Consumer Decision Making

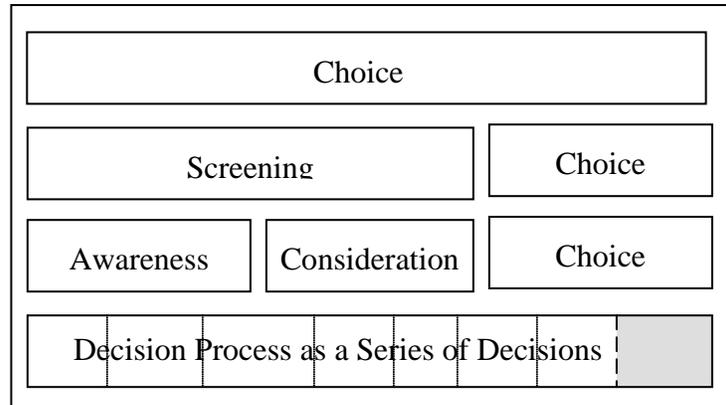


Figure 2
Research Stimuli Structure

Alternatives			Attributes					
Extreme	Higher priced	Capacity	Price	Cooling capacity	Efficiency	Noise level	Timer	Warranty
A			Lowest/	Under/over	Lowest/	Lowest/	Shortest/	Shortest/
D			Highest	specified	Highest	Highest	Longest	Longest
H								
	B		Higher than C,	Over	Lower than C,	Higher than C,	Shorter	Longer
	E		F, I	specified	F, I	F, I		
	G							
		C	Below average	Appropriate	Above average	Above average	Longer	Shorter
		F						
		I						

