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An examination of the effect of asymmetrically dominated decoys on consumer choice behaviour by using judgments and choice

A thesis presented in partial fulfilment of the requirements for the degree of Master of Business Studies in Marketing at Massey University, Palmerston North, New Zealand

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ABSTRACT

The Purpose of this research was to test assumptions underlying the three asymmetrically dominated decoy effect (ADE) models described by Wedell and Pettibone (1996): the Weight Change Model, the Value Shift Model, and the Emergent Value Model. Of particular interest was whether there is support for an alternative interpretation of the Weight Change Model, as proposed by Bonaccio and Reeve (2006).

Wedell (1991), Wedell and Pettibone (1996) conducted a series of studies on the three models. Their results found no support for the Weight Change Model but support both the Value Shift Model and the Emergent Value Models. These results have been widely accepted (see Highhouse, 1996; Pettibone & Wedell, 2000; Tenbrunsel & Diekmann, 2002). However, Bonaccio and Reeve (2006) proposed a different interpretation of the Weight Change Model. They argued that the lack of the supporting evidence for the model is a result of misinterpretation of the original Weight Change Formulation derived from Huber, Payne and Puto (1982). They suggested that the Weight Change Model might be a viable explanation for the ADE.

This study examined this issue by replicating the analysis of both Wedell and Pettibone (1996) and Bonaccio and Reeve (2006), using both a choice task and judgment tasks from their study, but with a different set of products and attribute values. The research used a mail survey of 960 New Zealand residents selected from the Electoral Roll of a median size New Zealand city.

The research demonstrated strong ADD effect in both choice and judgment tasks and found a strong relationship between choice and judgment. The study also found little support for either of the Weight Change Models (i.e., that of Wedell and Pettibone's, 1996, or that of Bonaccio and Reeve, 2006), but strong support for the Value Shift Model and some support for the Emergent Value Model. The use of No-decoy comparison with the decoy condition in current study also provides evidence that

Wedell and Pettibone's (1996) analysis is a weak test of the ADE and should not be used to support the decision of whether to use ADD in a choice set.

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1. Introduction

Research on behavioural decision making has demonstrated that preferences for an option in a choice set (the Target) are increased at the expense of a competing option (the Competitor) when an asymmetrically dominated decoy (ADD) is added into the choice set. Such an effect is referred to as an asymmetrically dominated decoy effect (ADE). A feature of ADE is that it violates both the similarity hypothesis and the regularity principle that had been the basis of marketing decisions. A number of general models of ADE have been developed to account for how and why ADDs influence a decision maker's choice behaviour. Three of these are the Weight Change Model, the Value Shift Model, and the Emergent Value Model (Wedell, 1991; Pettibone & Wedell, 1996).

The Weight Change Model proposes that adding a decoy alternative changes the relative weights assigned to the different attribute dimensions (Ariely & Wallsten, 1995; Wedell & Pettibone, 1996). There are two interpretations of the Weight Change Model; the explanation of Wedell and Pettibone's (1996); and that of Bonaccio and Reeve (2006). Wedell and Pettibone (1996) claim that the dimension on which the target option is superior to the competitor option will have more weight, while Bonaccio and Reeve (2006) claim that the dimension on which attribute values have greater variability will have more weight.

The value-shift model explains the ADE from the subjective value perspective, that is, the changes in preferences in a choice set caused by the inclusion of an asymmetrically dominated decoy (ADD) result from a shift in the subjective attribute value (i.e., dimensional value) on that dimension so that "the overall dimensional value of the targeted brand is increased relative to the other alternatives in the choice set" (Wedell & Pettibone, 1996, p. 328)

The Emergent Value Model is different from both the Weight Change Model and the Value Shift Model in that it argues that choice is not just dependent on the changes on the weights or the values along the dimension but also relies on the relational aspects of the choice set (Wedell & Pettibone, 1996). The model proposes that the

relationship between the targeted option and the decoy, that is, the domination of the decoy by the targeted option, makes the choice of the dominating alternative (the targeted brand) become easier to justify or explain and thus reduce the stress of making choice decision.

The three ADE models try to explain how and why ADD influences decision makers' choice behaviour. Studies of the three ADE models can help create understand of the cognitive processes underlying the ADE on choice decision and thus improve predictions when applying ADE strategies into choice setting. To date, most studies found strong support for the Value Shift Model and the Emergent Value Model but little support for the Weight Change Model (e.g., Ariely & Wallsten, 1995; Highhouse, 1996; Pettibone & Wedell, 2000; Tenbrunsel & Diekmann, 2002; Wedell, 1991; Wedell & Pettibone, 1996).

However, most of the studies of the three ADE models were limited to paper-and-pencil tests with homogeneous populations of students in a class or via computer (for example, see Bonaccio & Reeve, 2006; Pettibone & Wedell, 2000; Tenbrunsel & Diekmann, 2002; Wedell & Pettibone, 1996). Few studies were done across different segments, and no study has been reported that tests the three ADE models using a No-decoy control group. Thus, it is unclear whether the three ADE models can be applied to the general population.

The purpose of this research was to test whether there is evidence to support the three asymmetrically dominated decoy effect (ADE) models described by Wedell and Pettibone (1996): the Weight Change Model, the Value Shift Model, and the Emergent Value Model. To accomplish this, the studies of Wedell and Pettibone (1996) and Bonaccio and Reeve (2006) were replicated and extended. A comprehensive discussion of the specific objectives for this research is presented following the literature review section.

2. Literature Review

2.1 INTRODUCTION

This section will discuss the literature pertaining to the study of the asymmetrically dominated decoy effect (ADE). First, an overview of traditional assumptions about choice decision will be given. Secondly an alternative perspective that an insertion of an asymmetrically dominated decoy (ADD) will violate the traditional assumptions about choice decision will be presented. Thirdly the robustness of ADE will be examined. Finally, three models of ADE will be examined and the evidence support the models will be reviewed.

2.2 TRADITIONAL ASSUMPTIONS ABOUT CHOICE DECISIONS

An important issue in marketing is understanding how to establish a range of products or brands (a choice set) so that the targeted alternative in the choice set can catch a customer's eye, and, thus increase sales. There have been numerous studies on the subject of choice sets (Luce, 1977; Pessemier, Burger, Teach, & Tigert, 1971; Punj & Staelin, 1978; Reibstein, 1978; Silk & Urban, 1978; Tversky, 1972). Two traditional assumptions underpin these studies: the similarity hypothesis and the regularity principle (Tversky, 1972).

2.2.1 Similarity hypothesis

The idea of the similarity hypothesis is that adding a third alternative to a choice set will take a greater share from items that are similar to it than from those that are dissimilar to it (Tversky, 1972). For example, consider a choice set Brand A and Brand B (see Table 1), to which is then added a third alternative Brand C. According to the similarity hypothesis, since Brand C is more similar in price and quality to Brand B, it should take a greater share from Brand B than Brand A.

Table 1. Choice Set One Table

Brand	Price ($)	Quality
A	4.95	75
B	4.25	65
Adding a third alternative		
C	4.15	60

2.2.2 Regularity principle

The regularity principle (also called the rational choice theory) (Heath & Chatterjee, 1995) asserts that preferences between two alternatives should not depend upon a third item; that is, the addition of a third alternative to a choice set cannot increase the choice share of the original brands in the choice set (Doyle, O'Connor, Reynolds & Bottomley, 1999; Heath & Chatterjee, 1995; Huber, Payne and Puto, 1982). For example, if the regularity principle holds, then neither of the relative choice shares of Brands A or B in the choice set in Table 1 will be increased by adding Brand C. Instead, Brand C will take shares away from both of them in proportion of their market share. Thus, regularity will be satisfied because a substitution effect occurs, that is, a new alternative takes shares away from the original alternatives,

2.2.3 Summary

The similarity hypothesis and the regularity principle are fundamental assumptions of most choice models (see Luce, 1959; Punj and Staelin, 1978; Tversky, 1972) and have been found to hold empirically (Luce, 1977; Pessemier, Burger, Teach, & Tigert, 1971; Punj & Staelin, 1978; Reibstein, 1978; Silk & Urban, 1978; Tversky, 1972). In addition, they are widely reflected in marketing practice. For example, it is traditionally believed that companies need to design new products that are dissimilar from their current products in order to avoid or minimize cannibalization (Huber, Payne & Puto, 1982).

However, the regularity principle and similarity hypothesis do not always apply. There are some exceptions to the regularity principle. For example, when facing a decision of choosing a digital camera from a choice set of two where the decision rule is to choose a brand excluding the most expensive one, the probability of choosing the most expensive brand in the original choice set will then be increased by simply adding a brand that is more expensive to it. In addition, it is also easy to think of examples that violate the similarity hypothesis. Taking the digital camera as an example again, the probability of choosing the most expensive brand in the choice set of two can also be increased by adding a similar brand, which is at the same price but

much lower quality. This additional new brand can increase the choice share of the brand similar to it in the original set.

2.3 ALTERNATIVE VIEW: ASYMMETRICALLY DOMINATED DECOY EFFECT (ADE)

Huber, Payne, and Puto (1982) claim that the application of the similarity hypothesis and the regularity principle is limited. This is because offering a new item (decoy) that is inferior to or dominated by at least one alternative in the set, but not dominated by at least one other alternative, will lead to a preference shift, increasing the choice share of the dominating alternative – the targeted brand. Thus, this violates the similarity hypothesis and the regularity principle. They defined this phenomenon as the asymmetrical dominated decoy effect (ADE). This was the first time that ADE was introduced and since then, it has been one of the most researched topics in marketing (Dhar & Sherman 1996; Herne 1997, 1998, 1999; Huber, Payne & Puto, 1982, 1983; Lehmann & Pan, 1994; Medin, Goldstone & Markman, 1995; Nowlis & Simonson, 1997; Pan & Lehmann, 1993; Simonson 1989; Wedell, 1991).

Doyle, O'Connor, Reynolds and Bottomley (1999) agree with Huber et al's (1982) point of view and, after running a study on ADE, stated that "under certain conditions both the similarity and regularity hypotheses can be violated" (p. 227). Evidence that ADE increases the share of the dominating alternative (the targeted brand) in a choice set has been found in a wide variety of choice situations as, for example, in commercial products (Heath, 1995); gambling (Wedell, 1991); political candidates (Pan, O'Curry & Pitts, 1995); job candidates (Highhouse, 1996); and policy issues (Herne, 1997).

The findings on the effects of asymmetrically dominated decoys (ADD) have managerial and theoretical importance (Huber et al. 1982). From the managerial view, ADE contradicts the traditional view that adding a new item will decrease the share of the product that it is most similar to. It also implies that inserting a decoy brand can increase the choice preference on the targeted product in the choice set and hence increase the sales of it (Huber et al., 1982). From the theoretical view, the

acceptance of ADE implies that most prior choice models, such as Luce's (1997) proportional draw model and Punj and Staelin's (1978) college choice model, need to be modified, since they do not take ADE into account (Huber et al. 1982).

2.3.1 Definition of asymmetrically dominated decoy effect (ADE)

According to Huber et al. (1982), the term asymmetric dominated effect (ADE) is used to describe the phenomenon whereby the attractiveness of the target alternative in a choice set is increased by adding an inferior choice alternative (a decoy) that is asymmetrically dominated.

Consider the actual results of one of the scenarios presented by Huber, et al. (1982). In Table 2, Brand C (Competitor) is of a higher quality than Brand T (Target). However, it is more expensive. Both brands have different strengths and weaknesses, forcing customers to make trade-off decisions among attributes (in this case, price and quality). Given the choice set {C, T}, 43% of respondents chose Brand T while 57% selected Brand C (see Table 2). However, when a new alternative Brand D (Decoy) was added into the choice set {C, T, D}, the result changes (see Table 3). Sixty three percent of customers chose Brand T, while only 37% opted for Brand C. No customers chose the decoy D. The choice share of Brand T is increased by 20% at the expense of a reduction of 20% choice share for Brand C.

Table 2. Choice Set of Beer – No decoy

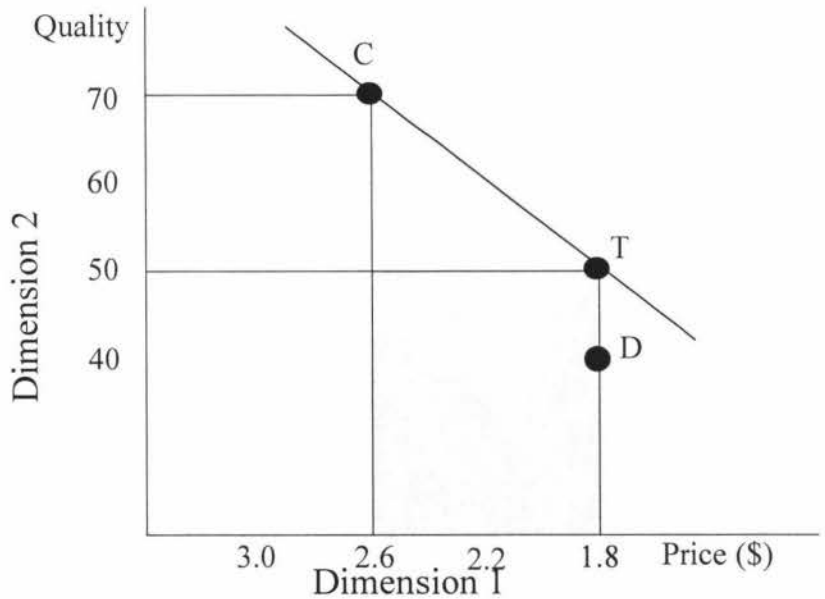
Brand	Price ($)	Quality	Choice Share (%)
C (Competitor)	2.60	70	57
T (Target)	1.80	50	43

Table 3. Choice Set of Beer – Decoy added

Brand	Price ($)	Quality	Choice Share (%)
C (Competitor)	2.60	70	37
T (Target)	1.80	50	63
D (Decoy)	1.80	40	0

The key point to note about the ADE is that Brand D is asymmetrically dominated; that is, Brand D is completely dominated by Brand T (target) but not by Brand C (competitor). Taking Huber et al's (1982) choice set in Table 2 and Table 3 as an example, Brand D is the same price as Brand T; however, it is of a lower quality. Thus, Brand D is completely dominated by Brand T. Although Brand D is a lower quality than Brand C, it is not completely dominated by it, as it is cheaper than Brand C. Therefore, Brand D fulfils the prerequisites as an ADD. It is evident that although no customers chose the asymmetrically dominated decoy (Brand D), it does alter consumers' preferences. Figure 1 shows the relationship of targeted Brand T to decoy D. The point to note is that any brand situated in the grey area means it is asymmetrically dominated by the targeted brand.

Figure 1. Relationship of Targeted Brand T to Decoy Brand D.



Note:

1. T = low price/quality; C = high price/quality
2. Decoy (D) is asymmetrically dominated by Brand T, because it is completely dominated by Brand T, but not by Brand C.
3. Decoy effect is shown in shadow (grey region).

2.3.2 Empirical support of ADE

ADE in Commercial products

Evidence of ADE is widely demonstrated in the experimental and consumer choice literature (e.g. Highhouse, 1996; Huber, et al., 1982, 1983; Lehman & Pan, 1994; Ranteshwar, Shocker, & Stewart, 1987; Simonson, 1989). As an example, Pettibone and Wedell (2000) conducted experiments that examined choices between two different brands of computers (namely Brand T and Brand C), described on two dimensions: price and computer memory. Brand T was cheaper than C; however, it was lower in memory. Brand C was a well-established brand in the market; it had a higher price but also higher memory. By adding a decoy brand (D), which was clearly more expensive than Brand T with a lower quality, the choice probabilities of selecting the targeted alternative T increased significantly to 58% compared to 29% when there was no decoy added. Thus the study confirmed ADD effect for common choice.

On the other hand, Slaughter, Sinar, and Highhouse (1999) argue that in most of the experiments, participants are presented with explicit numerical representations of attributes, such as computers with a ride quality rating of 80 and a price of $5000. This cannot reflect the real situation in the marketplace and, thus, cannot truly test ADE in realistic situations. Slaughter et al. conducted an experiment in which the dimension scores of the alternatives in the choice set are not made explicit to participants. Rather, participants were asked to make a choice decision after watching a video that showed three alternatives in a choice set performing at various levels of quantity and quality. The results of the experiments showed that the effect of asymmetrical dominated decoys is quite strong, even in a situation in which no numerical attribute information is presented. After conducting a similar study, Park and Kim (2005) agreed with the point of view of Slaughter, et al. (1999) that ADE is strong, even in situations in which dimension scores are not made clear to decision makers.

It should be noted, however, that price is always presented with explicit numbers to consumers in real market (Schiffman, Bednall, O'Cass, Paladino & Kanuk, 2005). In

addition, although most of the other attributes of products, such as quality, are represented by implicit settings like the in-store design, package, and color of the products, consumers do make a comparison by using numerical representations to present these implicit attributes in their minds (Schiffman, Bednall, O'Cass, Paladino & Kanuk, 2005). Thus, presenting the alternatives with explicit numerical representations to respondents can reflect the real market situation to some extent, depending on what and how many attributes and what kinds of numerical representations are used. Furthermore, from a research perspective, it is a timely and relatively inexpensive means to conduct research by presenting products with explicit numerical representations of attributes to respondents.

In another study, Heath and Chatterjee (1995) conducted a meta-analysis of 15 previous ADE studies in order to assess the validity of the effect of the asymmetrically dominated decoy (ADD). From this study, they concluded that "decoy effects appear to be robust" (p. 268). Heath and Chatterjee also conducted a wide-ranging experiment involving 1261 student participants. In order to obtain generalisability of the meta-analytic pattern to different types of consumers, they conducted the experiment among a traditional population – graduate students from a nationally-ranked MBA programme in an urban research-oriented university and a non-traditional population – undergraduates from a rural, teaching-oriented state university that draws students from steel or coal industries. They came to the same conclusion as Huber et al. (1982) that decoys increase the choice probability of the targeted brand in both of the traditional and non-traditional population. It should be noted, however, that although Heath and Chatterjee tried to make the experiment more generalisable by using two varied populations, their experiment was still limited to paper-and-pencil tests on a homogeneous population of students. Consequently, the generalisability of the result is questionable.

ADE in other non-commercial choice situations

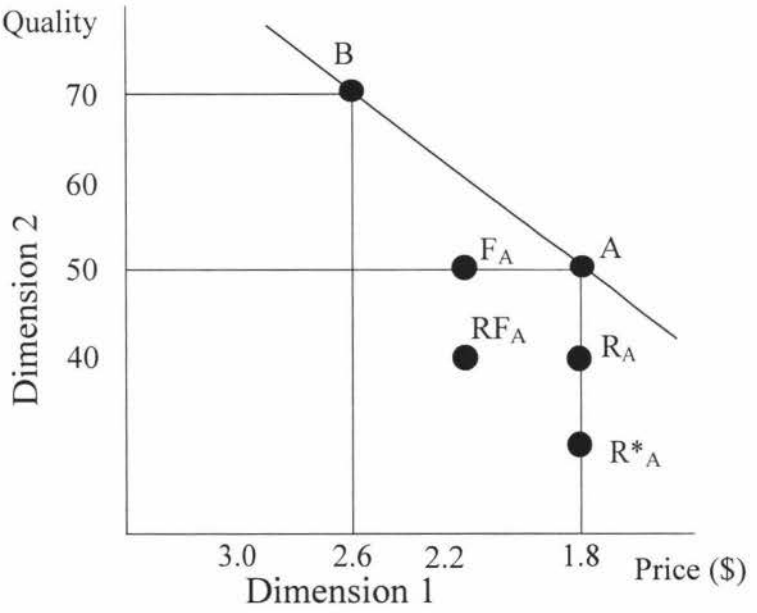
As well as being recognized in marketing, ADE appears to be general and extends to other choice situations, such as gambling (Wedell, 1991), employee recruitment (Highhouse, 1996), apartment selection (Simonson, 1989), and political issues (Herne, 1997). For example, Slaughter et al.(1999) replicated an asymmetric dominance experiment conducted by Highhouse (1996) that examined ADE in a simulated

employee selection context, and concluded that "the presence of the decoy actually seemed to increase the attractiveness of the target" (p. 825). Similarly, in a study of ADE in a political context, Herne (1997) found that the selection of the dominating options (target) was increased after an asymmetrically dominated decoy was added. Pettibone and Wedell (2000) found that the decoy did increase the share of the target brands and concluded that "[ADE] is robust and has been replicated with many different types of decoys and stimulus materials, demonstrating violations of normative choice principles" (p. 301).

2.3.3 Asymmetrically dominated decoy (ADD) strategies (R, R*, F and RF)

Huber, Payne and Puto (1982) proposed four different asymmetrically dominated decoy (ADD) strategies (see figure 2).

Figure 2. Different Decoy Placement Strategies



Notes: 1.F=frequency increasing
RF=Range-frequency
R=Range increasing
R*=Extreme range increasing
2. Decoy effect is shown in shadow (grey region)

1) **Range increasing (R) strategy.** A "Range" strategy introduces a decoy that extends the range of values on one dimension.

2) **Extreme range increasing (R*) strategy**. An "Extreme Range" strategy introduces a decoy that strongly extends the range of values on one dimension.

3) **Frequency (F) strategy**. A "Frequency" strategy introduces a decoy that extends the frequency of values on one dimension.

4) **Range-frequency (RF) strategy**. A "Range-frequency" strategy introduces a decoy that extends both the range and frequency of values on one dimension.

2.3.4 Evidence in support of the ADD strategies

Huber et al. (1982) conducted an experiment involving 153 student participants in order to examine the effect of ADD on choice behaviour by using different placement strategies. They concluded that, in general, ADD increases the choice share of the target brand and thus violates the regularity principle and similarity hypothesis. They also proposed that different decoy placement strategies have different effects on choice behaviour; R* strategy had a greater effect than the R strategy, and the RF strategy appeared stronger than the F strategy. Finally, they concluded that the choice share of the target brand could be increased in a predicted direction. However, they did not give details of how different the four decoy placement strategies were. A limitation of the study is that the sample size of the experiment is relatively small. Only 153 students participated in the study so the statistical power is weak and the representativeness of the sample is questionable. Furthermore, it should be noted that the experiment of Huber et al (1982) is limited to paper-and-pencil tests on a homogeneous population of students in a situation controlled by time constraint. Consequently, the generalizability of the result is also questioned.

The findings of Huber et al. (1982) are of practical importance for marketers, as they suggest ways in which preferences for a given brand can be improved by adding an additional alternative into the choice sets. After the introduction of the ADE theory,

many studies on ADE followed, and most of the studies found similar results (e.g. Dhar & Sherman 1996; Herne 1997, 1998, 1999; Huber, Payne & Puto, 1982, 1983; Lehmann & Pan, 1994; Medin, Goldstone & Markman, 1995; Nowlis & Simonson, 1997; Pan & Lehmann, 1993; Simonson 1989; Wedell, 1991). For instance, Herne (1997) found strong decoy effect in a political election study. An inserting of a decoy candidate who was totally inferior to the targeted candidate but not to the competitors increased the voters' preference to the targeted candidate. Heath and Chatterjee (1995) have the same findings as Huber et al. (1982) that the addition of a decoy would increase the choice probability of the targeted brands. However, they further concluded that decoy effect only worked when the higher quality brand was targeted and it does not work for the lower quality product.

2.4 EXPLANATIONS FOR THE ADE: THREE MODELS OF THE ASYMMETRICALLY DOMINATED DECOY EFFECT (ADE)

2.4.1 Introduction

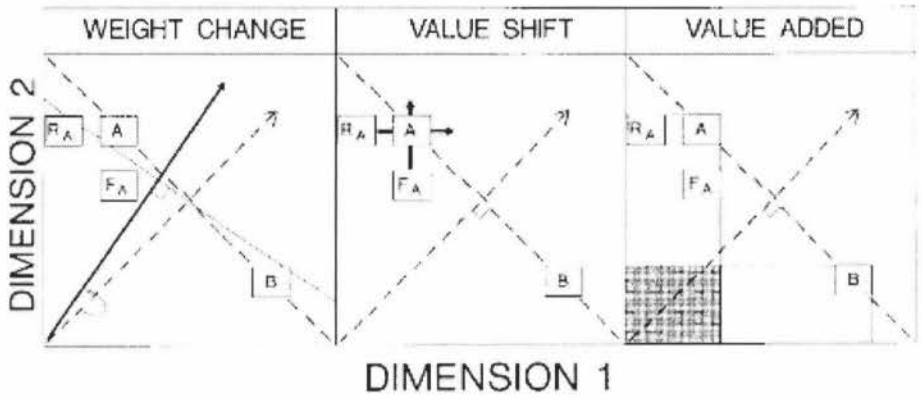
The strong evidence in favour of the ADE has made it an important and robust decision-making phenomenon since Huber et al. (1982) introduced the ADE context into marketing. However, in their original paper, they did not test any explanation for it. Hence, the question is raised as to what mechanisms might explain how and why decoy options influence decision makers' choices.

A number of market researchers and psychologists have tried to explain the effect of the asymmetrically dominated decoy (see Highhouse, 1996; Simonson, 1989; Tversky & Kahneman, 1991). Substantial general models of ADE have been developed and described in the literature, such as Tversky's (1972) elimination-by-aspects model, based on the principle of sequential elimination, Tversky and Simonson's (1993) 'extremeness aversion' model, "based on the principle of pairwise comparisons subject to loss aversion" (Scholten, 2002, p.683), and Huber et al's (1982) range-frequency explanation of ADE according to Parducci's (1964, 1995) original hypothesis.

Based on their work, Wedell (1991) describes three different models of ADE (see figure 3):

1. The Weight Change Model
2. The Value Shift Model
3. The Emergent Value Model also referred to the Dominance Valuing Model or the Value Added Model.

Figure 3. Illustration of the Three ADE Models



Note: A is the targeted brand; B is the competitor brand, R_A and F_A are the decoys which are targeting brand A over B.
Source: From Wedell and Pettibone (1996, p.327).

2.4.2 The Weight Change Model

2.4.2-1 Introduction

The Weight Change Model, also known as a Context-dependent Weighting Model (see Highhouse, 1996) may provide insight into the working of ADE. The Weight Change Model supposes that the addition of a decoy alternative changes the relative weights assigned to the different attribute dimensions (Ariely & Wallsten, 1995; Wedell & Pettibone, 1996). The assumption underpinning this model is that the relative dimension or attribute weights of an alternative sum to 1.0; that is, an increase of the weight on one dimension would lead to a decrease in the relative weights of the other dimensions (Wedell, 1998).

There are two different interpretations of the Weight Change Model; the explanation of Wedell and Pettibone (1996) and that of Bonaccio and Reeve (2006).

2.4.2-2 Wedell and Pettibone's interpretation of the Weight Change Model

Wedell and Pettibone (1996) claim that the dimension on which the targeted brand is superior to the competitor brand has more weight. They explain the Weight Change Model by using the slope of a preference line, which is graphically illustrated in the top left of Figure 3. In Figure 3, before a range decoy (R_A) is added into the choice set, it is assumed the preference/attractiveness to both Brand A and B is equal (Wedell & Pettibone, 1996). The slope of the preference vector corresponds to the relative weight of dimension 2 divided by the weight of dimension 1 (i.e., w2/w1). When a Range decoy is added, that is, the range is extended on Dimension 1, the relative weight given to Dimension 1 decreases, as illustrated by a decrease in the slope of the preference line (Wedell, 1998). A new preference contour is brought into the figure. Since the weight of Dimension 1 decreases, the weight of Dimension 2 increases (Wedell & Pettibone, 1996). Hence, Brand A, which is favoured on Dimension 2, becomes more attractive than Brand B because Brand A is lying above the new preference contour while Brand B is below the preference line.

To summarize, Wedell and Pettiboen's (1996) interpretation of the Weight Change Model predicts that the R decoy decreases the relative weight of the targeted alternative's weakest dimension, whereas the F decoy increases the weight of the targeted alternative's strongest dimension (Wedell & Pettibone, 1996). For the decoys shown in Figure 4, the R decoy reduces the weight of the price dimension while the F decoy increases the weight of the quality dimension.

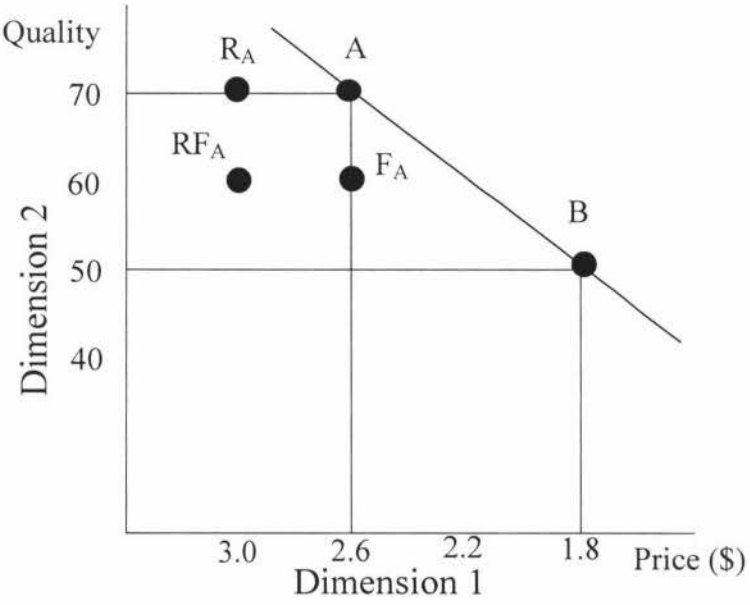
Taking the choice set of Table 4 (see Figure 4 as well) as an example, the target brand (Brand A) is priced at $2.60, but the quality is higher than the competitor Brand B. Both Brands A and B have different strengths and weaknesses, forcing customers to make difficult trade-off decisions among attributes – in this case, price and quality. However, by adding an asymmetrically dominated decoy (R_A), whose quality is the same as the targeted brand but more expensive, the quality dimension in the choice set stands out, which, in turn, makes the quality dimension more meaningful to

consumers and hence increases the weighting of the quality dimension in decision making.

Table 4. Example of the Arrangement of Decoy (Targeting Brand T)

Brand	Price ($)	Quality
A (the targeted brand)	**2.6**	**70**
B (the competitor brand)	1.8	50
R_A	**1.8**	40
F_A	2.2	**50**
RF_A	**2.2**	**40**

Figure 4. Example of the Arrangement of Decoy (Targeting Brand T)



2.4.2-3 A different view of the Weight Change Model

Bonaccio and Reeve (2006) have a different point of view on the Weight Change Model from Wedell and Pettibone (1996). They argue that the lack of the supporting evidence of the model is a result of misinterpretation of the original Weight Change Formulation derived from Huber, Payne and Puto (1982). They suggest that the misinterpretation of the Weight Change Model has led to inappropriate tests of the

original formulation of the model, as the results of the dimensional importance ratings reported by Wedell and Pettibone (1996) and Ariely and Wallsten (1995) seem to support their interpretation of the Weight Change Model in that the Range decoy increased the weight of the dimension that it extended which is consistent with the prediction of their interpretation. Thus, Bonaccio and Reeve (2006) assert that earlier refutations of the viability of the Weight Change Model may be premature.

If a misinterpretation has occurred when the prior researchers (Wedell, 1991; Wedell & Pettibone, 1996) investigated the Weight Change Model, then the result of the studies should be questioned because the test used to examine the model might be inappropriate. The key issue is whether Wedell (1991) and Wedell and Pettibone (1996) misinterpreted the Weight Change Model. If the assertion of Bonaccio and Reeve (2006) is proved to be correct, then a new look at the studies of Wedell (1991) and Wedell and Pettibone (1996) would be required as they have been widely accepted in marketing. Also, it might be suggested that the weight-change model is viable as an ADE explanation and could be a good predictor for ADE. As such, it is necessary to reconsider whether there is support for the weight-change model.

2.4.2-4 A reconsideration of Huber et al.'s (1982) original formulation

Huber et al. (1982) suggested that "decoy effects operate in much the same way as range and frequency effects found in psychophysical measurement" (p.92). According to Huber et al. (1982), the original formulation of the Weight Change Model was defined as follows:

> "Increasing the range of the dimension on which the competitor is superior is hypothesized to decrease the importance of a fixed difference on that dimension....Increasing the frequency of items along the dimension on which the target is superior might...draw more attention to [that] dimension" (pp.92-93).

Taking the choice set in Figure 4 as an example, the theory of Huber et al. (1982) proposed that the R decoy will draw more attention to the price dimension in which the range is extended and thus, reduce the psychological distance of 80 cents

disadvantage a competitor has over its target. Adding such a decoy would lower the variance along the price dimension, thus making the standardized differences in quality greater and, hence, the R decoy would reduce the importance on the price dimension. The preference for the targeted Brand A would be therefore increased as it is superior on quality dimension. On the other hand, the F decoy will draw more attention to the quality dimension on which frequency is increased. The addition of a beer with a quality of 60 might tend to spread the psychological distance of a 20 rating advantage the target has over its competitor along the quality dimension. Thus, the weight of the quality dimension is increased.

One problem for the original formulation of the Weight Change Model given by Huber et al. (1982) is that they have given a rather vague definition of the Weight Change Model. In fact they rarely use the term *weight* to explain why and how ADE occurs but rather use the term *importance* to explain the ADE phenomena. It is argued that their explanation of ADE is the Importance Change Model rather than the Weight Change Model. It is unclear whether importance is equal to weight according to Huber et al. (1982). It is possible that the importance for one dimension increase while the weight of that dimension is reduced. It is also likely that increasing the importance on one dimension will lead to the increase of the weight of that dimension.

A close examination of Wedell (1991) and Wedell and Pettibone's (1996) definitions of the Weight Change Model indicates that there are some differences from the Huber et al.'s (1982) interpretation:

> "A decoy can affect choice by increasing the relative weight given to [one] of the dimensions...The decoy...extends the range of variation along Dimension 1 but not along Dimension II...increase preference for Target A...as resulting from a decrease in the relative weight accorded Dimension 1" (Wedell, 1991, p.768).

> "Adding a decoy alternative changes the relative weights assigned to the different attributes...[T]he weight-change model argues that relative weight given a dimension decreases when the range is extended or

increases when the number of different attribute values on that dimension increase" (Wedell & Pettibone 1996, p.328).

It is obvious that Wedell (1991) and Wedell and Pettibone (1996) have made a very clear definition on the weight change model. The term *importance* is not used. Instead, the term *weight* is used all the time. Taking the example in Figure 6 as an example again, according to Wedell (1991) and Wedell and Pettibone (1996), the range decoy will decrease the relative weight of the price dimension on which it extends the range of that dimension, while the frequency decoy will increase the weight of the quality dimension on which the target is superior.

Although a comparison between Huber et al.'s (1982) importance change theory and Wedell and Pettibone's (1996) weight change model shows that their predictions are at the same direction based on their importance and weight theory (see Table 5), it is still unclear whether the term *importance* is equal to *weight* or not, whether the change in importance will lead to the same change in weight or not.

Table 5. Predictions Based on the Importance change and the Weight Change Theories

	R decoy	**F decoy**
Huber et al.'s (1982) **Importance Change theory**	Decrease the importance of the dimension on which it extended	Increase the importance of the dimension on which the targeted alternative is superior
Wedell (1991) and Wedell and Pettibone's (1996) **Weight Change Model**	Decrease the weight of the dimension on which it extended	Increase the weight of the dimension on which the targeted alternative is superior

Wedell has restated his definition on the Weight Change Model in his later research on ADE and used the terms *weight* and *importance* as meaning the same.

> "The weight-change model assumes that exposure to the contextual pairs alters the relative weighing or importance of the attribute dimensions". (Wedell, 1998, p.51).

> "Weight change models ascribe decoy effects to changes in the relative weighting or importance of the dimensions" (Ariely & Wallsten, 1995; Huber et al., 1982, cited in Pettibone and Wedell, 2000, p.303)

It is clear that Wedell (1998) and Pettibone and Wedell (2000) define the weight change model based on the assumption that the term *importance* is equal to *weight*. Increasing the importance will lead to increasing the weight of that dimension. This idea can be seen from judgment task they used – a dimensional importance rating scale.

The results that Huber et al. (1982) found in choice tasks showed a significant effect for the R decoys on choice proportions but no significant effects for the RF and the F decoys. It is consistent with the findings of Wedell (1991) that only the R decoys have significant effects on choice, and the F and RF decoys are ineffective in increasing the choice proportion of the targeted brand. However, it should be noted that their results are based on choice tasks rather than judgment tasks. Although prior research has demonstrated that "judgments of attractiveness show the same type of decoy effects as found in choice" (Ariely & Wallsten, 1995; Simonson, 1989, cited in Wedell & Pettibone, 1996, p.331), it is not clear which dimension would manipulate the effect of the R or F decoy.

Ariely and Wallsten (1995) used judgment tasks to study more precisely the processes of ADE in judgment rather than ADE in choice tasks. Although they found a systematic decoy effect on importance ratings, they argued that the pattern of the data they found, "namely the positive and negative dimensions, were consistently set in the same physical direction (opposite utility directions)" (Ariely & Wallsten, 1995, p. 231). That is, the range decoy increased the weight of the dimension on which it extends, which was in the opposite direction than predicted by the Weight Change Model. Thus, Ariely and Wallsten concluded that the Weight Change Model was not supported.

Wedell and Pettibone (1996) obtained the same findings as Ariely and Wallsten (1995). In the overall analysis of the R decoy, the dimension that was extended received significantly more weight. This result was consistent with Ariely and

Wallsten's (1995) results but was inconsistent with the Weight Change Model which suggests that the R decoy will decrease the weight of the dimension that is extended. The F decoy did not produce a significant effect. Therefore, Wedell and Pettibone drew the conclusion that the Weight Change Model was unsupported. Several other studies across a variety of tasks also suggest that participants increase the weight of the extended dimension (Fisher, 1995; Goldstein, 1990; Mellers & Cook, 1994; Wedell, 1998).

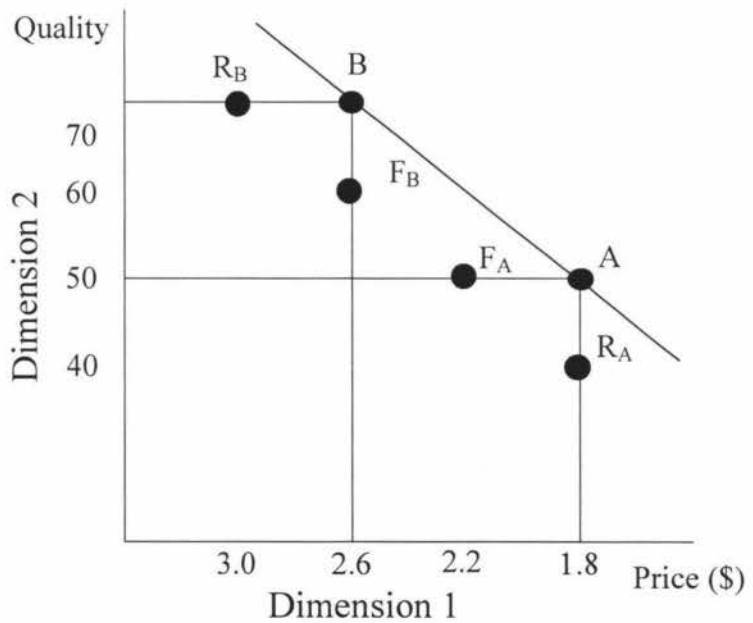
To summarize, Huber et al. (1982) did not provide a very clear definition of the Weight Change Model but used ambiguous terms, such as 'important' rather than 'weight'. It is unclear whether increasing the importance of one attribute (dimension) means that the weight of that dimension increases, or conversely, whether attaching more importance on one dimension means the weight of that dimension decrease. It is agued the explanation that Huber et al. (1982) proposed is a theory of importance change rather than weight change theory. Furthermore, it is also noted that Huber et al. aimed to test the effect of ADD on choice. The cognitive process behind the ADE on decision making was not their focus.

Although Wedell (1991) and Wedell and Pettibone (1996) use *weight* rather than *importance* terminology to interpret the weight change model, it is clear that the prediction of both theories are consistent and in the same direction. In the later study of Wedell (1998) and Pettibone and Wedell (2000), they restate the definition of weight change model and propose that the term *importance* is equivalent to *weight*. That is, increasing the importance of one dimension will lead to an increase in the weight of that dimension. It is clear that Wedell and Pettibone's (1996) study on weight change model did not misinterpret Huber et al.'s (1982) original formulation but built on it, and hence, this seems little support for the argument of Bonaccio and Reeve (2006) that the lack of supporting evidence of the Weight Change Model was due to the misinterpretation of Huber et al.'s (1982) original formulation, and that the misinterpretation of the original formulation of the Weight Change Model has led to the inappropriate tests of the original formulation of the model.

2.4.2-5 Bonaccio and Reeve's (2006) interpretation of the Weight Change Model

Bonaccio and Reeve (2006) have a different interpretation of Huber et al's (1982) formulation to that of Wedell and Pettibone (1996). They use the phrase "changes in the relative *attribute variability*" to explain the Weight Change Model. According to Bonaccio and Reeve (2006), the dimension that has greater variability has more weight. That is, if the variability of one dimension increases, the weight of that dimension increases consequently. Taking Figure 5 as an example, according to Bonaccio and Reeve, the insertion of a Range decoy that is targeting Brand B (R_B), adds a new value, \$3.00, to the price dimension (Dimension 1). Since this price dimension now has three score values in total (one each for Brand A, Brand B, and the decoy R_B) while the No-decoy situation has only two value scores, one for Brand A, and one for Brand B, the decoys cause the variability of the price dimension to increase. This increase in variability leads to the importance or the weight of that dimension to increase.

Figure 5. Example of the Arrangement of Decoys (Targeting Brand A or B)



Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A/F_A}$ = Brand A is targeted by the R or F decoy, $\mathbf{R_B/F_B}$ = Brand B is targeted by the R or F decoy
3. Decoy effect shown in shadow (the grey area)

An assumption underlying Bonaccio and Reeve's (2006) interpretation of the Weight Change Model is that consumers will make rational decisions by comparing the

ranking of each dimension for each product and choose the brand with highest rankings. Taking the Figure 5 as an example again, the addition of the R_B decoy extended the range of the price dimension on which the target brand is inferior to the competitor. For the price dimension, the rank for the targeted brand (Brand B) and the competitor (Brand A) are 1= Brand A, 2= Brand B, 3=Decoy R_B. For the quality dimension, the ranks in the choice set are 1=Brand B = Decoy R_B, 2=Brand A. Thus, the R decoy has no effect on the choice set because of the confounding effect. Bonaccio and Reeve (2006) also propose that the RF decoy is unlikely to work because of the confounding effects. On the other hand, the adding of the F_B decoy will increase the frequency of the dimension on which the target is superior to the competitor. According to Bonaccio and Reeve, for the price dimension, the ranks for the targeted brand (Brand B) and the competitor (Brand A) are 1=Brand A, 2=Brand B=decoy. For the quality dimension, the ranks in the choice set are 1=Brand B, 2=Decoy F_B, 3= Brand A. As a result, the quality dimension with the increased frequency should be perceived as most important and decision makers should prefer the targeted Brand B. Hence, Bonaccio and Reeve (2006) suggested that the Weight Change Model will only work under the Frequency decoy scenarios and the R and RF decoys will be ineffective.

2.4.2-6 Evidence related to Wedell and Pettibone's (1996) interpretation of the Weight Change Model

Wedell (1991) and Wedell and Pettibone (1996) conducted a series of studies on the three ADE models, and their results argue against a Weight Change Model and support the Value Shift Model and the Emergent Value Model, which will be discussed in the later sections. Wedell (1991) also conducted experiments in gambling and again found the lack of support for the Weight Change Model in which he found no decoy effect for an RS decoy for which weight depended on range extension. Mellers and Cooke (1994) also concluded that their results were inconsistent with a weight-change model.

The conclusions of Wedell (1991) and Wedell and Pettibone (1996) have been widely accepted. For example, Highhouse (1996) asked 218 undergraduate psychology students to make judgments on job-candidates selecting situations and they were

required to rank order dimensions in terms of importance prior to assessing job candidates. No main effect for weighting condition on choice was evident. Highhouse concluded that the results failed to provide evidence in support of the weight-change explanation.

It is argued by Wedell and Pettibone (1996) that the failure to find a "weighting by target interaction" in Highhouse's (1996) study was due to a weak manipulation conducted under artificial circumstances. The experiment was designed based on the assumption that the initial weight goes to each dimension was equal. However, it should be noted that all participants were university students and who had little experience or knowledge of how to select candidates. For them, the weight of each dimension may have been 30-70 or 40-60, and it is possible that inexperienced participants only looked at the dimensions that they thought important and ignored the dimension that they considered useless, and then made their decisions. In other words, the decoys might not have had an effect on the choice behavior because the initial weights for each dimension were not equal. Their results support this, as nearly 70% of the subjects in the weighting condition expressed a preference for the work sample over the 'promotability' ratings. Indeed, Highhouse (1996) admitted that it is necessary to examine the decoy effect on the employee selection decisions by using experienced personnel decision makers in order to avoid the inexperienced participants dismissing different dimensions in their performance.

Tenbrunsel and Diekmann (2002) also found results contrary to the Weight Change Model. Seventy-one undergraduate students were asked to make different types of assessment judgments, which were evaluated on a 9-point scale, ranging from 1 to 9. A comparison of the importance ratings for the dominant attribute with that of the non-dominating attribute was not significant. These results also do not provide support for the Weight Change Model.

Ariely and Wallsten (1995) provide the most positive evidence in the literature supporting the Weight Change Model. They conducted experiments to test the decoy effect versus the non-decoy effect and the weight-change model. Sixty undergraduate students participated in the experiment. They were asked to indicate the relative importance of different dimensions using 100-points. Results demonstrated

systematic effects of decoys on importance ratings. That is, adding an inferior decoy changed the relative weight of a targeted dimension significantly, as inferred from direct importance ratings. However, the results further showed that the decoy did alter the weight of target dimensions, but in the opposite direction than that predicted by the weight-change model. Wedell and Pettibone (1996) criticised Ariely and Wallsten's (1995) findings because, although there was a systematic decoy effect on importance ratings, there was no way to validate the use of the importance ratings as a measure of weight, or to relate importance ratings directly to attractiveness ratings, since they did not test the attractiveness and the weighting changes in the same experiments. The small sample size of only 60 students in Ariely and Wallsten's study was also a concern. It was argued that the small sample size would have an impact on the power of the test, which directly raised questions about the generalisability of this study.

Wedell and Pettibone (1996) attempted to use multiple judgment tasks to study more precisely the processes of ADE in judgment rather than ADE in choice tasks. The method they used was different from Ariely and Wallsten (1995) in that judgments for several tasks were obtained from each participant. Hence, "the validity of the importance ratings can be established by finding a positive correlation between the importance of a dimension and the tendency to assign higher attractiveness values to alternatives with high values on that dimension" (Wedell & Pettibone, 1996, p.331).

One hundred and fifty-eight undergraduate students were involved in the experiments with twenty products or services being tested and R or F decoys used in each choice set. Participants were asked to make four different judgments in each choice set, but no choice questions were asked. The results of importance ratings were unsupportive of the weight-change model. In the overall analysis of the R decoy, the dimension that was extended received significantly more weight. This result is consistent with Ariely and Wallsten's (1995) study, which found similar results, but it is inconsistent with the Weight Change Model, which predicts that the R decoy will decrease the weight of the dimension that is extended.

2.4.2-7 Evidence related to Bonaccio and Reeve's (1996) interpretation of the Weight Change Model

Bonaccio and Reeve (2006) argue that the results of the dimensional importance ratings reported by Wedell and Pettibone (1996) and Ariely and Wallsten (1995) seem to support their interpretation of the Weight Change Model in that the Range decoy increased the weight of the dimension that it extended which is consistent with the prediction of their interpretation.

However, surprisingly, Bonaccio and Reeve (2006) did not find support for their interpretation of the Weight Change Model in their study. Bonaccio and Reeve conducted an experiment to test whether the Weight Change Model is a viable explanation for ADE. One hundred and sixty three undergraduate students participated in the experiment. They were asked to make choice and assess the judgment tasks. Results did not demonstrated systematic effects of decoys on importance ratings for both the R and F decoys according to their interpretation. In contrast, their results for the R decoy are consistent with the prediction of Wedell and Pettibone's (1996) interpretation of the Weight Change Model that the R decoy decreased the weight of the dimension that it extended.

There is a concern about the sample size in the study of Bonaccio and Reeve (2006). It is unclear what sample sizes are for each treatment group in the study of Bonaccio and Reeve (2006); whether the same sample size for one product across different treatment group or not. It is understood that if different sample sizes assigned to one product across different treatment group, then product with greater sample size will have more weight. In this case, the generalizability of the results that compare the results under different treatment group will be questioned.

2.4.2-8 Summary

There are two interpretations of the Weight Change Model; the explanation of Wedell and Pettiboen (1996) and that of Bonaccio and Reeve (2006). To date, there is little support for a Wedell and Pettibone's (1996) interpretation of the Weight Change Model. Pettibone and Wedell (2000) do not even think it is necessary to test the Weight Change Model because of the lack of supporting evidence. Both Ariely and

Wallsten (1995) and Wedell and Pettibone (1996) found the weight of the dimensions of products does change when a decoy was inserted. However they found the dimension that was extended received significantly more weight. This result is inconsistent with the prediction of the interpretation of Wedell and Pettibone (1996) on the Weight Change Model, which predicts that the R decoy will decrease the dimension that was extended. The F decoy was not found significant on the importance ratings.

Conversely, according to Bonaccio and Reeve's (2006) interpretation of the Weight Change Model, the results of Wedell and Pettibone (1996) and Ariely and Wallsten (1995) seem to support their interpretation because this proposed that the Range decoy increases the weight of the dimension that it extends. This suggested that the Weight Change Model might be a viable explanation for the ADE, although, surprisingly, Bonaccio and Reeve (2006) did not find support for their interpretation for both the R and F decoy. But, rather, their results show support for Wedell and Pettibone's (1996) interpretation.

Thus, it is unclear which interpretation of the Weight Change Model are supported based on their findings; that is, Wedell and Pettibone's (1996) results support Bonaccio and Reeve's (2006) interpretation of the Weight Change Model while Bonaccio and Reeve's results show support for Wedell and Pettibone's interpretation. It is suggested that a study should be conducted to test which interpretation is supported.

2.4.3 The Value Shift Model

2.4.3-1 Introduction

The Value Shift Model (see Figure 3) proposes that "decoys operate through changing the perceived attractiveness of the dimensional values of the alternatives" (Pettibone & Wedell, 2000, p.302), so that the "overall value of the targeted alternative is increased relative to the other alternative" in the choice set (Wedell & Pettibone, 1996, p.328). Tenbrunsel and Diekmann (2002) also studied this ADE phenomenon and

concluded that the presence of the ADD increases the attractiveness of the targeted brand because "the sum of the attribute values of a dominating alternative is greater than the sum of the attribute ratings of the non-dominating alternative" (p. 1153). In general, there are two theories that account for these changes: Huber et al.'s (1982) range-frequency theory (Parducci, 1965, 1995) and Tversky and Kahneman's (1991) loss aversion or reference dependent theory.

Range-frequency theory

Huber et al. (1982) proposed that the decoy effect is the result of the range-frequency theory, which explains the effect of "increasing the range of the dimension on which the target is weakest…[or]…increasing the frequency of the dimension on which the target is superior" (p. 92). Brennan and Xu (2007) make a good account of how the decoy effect occurs according to the range-frequency theory:

> "The reasoning is that, by extending the range of values on a dimension on which the targeted brand is inferior, the value of the target on that dimension now seems more reasonable compared with that of the competitor. Since the targeted brand is clearly superior to the decoy, it becomes a more acceptable choice option. Alternatively, increasing the frequency of the options with the same value as the target on one dimension makes this value seem more like the norm and makes the competitor's value seems less attractive. Again, as the target is clearly superior to the decoy on the other dimension, and the competitor now seems less attractive, the target becomes a more acceptable choice" (p. 3).

Simply said, the insertion of the asymmetrically dominated decoy (ADE) makes the weak dimension of the target brand seem more reasonable or stronger and the strong dimension of the target even more desirable.

For example, the target (Brand T) in the choice set of Table 4 is priced at $2.60 compared with $1.80 for Brand C, but the quality is higher than the competitor Brand C (Brand T: 70, Brand C: 50). In other words, compared with Brand C, the target Brand T is strong on the quality dimension but weak on the price dimension. The R decoy (brand R), which is positioned at the same level of quality as the target brand T

but much more expensive, is added to make the weak price dimension of the target brand less extreme (R strategy) (see Figure 4). Alternatively, this decoy, which can be positioned at a lower quality than the target brand T but at the same price level or even more expensive, will make the strong dimension of target brand T much stronger. Hence, the overall attractiveness of the target alternative is increased.