Figure 3
Process Tracing Program Structure

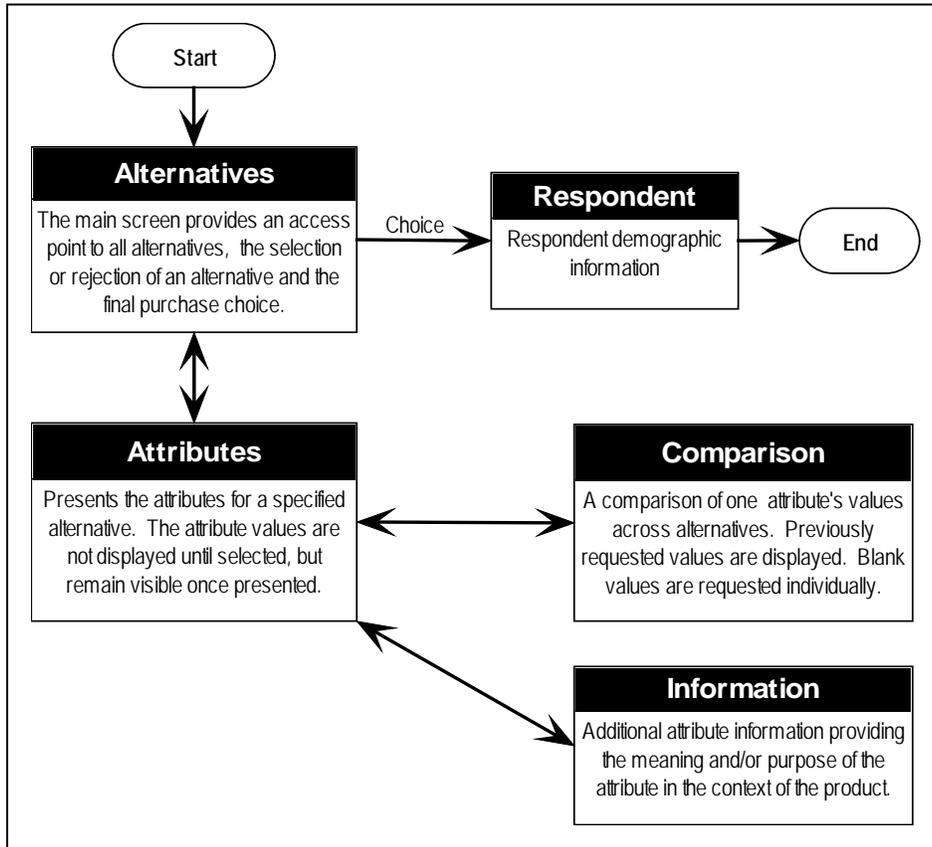


Figure 4
Consumer Decision Making Pathways

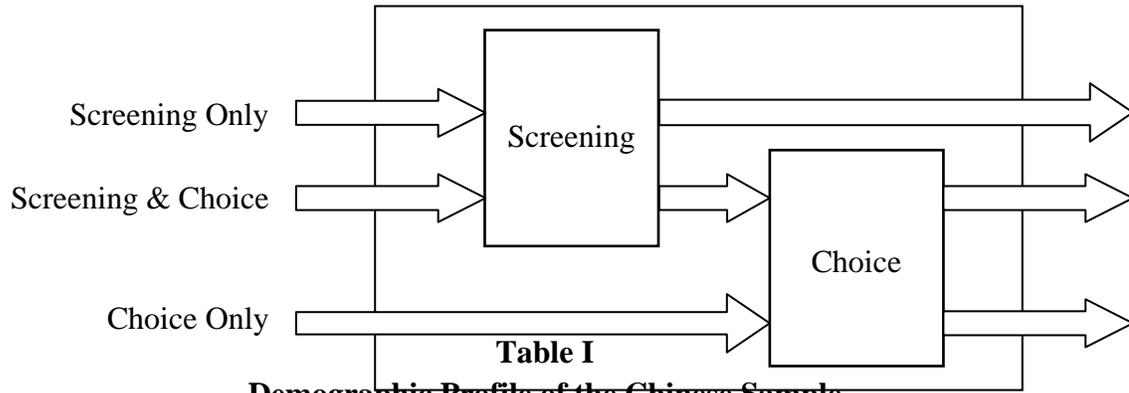


Table I
Demographic Profile of the Chinese Sample

Age	%	Gender	%	Marital status	%
20-29	30.5%	Male	51.4%	Married	70.6%
30-39	29.8%	Female	48.6%	Single	29.4%
40-49	31.2%				
50-59	8.5%				

Table II
Number of Decision Waves

Decision waves	Frequency	Percentage (%)		Decision process
1	103	39.3	39.3	Single-wave
2	54	20.6	20.6	Two-waves
3	25	9.5	40.1	Multi-waved
4	25	9.5		
5	15	5.7		
6	10	3.8		
7	8	3.1		
8	3	1.1		
9	3	1.1		
10	16	6.1		
Total	262	100	100	

Table III
Respondent Utilisation of Screening and Choice Decision Phases

Decision Waves	n	Screening Only	Choice Only	Screening & Choice	Number of Decisions	
					Screening	Choice
1	103	73	30	-	73	30
2	54	24	-	30	78	30
3	25	17	-	8	67	8
4	25	15	-	10	90	10
5	15	7	-	8	67	8
6	10	5	-	5	55	5
7	8	6	-	2	54	2
8	3	3	-	0	24	-
9	3	3	-	0	27	-
10	16	0	-	16	144	16
Total	26	153	30	79	679	109
%		58.3%	11.5%	30.2%		

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Appendix 1: Data Log Summary Example

75	Information search		Knowledge acquisition	Alternatives		Attributes						Search pattern		Notation:	
	Alternative	Attribute		Rejected	Retained	PR	CC	EE	IN	TI	CW	AL-based	AT-based		
	A	PR, CC, EE, IN, TI, CW										1			
	A – I	EE										1			
1 st				D, E, G				✓							
	A – I	CW										1			
2 nd				D, E, G									x		
	A – I	CW										1			
	B	CW													
	A – I	EE										1			
	B	EE ¹						✓							
	A – I	IN										1			
	B	IN							x						
	A – I	CC										1			
	B	CC						✓							
	B	TI										1			
	B	PR						✓							
	A – I	TI										1			
	B	TI								✓					
3 rd				B										Choice set	Choice
														B	B

¹ The cut-off level was relaxed.