Loss-aversion theory

An alternative explanation, presented by Tversky and Kahneman (1991), advocates a reference-dependent theory of both risky and riskless choice (the presence of loss aversion). A central assumption underlying this theory is that "outcomes that are below the reference point (losses) are weighted more heavily than outcomes that are above the reference point (gains)" (Simonson & Tversky, 1992, p. 282). In short, losses generally appear larger than the corresponding gains.

Simonson and Tversky (1992) suggested a loss-aversion explanation for the compromise decoy; that is, alternatives in the choice set are valued relative to a reference point, with losses looming larger than equally sized gains. The inclusion of a compromise decoy (C_d) will cause the target brand to become the reference point, so that the valuation of the compromise decoy and competitor brand will suffer in comparison. This process would result in the selection of the target Brand T, as it is an intermediate option in the choice set and consumers are more willing to choose middle options in order to avoid big losses. The attractiveness of the competitor brand is diminished because it becomes an extreme option.

Taking the choice set in Figure 4 as an example again, the Targeted brand, which is the same quality as the R_A decoy, but at a lower price, is using as a reference. Thus, Brand T is equal to the decoy on quality attribute (or is a non-loss) and better on price attribute (or shows a moderate gain). In comparison to the target brand, the competitor brand (C) represents a large gain on price attribute, but it reflects a loss on quality attribute; therefore, consumers are more willing to choose the target brand rather than the competitor brand in order to avoid larger losses.

2.4.3-2 Evidence related to the Value Shift Model

Huber et al. (1982) conducted studies on ADE by using the R, F, and RF decoys. If the Value Shift Model holds, one would expect significant effects for all three types of decoys, with the RF having the largest effects because it combines both the R and F decoys. The results of Huber et al. (1982) did not support the Value Shift Model, as the RF showed the weakest effects, and the F decoy did not bring significant shifts in choice preferences.

However, most evidence found so far supports the Value Shift Model. In the study of Ariely and Wallsten (1995), participants were asked to set missing values in order to make the targeted brand equally attractive to the competitor brand. The results showed support for the Value Shift Model in that the insertion of the decoy increased the targeted attribute values.

Perhaps the strongest evidence for the Value Shift Model was provided by Wedell and Pettibone (1996) and Pettibone and Wedell (2000) in which participants were asked to make judgments on the dimension value ratings. The value ratings shifted with context in a way that produced a decoy effect on the overall attractiveness ratings of the alternatives. In a study which employed job-choice decision tasks, Tenbrunsel and Diekmann (2002) also found support for the Value Shift Model. Seventy-one undergraduate students were asked to make different types of assessment judgments, which were evaluated on a 9-point scale, ranging from 1 to 9. A comparison of the dimensional value ratings for the dominant attribute with that of the non-dominating attribute was significant. These results provide support for the Value Shift Model.

More recent evidence for value shift model came from a study of Bonaccio and Reeve (2006) which replicated the study of Wedell and Pettibone (1996). Bonaccio and Reeve (2006) conducted an experiment in class in which 163 undergraduate students participated. They were asked to make choice and assess the judgment tasks. Their results show that loss aversion can account for decoy effect.

2.4.3-3 Summary

The Value Shift Model explains the ADE from the subjective value change perspective. That is, "changes in preferences caused by inclusion of the decoy do not result from a change in the relative weighting of the dimensions but rather from a shift in the subjective values of the stimuli along the dimensions of judgment" (Wedell, 1991, p.769). Most evidence found so far supports the Value Shift Model (e.g., Tenbrunsel & Diekmann, 2002; Pettibone & Wedell, 2000; Wedell, 1991; Wedell & Pettibone, 1996). This suggests that the Value Shift Model is a viable explanation for ADE.

2.4.4 The Emergent Value Model (The Dominance Valuing Model or the Value Added Model)

2.4.4-1 Introduction

The Emergent Value Model, also know as the Dominance Valuing Model (Wedell, 1991) or the Value Added Model (Wedell & Pettibone, 1996), is different from both the Weight Change Model and the Value Shift Model in that it argues that choice is not just dependent on the changes on the weights or the values along the dimension but also relies on the relational aspects of the choice set (Wedell & Pettibone, 1996). The model proposes that the relationship between the targeted option and the decoy, that is, the domination of the decoy by the targeted option, makes the choice of the dominating alternative (the targeted brand) become easier to justify or explain and thus reduce the stress of making choice decision. Thus, "for the AD decoy, the presence or absence of dominance relationships may be a key determinant of the value added to the alternative" (Wedell and Pettibone, 1996, p.328). According to Simonson (1989), the Emergent Value Model explains the ADE from two bases: the need to justify one's choice, and the human nature of simplifying the choice process to reduce the stress of making choice decision.

A need to justify one's choice

Simonson (1989) suggests that one reason ADE happens is because people have the need to justify their choice, as "justification has been argued to be an important component of discrepancies in judgements" (Payne, 1982; Slovic et al., 1982, cited by Tenbrunsel & Diekmann, 2002, p.1152). Montgomery (1983) suggests that the relationship between alternatives is one source of justification. That is, decision makers may try to justify their choice decisions by seeking relationship among the alternatives; for example, whether one alternative is dominating (or superior to) other alternatives in the choice set. Thus, the insertion of a dominated alternative (i.e., a decoy) provides a reason for selecting the dominating brand (i.e., the targeted brand) because once the targeted brand is perceived to dominate the decoy, decision makers may choose it because it is more easily justified or explained (Tenbrunsel & Diekmann, 2002).

Human nature to reduce stress by simplifying the choice process

Simonson (1989) also suggests that the decoy effect may be due to the human nature to simplify their choice process and reduce the anxiety associated with choosing an alternative in a choice task. Thus, choosing a dominating alternative (i.e., the targeted brand) would allow decision makers to avoid difficult tradeoffs, and ensure that they do not choose the weakest alternative, thus they are less likely to be criticised from their peers for the choice (Slaughter, Sinar & Highhouse, 1999; Wedell, 1991; Highhouse, 1996).

2.4.4-2. Evidence related to the Emergent Value Model

Wedell and Pettibone (1996) provide strong evidence for the Emergent Value Model. They conducted an experiment which explored the cognitive models of asymmetrically dominated decoy effects among the undergraduate students. Participants were asked to assess how easily they could justify selecting each alternative in the choice set. The results showed support for the Emergent Value Model in that the insertion of an asymmetrically dominated decoy (ADD) resulted in higher justifiability of the targeted brands. Tenbrunsel and Diekmann (2002)

conducted experiments in job selection and also found support for the Emergent Value Model.

2.4.4-3 Summary

The Emergent Value Model differs from the Weight Change Model and the Value Shift Model in that it is assumed the reasoning behind consumers' choices does not depend on the integration of weights and dimensional values but rather the demands of the choice task or social situation (Pettibone & Wedell, 2000). This model has been found as a viable predictor for the ADE.

2.4.5 The relationship between choice and judgment

Recent studies of ADE have tended to use judgment tasks in order to test possible explanatory models of the ADD effect. However, most previous work (e.g., Huber, Payne & Puto, 1982; Heath & Chatterjee, 1995) used the choice task to study the decoy effect. The question is whether choice and judgment tasks are equivalent substitutes in ADE research. For example, Huber et al. (1982) studied the ADE in choice task, whereas Wedell and Pettibone (1996) used judgment tasks to examine the cognitive processes behind ADE. That is, Huber et al. (1982) attempted to explore different types of decoy, while Wedell (1996) tried to find out why and how ADD works on choice behaviour. Consequently, Huber et al. (1982) used choice while Wedell (1996) used judgment tasks. This difference remains an interesting question: does ADD have the same effect on choice and judgment.

In the other words, what is the relationship between choice and judgment? Since the study of the Wedell (1996) is based on the assumption that "the attractiveness judgments exhibit the same types of effects found in choice" (Ariely & Wallsten, 1995; Pettibone & Wedell, 2000; Simonson, 1989; cited in Tenbrunsel & Diekmann, 2002, p. 1154), it is important to test this assumption and thus enhance the validity of the judgment tasks in the research. One way in which the present research can provide a further test of the correspondence between decoy effects in judgment and choice is by including choice questions (see Tenbrunsel & Diekmann, 2002). The

assumption will be supported if the highest rated alternative in each choice set was the same as the choice responses. Pettibone and Wedell (2000) introduced choice tasks in their decoy study as well as the judgment tasks in order to examine the relationship between choice and judgment. Participants were asked to complete both tasks. Their results provide strong evidence that decoy effects in judgment tasks reflect the same pattern as found in the choice task.

2.4.6 The findings and limitations of Wedell and Pettibone (1996)

Wedell and Pettibone (1996) conduted a series of studies on the cognitive progress behind the ADE on choice behaviour. These studies of the three ADE models of Wedell and Pettibone (1996) are of practical importance for marketers, as they help to understand the cognitive process underlying choice and hence improve predictions in applied choice setting based on the assumptions of the models. Their findings support the Value Shift Model and the Emergent Value Model, but against the Weight Change Model.

However, there are some concerns about Wedell and Pettibone's (1996) study. There is a concern about the sample frame for their experiment. The experiment was conducted using a homogeneous population of students. However, students are not real customers, and they differ from the general population in terms of age, income and education level. It is unclear whether their cognitive processing for choice judgment is the same as for people from other segments of the population. Consequently, the generalizability of the results is questioned.

Another limitation of the Wedell and Pettibone (1996) is that they did not use a no-decoy condition as a control group to compare with the decoy-added condition, such as R condition or F condition, and hence the generalizability of the results is again questioned.

2.5 OVERALL SUMMARY

Since the introduction of the asymmetrically dominated decoy effect (ADE) by Huber et al. in 1982, ADE has been one of the most researched topics in marketing, because it violates the similarity hypothesis and the regularity principle (Tversky, 1972), both of which are fundamental assumptions for most choice models. ADE not only appears to be robust in commercial choice situations but also in most non-commercial choice situations, such as political issues, and job recruitment. Huber et al. (1982) also found that different decoy placement strategies (R, R*, F, RF) have different effects on choice behaviour, and asserted that the choice share of the target brand can be increased in a predicted direction by using these four placement strategies.

A number of market researchers and psychologists have tried to explain the effect of the asymmetrically dominated decoy (ADD). Three models of ADE have been developed and described in the literature to account for how and why ADD influences decision maker's choice behaviour: the Weight Change Model, the Value Shift Model, and the Emergent Value Model (Wedell, 1991; Pettibone & Wedell, 1996).

Wedell (1991) and Wedell and Pettibone (1996) conducted a series of studies on the three models. Their results argue against the Weight Change Model of decoy effects and support the Value Shift Model and the Emergent Value Model. As a result, Pettibone and Wedell (2000) did not think it necessary to test the Weight Change Model because of the lack of supporting evidence. The results of Wedell and Pettibone (1996) have been widely accepted (see Highhouse, 1996; Pettibone & Wedell, 2000; Tenbrunsel & Diekmann, 2002).

However, Bonaccio and Reeve (2006) propose a different interpretation of the Weight Change Model. They argue that the lack of the supporting evidence of the model is a result of misinterpretation of the original Weight Change Formulation derived from Huber et al. (1982). They suggest that the Weight Change Model is a viable explanation for ADE as the results of Wedell and Pettibone (1996) and Ariely and Wallsten (1995) seem to support their interpretation of the Weight Change Model. However, surprisingly, Bonaccio and Reeve (2006) did not find support for their

interpretation in their study for both the R and F decoy. But, rather, their results for the R decoy show support for Wedell and Pettibone's (1996) interpretation.

The predictions and results for both Wedell and Pettibone (1996) and Bonaccio and Reeve (2006) are contrast to each other, that is, Wedell and Pettibone's (1996) results support Bonaccio and Reeve's (2006) interpretation of the Weight Change Model while Bonaccio and Reeve's results show support for Wedell and Pettibone's interpretation. It is unclear which interpretation of the Weight Change Model is supported based on their findings. It is suggested that a study should be conducted to test which interpretation of the Weight Change Model is supported.

On the whole, the study of the three ADE models are of practical importance for marketers, as they help to understand the cognitive process underlying the ADE on choice decision, and a good understanding can help to improve predictions in applying ADE strategies into choice setting. However, it is found that most of the studies of the three ADE models were limited to paper-and-pencil tests with homogeneous populations of students in a class or via computer (for example, see Bonaccio & Reeve, 2006; Pettibone & Wedell, 2000; Tenbrunsel & Diekmann, 2002; Wedell & Pettibone, 1996). Also, few studies were done across different segments, and no study has been reported that tests the three ADE models using a No-decoy control group. Thus, it is unclear whether the three ADE models can be applied to the general population.

The purpose of this research was to test whether there is evidence to support the three ADE models by using choice and judgment tasks in a wide cross-section of people. A comprehensive discussion of the specific objectives and hypotheses for this research is presented in the next section.

3. Objectives

The purpose of this research was to seek the empirical evidence to support the three asymmetrically dominated decoy effect (ADE) models described by Wedell and Pettibone (1996): the Weight Change Model, the Value Shift Model, and the Emergent Value Model.

In particular, this research examines the assumptions underlying the three models by using choice and judgment tasks, replicating and extending the work of Wedell and Pettibone (1996) and Bonaccio and Reeve (2006).

In order to address the main research question, the following questions are also addressed:

1. Do decoy effects occur in both the choice and judgment tasks employed in the present study? and

2. Do the judgment tasks reflect the same pattern of decoy effects as the choice task? That is, are judgement tasks a valid substitute for choice tasks in ADE experiments?

To address these questions, this study involves a choice task and a range of judgment tasks using the descriptive scales from Wedell and Pettibone (1996) and Bonaccio and Reeve (2006).

3.1 HYPOTHESES

The following hypotheses were developed on the basis of previous research and discussion reported in the literature.

3.1.1 Effect of decoy on choice behaviour

H1. The proportion of respondents choosing an alternative in a choice set will be higher when that alternative is targeted by a decoy (R or F) than when its competitor brand is targeted. More specifically:

H1a. When Brand A is the target of a Range decoy (i.e., R_A), the proportion of respondents choosing Brand A from the choice set {A,B,C} will be higher than when the target of the Range decoy is Brand B (i.e., R_B). That is, choice of Brand A should be greater with R_A than R_B.

H1b. When Brand B is the target of a Range decoy (i.e., R_B), the proportion of respondents choosing Brand B from the choice set {A,B,C} will be higher than when the target of the Range decoy is Brand A (i.e., R_A). That is, choice of Brand B should be greater with R_B than R_A.

H1c. When Brand A is the target of a Frequency decoy (i.e., F_A), the proportion of respondents choosing Brand A from the choice set {A,B,C} will be higher than when the target of the Frequency decoy is Brand B (i.e., F_B). That is, choice of Brand A should be greater with F_A than F_B.

H1d. When Brand B is the target of a Frequency decoy (i.e., F_B), the proportion of respondents choosing Brand B from the choice set {A,B,C} will be higher than when the target of the Frequency decoy is Brand A (i.e., F_A). That is, choice of Brand B should be greater with F_B than F_A.

H2. The proportion of choosing an alternative in a choice set will be higher when that alternative is targeted by a decoy (R or F decoy) than when no decoy is added into the choice set. More specifically,

H2a. When Brand A is the target of a Range decoy (i.e., R_A), the proportion of respondents choosing Brand A from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, choice of Brand A should be greater with R_A than No-decoy.

H2b. When Brand B is the target of a Range decoy (i.e., R_B), the proportion of respondents choosing Brand B from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, choice of Brand B should be greater with R_B than No-decoy.

H2c. When Brand A is the target of a Frequency decoy (i.e., F_A), the proportion of respondents choosing Brand A from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, choice of Brand A should be greater with F_A than No-decoy.

H2d. When Brand B is the target of a Frequency decoy (i.e., F_B), the proportion of respondents choosing Brand B from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, choice of Brand B should be greater with F_B than No-decoy.

3.1.2 Effect of decoy on judgment of brand attractiveness

H3. An alternative in a choice set will be perceived as more attractive when it is targeted by a decoy (R or F decoy) than when its competitor brand is targeted.

H3a. When Brand A is the target of a Range decoy (i.e., R_A), the attractiveness ratings of Brand A from the choice set {A,B,C} will be higher than when the target of the Range decoy is Brand B (i.e., R_B). That is, the mean rating for Brand A should be higher with R_A than R_B.

H3b. When Brand B is the target of a Range decoy (i.e., R_B), the attractiveness ratings of Brand B from the choice set {A,B,C} will be higher than when the target of the Range decoy is Brand A (i.e., R_A). That is, the mean rating for Brand B should be higher with R_B than R_A.

H3c. When Brand A is the target of a Frequency decoy (i.e., F_A), the attractiveness ratings of Brand A from the choice set {A,B,C} will be higher than when the target of the Frequency decoy is Brand B (i.e., F_B). That is, the mean rating for Brand A should be higher with F_A than F_B.

H3d. When Brand B is the target of a Frequency decoy (i.e., F_B), the attractiveness ratings of Brand B from the choice set {A,B,C} will be higher than when the target of the Frequency decoy is Brand A (i.e., F_A). That is, the mean rating for Brand B should be higher with F_B than F_A.

H4. An alternative in a choice set will be perceived as more attractive when it is targeted by a decoy (R or F decoy) than when no decoy is added into the choice set.

H4a. When Brand A is the target of a Range decoy (i.e., R_A), the attractiveness ratings of Brand A from the choice set {A,B,C}will be higher than when no decoy is added into the choice set {A,B}. That is, the mean rating for Brand A should be higher with R_A than No-decoy.

H4b. When Brand B is the target of a Range decoy (i.e., R_B), the attractiveness ratings of Brand B from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. T That is, the mean rating for Brand B should be higher with R_B than No-decoy.

H4c. When Brand A is the target of a Frequency decoy (i.e., F_A), the attractiveness ratings of Brand A from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, the mean rating for Brand A should be higher with F_A than No-decoy.

H4d. When Brand B is the target of a Frequency decoy (i.e., F_B), the attractiveness ratings of Brand B from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, the mean rating for Brand B should be higher with F_B than No-decoy.

3.1.3 The relationship between judgment and choice

H5. The decoy effect will have a similar effect in both choice and judgment tasks. That is, the highest rated alternatives in brand attractiveness judgment task will match the alternatives chosen in the choice task.

3.1.4 Weight Change Model: Effect of decoy on judgment of attribute (dimensional) importance

Wedell and Pettibone (1996) and Bonaccio and Reeve (2006) have different interpretations on the weight change model. Thus, the hypotheses based on them are developed separately.

According to Wedell and Pettibone (1996):

H6. When a Range decoy or a Frequency decoy is added to a choice set, the dimension on which the targeted brand is superior to the competitor brand, will be perceived as having more importance or weight than when the competitor brand is the target.

H6a. When Brand A is the target of a Range decoy (i.e., R_A), the importance ratings of Dimension 1, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be higher than when the target of the Range decoy is Brand B (i.e., R_B). That is, the mean rating for Dimension 1 should be higher with R_A than R_B.

H6b. When Brand B is the target of a Range decoy (i.e., R_B), the importance ratings of Dimension 2, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be higher than when the target of the Range decoy is Brand A (i.e., R_A). That is, the mean rating for Dimension 2 should be higher with R_B than R_A.

H6c. When Brand A is the target of a Frequency decoy (i.e., F_A), the importance ratings of Dimension 1, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be higher than when the target of the Frequency decoy is Brand B (i.e., F_B). That is, the mean rating for Dimension 1 should be higher with F_A than F_B.

H6d. When Brand B is the target of a Frequency decoy (i.e., F_B), the importance ratings of Dimension 2, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be greater than when the target of the Frequency decoy is Brand A (i.e., F_A). That is, the mean rating for Dimension 2 should be higher with F_B than F_A.

H7. When a Range decoy or a Frequency decoy is added to a choice set, the dimension on which the targeted brand is superior to the competitor brand will be perceived as having more importance or weight than when no decoy is added to the choice set.

H7a. When Brand A is the target of a Range decoy (i.e., R_A), the importance ratings of Dimension 1, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be higher than when no decoy is added into the choice set {A,B}. That is, the mean rating for Dimension 1 should be higher with R_A than No-decoy.

H7b. When Brand B is the target of a Range decoy (i.e., R_B), the importance ratings of Dimension 2, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be higher than when no decoy is added into the choice set {A,B}. That is, the mean rating for Dimension 2 should be higher with R_B than No-decoy.

H7c. When Brand A is the target of a Frequency decoy (i.e., F_A), the importance ratings of Dimension 1, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be higher than when no decoy is added into the choice set {A,B}. That is, the mean rating for Dimension 1 should be higher with F_A than No-decoy.

H7d. When Brand B is the target of a Frequency decoy (i.e., F_B), the importance ratings of Dimension 2, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be higher than when no decoy is added into the choice set {A,B}. That is, the mean rating for Dimension 2 should be higher with R_B than No-decoy.

Alternatively, according to Bonaccio and Reeve (2006):

H8. When a Range decoy is added, the dimension on which the range of values is extended, and on which the targeted brand is inferior to the competitor brand, will perceived as having more importance or weight than when the competitor brand is the target. When a Frequency decoy is added, the predictions are the same as for Wedell and Pettibone (1996).

H8a. When Brand A is the target of a Range decoy (i.e., R_A), the importance ratings of Dimension 1, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be lower than when the target of the Range decoy is Brand B (i.e., R_B). That is, the mean rating for Dimension 1 should be higher with R_B than R_A.

H8b. When Brand B is the target of a Range decoy (i.e., R_B), the importance ratings of Dimension 2, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be lower than when the target of the Range decoy is Brand A (i.e., R_A). That is, the mean rating for Dimension 2 should be higher with R_A than R_B.

H8c. Same as H6c.

H8d. Same as H6d.

H9. When a Range decoy is added, the dimension on which the range of values is extended, and on which the targeted brand is inferior to the competitor brand, will perceived as having more importance or weight than when no decoy is

added into the choice set. When a Frequency decoy is added, the predictions are the same as Wedell and Pettibone (1996).

H9a. When Brand A is the target of a Range decoy (i.e., R_A), the importance ratings of Dimension 1, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be lower than when no decoy is added into the choice set {A,B}. That is, the mean rating for Dimension 1 should be higher with R_A than No-decoy.

H9b. When Brand B is the target of a Range decoy (i.e., R_B), the importance ratings of Dimension 2, on which the targeted brand from the choice set {A,B,C} is superior to the competitor brand, will be lower than when no decoy is added into the choice set {A,B}. That is, the mean rating for Dimension 2 should be higher with R_B than No-decoy.

H9c. Same as H7c.

H9d. Same as H7d.

3.1.5 Value Shift Model: Effect of decoy on judgment of dimensional value

H10. The combined dimensional attractiveness ratings will be higher for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when the decoy is targeting the competitor brand.

H10a. When Brand A is the target of a Range decoy (i.e., R_A), the combined dimensional values of Brand A from the choice set {A,B,C} will be higher than when the target of the Range decoy is Brand B (i.e., R_B). That is, the mean combined dimensional value rating for Brand A should be higher with R_A than R_B.

H10b. When Brand B is the target of a Range decoy (i.e., R_B), the combined dimensional values of Brand B from the choice set {A,B,C} will be

higher than when the target of the Range decoy is Brand A (i.e., R_A). That is, the mean combined dimensional value rating for Brand B should be higher with R_B than R_A.

H10c. When Brand A is the target of a Frequency decoy (i.e., F_A), the combined dimensional values of Brand A from the choice set {A,B,C} will be higher than when the target of the Frequency decoy is Brand B (i.e., F_B). That is, the mean combined dimensional value rating for Brand A should be higher with F_A than F_B.

H10d. When Brand B is the target of a Frequency decoy (i.e., F_B), the combined dimensional values of Brand B from the choice set {A,B,C} will be higher than when the target of the Frequency decoy is Brand A (i.e., F_A). That is, the mean combined dimensional value rating for Brand B should be higher with F_B than F_A.

H11. The combined dimensional attractiveness ratings will be higher for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when no decoy is added into the choice set.

H11a. When Brand A is the target of a Range decoy (i.e., R_A), the combined dimensional values of Brand A from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, the mean combined dimensional value rating for Brand A should be higher with R_A than No-decoy.

H11b. When Brand B is the target of a Range decoy (i.e., R_B), the combined dimensional values of Brand B from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, the mean combined dimensional value rating for Brand B should be higher with R_B than No-decoy.

H11c. When Brand A is the target of a Frequency decoy (i.e., F_A), the combined dimensional values of Brand A from the choice set {A,B,C} will be

higher than when no decoy is added into the choice set {A,B}. That is, the mean combined dimensional value rating for Brand A should be higher with F_A than No-decoy.

H11d. When Brand B is the target of a Frequency decoy (i.e., F_B), the combined dimensional values of Brand B from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, the mean combined dimensional value rating for Brand B should be higher with F_B than No-decoy.

3.1.6 Emergent value model: Effect of decoy on judgment of justifiability

H12. Ratings of justifiability will be higher for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when the decoy is targeting the competitor brands.

H12a. When Brand A is the target of a Range decoy (i.e., R_A), the justifiability ratings of Brand A from the choice set {A,B,C} will be higher than when the target of the Range decoy is Brand B (i.e., R_B). That is, the mean rating for Brand A should be higher with R_A than R_B.

H12b. When Brand B is the target of a Range decoy (i.e., R_B), the justifiability ratings of Brand B from the choice set {A,B,C} will be higher than when the target of the Range decoy is Brand A (i.e., R_A). That is, the mean rating for Brand B should be higher with R_B than R_A.

H12c. When Brand A is the target of a Frequency decoy (i.e., F_A), the justifiability ratings of Brand A from the choice set {A,B,C} will be higher than when the target of the Frequency decoy is Brand B (i.e., F_B). That is, the mean rating for Brand A should be higher with F_A than F_B.

H12d. When Brand B is the target of a Frequency decoy (i.e., F_B), the justifiability ratings of Brand B from the choice set {A,B,C} will be

higher than when the target of the Frequency decoy is Brand A (i.e., F_A). That is, the mean rating for Brand B should be higher with F_B than F_A.

H13. Ratings of justifiability will be higher for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when no decoy is added into the choice set.

H13a. When Brand A is the target of a Range decoy (i.e., R_A), the justifiability ratings of Brand A from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, the mean rating for Brand A should be higher with R_A than No-decoy.

H13b. When Brand B is the target of a Range decoy (i.e., R_B), the justifiability ratings of Brand B from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, the mean rating for Brand B should be higher with R_B than No-decoy.

H13c. When Brand A is the target of a Frequency decoy (i.e., F_A), the justifiability ratings of Brand A from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, the mean rating for Brand A should be higher with F_A than No-decoy.

H13d. When Brand B is the target of a Frequency decoy (i.e., F_B), the justifiability ratings of Brand B from the choice set {A,B,C} will be higher than when no decoy is added into the choice set {A,B}. That is, the mean rating for Brand B should be higher with F_B than No-decoy.

3.1.7 Emergent value model: Effect of decoy on judgment of evaluation anxiety

H14. Ratings of evaluation anxiety will be lower for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when a decoy is targeting the competitor brands.

H14a. When Brand A is the target of a Range decoy (i.e., R_A), the evaluation anxiety ratings of Brand A from the choice set {A,B,C} will be lower than when the target of the Range decoy is Brand B (i.e., R_B). That is, the mean rating for Brand A should be lower with R_A than R_B.

H14b. When Brand B is the target of a Range decoy (i.e., R_B), the evaluation anxiety ratings of Brand B from the choice set {A,B,C} will be lower than when the target of the Range decoy is Brand A (i.e., R_A). That is, the mean rating for Brand B should be lower with R_B than R_A.

H14c. When Brand A is the target of a Frequency decoy (i.e., F_A), the evaluation anxiety ratings of Brand A from the choice set {A,B,C} will be lower than when the target of the Frequency decoy is Brand B (i.e., F_B). That is, the mean rating for Brand A should be lower with F_A than F_B.

H14d. When Brand B is the target of a Frequency decoy (i.e., F_B), the evaluation anxiety ratings of Brand B from the choice set {A,B,C} will be lower than when the target of the Frequency decoy is Brand A (i.e., F_A). That is, the mean rating for Brand B should be lower with F_B than F_A.

H15. Ratings of evaluation anxiety will be lower for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when no decoy is added into the choice set.

H15a. When Brand A is the target of a Range decoy (i.e., R_A), the evaluation anxiety ratings of Brand A from the choice set {A,B,C} will be lower than when no decoy is added into the choice set {A,B}. That is, the mean rating for Brand A should be lower with R_A than No-decoy.

H15b. When Brand B is the target of a Range decoy (i.e., R_B), the evaluation anxiety ratings of Brand B from the choice set {A,B,C} will be lower than when no decoy is added into the choice set {A,B}. That is, the mean rating for Brand B should be lower with R_B than No-decoy.

H15c. When Brand A is the target of a Frequency decoy (i.e., F_A), the evaluation anxiety ratings of Brand A from the choice set {A,B,C} will be lower than when no decoy is added into the choice set {A,B}. That is, the mean rating for Brand A should be lower with F_A than No-decoy.

H15d. When Brand B is the target of a Frequency decoy (i.e., F_B), the evaluation anxiety ratings of Brand B from the choice set {A,B,C} will be lower than when no decoy is added into the choice set {A,B}. That is, the mean rating for Brand B should be lower with F_B than No-decoy.

4. Method

This study replicated and extended the studies of Wedell and Pettibone (1996) and Bonaccio and Reeve (2006) by using both choice and judgment tasks to examine three models of the asymmetrically dominated decoy effect (ADE): the Weight Change Model, the Value Shift Model, and the Emergent Value Model.

4.1 SURVEY METHOD

The study was conducted via a mail survey. A mail survey of 960 members of the general public was conducted between November 19th, and December 18th, 2007. A reminder was sent 10 days after the first mailing. After one reminder to non-respondents, 302 valid questionnaires had been obtained by December 18th, 2007, representing an overall response rate of 32%.

4.1.1 Rationale for using a mail survey

In Wedell and Pettibone's (1996) study, the experiment was conducted by using an electronic questionnaire via computers, and students participated in the experiment to obtain course credits. In contrast, Massey University has a policy of not allowing surveys to be conducted during class time and students cannot get credits for participating in surveys. There is also not an adequate number of students in each class, and class attendance is voluntary and varies, so it would be difficult to achieve an adequate sample size. In addition, it should be noted that highly advanced computer skills are necessary to design an electronic questionnaire and to maintain, control, and collect the data. This option was not available.

An alternative would have been to conduct a mall-interview with shoppers, but this option was considered inappropriate as the purpose of the research was to understand the process of choice making, which requires high-involvement condition.

Conducting such a survey in a busy and uncontrolled environment was not likely to produce a valid result.

A mail survey was chosen as it is a relatively cheap method for obtaining responses from a wide cross-section of people, which was needed in this research. There is also no time pressure during a mail survey. As the purpose of the research was to investigate the cognitive process of judgment making, time was required to complete the questionnaire. During a mail survey, respondents have time to sit down to consider and complete the questionnaire, meaning that the answers can reflect the cognitive processes of the respondents. There are some concerns about using a mail survey, however, for instance, poor response rates are possible due to the uncontrolled environment. This is not an issue so long as the composition of the different treatment groups does not differ. This was achieved by balancing the groups in terms of gender and age. Literacy could also be a problem. However, in this survey, the questionnaires were very simple and a high degree of literacy was not required.

Wedell and Pettibone (1996), Bonaccio and Reeve (2006), and most other researchers on ADE models, conducted experiments among university students. However, there is a need to ask people from other segments of the population as well. By using a mail survey, a wider cross-section of respondents can be obtained, and the results are more generalisable. Therefore, it was appropriate to conduct a mail survey in this research.

4.2 SAMPLE

A systematically selected random sample of 960 New Zealanders living in Wanganui, a medium-sized city in New Zealand, was drawn from the electoral roll. After sorting by age and gender, sample members were allocated to one of five treatment groups balanced in terms of gender and age category based on information in the electoral roll. Each treatment group was sent a mail questionnaire containing different content, reflecting the different ADE treatment examined in the study. The mail sample size for each treatment group is shown in Table 6. No statistical significant difference was found among the five treatment groups with regard to age and gender.

Table 6. The Mail Sample Size for Each Treatment Group

Group 1	Group 2	Group 3	Group 4	Group 5
192	191	194	192	191

4.3 RESEARCH DESIGN

The topic of the survey was a study of how people make choices, and required respondents to answer questions regarding choice and judgment. The usual demographic and personal information was also gathered.

The basic design variables were:

1). **Within-subject variables** which included

a. Decoy type, R or F, targeting Brand A or B

b. Decoy target, Brand A or B

c. Choice domain (products): beer, cars, restaurants, MP3 players and chocolate bars

2). **Between-subjects variables** which included:

a. Task order, which consisted of five counterbalanced orders in which to perform the judgment task

4.3.1 The assignment of decoys to each treatment group

In total, there were five treatment groups. For each group there were five choice sets, each using different decoys for each of five products (see Table 7).

Table 7. Assignment of Decoys to Each Treatment Group

Domain/Stimuli	Group 1	Group 2	Group 3	Group 4	Group 5
Beer	**No-decoy**	R_A	R_B	F_A	F_B
Car	F_B	**No-decoy**	R_A	R_B	F_A
Restaurant	F_A	F_B	**No-decoy**	R_A	R_B
MP3 Player	R_B	F_A	F_B	**No-decoy**	R_A
Chocolate Bar	R_A	R_B	F_A	F_B	**No-decoy**

4.4 MATERIALS

The questionnaire was a 16 pages A4 booklet. Five versions were produced for each treatment group. Each version has the same format: five sets of choice set in the order: beer, cars, restaurants, MP3 players and chocolate bars; for each choice set, five judgment tasks were presented using scales from Wedell and Pettibone (1996): Attractiveness, Importance, Dimensional value, Justifiability, and Evaluation anxiety, followed by a question on recent usage of the product; following the 5 choice set, then five choice questions were asked for each of the five products; demographic information were also asked at the end of the questionnaire. Thus, each treatment group was required to make 25 judgments and 5 choices.

The stimuli or products used in this study were **beer, cars, restaurants, MP3 players and chocolate bars**. Each choice set contained two superior options (Brand A or Brand B) with competing strengths and weaknesses, and a relatively inferior decoy (R or F), which was dominated by the targeted alternative (Brand A or B) on one attribute (e.g., price or quality). Each option in the set was defined on two dimensions, such as price and quality (beer, chocolate bar), petrol consumption and ride quality (car), driving time and food quality (restaurant), and price and storage capacity (MP3 player). The products and the value of the products used were the same as those used in the study of the effect of asymmetrically dominated decoys by Xu (2006) and Brennan and Xu (2007). These closely followed the values used by Huber et al. (1982) and were adjusted to reflect the current values in the New Zealand market. A description of the five stimuli is provided in Table 8.

Table 8. Choice Sets Used in Study: Value for Each Option

Domain/Stimuli	Dimensions	Choice options					
		A	**B**	**R_A**	**R_B**	**F_A**	**F_B**
Beer (12 packs)	Price ($)	13.00	17.00	13.00	19.00	15.00	17.00
	Quality (1 to 100)	50	70	40	70	50	60
Car	Petrol Consumption (liters/100 kilometres)	8	10	8	11	9	10
	Ride quality (1 to 100)	80	100	70	100	80	90
Restaurant	Driving time from home (minutes)	5	25	5	35	15	25
	Food quality (1 to 5 Stars)	3	5	2	5	3	4
MP3 Player	Price ($)	99.00	299.00	99.00	399.00	199.00	299.00
	Storage Capacity (GB)	3	5	2	5	3	4
Chocolate Bar (50g)	Price ($)	1.00	2.00	1.00	2.50	1.50	2.00
	Quality (1 to 100)	50	70	40	70	50	60

Notes: 1. A = low price/quality; B = high price/quality
2. R_A or F_A refer to the R or F decoy, which favour on the dimension that the target Brand **A** is superior to the competitor Brand B; Brand **A** is the target;
3. R_B or F_B refer to the R or F decoy, which favour on the dimension that the target Brand **B** is superior to the competitor Brand A; Brand **B** is the target

For each product, participants were asked to make five types of judgments, which were designed to test:

-whether the decoy effect occurred;

-whether the decoy induced by different changes according to the three models: the Weight Change Model, the Value Shift Model, and the Emergent Value Model.

4.4.1 Five judgment and one choice tasks

The judgment tasks included the following sets of 9-point scales:

1) Attractiveness. Participants rated the overall attractiveness of each alternative in the choice set. It was assumed that attractiveness ratings would reflect the same type of decoy effects found in a choice task (Ariely & Wallsten, 1995; Simonson, 1989; Wedell & Pettibone, 1996). An alternative should be more attractive when targeted by the decoy than when the decoy targets the competitor brand or when no decoy is added to the choice set.

2) Importance. Participants made a judgment of the importance of each of the two attributes for each choice set. This task was used to test for **the Weight Change Model.** Wedell and Pettibone (1996) and Bonaccio and Reeve (2006) have different interpretations of the weight change model. According to Wedell and Pettibone (1996), to support this model, a greater importance would be assigned to the dimension on which the targeted brand is superior to the competitor brand, while according to Bonaccio and Reeve (2006), the dimension that has more variability will be perceived as more important and has more weight if the weight change model is supported.

3) Dimensional value. Participants rated the attractiveness of each alternative on each of its dimensions. These judgments tested for subjective changes in the dimensional values as predicted by the V**alue Shift Model**. To support the value shift model, the combined dimensional attractiveness ratings should be higher for an alternative in a choice set when targeted by the decoy than its competitor is the target of the decoy or when no decoy is added to the choice set.

4) Justifiability. Participants rated how easily they could justify their selection of each alternative in a choice set. This task was designed to test the **Emergent Value Model**. To support it, the justifiability ratings should be higher for an alternative in a choice set when targeted by the decoy than when the decoy is targeting the competitor brand or when no decoy is added to the choice set.

5) Evaluation-anxiety. Participants rated the degree to which they believed they would be criticised by their peers if they chose one brand in the choice set. This task was also designed to test **the Emergent Value Model**. To support it, the evaluation anxiety ratings for the targeted brand in a choice set should be lower than when its competitor brand is the target or when no decoy is added to the choice set.

6) Choice. For each product, respondents were asked to choose one preferred brand. Choice questions were used to verify that the attractiveness ratings of each alternative reflected the same pattern as the choice task. If a decoy effect occurs, the proportion of choosing an alternative in a choice set should be higher when it is targeted by a

decoy (R or F decoy) than when its competitor brand is targeted or when no decoy is added to the choice set.

The research was designed to test the assumption of prior research that "the attractiveness judgments exhibit the same types of effects found in choice" (Ariely & Wallsten, 1995; Pettibone & Wedell, 2000; Simonson, 1989; cited in Tenbrunsel & Diekmann, 2002, p. 1154). It is important to test this assumption and thus enhance the validity of the judgment tasks in the research. The assumption of equivalence between judgment and choice is supported if the highest rated alternative in each choice set was the same as the alternative chosen in the choice task.

4.5 PROCEDURE

Participants were asked to make five types of judgments for each of five choice sets. A 9-point scale was used for the judgments, following the study of Wedell and Pettibone (1996). Attractiveness, importance, justifiability, and dimensional value ratings were made on 9-point scales with **1** labelled "*not at all*" followed by the label *"attractive", "justifiable", or "important*", and 9 labelled *"very",* followed by the relevant dimension label. Although it is argued that 9-point scale might be too many for participants to make a judgment, as participants might become confused when too many scale points are used, a 9-point scale was used in this research in order to compare the results with those of Wedell and Pettibone (1996).

After completing the judgment tasks for five different products, respondents answered five choice questions (one for each of the five products), and to complete a 5-point price sensitive scale, then a set of demographic questions. Each choice set was represented as a 3 X 2 table, with the three rows corresponding to the three options and the two columns corresponding to the two dimensions (for details, see example in Appendix E). The order in which judgments were made did not change across treatment groups or products. The questionnaire took approximately 17 minutes to complete.

4.6 ANALYSIS

T-tests and analysis of variance (ANOVA) were used to analyse the judgment data obtained from the different tasks and thus determined whether or not specific models were supported by the data. A cross-tabulation procedure was conducted to analyse the relationship between choice and judgment.

Wedell and Pettibone (1996) only analysed the data under the decoy conditions (e.g., R_A vs R_B or F_A vs F_B). Bonaccio and Reeve (2006) followed the same analysis in their decoy effect study. According to them, if the decoy effect occurs, then the mean rating for a brand (e.g Brand A) will be higher when it is the target of a decoy (e.g. R_A, F_A) than when the competitor brand (e.g. Brand B) is the target (e.g. R_B, F_B). That is, the mean ratings of Brand A will be higher under the R_A condition than under the R_B condition, while the mean ratings of Brand B will be higher under the R_B condition than under the R_A condition. This assumption was also followed in this research.

As well as replicating the analysis of Wedell and Pettibone (1996), an alternative analysis was used. The comparisons used by Wedell and Pettibone (1996) (e.g., R_A vs. R_B) only deal with the mean ratings of alternatives under decoy conditions (the comparison is whether the alternative or competitor is targeted by the decoy). While this indicates whether or not the decoy works for the target brands, it is a weaker test of ADE than a comparison of the decoy with a No-decoy situation (e.g., R_A vs. No-decoy); all the results of this analysis cannot be used to support marketing decisions of whether to use a decoy or not, as the effects of the decoy comparisons (e.g., R_A vs. R_B, F_A vs. F_B) produce larger decoy effect compared with a decoy vs. No-decoy comparison; R_A vs. R_B (or F_A vs. F_B) generate ratings shift in opposite directions to each other. Thus, in this study, an alternative approach is used, with decoy condition compared with a No-decoy condition to determine whether or not there is stronger evidence of decoy effect.

Wedell and Pettibone (1996) used the overall mean criterion instead of the mean at the product level criterion to analyse the results while Bonaccio and Reeve (2006) used the mean at the product level criterion to analyse data. There is no right answer

for which criterion is used to analyse the data as both criteria have good and bad side. For example, the overall mean can analyse the ADE in a general term instead of specific products and thus the results can be more generalizable. However, it can be affected more by some individual mean at the product level if they have bigger sample size and thus the results are not generalizable. On the other hand, the mean at the product level will not affected by different sample size but it is possible that they cannot represent the general product categories and thus the results have the generalizability issue as well. In this study, both criteria (the overall mean and the mean at the product level) are used.

4.7 SUMMARY

The methodology used in this study is summarised in Table 9 where it is compared with that used by Wedell and Pettibone (1996) and Bonaccio and Reeve (2006), which was replicated in this research.

Table 9. A comparison of the Current Study with Wedell and Pettibone (1996), and Bonaccio and Reeve (2006)

	Wedell and Pettibone (1996)	**Bonaccio and Reeve (2006)**	**This Study**
Sample Size	158	163	302
Respondents' Ages	Unclear, but presumably approximately 18-25, since all participants were undergraduate students	Unclear, but presumably approximately 18-25, since all participants were undergraduate students	Between 16-65 years of old, a wide range across sections of people
Method	In-class experiment, all materials and instructions were presented on computers.	In-class experiment, all materials and instructions were presented on a booklet.	Mail survey
Country	United States	United States	New Zealand
Products	**20** products or services	**4** products or service; Job offers, Plane tickets, parking permits, and cameras	Five products and services; Beer, cars, restaurants, MP3 players, chocolate bars
Instrument	Four judgment tasks to test three ADE models;	Using both judgment and choice tasks to test the weight change model; four decoy conditions (R_A, R_B, F_A, F_B)	Using both judgment and choice tasks; five judgment tasks and one choice question (control group); five decoy conditions (R_A, R_B, F_A, F_B, Non-decoy)
Population	U.S university students	U.S university students	A wide cross-section of people randomly selected from electronic roll for a median size city in New Zealand

5. Results

The data collected from the mail survey are analysed at varying aggregated and individual levels. The results of these analyses, for each product category, are presented and discussed in the following sections. In the initial section, the data are examined by using exploratory data analysis. Then the results obtained from the choice and judgment tasks are presented. Analysis of variance (ANOVA) and paired t-test is used to test whether the results of five judgment tasks under different decoy conditions are statistically significant. Cross-tabulation procedures are also used to test the relationship between choice and judgments, using chi-square tests to test the significance of the results. A significance level of 0.05 is used to judge statistical significance.

5.1 EXPLORATORY DATA ANALYSIS

By running frequency procedures for each product category, that is, beer, cars, restaurants, chocolate bars, and MP3 players, it is found that there is small number of cases for each product in each treatment group that respondents did not complete all the questions but only some of them. The reasons for not fulfilling all questions are varied. For example, some respondents indicated that they were diet-conscious people and would never buy chocolate bars for themselves and their family, or they do not drink beer and would not buy it, or they would never buy an MP3 player and have little knowledge of them. Some respondents just answered the questions that interested them and then ignored other questions. Since one assumption underlying the current study is that the answers of the questionnaire given by those participants who only answered some but did not complete the overall questionnaires are not reliable, these small number of cased were dropped from the overall data. Only the cases that participants finished all judgment and choice tasks were considered. Cross tabulations were used to check whether differences existed between respondents who had been randomly assigned to the various treatment groups. The results show a high

level of matching of the 5 treatment groups with respect to respondent characteristic (gender, age group, income group, education, and ethics group).

5.2 CHOICE AND JUDGMENT

This section presents the results of one choice and five judgment tasks made by participants in order to test the three ADD models: the Weight Change Model, the Value Shift Model, and the Emergent Value Model. The choice task collected actual choice data, while the five judgment tasks involved ratings of overall attractiveness, importance, dimensional value, justifiability and evaluation anxiety associated with five different products (i.e., beer, cars, restaurants, MP3 players and chocolate bars).

The critical tests in each task are captured by comparing the mean ratings of brand A and brand B under five decoy conditions:

- No decoy condition;
- R_A condition, that is, when Brand A is targeted by the R decoy, Brand B is the competitor brand;
- R_B condition, that is, when Brand B is targeted by the R decoy, Brand A is the competitor brand;
- F_A condition, that is, when Brand A is targeted by the F decoy, Brand B is the competitor brand;
- F_B condition, that is, when Brand B is targeted by the F decoy, Brand A is the competitor brand.

The mean ratings for each choice and judgment task are presented in separate tables. In each table, the results for the lower quality/lower priced target brand (Brand A) are shown on the left, and those for the higher quality/higher priced target brand (Brand B) are shown on the right.

The choice task is analysed first; then the five judgment tasks, which involve ratings of overall attractiveness, importance, dimensional value, justifiability and evaluation anxiety, are analysed separately. Within each task, the R decoy was evaluated first for

brand A and brand B, followed by the evaluation of the F decoy, for brand A and brand B.

5.2.1 Effect of decoy on choice behaviour

A choice task was used to determine whether a decoy effect does occur with the choice set used in the study. The task was used to set a benchmark for testing decoy effect in judgment tasks and to verify that the judgment tasks (i.e., the attractiveness, importance, and dimensional value, justifiability, and evaluation anxiety ratings) for each alternative reflect the same pattern as the choice task. That is, to answer these questions: can judgment tasks also be used to test decoy effect, and do judgment tasks give the same results in decoy situation as choice task?

According to Huber et al. (1982), the insertion of an asymmetrically dominated decoy (ADD) will lead a violation of regularity, that is, adding a ADD will alter the relative attractiveness of the other alternatives in a choice set and increase the share of the dominating alternative (i.e., the targeted brand). Thus, the following hypotheses are made to test whether there is a decoy effect in the choice task:

H1. The proportion of respondents choosing an alternative in a choice set will be higher when that alternative is targeted by a decoy (R or F) than when its competitor brand is targeted.

H2. The proportion of choosing an alternative in a choice set will be higher when that alternative is targeted by a decoy (R or F decoy) than when no decoy is added into the choice set.

Following Huber et al. (1982), a free-choice questionnaire was used to test the decoy effect in choice tasks. Participants were asked to make a selection within a given choice set {A,B,C} across five product categories, which are Beer, Cars, Restaurants, Mp3 players and Chocolate bars. In the following analysis, Brand A and Brand B are either the targeted brand or the competitor brand, while Brand C is the asymmetrically dominated decoy.

A decoy effect is evident if the choice probability for Brand A is greater under R_A or F_A condition than when it is under R_B or F_B condition or the choice probability for Brand B is greater under R_B or F_B condition than when it is under R_A or F_A condition (i.e., Brand A: $R_A>R_B$; $F_A>F_B$; Brand B: $R_B>R_A$; $F_B>F_A$). Such occurrences are shown in bold in Tables 11 and 12.

A decoy effect is also evident if the choice probability of the target brand, which is targeted by a decoy (e.g R_A or F_A for Brand A, or R_B or F_B for Brand B), is greater than when no decoy is added to the choice set. Such occurrences are shown in bold in Tables 13.

To summarize, if H1 and H2 hold, then results shown in Table 1 are expected. Note that Table 10 reports the probability of choosing the targeted Brand A or B under different decoy condition.

Table 10. Expected Results for the Decoy Effect on Choice Behaviour

		Probability of choosing Target when it is:						
		Brand A				Brand B		
H1:	**H1a**	R_B	<	R_A	**H1b**	R_A	<	R_B
	H1c	F_B	<	F_A	**H1d**	F_A	<	F_B
H2:	**H2a**	No-decoy	<	R_A	**H2b**	No-decoy	<	R_B
	H2c	No-decoy	<	F_A	**H2d**	No-decoy	<	F_B

Notes:
1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy, $\mathbf{F_A}$ = A is targeted by F decoy, $\mathbf{F_B}$ = B is targeted by F decoy **No-decoy** = No decoy is added to the choice set.
3. **H1a, H1b, H1c, H1d** are the specific hypotheses for Hypothesis 1, while **H2a, H2b, H2c, H2d** are the specific hypotheses for Hypothesis 2; see Section 3 for the objective section (pp.43-44)
4. $\underline{R_B<R_A}$ means Brand A will receive greater choice probability with the R_A conditions than with R_B condition.

Range Decoy (R_A, R_B)

Table 11 shows the results of the choice probability for both Brand A and Brand B by target condition. For example, the proportion of respondents choosing Beer-Brand A

under the R_B decoy condition is .304, with the proportion choosing Brand A under the R_A decoy condition is .609.

Table 11. Choice Probabilities for Brand A and Brand B: R_A vs. R_B

		Brand A		Brand B	
Domain	**N**	**R_B**	**R_A**	**R_A**	**R_B**
Beer	46	0.304	**0.609[c]**	0.370	**0.630[c]**
Car	47	0.255	**0.426**	0.574	0.574
Restaurant	50	0.280	**0.360**	0.640	**0.720**
MP3	49	0.510	**0.755[b]**	0.204	**0.449[b]**
Chocolate Bar	49	0.224	**0.408[a]**	0.571	**0.735[a]**
Mean		0.315	**0.512[c]**	0.472	**0.622[c]**

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. **R_A** = A is targeted by R decoy, **R_B** = B is targeted by R decoy
3. Decoy effect shown in **bold**
4. a. Chi-square test for mean differences significant at $p<.10$,
b. Chi-square test for mean differences significant at $p<.05$,
c. Chi-square test for mean differences significant at $p<.01$

As predicted by Hypotheses 1a and 1b, when a Range decoy was added into the choice set, a strong indication of the decoy effect is evident for all five products when the target was Brand A (R_A) and also for four of five products when the target was Brand B (R_B). The difference in choice probability are statistically significant for 3 of 5 products. This result suggests that all products have effects of the decoy in the expected direction to some extent except for Car-Brand B. The decoy effect is also evident from the overall mean choice probability for both Brand A and Brand B (Brand A: RA>RB; Brand B: RB>RA), with results statistically significant (x^2 = 15.757, df=1, $p<.000$).

Frequency Decoy (F_A, F_B)

The results of the choice probabilities for both Brand A and Brand B with an F condition are shown in Table 12.

Table 12. Choice Probabilities for Brand A and Brand B: F_A vs. F_B

		Brand A		Brand B	
Domain	**N**	F_B	F_A	F_A	F_B
Beer	46	0.283	0.261	0.652	**0.696**
Car	47	0.255	**0.468**[b]	0.468	**0.681**[b]
Restaurant	50	0.220	**0.440**[b]	0.460	**0.680**[b]
MP3	49	0.612	**0.714**	0.184	**0.327**
Chocolate Bar	49	0.204	**0.347**	0.592	**0.735**
Mean		0.315	**0.446**[c]	0.471	**0.624**[c]

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. F_A = A is targeted by F decoy, F_B = B is targeted by F decoy
3. Decoy effect shown in **bold**
4. a. Chi-square test for mean differences significant at $p<.10$,
b. Chi-square test for mean differences significant at $p<.05$,
c. Chi-square test for mean differences significant at $p<.01$

Hypotheses 1c and 1d are supported for the Frequency decoy with a strong decoy effect found in four of five products when the target is Brand A (F_A) and in five products when the target is Brand B (F_B), although the difference were statistically significant only for two of the five products (car and restaurant) . The decoy effect is also evident in the overall choice for both brands (Brand A: $F_A>F_B$; brand B: $F_B>F_A$) where the results are statistically significant ($x^2 = 10.716$, df = 1, $p<.001$).

Comparison of R and F decoy with a No-decoy control

The previous analysis explored the procedure of Wedell and Pettibone (1996), where R_A (or F_A) is compared with R_B (or F_B) for each brand. An alternative approach is to compare decoy conditions with a No-decoy condition. The results of the No-decoy and decoy comparison are shown in Table 13.

Table 13. Choice Probabilities for the Targeted Brand, for the Different Decoy Strategies (R or F)

Domain	N	Probability of choosing Target when it is:					
		Brand A			Brand B		
		No Decoy	R_A	F_A	No Decoy	R_B	F_B
Beer	46	0.413	**0.609**[b]	0.261	0.587	**0.630**	**0.696**
Car	47	0.426	0.426	**0.468**	0.574	0.574	**0.681**
Restaurant	50	0.420	0.360	**0.440**	0.580	**0.720**	**0.680**[a]
MP3	49	0.896	0.755	0.714	0.104	**0.449**[c]	**0.327**[c]
Chocolate Bar	49	0.408	0.408	0.347	0.592	**0.735**[a]	**0.735**[b]
Mean		0.513	0.512	0.446	0.487	**0.622**[c]	**0.624**[c]

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy, $\mathbf{F_A}$ = A is targeted by F decoy, $\mathbf{F_B}$ = B is targeted by F decoy
No-decoy = No decoy is added to the choice set.
3. **Bold** = violation of regularity = decoy effect occurs
4. a. Chi-square test for mean differences significant at p<.10,
b. Chi-square test for mean differences significant at p<.05,
c. Chi-square test for mean differences significant at p<.01

From Table 13, the decoy effect is only evident when the higher quality brand, Brand B, is targeted, with four of five products for the R decoy and all five products support the Hypothesis 2 under the F condition. The difference in choice probabilities for Brand B are statistically significant for just 2 of 5 products with R_B, and 3 of 5 products with F_B, but the probability of choosing the targeted brand are in the expected direction. The decoy effect is also reflected in the overall choice probability for Brand B (No-decoy $<R_B$, No-decoy$<F_B$), with results statistically significant for both R_B ($x^2 = 14.772$, df=1, p<.000) and F_B (x^2=14.772, d=1, p<.000).

The results for the lower-quality brand, Brand A, do not replicate the strong decoy effect reported by Huber et al. (1982), as the decoy effect only occurs for one of five products for the R decoy, and two of five products for the F decoy, whereas in Huber et al.'s study, all products display strong decoy effects for both Brand A and Brand B. Furthermore, the overall mean result for Brand A is not statistically significant, which means the results are likely due to the chance. This comparison of decoy and No-decoy indicates a stronger decoy effect for Brand B (the higher priced/higher quality brand) than Brand A (i.e., the lower priced/lower quality brand),

Summary

When the analysis include a comparison of R_A with R_B or F_A with F_B (i.e., the analysis of Wedell and Pettibone, 1996), the results provide strong support for the proposition that the insertion of a decoy leads to a violation of regularity. That is, an asymmetrically dominated decoy increases the choice probability of the targeted brand. The results of the choice task indicate strong decoy effects for both R and F decoys and correspond to the predictions made by Hypothesis 1a, 1b, 2a, and 2b in 19 of 20 cases across the five products and four types of decoy (R_A, R_B, F_A and F_B). While only 10 of the 18 differences are statistically significant, the overall decoy effect tendency suggests that the results are not confound to cetain decoy products. may be occurred by chance. The overall mean results do show a strong decoy effect in choice, which is consistent with Pettibone and Wedell (2000) and Huber et al. (1982).

However, when the decoy set is compared with a base line, No-decoy set (see Table 13), the decoy effect is only evident when the higher product higher quality brand, Brand B, was targeted. That is, the results only support Hypothesis 1d and 2d when Brand B, the higher quality brand, is targeted. This founding is consistent with the insertion of Heath and Chatterjee (1995) that "decoys increase shares of higher-quality brands but typically do not increase shares of lower-quality brands" (p. 268). These results demonstrated that both the R and F decoys lead to a significant ADD effect for each targeted brand. The results confirm that the choice sets used in the study are suitable for use in the judgment tasks to examine the ADE models.

5.2.2 Effect of decoy on judgment of brand attractiveness

Since the current study is replicating and extending the study of Wedell and Pettibone (1996) and their study is based on the assumption that "the attractiveness judgments exhibit the same types of effects found in choice" (Ariely & Wallsten, 1995; Pettibone & Wedell, 2000; Simonson, 1989; cited in Tenbrunsel & Diekmann, 2002, p. 1154), it is important to test this assumption and thus enhance the validity of the judgment tasks in the research. Following Wedell and Pettibone (1996), a set of

"attractiveness" judgment scales was used. The purpose of these "attractiveness" ratings was to test whether the decoy effect occurs in a judgment procedure. The attractiveness ratings also provide a basis for comparing the choice and judgment. The following analysis addressed two hypotheses:

H3. An alternative in a choice set will be perceived as more attractive when it is targeted by a decoy (R or F decoy) than when its competitor brand is targeted.

H4. An alternative in a choice set will be perceived as more attractive when it is targeted by a decoy (R or F decoy) than when no decoy is added into the choice set.

Participants were asked to rate the attractiveness of each alternative in a choice set. A decoy effect is evident if the mean rating for Brand A is greater under R_A or F_A condition than when it is under R_B or F_B condition or the mean rating for Brand B is greater under R_B or F_B condition than when it is under R_A or F_A condition (i.e., Brand A: $R_A > R_B$; $F_A > F_B$; Brand B: $R_B > R_A$; $F_B > F_A$). Such occurrences are shown in bold in Tables 15 and 16.

A decoy effect is also evident if the attractiveness of the target brand, which is targeted by a decoy (e.g R_A or F_A for brand A, or R_B or F_B for brand B), is greater than when no decoy is added to the choice set. Such occurrences are shown in bold in Tables 17.

In sum, if a decoy effect occurs in the judgment task of brand attractiveness, then the following results are expected:

Table 14. Expected results for the decoy effect on judgment of brand attractiveness

		Brand attractiveness rating for:						
		Brand A				Brand B		
H3:	**H3a**	R_B	<	R_A	**H3b**	R_A	<	R_B
	H3c	F_B	<	F_A	**H3d**	F_A	<	F_B
H4:	**H4a**	No-decoy	<	R_A	**H4b**	No-decoy	<	R_B
	H4c	No-decoy	<	F_A	**H4d**	No-decoy	<	F_B

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy, $\mathbf{F_A}$ = A is targeted by F decoy, $\mathbf{F_B}$ = B is targeted by F decoy
No-decoy = No decoy is added to the choice set.
3. **H3a, H3b, H3c, H3d** are the specific hypotheses for Hypothesis 3, while **H4a, H4b, H4c, H4d** are the specific hypotheses for Hypothesis 4; see Section 3 for the objective section (pp.44-45)
4. $\underline{R_B<R_A}$ means Brand A will receive greater attractiveness ratings with the R_A conditions than with R_B condition.

Range Decoy (R_A, R_B)

The results for the attractiveness ratings for both Brand A and Brand B are shown in Table 15.

Table 15. Attractiveness Ratings for Brands A and B: R_A vs R_B

		Brand A		Brand B	
Domain	**N**	$\mathbf{R_B}$	$\mathbf{R_A}$	$\mathbf{R_A}$	$\mathbf{R_B}$
Beer	46	4.35	**5.85**[b]	5.78	**6.46**
Car	47	4.98	**6.40**[c]	6.91	6.68
Restaurant	50	5.04	**5.20**	6.32	**7.32**[b]
MP3	49	6.59	**7.02**	4.37	**6.02**[c]
Chocolate Bar	49	5.71	5.55	6.57	**7.16**
Mean		5.33	**6.00**[c]	5.99	**6.73**[c]

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
b. Paired t test for mean differences significant at p<.05,
c. Paired t test for mean differences significant at p<.01

As shown in Table 15, when a range decoy is added into the choice set, the results correspond to predictions made by H3a and H3b. A strong indication of a decoy effect is evident for four of five products when the target is brand A (R_A) and for four

of five products when the target is brand B (R_B). While only 4 of the 10 comparisons were statistically significant at the .05 level of the paired t test, suggesting that some of the results may be due to chance, overall, 8 of 10 results were in the expected direction, and the statistically significant test (Brand A: t=3.021, df=479, p<.01; Brand B: t=-3.688, df=479, p<.000) for the overall mean for both brands (Brand A: $R_A > R_B$; Brand B: $R_B > R_A$) is an indicator that a decoy effect has occurred. .

Frequency Decoy (F_A, F_B)

The attractiveness ratings results for both Brand A and Brand B are reported in Table 16.

Table 16. Attractiveness Ratings for Brands A and B: F_A vs F_B

		Brand A		Brand B	
Domain	**N**	**F_B**	**F_A**	**F_A**	**F_B**
Beer	46	4.48	**5.04**	5.59	**6.41**[a]
Car	47	5.74	**6.43**	6.98	**7.32**
Restaurant	50	5.06	**5.74**	6.50	**6.96**
MP3	49	6.73	**7.18**	5.24	5.18
Chocolate Bar	49	4.06	**6.24**[c]	6.35	**6.90**
Mean		5.21	**6.13**[c]	6.13	**6.55**[c]

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. **R_A** = A is targeted by R decoy, **R_B** = B is targeted by R decoy
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
b. Paired t test for mean differences significant at p<.05,
c. Paired t test for mean differences significant at p<.01

As predicted by Hypothesis H3c and H3d, when a Frequency decoy was used, a strong indication of a decoy effect is evident for five products when the target is Brand A (F_A) and also for four of five products when the target is Brand B (F_B). While the paired t tests were only statistically significant in two of the ten comparisons, 9 out of 10 observations are in the expected direction. A sign test indicates that the results are statistically significant at p<.05 (Siegel, 1956). This decoy effect is also evident from the overall mean for both brands (Brand A: $F_A > F_B$; brand B: $F_B > F_A$) where the results are statistically significant (Brand A: t=4.181, df=480, p<.000; Brand B: t=-2.006, df=480, p<.05).

Comparison of R and F decoy with a No-decoy control

A comparison of the attractiveness ratings for the decoys sets compared with the No-decoy set (see Table 17) shows a similar pattern to that found in the choice tasks (see Table 13).

Table 17. Attractiveness Ratings for Brand A and B: No decoy vs RA or FA or RB or FB

Domain	N	Brand A			Brand B		
		No Decoy	R_A	F_A	No Decoy	R_B	F_B
Beer	46	5.11	**5.85**	5.04	5.87	**6.46**	**6.41**
Car	47	6.47	6.40	6.43	7.21	6.68	**7.32**
Restaurant	50	5.58	5.20	**5.74**	6.26	**7.32**[b]	**6.96**
MP3	49	6.29	**7.02**	**7.18**	4.06	**6.02**[c]	**5.18**[b]
Chocolate Bar	49	6.24	5.55	6.24	6.45	**7.16**[a]	**6.90**
Mean		5.94	**6.00**	**6.13**	5.97	**6.73**[c]	**6.55**[c]

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. R_A = A is targeted by R decoy, R_B = B is targeted by R decoy, F_A = A is targeted by F decoy, F_B = B is targeted by F decoy
No-decoy = No decoy is added to the choice set.
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
b. Paired t test for mean differences significant at p<.05,
c. Paired t test for mean differences significant at p<.01

That is, the decoy effect is only evident when the higher quality brand, Brand B, was targeted, with four of five products for the R decoy and all five products under the F condition (paired t tests were statistically significant in four of ten comparisons). The decoy effect is also reflected in the overall mean attractiveness ratings for Brand B (No-decoy $<R_B$, No-decoy$<F_B$), with results statistically significant for both R_B (t = -3.894, df=479, p<.000) and F_B (t=-2.766, d=480, p<.01), but not for Brand A.

The results for the lower-quality brand, Brand A, suggested only a weak decoy effect, as the decoy effect only occurs with two of five products for the R decoy, and two of five products for the F decoy. Furthermore, the results for the Brand A are not statistically significant which means the results are likely due to the chance. However, the tendency for R and F decoy work better for the higher quality products in the judgment task is consistent with the findings in choice.

Summary

When the approach of Wedell and Pettibone's (1996) was used to examine the decoy effect, comparing the results of R_A with R_B or F_A with F_B for Brand A and Brand B (see Table 15 and 16), the results for the attractiveness ratings indicate strong decoy effects for both the R and F decoys. This is consistent with the findings of Wedell and Pettibone (1996). Thus, the results support the predictions made by Hypothesis 3 in 17 of 20 cases, which is that an alternative in a choice set will be perceived as more attractive when it is targeted by a decoy (R or F decoy) than when its competitor brand is targeted. The overall mean for both Brand A and Brand B under both the R and F decoy condition are statistically significant at $p<.05$.

However, when the decoy set is compared with no-decoy set (see Table 17), the results for the attractiveness ratings only support Hypothesis 3b and 3c when Brand B, the higher quality brand, is targeted. When the lower quality brand, Brand A, is targeted, participants did not show preferences for the targeted brand in the choice set for three of five products under both R and F decoy conditions. Again, this pattern is the same as that found in the choice task (see Table 8) and is consistent with the findings of Heath and Chatterjee (1995), who also found that R and F decoys worked for the higher-quality brands but not the lower-quality brands.

5.2.3 The relationship between judgment and choice

Based on the previous research and discussion reported in the literature (Ariely & Wallsten, 1995; Pettibone & Wedell, 2000; Simonson, 1989; Tenbrunsel & Diekmann, 2002), the asymmetrically dominated decoy effect (ADE) theory would predict that the asymmetrically dominated decoy (ADD) manipulation in the judgment tasks result in the same pattern as found in the choice tasks. Thus, the following hypothesis is expected:

H5. The decoy effect will have a similar effect in both choice and judgment tasks. That is, the highest rated alternatives in brand attractiveness judgment task will match the alternatives chosen in the choice task.

The results of choice and attractiveness ratings (see section 5.2.1 and 5.2.2) demonstrated that the decoy effect does occur in both choice and judgment tasks. However, the results are based on two different standards; one is the choice proportion, and the other is an attractiveness rating. It is hard to tell the relationship between choice and judgment from different comparisons. In order to examine the relationship between choices and preferences using the same choice sets, attractiveness judgments were converted into preferences (Pettibone and Wedell, 2000). The procedure of Pettibone and Wedell (2000) was followed in this study, where the highest rated alternative in each set of alternatives was used to infer the preferred alternative; that is, it is assumed that this is the alternative that would be chosen is a choice was made. Any cases where participants did not make both choice and attractiveness judgments, or where the same judgment ratings are given to more than one brand, were excluded in this analysis. In total, there were 1028 valid responses (or cases). The cross table of Judgment-based preferences with choices are presented in Table 18.

Table 18. Contingency table of choices by preferences inferred from attractiveness judgments

	Choice			
Judgment	**Target**	**Competitor**	**Decoy**	**Total**
Target	475	54	13	542
	(.46)	(.05)	(.01)	(.53)
Competitor	72	366	11	449
	(.07)	(.36)	(.01)	(.44)
Decoy	12	10	15	37
	(.01)	(.01)	(.02)	(.04)
Total:	559	430	39	1028
	(.54)	(.42)	(.04)	

Note: Frequency = 1028; frequencies show along with percentages in parentheses.

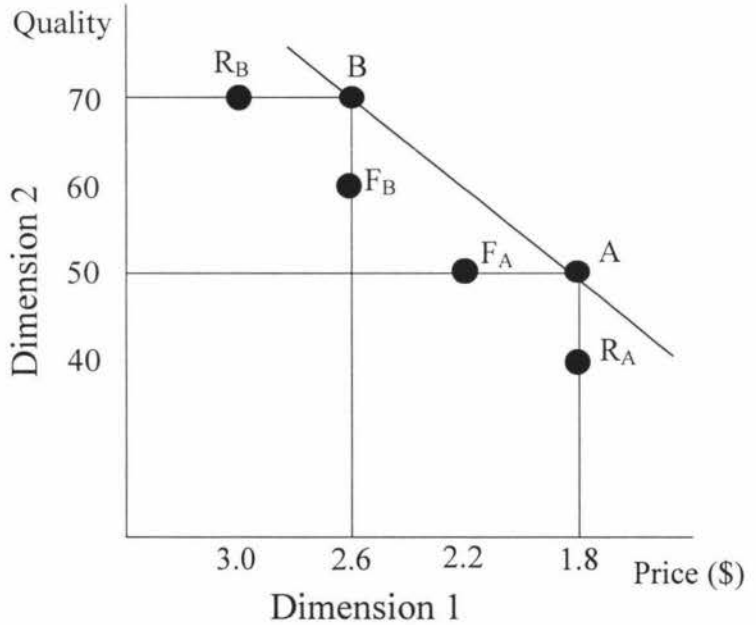
The marginal frequencies in Table 18 indicate decoy effects for both choice and judgment. The horizontal marginal frequencies represent the choices, while the vertical marginal frequencies represent the preferences based on the attractiveness

judgments. A strong decoy effect is demonstrated in both choice and judgment, shown by the higher frequencies for the target brand over the competitor and decoy brands. It is also evident that although few decoys are chosen in the choice set, adding a decoy does alter participants' preferences. Both results of the marginal frequencies for choice and judgments are statistical significant at .000 level (x^2=674.117, d=4, p<.000). These results are consistent with the findings of Wedell and Pettibone (2000) that decoy demonstrates similar effect in both choice and judgment tasks.

5.2.4 Weight Change Model: Effect of decoy on judgment of attribute (dimensional) importance

The weight change model has been proposed as an explanation of the decoy effect shown in Figure 6.

Figure 6. Example of R_A, R_B, F_A, and F_B decoys (targeting Brand A or B)



Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. **R_A or F_A** = Brand A is targeted by the R or F decoy, **R_B or F_B** = Brand B is targeted by the R or F decoy
3. Decoy effect shown in shadow

There are two different interpretations of the weight change model; the explanation of Wedell and Pettibone (1996) and that of Bonaccio and Reeve (2006).

Wedell and Pettibone (1996) claim that the dimension on which the targeted brand is superior to the competitor brand has more weight. Thus, if the weight change model holds, then

H6. When a Range decoy or a Frequency decoy is added to a choice set, the dimension on which the targeted brand is superior to the competitor brand, will be perceived as having more importance or weight than when the competitor brand is the target.

H7. When a Range decoy or a Frequency decoy is added to a choice set, the dimension on which the targeted brand is superior to the competitor brand will be perceived as having more importance or weight than when no decoy is added to the choice set.

Conversely, according to Bonaccio and Reeve (2006), the dimension that has greater variability has more weight. That is, if the variability of one dimension increases, the weight of that dimension increases consequently. The hypotheses based on Bonaccio and Reeve (2006) are:

H8. When a Range decoy is added, the dimension on which the range of values is extended, and on which the targeted brand is inferior to the competitor brand, will perceived as having more importance or weight than when the competitor brand is the target. When a Frequency decoy is added, the predictions are the same as for Wedell and Pettibone (1996).

H9. When a Range decoy is added, the dimension on which the range of values is extended, and on which the targeted brand is inferior to the competitor brand, will perceived as having more importance or weight than when no decoy is added into the choice set. When a Frequency decoy is added, the predictions are the same as Wedell and Pettibone (1996).

The predictions of these two interpretations for the Frequency decoy are the same. The difference between them is the predictions for the Range decoy. Wedell and

Pettibone (1996) proposed that the R decoy will decrease the weight of the dimension whose range is extended and on which the targeted brand is inferior to the competitor brand, while Bonaccio and Reeve (2006) asserted that the R decoy will increase the weight of that dimension which it extends, since the variability of that dimension is increased.

Following Wedell and Pettibone (1996) and Bonaccio and Reeve (2006), an "importance" scale was used to test the weight change model. Participants were asked to indicate the importance of each of the two attributes for each product (i.e. Beer: price and quality; Cars: petrol consumption and ride quality; restaurant: driving time and food quality; MP3 players: price and storage capacity; chocolate bars: price and quality). In the following analysis, the "price" (or cost) attribute is called Dimension 1 (price, petrol consumption, and driving time) while "quality" attribute is labelled Dimension 2 (quality, ride quality, food quality, and storage capacity).

5.2.4-1 Wedell and Pettibone's (1996) interpretation

Support for the Wedell and Pettibone's (1996) interpretation of the weight-change model would be indicated by greater importance assigned to the dimension on which the targeted brand is superior to the competitor brand (e.g., Brand A is superior to Brand B on Dimension 1 and is targeted by R_A or F_A), and when the targeted brand is targeted by a decoy than when the targeted brand is not targeted by a decoy (e.g., Brand A, which is superior to Brand B on Dimension 1, is not targeted by R_A or F_A). That is, the mean rating for Dimension 1 should be higher under R_A or F_A condition than when it is under R_B or F_B condition or the mean rating for Dimension 2 should be higher under R_B or F_B condition than when it is under R_A or F_A condition (i.e., Dimension 1: $R_A > R_B$; $F_A > F_B$; Dimension 2: $R_B > R_A$; $F_B > F_A$). Such occurrences are shown in bold in Tables 20 and 21.

Support for the weight-change model would also be indicated if the importance rating of a targeted dimension is higher when targeted by a decoy (e.g R_A or F_A for Dimension 1, or R_B or F_B for Dimension 2) than when no decoy is added to the choice set. For example, Dimension 1 will receive higher importance ratings with the R_A or

F_A conditions than with No-decoy condition. Such occurrences are shown in bold in Table 22.

In summary, according to Wedell and Pettibone (1996), if the weight change model hold, the following results (see Table 19) are expected in current study.

Table 19. Expected results for the decoy effect on judgment of dimensional importance

		Dimensional importance ratings for:						
		Dimension 1				Dimension 2		
H6:	**H6a**	R_B	<	R_A	**H6b**	R_A	<	R_B
	H6c	F_B	<	F_A	**H6d**	F_A	<	F_B
H7:	**H7a**	No-decoy	<	R_A	**H7b**	No-decoy	<	R_B
	H7c	No-decoy	<	F_A	**H7d**	No-decoy	<	F_B

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy, $\mathbf{F_A}$ = A is targeted by F decoy, $\mathbf{F_B}$ = B is targeted by F decoy
No-decoy = No decoy is added to the choice set.
3. **H6a, H6b, H6c, H6d** are the specific hypotheses for Hypothesis 6, while **H7a, H7b, H7c, H7d** are the specific hypotheses for Hypothesis 7; see Section 3 for the objective section (pp.46-48)
4. $\underline{R_B \leq R_A}$ means Dimension 1 will receive higher importance ratings with the R_A conditions than with R_B condition.

Range Decoy (R_A, R_B)

The results of the importance ratings for both Dimension 1 and 2 are reported in Table 20.

Table 20. Importance Ratings for Dimensions 1 and 2: R_A vs R_B

		Dimension 1		Dimension 2	
Domain	**N**	$\mathbf{R_B}$	$\mathbf{R_A}$	$\mathbf{R_A}$	$\mathbf{R_B}$
Beer	46	7.13	6.74	7.09	**7.15**
Car	47	7.22	**7.79**	7.36	7.15
Restaurant	50	5.70	5.06	7.74	**7.82**
MP3	49	7.59	7.33	6.49	6.45
Chocolate Bar	49	7.04	6.12	7.53	**7.55**
Mean		6.94	6.61	7.24	7.22

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy

3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
   b. Paired t test for mean differences significant at p<.05,
   c. Paired t test for mean differences significant at p<.01

The results for the targeted Dimension 1 is in the opposite direction than predicted by the Weight Change Model, with four of five products assigned less importance under the R_A condition than under the R_B condition (see Table 20), and the overall mean is significant at the .1 level, but in the opposite direction to Wedell and Pettibone's (1996) prediction of the Weight Change Model. In contrast, there is some support for the Weight Change Model for Dimension 2 with three of five products perceived high mean, the difference in overall means are not significant for Dimension 2. Thus, the overall importance mean ratings for both brands fail to support Wedell and Pettibone's (1996) interpretation of the Weight Change Model (Dimension 1: $R_A<R_B$; Dimension 2: $R_B<R_A$).

Frequency Decoy (F_A, F_B)

Table 21 presents the result for the importance rating for Dimension 1 and Dimension 2 when a Frequency decoy is added to the choice set.

Table 21. Importance Ratings for Dimensions 1 and 2: F_A vs F_B

		Dimension 1		Dimension 2	
Domain	**N**	F_B	F_A	F_A	F_B
Beer	46	6.74	**6.80**	7.02	**7.33**
Car	47	7.57	**8.06**	7.09	**7.23**
Restaurant	50	6.32	5.92	7.84	7.82
MP3	49	7.33	7.29	6.47	5.82
Chocolate Bar	49	6.02	**6.55**	7.67	7.31
Mean		6.80	**6.92**	7.22	7.10

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
   b. Paired t test for mean differences significant at p<.05,
   c. Paired t test for mean differences significant at p<.01

As Table 21 shown, support for the Weight Change Model is evident for three of five products when the target was Dimension 1 (R_A). However, the results for the targeted Dimension 2 are in the opposite direction than predicted by the Weight Change Model;

three of five products were assigned less importance under R_B condition than under R_A condition. The overall mean importance ratings for Dimension 1 support the Weight Change Model while the overall importance rating for Dimension 2 fail to support the model (Dimension 1: $R_A > R_B$; Dimension 2: $R_B < R_A$) (see Table 21). The results are statistically insignificant for both individual product mean ratings and the overall importance means.

Comparison of R and F decoy with a No-decoy control

The Weight Change Model is supported when the decoy set is compared with No-decoy set under both R and F decoy condition (see Table 22).

Table 22. Importance Ratings for Brand A and B: No decoy vs R_A or F_A or R_B or F_B

Domain	N	Dimension 1			Dimension 2		
		No Decoy	R_A	F_A	No Decoy	R_B	F_B
Beer	46	6.65	**6.74**	**6.80**	6.52	**7.15**	**7.33**
Car	47	7.57	**7.79**	**8.06**	7.45	7.15	7.23
Restaurant	50	5.60	5.06	**5.92**	7.70	**7.82**	**7.82**
MP3	49	6.98	**7.33**	**7.29**	5.86	**6.45**	5.82
Chocolate Bar	49	6.82	6.12	6.55	7.45	**7.55**	7.31
Mean		6.72	6.61	**6.92**	7.00	**7.22**	**7.10**

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. **R_A** = A is targeted by R decoy, **R_B** = B is targeted by R decoy,
F_A = A is targeted by F decoy, **F_B** = B is targeted by F decoy
No-decoy = No decoy is added to the choice set.
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at $p<.10$,
b. Paired t test for mean differences significant at $p<.05$,
c. Paired t test for mean differences significant at $p<.01$

When Dimension 1 is the target, the decoy effect is evident in the mean ratings for three of the five products under the R decoy condition and for four of five products under the F condition. The overall mean importance rating for Dimension 1 does not support the Weight Change Model under the R condition, but does support the Weight Change Model under F condition (Dimension 1: No-decoy$<F_A$). However, the result is not statistically significant.

When Dimension 2 is the target, the results when the decoy set is compared with No-decoy set show the same pattern as found in Table 20 and 21. The decoy effect is evident from the mean ratings for four of the five products when the target is Dimension 1 but for only two of five products when the target is Dimension 2. However, the overall importance mean ratings for Dimension 2 are consistent with the Weight Change Model under both R and F conditions (Dimension 2: No-decoy$<R_B$; No-decoy$<F_B$), but the results are not statistical significant and so may be due to the chance.

Summary

When Wedell and Pettibone's (1996) method of analysis (i.e., R_A vs. R_B, F_A vs F_B) is applied (see Table 20 and 21), the results provide some support for the Weight Change Model. That is, Hypothesis 6 is reflected in 3 of five products on Dimension 2 for the R decoy and in 3 of five products on Dimension 1 for the F decoy. The lack of statistical significant for the results show the results may be occurred by chance.

However, when the decoy set is compared with a based line, no-decoy set (see Table 22), the results of the importance ratings generally support the weight change model. The results support to the predictions of Hypothesis 7 in three of five products and four of five products when both dimension was targeted by the Range decoy while the results only correspond to Hypothesis 7 when Dimension 1 was targeted by the F decoy.

5.2.4-2 Bonaacio and Reeve's (2006) interpretation

According to Bonaccio and Reeve (2006), support for the weight-change model would be indicated by greater importance assigned to the dimension, which has greater variability. The prediction of the Frequency decoy of this explanation is the same as Wedell and Pettibone (1996), while the R decoy has opposite prediction. That is, the importance mean rating for Dimension 1 is greater under R_B or F_A condition than when it is under R_A or F_B condition or the mean rating for Dimension 2 is greater under R_A or F_B condition than when it is under R_B or F_A condition (i.e.,

Dimension 1: $R_A<R_B$; $F_A>F_B$; Dimension 2: $R_B<R_A$; $F_B>F_A$). Such occurrences are shown in bold in Tables 24 and 25.

Support for the Weight Change Model would also be indicated if the importance rating of a targeted dimension is less when targeted by a Range decoy (e.g R_A for Dimension 1, or R_B for Dimension 2) than when no decoy is added to the choice set, or the importance rating of the dimension, on which the targeted brand is superior to the competitor brand, is greater when targeted by a Frequency decoy than when no decoy is added. Such occurrences are shown in bold in Table 26.

In summary, according to Bonaccio and Reeve (2006), if the Weight Change Model holds, the following results (see Table 23) are expected in current study.

Table 23. Expected results for the decoy effect on judgment of dimensional importance

		Dimensional importance ratings for:						
		Dimension 1				Dimension 2		
H8:	**H8a**	R_B	>	R_A	**H8b**	R_A	>	R_B
	H8c	F_B	<	F_A	**H8d**	F_A	<	F_B
H9:	**H9a**	No-decoy	>	R_A	**H9b**	No-decoy	>	R_B
	H9c	No-decoy	<	F_A	**H9d**	No-decoy	<	F_B

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy, $\mathbf{F_A}$ = A is targeted by F decoy, $\mathbf{F_B}$ = B is targeted by F decoy
No-decoy = No decoy is added to the choice set.
3. **H8a, H8b, H8c, H8d** are the specific hypotheses for Hypothesis 8, while **H9a, H9b, H9c, H9d** are the specific hypotheses for Hypothesis 9; see Section 3 for the objective section (pp.48-49)
4. $\underline{\mathbf{R_B}>\mathbf{R_A}}$ means Dimension 1 will receive higher importance ratings with the R_B conditions than with R_A condition.

Range Decoy (R_A, R_B)

As shown in Table 24, when Range decoy was used, the results correspond to prediction made by Hypothesis 8a on Dimension 1 but not support Hypothesis 8b on Dimension 2. Support for the weight change model is evident for four of five products when the target was Dimension 1 (R_A). But the results for the targeted Dimension 2 were in the opposite direction to than predicted by Bonaccio and

Reeve's (2006) weight-change model; three of five products were assigned less importance under R_A condition than under R_B condition.

Table 24. Importance Ratings for Dimensions 1 and 2: R_A vs R_B

Domain	N	Dimension 1		Dimension 2	
		R_A / Does not have GRV	R_B /Has GRV	R_B / Does not have GRV	R_A / Has GRV
Beer	46	6.74	**7.13**	7.15	7.09
Car	47	7.79	7.22	7.15	**7.36**
Restaurant	50	5.06	**5.70**	7.82	7.74
MP3	49	7.33	**7.59**	6.45	**6.49**
Chocolate Bar	49	6.12	**7.04**	7.55	7.53
Mean		6.61	**6.94**[a]	7.22	**7.24**

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
b. Paired t test for mean differences significant at p<.05,
c. Paired t test for mean differences significant at p<.01
5. GRV=Greater relative variability

Frequency Decoy (F_A, F_B)

As discussed before, which was also shown in the Table 21, the results of Bonaccio and Reeve's (2006) Frequency decoy are the same as Wedell and Pettibone's (1996) (see Table 25). The results correspond to predictions made by Hypothesis 8c on Dimension 1 but not on Dimension 2.

Table 25. Importance Ratings for Dimensions 1 and 2: F_A vs F_B

Domain	N	Dimension 1		Dimension 2	
		F_B /Does not have GRV	F_A /Has GRV	F_A /Does not have GRV	F_B /Has GRV
Beer	46	6.74	**6.80**	7.02	**7.33**
Car	47	7.57	**8.06**	7.09	**7.23**
Restaurant	50	6.32	5.92	7.84	7.82
MP3	49	7.33	7.29	6.47	5.82
Chocolate Bar	49	6.02	**6.55**	7.67	7.31
Mean		6.80	**6.92**	7.22	7.10

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy
3. Decoy effect shown in **bold**

4. a. Paired t test for mean differences significant at p<.10,
   b. Paired t test for mean differences significant at p<.05,
   c. Paired t test for mean differences significant at p<.01
5. GRV=Greater relative variability

Comparison of R and F decoy with a No-decoy control

The results of the importance ratings between decoy conditions and No-decoy conditions are shown in Table 26. Hypothesis 9 is not supported at all for both the R and F decoy as none of the results are statistically significant.

Table 26. Importance Ratings for Brand A and B: No decoy vs R_A or F_A or R_B or F_B

Domain	N	Dimension 1			Dimension 2		
		No Decoy	R_A	F_A	No Decoy	R_B	F_B
Beer	46	6.65	6.74	**6.80**	6.52	7.15	**7.33**
Car	47	7.57	7.79	**8.06**	7.45	**7.15**	7.23
Restaurant	50	5.60	**5.06**	**5.92**	7.70	7.82	**7.82**
MP3	49	6.98	7.33	**7.29**	5.86	6.45	5.82
Chocolate Bar	49	6.82	**6.12**	6.55	7.45	7.55	7.31
Mean		6.72	**6.61**	**6.92**	7.00	7.22	**7.10**

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy, $\mathbf{F_A}$ = A is targeted by F decoy, $\mathbf{F_B}$ = B is targeted by F decoy
   No-decoy = No decoy is added to the choice set.
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
   b. Paired t test for mean differences significant at p<.05,
   c. Paired t test for mean differences significant at p<.01
5. GRV=Greater relative variability

Summary

The interpretation of Wedell and Pettibone (1996) and Bonaccio and Reeve's (2006) differ on the predictions for the R decoy, on which they have the opposite prediction. Their predictions for the F decoy are the same.

When the data are only analysed under decoy conditions (see Table 24 and 25), the results provide little support for Bonaccio and Reeve's (2006) interpretation of the Weight Change Model with only R_A decoy shows decoy effect. The lack of statistical significant for the results show the results may be occurred by chance.

When the decoy set is compared with No-decoy set (see Table 26), the results at the product level on importance rating only support the Weight Change Model when Dimension 1 was targeted under the F condition. Hypothesis 9a and 9b was not reflected at all but the results are in an opposite direction that the mean ratings of three of five products are greater than No-decoy condition on Dimension 1 while four of five products are greater on Dimension 2. These results are complied with Wedell and Pettibone's (1996) prediction of the Weight Change Model that when a Range decoy is added, the importance rating of the dimension, on which the targeted brand is superior to the competitor brand, is greater than when no decoy is added to the choice set. However, it should be noted that none of the mean difference is statistically significant. The results of the overall mean show the decoy effect except R_B decoy is used. However, the results are not statistically significant at .05 level.

5.2.5 Effect of decoy on judgment of dimensional value: testing the value shift model

The Value Shift Model explains the ADE from the subjective value perspective, that is, the changes in preferences in a choice set caused by an inclusion of an asymmetrically dominated decoy (ADD) result from a shift in the subjective attribute value (i.e., dimensional value) on that dimension so that "the overall dimensional value of the targeted brand is increased relative to the other alternatives in the choice set" (Wedell & Pettibone, 1996, p. 328). In simple words, the presence of "the decoy changes the perception of the decision makers' perceptions of the attractiveness of a given value on a dimension" (Bonaccio & Reeve, 2006, p.201). According to the Value Shift Model, the inclusion of a Range decoy extends the range of values along the dimension on which the targeted brand is the weakest and thus increases the subjective value of the targeted brand on that dimension. The inclusion of a Frequency decoy has the same effect as the Range decoy. It increases the frequency of the values on the dimension on which the targeted brand is superior to the competitor brand and thus increases the subjective value of the targeted brand on that dimension.

In the study of Wedell and Pettibone (1996), the combined dimensional value, which was the sum of the two dimensional values, was used to test the value shift model. According to Wedell and Pettibone (1996), if the Value Shift Model holds, then:

H10. The combined dimensional attractiveness ratings will be higher for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when the decoy is targeting the competitor brand.

H11. The combined dimensional attractiveness ratings will be higher for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when no decoy is added into the choice set.

Following Wedell and Pettibone (1996) and Bonaccio and Reeve (2006), a set of "attribute value attractiveness" scale was used to test the dimensional value model. Participants were asked to rate the attractiveness value of each of the two attributes (i.e., dimension) for each product (i.e. Beer: price and quality; Cars: petrol consumption and ride quality; restaurant: driving time and food quality; MP3 players: price and storage capacity; chocolate bars: price and quality) on a 9-point "attribute value attractive" scale. Similar to the analysis of the weight change model, in the following analysis, the attributes were referred to as Dimension 1 and 2, while Dimension 1 represented price (price, petrol consumption, and driving time) and Dimension 2 meant quality (quality, ride quality, food quality, and storage capacity). Each of the Dimension 1 + Dimension 2 means the combined ratings of the attribute value ratings on each Dimension.

Support for the value-shift model would be indicated by a pattern in which the combined attribute value ratings (Dimension 1 + Dimension 2) of a brand were greater when it was targeted by a decoy (e.g., Brand A is targeted by R_A or F_A) than when its competitor was targeted by a decoy (e.g., Brand A is not targeted by R_A or F_A). That is, the combined dimensional value ratings for Brand A should be greater under the R_A or F_A condition than when it is under the R_B or F_B condition and the combined dimensional value ratings for Brand B should be greater under the R_B or F_B condition than when it is under the R_A or F_A condition (i.e., Brand A: $R_A > R_B$; $F_A > F_B$; Brand B: $R_B > R_A$; $F_B > F_A$). Such occurrences are shown in bold in Tables 28 and 29.

Support for the value shift model would also be indicated if the combined dimensional value ratings of a targeted brand, which is targeted by a decoy (e.g R_A or F_A for Brand A, or R_B or F_B for Brand B), is greater than when no decoy is added to the choice set. Such occurrences are shown in bold in Tables 30.

In sum, according to Wedell and Pettibone (1996), if the value shift model holds, the following results are expected:

Table 27. Expected results for the decoy effect on judgment of justifiability

			Dimensional value ratings given that:						
		Dimension	**Brand A**				**Brand B**		
H10:	**H10a**	**1**	R_B	>	R_A	**H10b**	R_A	<	R_B
		2	R_B	<	R_A		R_A	>	R_B
		1+2	R_B	<	R_A		R_A	<	R_B
	H10c	**1**	F_B	<	F_A	**H10d**	F_A	<	F_B
		2	F_B	<	F_A		F_A	<	F_B
		1+2	F_B	<	F_A		F_A	<	F_B
H11:	**H11a**	**1**	No-decoy	=<	R_A	**H11b**	No-decoy	<	R_B
		2	No-decoy	<	R_A		No-decoy	=<	R_B
		1+2	No-decoy	<	R_A		No-decoy	<	R_B
	H11c	**1**	No-decoy	<	F_A	**H11d**	No-decoy	=<	F_B
		2	No-decoy	=<	F_A		No-decoy	<	F_B
		1+2	No-decoy	<	F_A		No-decoy	<	F_B

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy, $\mathbf{F_A}$ = A is targeted by F decoy, $\mathbf{F_B}$ = B is targeted by F decoy **No-decoy** = No decoy is added to the choice set.
3. **H10a, H10b, H10c, H10d** are the specific hypotheses for Hypothesis 10, while **H11a, H11b, H11c, H11d** are the specific hypotheses for Hypothesis 11; see Section 3 for the objective section (pp.49-51)

Range Decoy (R_A, R_B)

Support of the value shift model is evident in Table 28.

Table 28. Dimensional Value Ratings for Brands A and B: R_A vs R_B

			Brand A		Brand B	
Domain	**N**	**Dimension**	**R_B**	**R_A**	**R_A**	**R_B**
Beer	46	1	6.67	6.78	5.00	**6.30**[c]
		2	3.85	**5.50**[c]	6.93	7.04
		1+2	10.52	**12.28**[b]	11.93	**13.34**[a]
Car	47	1	5.96	6.79	5.87	**6.46**
		2	4.70	**6.26**[c]	**7.85**[b]	7.15
		1+2	10.66	**13.05**[c]	13.72	13.61
Restaurant	50	1	**7.42**	7.08	3.90	**5.40**[c]
		2	4.16	**5.06**[b]	**7.88**	7.76
		1+2	11.58	**12.14**	11.78	**13.16**[b]
MP3	49	1	7.39	7.45	3.43	**5.98**[c]
		2	5.10	**6.12**[b]	**7.06**	6.98
		1+2	12.49	**13.57**	10.49	**12.96**[c]
Chocolate Bar	49	1	7.12	7.14	4.92	**6.73**[c]
		2	5.31	5.29	7.00	7.33
		1+2	12.43	12.43	11.92	**14.06**[c]
Mean		1	6.91	7.05	4.62	**6.17**[c]
		2	4.62	**5.65**[c]	**7.34**	7.25
		1+2	11.53	**12.70**[c]	11.96	**13.42**[c]

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. **R_A** = A is targeted by R decoy, **R_B** = B is targeted by R decoy
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
b. Paired t test for mean differences significant at p<.05,
c. Paired t test for mean differences significant at p<.01

As predicted by Hypothesis 10, four of five products have greater combined value ratings for both Brand A and B when they are targeted by the R decoy (i.e., the combined value ratings for brand A: $R_A > R_B$; and for brand B: $R_A < R_B$). The results are statistically significant for 4 of the 5 comparisons when Brand B is targeted and for 2 of 5 comparisons when Brand A is the target. The mean value ratings for both Brand A and B also reflect the same pattern; the mean value ratings of Brand A is greater when it is targeted by R decoy ($M_A = 6.35$ vs $M_B = 5.77$) while the reverse is true for brand B as well ($M_A = 5.98$ vs $M_B = 6.71$). Both mean value rating results are statistically significant (Brand A: t=3.527, df=479, p<.000; Brand B: t=-4.606, df=479, p<.000).

Frequency Decoy (F_A, F_B)

Table 29 shows the results of the dimensional value ratings for both Brand A and B under the F decoy condition.

Table 29. Dimensional Value Ratings for Brands A and B: F_A vs F_B

			Brand A		Brand B	
Domain	**N**	**Dimension**	**F_B**	**F_A**	**F_A**	**F_B**
Beer	46	1	6.61	6.39	4.52	**5.43**[a]
		2	3.87	**4.35**	6.57	**6.93**
		1+2	10.48	**10.74**	11.09	**12.36**
Car	47	1	6.96	6.77	5.91	**6.36**
		2	5.43	**5.66**	8.09	7.91
		1+2	12.39	**12.43**	14.00	**14.27**
Restaurant	50	1	7.24	**7.46**	4.26	**5.32**[b]
		2	4.52	**5.12**	7.54	**7.88**
		1+2	11.76	**12.58**	11.80	**13.20**[b]
MP3	49	1	7.63	7.24	4.24	**4.61**
		2	5.14	**6.08**[b]	6.53	**7.14**
		1+2	12.77	**13.32**	10.77	**11.75**
Chocolate Bar	49	1	6.51	**7.63**[c]	5.14	5.14
		2	3.82	**4.98**[c]	7.18	6.84
		1+2	10.33	**12.61**[c]	12.32	11.98
Mean		1	6.99	**7.10**	4.81	**5.37**[c]
		2	4.56	**5.24**[c]	7.18	**7.34**
		1+2	11.55	**12.34**[b]	11.99	**12.71**[b]

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. F_A = A is targeted by F decoy, F_B = B is targeted by F decoy
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at $p<.10$,
b. Paired t test for mean differences significant at $p<.05$,
c. Paired t test for mean differences significant at $p<.01$

The results of dimensional value ratings in Table 29 indicate a strong support for the Value Shift Model under the F decoy condition. Again, Hypothesis 10 was supported for the F decoy as all five products are assigned greater attractiveness for the combined value when the target is Brand A (F_A) and four of five products are judged to be more attractive when the target is Brand B (F_B). Although only two of the ten comparisons are statistically significant when t-tests were running, the sign test shows that the mean difference by the product level are statistically significant at $p<.05$ level as 9 of 10 comparisons are mean difference (Siegel, 1956). The mean value ratings

for both Brand A and B also reflect the same pattern; the mean value rating of Brand A is greater when it is targeted by R decoy (M_A = 6.17 vs M_B = 5.78) while the reverse is true for Brand B (M_A = 5.99 vs M_B = 6.36). Both results are statistically significant (Brand A: t=2.392, df=480, p<.05; Brand B: t=-2.163, df=480, p<.05).

Comparison of R and F decoy with a No-decoy control

In contrast to the strong decoy effect found in Table 28 and Table 29, which only analysed the results under decoy conditions (e.g., R_A and R_B), when the decoy set is compared with No-decoy set (see Table 30), the decoy effect is only evident when the brand was targeted by the Range decoy, with three of five products when Brand A was targeted and four of five products when Brand B was targeted. The results for both Brand A and Brand B for the F decoy are not as marked as those reported by Wedell and Pettibone (1996); the decoy effect only occurs for two of five products for both brands. However, all the results by the product level are not statistically significant which means the results are likely to be due to chance. The results for the mean value ratings for both Brand A and B provide little support for the Value Shift Model with only R_B shows decoy effect.

Table 30. Dimensional value Ratings for Brand A and B: No decoy vs R_A or F_A or R_B or F_B

Domain	N	Dimension	Brand A			Brand B		
			No Decoy	R_A	F_A	No Decoy	R_B	F_B
Beer	46	1	6.70	6.78	6.39	5.57	**6.30**	5.43
		2	4.78	**5.50**	4.35	6.93	7.04	6.93
		1+2	11.48	**12.28**	10.74	12.50	**13.34**	12.36
Car	47	1	6.72	6.79	**6.77**	6.74	6.46	6.36
		2	6.11	**6.26**	5.66	7.72	7.15	**7.91**
		1+2	12.83	**13.05**	12.43	14.46	13.61	14.27
Restaurant	50	1	7.24	7.08	**7.46**	4.50	**5.40**[b]	5.32[a]
		2	5.22	5.06	5.12	7.50	7.76	**7.88**
		1+2	12.46	12.14	**12.58**	12.00	**13.16**[a]	**13.20**[a]
MP3	49	1	7.37	7.45	7.24	3.31	**5.98**[c]	4.61[c]
		2	5.76	**6.12**	6.08	6.37	6.98	**7.14**[a]
		1+2	13.13	**13.57**	**13.32**	9.68	**12.96**[c]	**11.75**[c]
Chocolate Bar	49	1	7.49	7.14	**7.63**	5.45	**6.73**[c]	5.14
		2	5.27	**5.29**	4.98	7.39	7.33	6.84
		1+2	12.76	12.43	12.61	12.84	**14.06**[a]	11.98
Mean		1	7.10	7.05	7.10	5.11	**6.17**[c]	5.37
		2	5.43	**5.65**	5.24	7.18	7.25	**7.34**
		1+2	12.53	**12.70**	12.34	12.29	**13.42**[c]	**12.71**

Notes:
1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy, $\mathbf{F_A}$ = A is targeted by F decoy, $\mathbf{F_B}$ = B is targeted by F decoy
   No-decoy = No decoy is added to the choice set.
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at $p<.10$,
   b. Paired t test for mean differences significant at $p<.05$,
   c. Paired t test for mean differences significant at $p<.01$

Summary and Discussion

When the analysis of Wedell and Pettibone (1996) is followed, which is the results are only analysed under decoy conditions (see Table 28 and 29) the results provide strong support to the value shift model using the overall mean value. That is, the inclusion of an ADD changes the perception of the subjective attribute value (i.e., dimensional value) on that dimension "so that the overall dimensional value of the targeted brand is increased relative to the other alternatives in the choice set" (Wedell and Pettibone, 1996, p. 328). The results on dimensional value indicate strong decoy effects for both

the R and F decoys and correspond to the predictions made by Hypothesis 10 in 17 of 20 cases. The lack of statistical significance for the results at the product level show the results may have occurred by chance.

However, when a No-decoy condition was added to compare with the targeted decoy condition, it was apparent that the decoy effect is only evident when the brand was targeted by the Range decoy (see Table 30). The results only correspond to Hypothesis 11 when alternative in a choice set is targeted by a Range decoy.

5.2.6 Effect of decoy on judgment of justifiability: testing the emergent value model

The Emergent Value Model is different from both the Weight Change Model and the Value Shift Model in that it argues that choice is not just dependent on the changes on the weights or the values along the dimension but also relies on the relational aspects of the choice set (Wedell & Pettibone, 1996). The model proposes that the relationship between the targeted option and the decoy, that is, the domination of the decoy by the targeted option, makes the choice of the dominating alternative (the targeted brand) easier to justify or explain and thus reduce the stress of making choice decision. Thus, the Emergent Value Model can be tested from two bases according to Simonson (1989): the need to justify one's choice, and human nature to reduce stress within a choice task by simplifying the choice process.

Simonson (1989) suggests that one reason the ADE happens is because people often feel the need to justify their choice. The insertion of a dominated alternative (i.e., a decoy) may provide a reason for choosing the dominating option (i.e., the targeted brand). That is, once the targeted brand is perceived to dominate the decoy, decision makers may choose it because it is more easily justified or explained. Thus, if the emergent value model holds, then

H12. Ratings of justifiability will be higher for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when the decoy is targeting the competitor brands.

H13. Ratings of justifiability will be higher for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when no decoy is added into the choice set.

Simonson (1989) also suggests that the decoy effect may be due to the human nature to simplify their choice process and reduce the anxiety associated with choosing an alternative in a choice task. Hence, if the emergent value model holds, then the following hypotheses are reflected:

H14. Ratings of evaluation anxiety will be lower for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when a decoy is targeting the competitor brands.

H15. Ratings of evaluation anxiety will be lower for an alternative in a choice set when it is targeted by a decoy (R or F decoy) than when no decoy is added into the choice set.

These two bases of the Emergent Value Model are tested in this study. Following Wedell and Pettibone (1996) and Bonaccio and Reeve (2006), a set of "justifiability" scale was used to test the emergent value model on the basis of a need to justify a choice, while a set of "evaluation anxiety" scale was used to test the emergent value model on the basis of evaluation anxiety.

5.2.6-1 Testing the emergent value model on the basis of a need to justify a choice: justifiability

Participants were asked to assess how easily they could justify selecting each alternative in the choice set. Support for the emergent-value model would be indicated by higher justifiability ratings assigned for an alternative when it is targeted by a decoy (e.g., Brand A is targeted by R_A or F_A) than when its competitor brand is

targeted (e.g., Brand A is not targeted by R_A or F_A). That is, the justifiability rating for brand A is greater under R_A or F_A condition than when it is under R_B or F_B condition or the justifiability rating for brand B is greater under R_B or F_B condition than under R_A or F_A condition (i.e., brand A: $R_A > R_B$; $F_A > F_B$; brand B: $R_B > R_A$; $F_B > F_A$). Such occurrences are shown in bold in Tables 32 and 33.

Support for the emergent value model would also be indicated if the justifiability rating of a targeted brand, which is targeted by a decoy (e.g., R_A or F_A for Brand A, or R_B or F_B for Brand B), is greater than when no decoy is added to the choice set. Such occurrences are shown in bold in Tables 34.

To sum, if the emergent value model holds, then

Table 31. Expected results for the decoy effect on judgment of justifiability

		Brand justifiability rating given for:						
		Brand A				Brand B		
H12:	**H12a**	R_B	<	R_A	**H12b**	R_A	<	R_B
	H12c	F_B	<	F_A	**H12d**	F_A	<	F_B
H13:	**H413a**	No-decoy	<	R_A	**H13b**	No-decoy	<	R_B
	H13c	No-decoy	<	F_A	**H13d**	No-decoy	<	F_B

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy, $\mathbf{F_A}$ = A is targeted by F decoy, $\mathbf{F_B}$ = B is targeted by F decoy
No-decoy = No decoy is added to the choice set.
3. **H12a, H12b, H12c, H12d** are the specific hypotheses for Hypothesis 12, while **H13a, H13b, H13c, H13d** are the specific hypotheses for Hypothesis 13; see Section 3 for the objective section (pp.51-52)

Range Decoy (R_A, R_B)

The results of the justifiability ratings for both Brand A and Brand B are shown in Table 32.

Table 32. Justifiability Ratings for Brands A and B: R_A vs R_B

		Brand A		Brand B	
Domain	**N**	**R_B**	**R_A**	**R_A**	**R_B**
Beer	46	4.83	**6.41**[c]	6.28	**6.72**
Car	47	5.83	**6.49**	7.32	6.72
Restaurant	50	5.86	**5.94**	7.34	7.32
MP3	49	6.53	**7.39**[a]	5.02	**6.49**[c]
Chocolate Bar	49	6.00	**6.06**	6.78	**6.94**
Mean		5.81	**6.46**[c]	6.55	**6.84**

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. **R_A** = A is targeted by R decoy, **R_B** = B is targeted by R decoy
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
b. Paired t test for mean differences significant at p<.05,
c. Paired t test for mean differences significant at p<.01.

Hypothesis 12 is supported for the Range decoy with all five products when the target is Brand A (R_A) and with three of five products when the target is Brand B (R_B). However, paired-t tests shows that only three of the ten comparisons are statistically significant. The support for the Emergent Value Model also reflected in the overall mean for both brands (brand A: $R_A>R_B$; brand B: $R_B>R_A$), but the results of the overall mean is only statistically significant for Brand A ($t=3.032$, $df=479$, $p<.01$).

Frequency Decoy (F_A, F_B)

Table 33 reports the results of the justifiability ratings for both Brand A and Brand B.

Table 33. Justifiability Ratings for Brands A and B: F_A vs F_B

		Brand A		Brand B	
Domain	**N**	**F_B**	**F_A**	**F_A**	**F_B**
Beer	46	6.22	**6.41**	6.67	6.50
Car	47	6.47	**6.91**	7.23	7.11
Restaurant	50	6.16	**6.74**	6.84	**7.26**
MP3	49	6.77	**6.98**	5.57	**5.75**
Chocolate Bar	49	5.18	**6.20**[b]	5.94	**6.88**[b]
Mean		6.16	**6.65**[b]	6.45	**6.70**

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. **R_A** = A is targeted by R decoy, **R_B** = B is targeted by R decoy
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
b. Paired t test for mean differences significant at p<.05,

c. Paired t test for mean differences significant at p<.01

The same pattern is found in Table 33 as in Table 32; support for the Emergent Value Model under the F condition is evident for all five products when the target is brand A (F_A) and also for three of five domains when the target was brand B (F_B). Although the results are only statistically significant in 2 of 10 comparisons, the results do show the same pattern found in Wedell and Pettibone (1996). The support for the Emergent Value Model also reflected in the overall mean for both brands (Brand A: $F_A>F_B$; Brand B: $F_B>F_A$) (see Table 27), although the results of the overall mean is only statistically significant for Brand A (t=2.322, df=479, p<.05).

Comparison of R and F decoy with a No-decoy control

When the decoy set was compared with No-decoy set, the emergent value model is only supported on some decoy types under some target conditions (see Table 34).

Table 34. Justifiability Ratings for Brand A and B: No decoy vs R_A or F_A or R_B or F_B

Domain	N	Brand A			Brand B		
		No Decoy	R_A	F_A	No Decoy	R_B	F_B
Beer	46	6.17	6.41	**6.41**	6.59	**6.72**	6.50
Car	47	6.72	6.49	**6.91**	7.55	6.72	7.11
Restaurant	50	5.82	**5.94**	**6.74**[a]	6.62	**7.32**[a]	**7.26**
MP3	49	6.86	**7.39**	**6.98**	4.80	**6.49**[c]	**5.75**[a]
Chocolate Bar	49	6.67	6.06	6.20	7.10	6.94	6.88
Mean		6.45	**6.46**	**6.65**	6.53	**6.84**	**6.70**

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. R_A = A is targeted by R decoy, R_B = B is targeted by R decoy, F_A = A is targeted by F decoy, F_B = B is targeted by F decoy
No-decoy = No decoy is added to the choice set.
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
b. Paired t test for mean differences significant at p<.05,
c. Paired t test for mean differences significant at p<.01

The Hypothesis 13b for the R decoy is only evident when Brand B is targeted with 3 of 5 products perceiving higher justifiability ratings while the hypothesis 13c for the F decoy is only reflected when Brand A is targeted with 4 of five products received higher ratings. The results were statistically significant in only two of the ten comparisons for both the R and the F decoys. The support for the Emergent Value

Model is also reflected in the overall mean for both brands. However, none of the results of the overall means are statistically significant.

Summary

Overall, the R_A vs. R_B and F_A vs. F_B comparison support for the Emergent Value Model when only lower quality products are targeted in terms of the significance of the difference in the mean. That is, Hypothesis 12 is supported in 16 of 20 cases.

However, when the decoy set is compared with a No-decoy set (see Table 34), the results only provide limited support for the Emergent Value Model. That is, Hypothesis 13 is only supported for three of five products for Brand B for the R decoy and for 4 of five products for Brand A for the F decoy.

5.2.6-2 Testing the emergent value model on the basis of evaluation anxiety

Participants were asked to rate each alternative on the degree to which they believe they would be criticized by their peers if they chose the alternative. The emergent-value model would be supported if the perceived evaluation apprehension associated with an alternative when it is targeted by a decoy (e.g., Brand A is targeted by R_A or F_A) was less than when its competitor brand was targeted (e.g., Brand A is not targeted by R_A or F_A). That is, the evaluation anxiety rating for Brand A is less under R_A or F_A condition than when it is under R_B or F_B condition or the evaluation anxiety rating for Brand B is less under R_B or F_B condition than under R_A or F_A condition (i.e., Brand A: $R_A<R_B$; $F_A<F_B$; Brand B: $R_B<R_A$; $F_B<F_A$). Such occurrences are shown in bold in Tables 36 and 37.

Support for the emergent value model would also be indicated if the evaluation anxiety rating of a targeted brand, which is targeted by a decoy (e.g R_A or F_A for Brand A, or R_B or F_B for Brand B), is less than when no decoy is added to the choice set. Such occurrences are shown in bold in Tables 38.

In summary, if the emergent value model holds, then

Table 35. Expected results for the decoy effect on judgment of evaluation anxiety

		Brand evaluation anxiety rating given that:						
		Brand A				Brand B		
H14:	**H14a**	R_B	>	R_A	**H14b**	R_A	>	R_B
	H14c	F_B	>	F_A	**H14d**	F_A	>	F_B
H15:	**H15a**	No-decoy	>	R_A	**H15b**	No-decoy	>	R_B
	H15c	No-decoy	>	F_A	**H15d**	No-decoy	>	F_B

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy, $\mathbf{F_A}$ = A is targeted by F decoy, $\mathbf{F_B}$ = B is targeted by F decoy
No-decoy = No decoy is added to the choice set.
3. **H14a, H14b, H14c, H14d** are the specific hypotheses for Hypothesis 14, while **H15a, H15b, H15c, H15d** are the specific hypotheses for Hypothesis 15; see Section 3 for the objective section (pp.52-54)

Range Decoy (R_A, R_B)

Table 36 shows the results of the evaluation anxiety ratings by target conditions for the Range decoy.

Table 36. Evaluation Anxiety Ratings for Brands A and B: R_A vs R_B

		Brand A		Brand B	
Domain	**N**	$\mathbf{R_B}$	$\mathbf{R_A}$	$\mathbf{R_A}$	$\mathbf{R_B}$
Beer	46	4.52	**3.57**[a]	3.74	**3.22**
Car	47	4.37	**3.62**	3.77	**3.15**
Restaurant	50	5.28	**3.72**[c]	3.56	3.88
MP3	49	4.04	**2.82**[b]	4.35	4.53
Chocolate Bar	49	3.73	4.61	4.00	**3.59**
Mean		4.39	**3.67**[c]	3.88	**3.67**

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
b. Paired t test for mean differences significant at p<.05,
c. Paired t test for mean differences significant at p<.01

Support for the Emergent Value Model was evident for four of five products when the target was Brand A (R_A) and also for three of five products when the target was brand B (R_B). The results show three of five comparisons were statistically significant at

the .05 level of the paired t test when the target was Brand A. None of the results were significant when Brand B was targeted by the R decoy which suggests that the results are likely due to the chance. The support for the emergent value model is also reflected in the overall mean for both brands (brand A: $R_A<R_B$; brand B: $R_B<R_A$). A paired t-test shows only the difference for Brand A is statistically significant (t=-3.180, df=479, p<.01).

Frequency Decoy (F_A, F_B)

The results of the evaluation anxiety ratings for both Brand A and Brand B under the F condition were reported in Table 37.

Table 37. Evaluation Anxiety Ratings for Brands A and B: F_A vs F_B

		Brand A		Brand B	
Domain	**N**	F_B	F_A	F_A	F_B
Beer	46	3.87	**3.65**	2.93	3.28
Car	47	4.17	**3.94**	4.26	**4.04**
Restaurant	50	5.66	**4.40**[b]	4.50	**4.38**
MP3	49	4.20	**3.94**	4.67	**3.78**[a]
Chocolate Bar	49	4.10	**3.45**	3.16	3.18
Mean		4.40	**3.88**[b]	3.90	**3.73**

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
b. Paired t test for mean differences significant at p<.05,
c. Paired t test for mean differences significant at p<.01

As predicted by Hypothesis 14, when a Frequency decoy was added into a choice set, decision makers perceived less criticism from their peers for the choice in all five products when the target was brand A (F_A) and also in three of five products when the target was brand B (F_B). However, the paired t-tests were only statistically significant in two of the ten comparisons. The support for the Emergent Value Model is also reflected in the overall mean for both brands (Brand A: $F_A<F_B$; Brand B: $F_B<F_A$). The results were only statistically significant when Brand A was targeted (t=-2.273, df=480, p<.05).

Comparison of R and F decoy with a No-decoy control

When the decoy set was compared with no-decoy set (see Table 38), the emergent value model was only supported when Brand A is targeted by the Range decoy on (four of five products) and when Brand B is the target under the Frequency condition (three of five products). The results were statistically significant for only one of the ten comparisons. Although the overall mean for both brands show the decoy effect, none of the results are statistically significant.

Table 38. Anxiety-evaluation Ratings for Brand A and B: No decoy vs R_A or F_A or R_B or F_B

Domain	N	Brand A			Brand B		
		No Decoy	R_A	F_A	No Decoy	R_B	F_B
Beer	46	4.41	**3.57**	**3.65**	3.96	**3.22**	**3.28**
Car	47	4.51	**3.62**[a]	**3.94**	3.91	**3.15**	4.04
Restaurant	50	3.92	**3.72**	4.40	3.10	3.88	4.38
MP3	49	3.29	**2.82**	3.94	4.29	4.53	**3.78**
Chocolate Bar	49	3.31	4.61	3.45	3.57	3.59	**3.18**
Mean		3.89	**3.67**	**3.88**	3.77	**3.67**	**3.73**

Notes: 1. Brand A = low price/quality; Brand B = high price/quality
2. $\mathbf{R_A}$ = A is targeted by R decoy, $\mathbf{R_B}$ = B is targeted by R decoy, $\mathbf{F_A}$ = A is targeted by F decoy, $\mathbf{F_B}$ = B is targeted by F decoy
No-decoy = No decoy is added to the choice set.
3. Decoy effect shown in **bold**
4. a. Paired t test for mean differences significant at p<.10,
b. Paired t test for mean differences significant at p<.05,
c. Paired t test for mean differences significant at p<.01

Summary

The result for the R_A vs. R_B, F_A vs. F_B comparison (see Table 36 and 37) are consistent with those of Wedell and Pettibone (1996) and provide strong support for the Emergent Value Model. Hypothesis 14 is reflected in 15 of 20 cases.

However, when the decoy set is compared with a No-decoy set (see Table 38), the results on evaluation anxiety rating only provide limited support to the Emergent Value Model. Hypothesis 15 is only supported in three of five products for Brand A for the R decoy, and for four of five products for Brand B for the F decoy.

5.2.7 A summary of the Results

The results found for the three ADE models are summarised in Table 39.

Table 39. Summary of Results

		Current study (2007)								
Qs: Whether support the hypotheses:		**Analysis under decoy conditions**					**Analysis between decoy sets and No-decoy sets**			
		overall means		**individual products**			**overall means**		**individual products**	
		D^1	**T^2**	**D^1**	**T^2**		**D^1**	**T^2**	**D^1**	**T^2**
The decoy effect on choice	H1a: R_A	√	√	5/5	3/5	H2a: R_A	x	x	1/5	1/5
	H1b: R_B	√	√	4/5	3/5	H2b: R_B	√	√	4/5	2/5
	H1c: F_A	√	√	4/5	2/5	H2c: F_A	x	x	2/5	x
	H1d: F_B	√	√	5/5	2/5	H2d: F_B	√	√	5/5	3/5
The decoy effect on judgment	H3a: R_A	√	√	4/5	2/5	H4a: R_A	√	x	2/5	x
	H3b: R_B	√	√	4/5	2/5	H4b: R_B	√	√	4/5	3/5
	H3c: F_A	√	√	5/5	1/5	H4c: F_A	√	x	2/5	x
	H3d: F_B	√	√	4/5	1/5	H4d: F_B	√	√	5/5	1/5
The relationship between choice and judgment	H5:	√	√							
The Weight Change Model: Wedell and Pettibone's (1996) interpretation	H6a: R_A	x	x	1/5	x	H7a: R_A	x	x	3/5	x
	H6b: R_B	x	x	3/5	x	H7b: R_B	√	x	4/5	x
	H6c: F_A	√	x	3/5	x	H7c: F_A	√	x	4/5	x
	H6d: F_B	x	x	2/5	x	H7d: F_B	√	x	2/5	x
The Weight Change Model: Bonaccio and Reeve's (2006) interpretation	H8a: R_A	√	√	4/5	x	H9a: R_A	√	x	2/5	x
	H8b: R_B	√	x	2/5	x	H9b: R_B	x	x	1/5	x
	H8c: F_A	√	x	3/5	x	H9c: F_A	√	x	4/5	x
	H8d: F_B	x	x	2/5	x	H9d: F_B	√	x	2/5	x
The Value Shift Model	H10a: R_A	√	√	4/5	2/5	H11a: R_A	√	x	3/5	x
	H10b: R_B	√	√	4/5	4/5	H11b: R_B	√	√	4/5	3/5
	H10c: F_A	√	√	5/5	1/5	H11c: F_A	x	x	2/5	x
	H10d: F_B	√	√	4/5	1/5	H11d: F_B	√	x	2/5	2/5
The Emergent Value Model: Justifiability	H12a: R_A	√	√	5/5	2/5	H13a: R_A	√	x	2/5	x
	H12b: R_B	√	x	3/5	1/5	H13b: R_B	√	x	3/5	2/5
	H12c: F_A	√	√	5/5	1/5	H13c: F_A	√	x	4/5	1/5
	H12d: F_B	√	x	3/5	1/5	H13d: F_B	√	x	2/5	1/5

The emergent value model: Evaluation anxiety	H14a: R_A	√	√	4/5	3/5	H15a: R_A	√	x	4/5	1/5
	H14b: R_B	√	x	3/5	x	H15b: R_B	√	x	2/5	x
	H14c: F_A	√	√	5/5	1/5	H15c: F_A	√	x	2/5	x
	H14d: F_B	√	x	3/5	1/5	H15d: F_B	√	x	3/5	x

Notes: 1. D: √= mean difference supports Hypothesis; x = mean difference does not support the Hypothesis.

2. T: √= mean difference is statistically significant; x = mean difference is not statistically significant.

6. Discussion

The purpose of this research was to test whether there is empirical evidence to support the three asymmetrically dominated decoy effect (ADE) models described by Wedell and Pettibone (1996): the Weight Change Model, the Value Shift Model, and the Emergent Value Model. This was done by:

i. Analysing respondents' choices to determine whether there is an ADE on an actual choice situation,
ii. Comparing respondents' choices and judgments to investigate the relationship between choice and judgment,
iii. Analysing respondents' judgments in five judgment tasks designed to determine whether any of the three ADE models were supported.

The follow section discusses the findings presented in the results section. The results are related back to the literature and the research objectives, and the important implications of the research are discussed in detail.

6.1 EFFECT OF DECOY ON CHOICE BEHAVIOUR

It has been generally accepted in marketing that an alternative is more likely to be chosen in a choice task when targeted by an asymmetrically dominated decoy (e.g. see Huber et al. 1982; Heath & Chatterjee, 1995). Thus one would expect to find decoy effects in the choice tasks used in this research. Indeed, the results show evidence of strong decoy effects for both R and F decoys. Thus the results provide support to the proposition that the use of an ADD leads a violation of regularity. The results also confirm the suitability of choice sets selected for use in the judgment tasks to test the three ADE models.

It is notable that a strong effect was found for all four decoys (R_A, R_B, F_A, and F_B) when Wedell and Pettibone's (1996) analysis was used; that is, when comparisons between decoy conditions were made (i.e., R_A vs. R_B, F_A vs. F_B) using the overall

means across products. This finding is consistent with the results of Pettibone and Wedell (2000) that "an alternative was chosen more often when it was [targeted] by the decoy" (p. 308).

An interesting observation is that the results at the individual product level provide little support for the decoy effect on choice, with only the Range decoy producing the predicted results, although the tendency for respondents to choose the targeted brand more often than the competitor brand is evident. However, it is likely that this is due to the relatively small sample size for each product. Thus, a larger sample size is suggested in future studies

When comparisons were made with the No-decoy condition (i.e., R_A vs. No-decoy, R_B vs. No-decoy, F_A vs. No-decoy, and F_B vs. No-decoy), the R or F decoys worked better for higher quality products than lower quality products. This finding is consistent with the study of Heath et al. (1995) which studied the ADD effect with respect to the importance of price and quality, and found that "decoys increase shares of higher-quality brands but typically do not increase shares of lower-quality brands." (p. 268). Huber et al. (1982) also found that decoy worked better for the higher quality product than the lower-quality product, although it should be noted that in their study, the decoys worked for both the higher-quality and lower-quality products.

6.2 EFFECT OF DECOY ON JUDGMENT OF BRAND ATTRACTIVENESS

As in the choice task, the brand attractiveness judgment task also showed strong decoy effects for all four decoys ((i.e., R_A vs. R_B, F_A vs. F_B) when measured using the overall mean across products. This confirms previous findings that judgment tasks can be used to examine decoy effects (Wedell & Pettibone, 1996). Although the results at the individual product level provide little support for the decoy effect on judgment, there was still a clear tendency for respondents to perceive the targeted brand as more attractive than the competitor brand.

When comparisons were made with the No-decoy condition (i.e., R_A vs. No-decoy, R_B vs. No-decoy, F_A vs. No-decoy, and F_B vs. No-decoy), the findings were consistent

with the conclusion reached in the choice task that the decoys worked better for the higher quality product.

6.3 THE RELATIONSHIP BETWEEN JUDGMENT AND CHOICE

According to Wedell and Pettibone (1996), if the assumption holds that the attractiveness ratings reflect the same decoy effect found in choice, then the validity of using judgment ratings tasks as a substitute for choice will be enhanced (p.331). The current study provides strong support for the claim that decoy effects in judgment tasks reflect the same pattern as found in the choice task, and this finding is consistent with previous studies (Wedell and Pettibone, 2000; Simmonson, 1989). Thus, the results provide confidence that the judgment tasks can be used to test the three models of decoy effects.

6.4 THE THREE ADE MODELS

6.4.1 The Weight Change Model

When Wedell and Pettibone's (1996) analysis was used, that is, comparisons between decoy conditions were made (i.e., R_A vs. R_B, F_A vs. F_B), the results did not support Wedell and Pettibone's (1996) interpretation of the Weight Change Model. The comparisons made using a No-decoy condition (i.e., R_A vs. No-decoy, R_B vs. No-decoy, F_A vs. No-decoy, and F_B vs. No-decoy) also fail to support Wedell and Pettibone's (1996) interpretation of the Weight Change Model. In fact, these findings are consistent with Wedell and Pettibone's (1996) own findings, as they also concluded that there was little support for the Weight Change Model.

The interpretation of the Weight Change Model presented by Bonaccio and Reeve (2006) also received little support in this study with only the R_A decoy producing the predicted result. This is contrary to the finding of Bonaccio and Reeve (2006). Thus the present research suggests that neither the interpretation of the Wedell and Pettibone's (1996) Weight Change Model nor the Bonaccio and Reeve's interpretation on the Weight Change Model can explain the ADD effect.

6.4.2 The Value Shift Model

When Wedell and Pettibone's (1996) analysis was used, that is, comparisons between decoy conditions were made (i.e., R_A vs. R_B, F_A vs. F_B), the results produced strong support for the Value Shift Model. These findings suggest that the Value Shift Model is a viable explanation to the ADE and is consistent with the conclusions of Wedell (1991), Wedell and Pettibone (1996) and Pettibone and Wedell (2000). Similar to the findings of ADE on choice and judgment, the results at the individual product level did not strongly support the Value Shift Model, although the pattern of the individual means was in the predicted direction. When comparisons were made with the No-decoy condition (i.e., R_A vs. No-decoy, R_B vs. No-decoy, F_A vs. No-decoy, and F_B vs. No-decoy), these results also provided little support to the Value Shift Model, with only the R_B decoy producing the predicted result. However, these results also seem likely to be due to the small number of products in the analysis and relatively small sample size for each task, so larger sample of participants needs to be considered in future work.

6.4.3 The Emergent Value Model

Overall, the results on both the justifiability ratings and the evaluation anxiety ratings show the same pattern. When Wedell and Pettibone's (1996) analysis was used, that is, comparisons between decoy conditions were made (i.e., R_A vs. R_B, F_A vs. F_B), the results from both scales of judgment task (justifiability and evaluation anxiety) support the Emergent Value Model, with strong support when the lower price/lower quality products was targeted (i.e., R_A and F_A). However, the model is not supported by the results from the No-decoy comparison (i.e., R_A vs. No-decoy, R_B vs. No-decoy, F_A vs. No-decoy, and F_B vs. No-decoy), which suggests that the support for the Emergent Value Model is quite weak, or at least not as strong as that for the Value Shift Model.

The lack of strong support for the Emergent Value Model is in contrast to the findings of Wedell (1991), Wedell and Pettibone (1996), and Pettibone and Wedell (2000). One possibility is that the unexpected results are due to the social desirability bias. The two sets of "justifiability" and "evaluation anxiety" scales used to examine the Emergent Value Model are rather personal (e.g., ask the respondent to say whether they are afraid of criticism), unlike the scales used to test the Value Shift Model, which asks respondents to judge brands rather than make responses about their own choices. It is possible that New Zealanders tend to give positive answers to these scales. For example, some respondents indicated in the questionnaires that they just do not care what other people think about their decisions, and they do not need to justify their act when making a choice.

6.4.4 Method of analysis

Wedell and Pettibone's (1996) analysis (e.g., R_A vs. R_B) is a weaker test of ADE compared with a comparison of the decoy with a No-decoy situation (e.g., R_A vs. No-decoy), since it results in bigger decoy effects, due to the fact that the R_A and R_B, (and F_A and F_B) move in opposing directions in responses to a decoy, and so produce larger differences in ratings than would be expected for the decoy vs. No-decoy condition. This suggests that although Wedell and Pettibone's (1996) approach can be used to indicate whether a decoy works for the targeted brand, it should not be used to support marketing decisions as to whether to use a decoy or not in a choice set. The lower incidences of statistically significant differences with the no-decoy comparison also suggest that this comparison is not sensitive enough to deal with the relatively small shifts in ratings caused by the decoys. On the other hand, they did serve to identify differences in the strength of the decoy effects on different attribute dimensions (i.e., price vs quality), so were useful for that.

Although there were some differences between this study and those of Wedell and Pettibone (1996) and Bonaccio and Reeve (2006) in terms of the method used, the sample size, the age of respondents, the products and instruments used, and the population selected from, it is argued that these differences should not result in different predictions according to the three ADE models, because, if the three ADE

models are general models, they should apply across a range of conditions. This especially the case given that it is claimed that the ADE is a very robust phenomena (Wedell and Pettibone, 1996). However, as the current study shows ADE was not evident in some situations when the No-decoy comparison was used, the effect does not appear to be as robust as Huber et al. (1982) suggested.

6.5 LIMITATIONS

Some concerns might be raised about the reliability of the ratings of dimensional importance used to test the Weight Change Model in this study, as the effect of the relative values chosen for the various products used in these decoy experiment is uncertain. Although the products and the value of the products used in this research closely follow those used by Huber et al. (1982) and Wedell and Pettibone (1996), adjusted to their equivalent value in the New Zealand market, there was no systematic procedure to ensure the two preference dimensions used in this study have equal weight, which is an assumption underlying the Models set out be Wedell and Pettibone (1996). Thus there is a possibility that in some tasks, participants may have only considered the dimension that they thought important and ignored the other dimension if they considered it irrelevant, and then made their judgements or choice. Because of this, the decoys might not have had the expected effect on the ratings of dimensional importance. Future research using a range of different attribute values is needed to examine this possibility.

The use of the 9-point scale in the judgment ratings is another concern. Some participants commented that the 9-points made the questionnaire too complicated and difficult to judge. It is therefore possible that participants might become confused when too many scale divisions are applied which may affect the reliability of the results. However, given that Wedell and Pettibone (1996) used 9-point scales, apparently without problems, it is not certain that the scale actually caused a problem. However, it is an issue that deserves further investigation.

Another concern is that only five product categories were selected for the study and there was evidence of considerable variation in the results across products for some

judgment tasks. This small number of products also means that a single product could have a large influence over the overall mean. It would therefore be preferable to use a much greater number of products, although this would increase demands on respondents.

6.6 DIRECTION FOR FUTURE RESEARCH

Firstly, while the decoys used in the present study were suitable for addressing the established research questions, adding additional decoys such as RF decoys to the study is needed in order to confirm whether the Value Shift Model provides a better explanation of ADE than the Emergent Value Model. While such an examination was not the focus of this study, the results suggest further examination of the Value Shift Model and the Emergent Value Model would be justified.

Secondly, it is suggested that future studies should test the ADE on at least 10 and preferably more products. This would enable a closer examination of ADE on different product categories (e.g., durable products, fast moving consumer goods, etc), and would allow for the use of a test such as the sign test (Siegel, 1956) to be used to test the pattern of ADD effects across products, rather than simply comparing overall means, as was done in this study.

Finally, a systematic procedure is needed to ensure the two preference dimensions, for example price and quality, used in an ADE study have equal weight, which is the assumption underlying the experiment. That is, a more systematic procedure for choosing attribute values (e.g., price and quality) needs to be considered.

6.7 CONCLUSION

The research demonstrated strong asymmetrically dominated decoy (ADD) effect in both choice and judgment tasks and found a strong relationship between choice and judgment. The study also found little support for the Weight Change Model (i.e., either for Wedell and Pettibone's (1996) interpretation of the Weight Change Model

or that of Bonaccio and Reeve (2006)), but strong support for the Value Shift Model and some support for the Emergent Value Model.

The contribution of the study is that it has extended the previous work by testing the assumptions underlying the three ADE model in a wide cross-section of people across a different range of products and attribute values and thus provides a generalizable results. The use of No-decoy comparison with the decoy condition also provides evidence that Wedell and Pettibone's (1996) analysis is a weak test of the ADE and should not be used to support the decision of whether to use ADD in a choice set.

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Appendices

APPENDIX A: ASSIGNMENT OF DECOY TO TREATMENT GROUPS

Table: Assignment of Decoy to five product categories (Group 1 – Group 5):

	Beer (12pack bottles)		Car		Restaurant		MP3 Player		Chocolate Bar	
	Price ($)	Quality (1 to 100)	Petrol Consumption (liters/100 kilometres)	Ride Quality (1 to 100)	Driving time (minutes)	Food Quality (1 to 5 stars)	Price	Storage Capacity (Gigabyte = GB)	Price ($)	Quality (1 to 100)
Original Set										
A	13.00	50	8	80	5	3	99.00	3 GB	1.00	50
B	17.00	70	10	100	25	5	299.00	5 GB	2.00	70
Decoy added										
A	13.00	50	8	80	5	3	99.00	3 GB	1.00	50
B	17.00	70	10	100	25	5	299.00	5 GB	2.00	70
$\mathbf{R_A}$	13.00	40	8	70	5	2	99.00	2 GB	1.00	40
A	13.00	50	8	80	5	3	99.00	3 GB	1.00	50
B	17.00	70	10	100	25	5	299.00	5 GB	2.00	70
$\mathbf{R_B}$	19.00	70	11	100	35	5	399.00	5 GB	2.50	70
A	13.00	50	8	80	5	3	99.00	3 GB	1.00	50
B	17.00	70	10	100	25	5	299.00	5 GB	2.00	70
$\mathbf{F_A}$	15.00	50	9	80	15	3	199.00	3 GB	1.50	50

A	13.00	50	8	80	5	3	99.00	3 GB	1.00	50
B	17.00	70	10	100	25	5	299.00	5 GB	2.00	70
F_B	17.00	60	10	90	25	4	299.00	4 GB	2.00	60

Notes:

R=Range decoy, R_A is targeting at Brand A, R_B is targeting at Brand B,
F=Frequency decoy, F_A is targeting at Brand A, F_B is targeting at Brand B.

APPENDIX B: AN EXAMPLE OF FOUR ADD PLACEMENT STRATEGIES: BEER

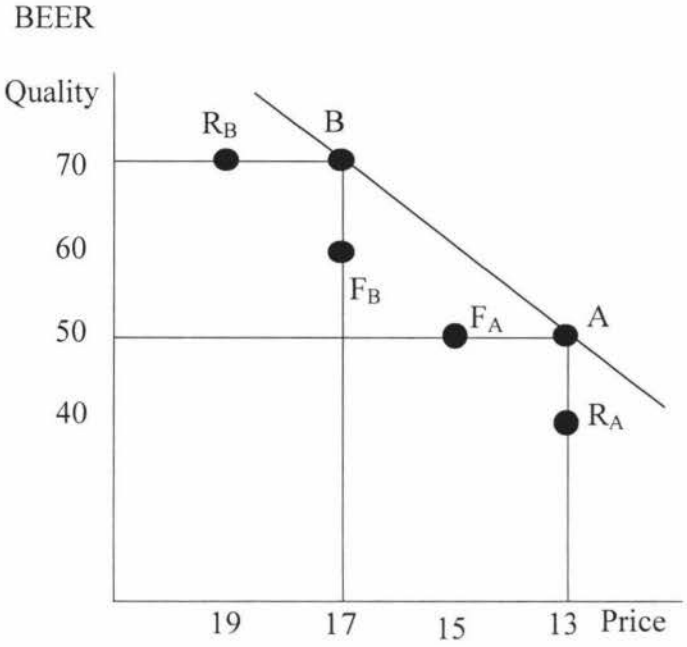

Figure 1. The arrangement of decoy

Notes:

R_A = R decoy favour on the dimension that the target brand **A** is the strongest; brand **A** is the target;

R_B = R decoy favour on the dimension that the target brand **B** is the strongest; brand **B** is the target;

APPENDIX C: INFORMATION LETTER FOR THE MAIL SURVEY

November 16, 2007

A STUDY OF HOW PEOPLE MAKE CHOICES

I am a Massey University student currently studying for my Masters degree, majoring in Marketing. For my research project I am conducting a survey to investigate how people make choices when buying products. I would be very grateful for your assistance.

I appreciate that you are probably busy and that it can be hard to find the time to complete a survey, so I have tried to make the questionnaire quick and easy to complete - all you have to do is read the questions and tick boxes. I have also enclosed a reply-paid envelope, so you do not need to put a stamp on it to return it to me.

You may be wondering how you were chosen for the survey. In order to get a representative sample of people for my study I randomly selected names from the electoral roll, and your name was one of those selected.

Please note that all of your answers will be completely confidential. The number on the questionnaire is simply to allow me to cross your name off once you have returned your questionnaire, so I don't send you a reminder.

Thank you in advance for your help. I look forward to receiving your completed questionnaire as soon as possible. Please accept the attached chocolate as a small token of appreciation.

Yours sincerely,

Xiaozhen (Monica) XU
Graduate Student in Marketing

P.S. If you have any questions relating to any aspects of this research, please feel free to contact me, or my supervisor, at the following addresses:

Xiaozhen (Monica) Xu
Department of Marketing
Massey University
E-mail: easy_xu@hotmail.com

Dr Mike Brennan
Department of Marketing
Massey University
Ph. 06 350 5576
E-mail: m.brennan@massey.ac.nz

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researchers named above are responsible for the ethical conduct of this research. If you have any concerns about the conduct of this research that you wish to raise with someone other than the researchers, please contact Professor Sylvia Rumball, Assistant to the Vice-Chancellor (Ethics & Equity), telephone 06 350 5249, e-mail humanethicspn@massey.ac.nz.

APPENDIX D: A REMINDER LETTER FOR THE MAIL SURVEY

A STUDY OF HOW PEOPLE MAKE CHOICES

Recently I sent you a questionnaire for my study on how people make choices when buying products. Because this survey is part of my research as a postgraduate student at Massey University, it is very important that I receive as many replies as possible.

As I have not yet received your reply, I am writing again to ask for your help.

I appreciate that you are busy so I have tried to make the questionnaire quick and easy to complete. It should take no longer than about 15 minutes.

I would be very grateful for your assistance, and look forward to receiving your reply.

Thank you in advance for your help.

Yours sincerely

Xiaozhen (Monica) XU
Graduate Student in Marketing

PS If you have already returned your questionnaire, thank you, and please ignore this reminder. If you have any questions about the survey, please feel free to email Monica at moni.xu@hotmail.com or Mike at m.brennan@massey.ac.nz.

APPENDIX E: QUESTIONNAIRE

CONFIDENTIAL

ID No. _____

Department of Marketing
Massey University

A STUDY OF HOW PEOPLE MAKE CHOICES

Thank you for taking part in this survey. Your participation is greatly appreciated, and is very important for my research.

This survey asks you for your opinions and judgements about various product attributes, like price and quality, for five different products. Because the questions are very similar for each product, they are quite repetitive, but they will not take long to answer, so please answer every question.

Please note that there is no right or wrong answer to any question, so just give the answer that suits you.

How to fill out this questionnaire

To answer the questions, all you have to do is tick a box. For most questions there is an instruction in **BOLD TYPE** explaining what is required.

For each product, you will see a box at the top of the left-hand page labelled BOX 1, 2, 3, 4 or 5, depending on which of the five products you are looking at.

This box contains a description of the product, and sets out two or three brands for you to consider.

For each product, the questions refer to the Brands set out in the BOX at the top of the left hand page.

BOX 1 **BEER**

Please imagine that you are deciding among the following beers. These beers vary only in terms of price and quality. Assume the Brands are equal on all other aspects.

Brands	Price ($) 12 pack (bottles)	Quality (0 = extremely low, 100 = extremely high)
Brand A	13.00	50
Brand B	17.00	70

Please look at the information in **BOX 1** above before answering the following questions.

1. How attractive to you is each **brand** shown in **BOX 1** above?

PLEASE TICK ONE BOX FOR EACH Brand

	Not at all attractive								Very attractive
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9

2. How important to you is **price** and **quality** for choosing among Brands in **BOX 1**? That is, how heavily does price and quality weigh when deciding which of these brands to choose?

PLEASE TICK ONE BOX FOR Price AND ONE BOX FOR Quality

	Not at all important								Very important
	1	2	3	4	5	6	7	8	9
Price									
Quality	1	2	3	4	5	6	7	8	9

3. Imagine that after choosing one of these brands you are going to be asked to justify your choice to someone. For each brand, how easy would it be to justify it as your top choice?

PLEASE TICK ONE BOX FOR EACH Brand

	Not at all justifiable								Very justifiable
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9

4. What is the likelihood that you would be criticised by others if you told them you had selected Brand A? What if it was Brand B?

PLEASE TICK ONE BOX FOR EACH Brand

	Not very likely to be criticised								Very likely to be criticised
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9

5. Given just the information shown in **BOX 1**, how attractive is the **price** and **quality** value listed for each brand?

FOR EACH brand, PLEASE TICK ONE BOX FOR price AND ONE BOX FOR quality

	Not very attractive								Very attractive
Brand A									
- price	1	2	3	4	5	6	7	8	9
- quality	1	2	3	4	5	6	7	8	9
Brand B									
- price	1	2	3	4	5	6	7	8	9
- quality	1	2	3	4	5	6	7	8	9

6. When did you last buy any bottles or cans of beer?

PLEASE TICK ONE BOX ONLY

Less than a week ago	1
Between 1- 3 weeks ago	2
Between 1-6 months ago	3
Between 7-12 months ago	4
Over a year ago	5
Never	6

BOX 2 **CAR**

Please imagine that you are deciding among the following cars. These cars vary only in terms of average petrol consumption (litres/100 kilometers) and ride quality. Assume the Brands are equal on all other aspects.

Brands	**Petrol Consumption** (litres/100 kilometers)	**Ride Quality** (0 = extremely low, 100 = extremely high)
Brand A	8	80
Brand B	10	100
Brand C	10	90

Please look at the information in **BOX 2** above before answering the following questions.

7. How attractive to you is each **brand** shown in **BOX 2** above?

PLEASE TICK ONE BOX FOR <u>EACH</u> Brand

	Not at all attractive								Very attractive
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

8. How important to you is **petrol consumption** and **ride quality** for choosing among the brands in **BOX 2**?
That is, how heavily does price and quality weigh when deciding which of these brands to choose?

PLEASE TICK ONE BOX FOR Petrol consumption AND ONE BOX FOR Ride quality

	Not at all important								Very important
	1	2	3	4	5	6	7	8	9
Petrol consumption									
Ride quality	1	2	3	4	5	6	7	8	9

9. Imagine that after choosing one of these brands you are going to be asked to justify your choice to someone. For each brand, how easy would it be to justify it as your top choice?

PLEASE TICK ONE BOX FOR <u>EACH</u> Brand

	Not at all justifiable								Very justifiable
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

10. What is the likelihood that you would be criticised by others if you told them you had selected Brand A? What if it was Brand B? What if it was Brand C?

PLEASE TICK ONE BOX FOR <u>EACH</u> Brand

	Not very likely to be criticised								Very likely to be criticised
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

11. Given just the information shown in **BOX 2**, how attractive is the **petrol consumption** and **ride quality** value listed for each brand?

FOR <u>EACH</u> brand, PLEASE TICK ONE BOX FOR petrol consumption AND ONE BOX FOR ride quality

	Not very attractive								Very attractive
Brand A									
- petrol consumption	1	2	3	4	5	6	7	8	9
- ride quality	1	2	3	4	5	6	7	8	9
Brand B									
- petrol consumption	1	2	3	4	5	6	7	8	9
- ride quality	1	2	3	4	5	6	7	8	9
Brand C									
- petrol consumption	1	2	3	4	5	6	7	8	9
- ride quality	1	2	3	4	5	6	7	8	9

12. When did you last look for or buy a car?

PLEASE TICK ONE BOX ONLY

Less than a week ago	1
Between 1- 3 weeks ago	2
Between 1-6 months ago	3
Between 7-12 months ago	4
Over a year ago	5
Never	6

BOX 3 **RESTAURANT**

Please imagine that you are deciding among the following restaurants. These restaurants vary only in terms of driving time (minutes) and average food quality rated by stars. Assume the Brands are equal on all other aspects.

Brands	Driving Time (minutes)	Food Quality (0 stars = extremely low, 5 stars = extremely high)
Brand A	5	3
Brand B	25	5
Brand C	15	3

Please look at the information in **BOX 3** above before answering the following questions.

13. How attractive to you is each **brand** shown in **BOX 3** above?

PLEASE TICK ONE BOX FOR EACH Brand

	Not at all attractive								Very attractive
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

14. How important to you is **driving time** and **food quality** for choosing among the brands in **BOX 3**? That is, how heavily does driving time and food quality weigh when deciding which of these brands to choose?

PLEASE TICK ONE BOX FOR driving time AND ONE BOX FOR food quality

	Not at all important								Very important
	1	2	3	4	5	6	7	8	9
Driving time									
Food quality	1	2	3	4	5	6	7	8	9

15. Imagine that after choosing one of these brands you are going to be asked to justify your choice to someone. For each brand, how easy would it be to justify it as your top choice?

PLEASE TICK ONE BOX FOR EACH Brand

	Not at all justifiable								Very justifiable
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

16. What is the likelihood that you would be criticised by others if you told them you had selected Brand A? What if it was Brand B? What if it was Brand C?

PLEASE TICK ONE BOX FOR EACH Brand

	Not very likely to be criticised								Very likely to be criticised
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

17. Given just the information shown in **BOX 3**, how attractive is the **driving time** and **food quality** value listed for each brand?

FOR EACH brand, PLEASE TICK ONE BOX FOR driving time AND ONE BOX FOR food quality

	Not very attractive								Very attractive
Brand A									
- driving time	1	2	3	4	5	6	7	8	9
- food quality	1	2	3	4	5	6	7	8	9
Brand B									
- driving time	1	2	3	4	5	6	7	8	9
- food quality	1	2	3	4	5	6	7	8	9
Brand C									
- driving time	1	2	3	4	5	6	7	8	9
- food quality	1	2	3	4	5	6	7	8	9

18. When did you last eat out at a restaurant?

PLEASE TICK ONE BOX ONLY

Less than a week ago	1
Between 1- 3 weeks ago	2
Between 1-6 months ago	3
Between 7-12 months ago	4
Over a year ago	5
Never	6

BOX 4 **MP3 PLAYER**

Please imagine that you are deciding among the following MP3 Players. These MP3 Players vary only in terms of price and storage capacity. Assume the Brands are equal on all other aspects.

Brands	Price ($)	Storage Capacity (Gigabyte = GB)
Brand A	99.00	3 GB
Brand B	299.00	5 GB
Brand C	399.00	5 GB

Please look at the information in **BOX 4** above before answering the following questions.

19. How attractive to you is each **brand** shown in **BOX 4** above?

PLEASE TICK ONE BOX FOR EACH Brand

	Not at all attractive								Very attractive
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

20. How important to you is **price** and **storage capacity** for choosing among the brands in **BOX 4**? That is, how heavily does price and storage capacity weigh when deciding which of these brands to choose?

PLEASE TICK ONE BOX FOR Price AND ONE BOX FOR storage capacity

	Not at all important								Very important
	1	2	3	4	5	6	7	8	9
Price									
Storage capacity	1	2	3	4	5	6	7	8	9

21. Imagine that after choosing one of these brands you are going to be asked to justify your choice to someone. For each brand, how easy would it be to justify it as your top choice?

PLEASE TICK ONE BOX FOR EACH Brand

	Not at all justifiable								Very justifiable
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

22. What is the likelihood that you would be criticised by others if you told them you had selected Brand A? What if it was Brand B? What if it was Brand C?

PLEASE TICK ONE BOX FOR EACH Brand

	Not very likely to be criticised								Very likely to be criticised
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

23. Given just the information shown in **BOX 4**, how attractive is the **price** and **storage capacity** value listed for each brand?

FOR EACH brand, PLEASE TICK ONE BOX FOR price AND ONE BOX FOR storage capacity

	Not very attractive								Very attractive
Brand A									
- price	1	2	3	4	5	6	7	8	9
- storage capacity	1	2	3	4	5	6	7	8	9
Brand B									
- price	1	2	3	4	5	6	7	8	9
- storage capacity	1	2	3	4	5	6	7	8	9
Brand C									
- price	1	2	3	4	5	6	7	8	9
- storage capacity	1	2	3	4	5	6	7	8	9

24. When did you last look for or buy an MP3 player?

PLEASE TICK ONE BOX ONLY

Less than a week ago	1
Between 1- 3 weeks ago	2
Between 1-6 months ago	3
Between 7-12 months ago	4
Over a year ago	5
Never	6

BOX 5 **CHOCOLATE BAR**

Please imagine that you are deciding among the following chocolate bars. These chocolate bars vary only in terms of price and average quality rating made in a blind taste test. Assume the Brands are equal on all other aspects.

Brands	Price ($)	Quality (0 = extremely low, 100 = extremely high)
Brand A	1.00	50
Brand B	2.00	70
Brand C	1.00	40

Please look at the information in **BOX 5** above before answering the following questions.

25. How attractive to you is each **brand** shown in **BOX 5** above?

PLEASE TICK ONE BOX FOR EACH Brand

	Not at all attractive								Very attractive
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

26. How important to you is **price** and **quality** for choosing among brands in **BOX 5**?
That is, how heavily does price and quality weigh when deciding which of these brands to choose?

PLEASE TICK ONE BOX FOR price AND ONE BOX FOR quality

	Not at all important								Very important
	1	2	3	4	5	6	7	8	9
Price									
Quality	1	2	3	4	5	6	7	8	9

27. Imagine that after choosing one of these brands you are going to be asked to justify your choice to someone. For each brand, how easy would it be to justify it as your top choice?

PLEASE TICK ONE BOX FOR EACH Brand

	Not at all justifiable								Very justifiable
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

28. What is the likelihood that you would be criticised by others if you told them you had selected Brand A? What if it was Brand B? What if it was Brand C?

PLEASE TICK ONE BOX FOR EACH Brand

	Not very likely to be criticised								Very likely to be criticised
	1	2	3	4	5	6	7	8	9
Brand A									
Brand B	1	2	3	4	5	6	7	8	9
Brand C	1	2	3	4	5	6	7	8	9

29. Given just the information shown in **BOX 5**, how attractive is the **price** and **quality** value listed for each brand?

FOR EACH brand, PLEASE TICK ONE BOX FOR price AND ONE BOX FOR quality

	Not very attractive								Very attractive
Brand A									
- price	1	2	3	4	5	6	7	8	9
- quality	1	2	3	4	5	6	7	8	9
Brand B									
- price	1	2	3	4	5	6	7	8	9
- quality	1	2	3	4	5	6	7	8	9
Brand C									
- price	1	2	3	4	5	6	7	8	9
- quality	1	2	3	4	5	6	7	8	9

30. When did you last buy any chocolate bars?

PLEASE TICK ONE BOX ONLY

Less than a week ago	1
Between 1- 3 weeks ago	2
Between 1-6 months ago	3
Between 7-12 months ago	4
Over a year ago	5
Never	6

We would now like to know which Brands you would actually choose if you were choosing one of each product for yourself. **PLEASE INDICATE YOUR CHOICE FOR EACH OF THE FIVE PRODUCTS.**
There is no right or wrong answer.

31. Please imagine that you are deciding among the following **beers**. These beers vary only in terms of price and quality. Assume the Brands are equal on all other aspects.

Given the set of brands shown below, which **Brand** would you select if you were actually making a choice?

BRANDS	**Price ($)** 12 pack (bottles)	**Quality** (0 = extremely low, 100 = extremely high)	**Choice (Tick one box only)**
Brand A	13.00	50	Brand A ☐ 1
Brand B	17.00	70	Brand B ☐ 2

32. Please imagine that you are deciding among the following **cars**. These cars vary only in terms of average petrol consumption (litres/100 kilometers) and ride quality. Assume the Brands are equal on all other aspects.

Given the set of brands shown below, which **Brand** would you select if you were actually making a choice?

BRANDS	**Petrol Consumption** (litres/100 kilometers)	**Ride Quality** (1-100)	**Choice (Tick one box only)**
Brand A	8	80	Brand A ☐ 1
Brand B	10	100	Brand B ☐ 2
Brand C	10	90	Brand C ☐ 3

33. Please imagine that you are deciding among the following **restaurants**. These restaurants vary only in terms of driving time (minutes) and average food quality rated by stars. Assume the Brands are equal on all other aspects.

Given the set of brands shown below, which **Brand** would you select if you were actually making a choice?

BRANDS	**Driving Time** (minutes)	**Quality** (0 stars = extremely low, 5 stars = extremely high)	**Choice (Tick one box only)**
Brand A	5	3	Brand A ☐ 1
Brand B	25	5	Brand B ☐ 2
Brand C	15	3	Brand C ☐ 3

34. Please imagine that you are deciding among the following **MP3 Players**. These MP3 Players vary only in terms of price and storage capacity. Assume the Brands are equal on all other aspects.

Given the set of brands shown below, which **Brand** would you select if you were actually making a choice?

BRANDS	**Price ($)**	**Storage Capacity** (GB = Gigabyte)	**Choice (Tick one box only)**
Brand A	99.00	3 GB	Brand A ☐ 1
Brand B	299.00	5 GB	Brand B ☐ 2
Brand C	399.00	5 GB	Brand C ☐ 3

35. Please imagine that you are deciding among the following **chocolate bars**. These chocolate bars vary only in terms of price and average quality rating made in a blind taste test. Assume the Brands are equal on all other aspects.

Given the set of brands shown below, which **Brand** would you select if you were actually making a choice?

BRANDS	**Price ($)**	**Quality** (0 = extremely low, 100 = extremely high)	**Choice (Tick one box only)**
Brand A	1.00	50	Brand A ☐ 1
Brand B	2.00	70	Brand B ☐ 2
Brand C	1.00	40	Brand C ☐ 3

PERSONAL SHOPPING STYLE

The following question contains a series of statements designed to help us to understand how people approach shopping. You will notice that some statements are quite similar and the task may seem repetitive. But please bear with us and take your time to respond to each one. Your complete and honest responses are very important to the success of the study. There are no right or wrong answers.

36		Strong disagr	Disagr	Neutra	Agree	Strong agree
a.	In general, the price or cost of buying products is important to me.	1	2	3	4	5
b.	I know that a new type of product is likely to be more expensive than older ones, but that doesn't matter to me.	1	2	3	4	5
c.	I am less willing to buy a product if I think that it will be high in price.	1	2	3	4	5
d.	I don't mind paying more to try out a new product.	1	2	3	4	5
e.	A really great product is worth paying a lot of money for.	1	2	3	4	5
f.	I don't mind spending a lot of money to buy a product.	1	2	3	4	5

ABOUT YOURSELF

Finally, so that we can be sure we have a good cross section of people in our survey, would you please answer the following questions about yourself and your household. Remember that all responses remain ***STRICTLY CONFIDENTIAL.***

37. Please indicate the year in which you were born: Year born: 19_____

38. What is your sex? Male ☐ 1 Female ☐ 2

39. Which of the following categories best describes <u>your own</u> yearly income from <u>all</u> sources <u>before tax?</u>

$15,000 or less ☐ 1
$15,001 - $30,000 ☐ 2
$30,001 - $45,000 ☐ 3
$45,001 - $60,000 ☐ 4
$60,001 - $75,000 ☐ 5
$75,001 - $90,000 ☐ 6
$90,001 or more ☐ 7

40. Which of the following categories best describes your total household yearly income from all sources before tax?

$15,000 or less	1
$15,001 - $30,000	2
$30,001 - $45,000	3
$45,001 - $60,000	4
$60,001 - $75,000	5
$75,001 - $90,000	6
$90,001- $105,000	7
$105,000 or more	8

41. Which one of these categories **best** describes the amount of formal education you have had?
PLEASE TICK *ONE* BOX ONLY

No formal schooling	1
Primary/Intermediate up to Standard 6 or Form 2	2
Secondary school for up to 3 years	3
Secondary school for 4 years or more	4
University/polytechnic for up to 3 years	5
University/polytechnic for 4 years or more	6

42. Which one of these categories **best** describes your highest formal qualification?
PLEASE TICK *ONE* BOX ONLY

No formal qualification	1
School qualifications only (Proficiency, School C, UE, Bursary etc.)	2
Trade or Professional certificate	3
Diploma below Bachelor level	4
Bachelor's Degree	5
Post-graduate or higher qualification	6

43. Which of the following categories describe your ethnic origin?
PLEASE TICK AS MANY AS YOU NEED

Maori	1
European	2
Chinese	3
Pacific Island	4
Indian	5
Other (please specify_____)	6

Thank you for taking the time to complete this survey.

Please place it in the Reply-Paid envelope provided,
and send it back to me as soon as possible – no stamp is required.