THE IMPACT OF SHELF SPACE ON BRAND CHOICE

An experiment comparing store brands and national brands

Anh Kieu Nguyen

Supervised by: Associate Professor John Dawes
Associate Professor Anne Sharp
Dr Giang Trinh
Dr Justin Cohen



University of South Australia

Ehrenberg-Bass Institute for Marketing Science

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For my beloved daughter, Ha Anh

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Declaration of originality

I declare that:

This thesis presents work carried out by myself and does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university. To the best of my knowledge, it does not contain any materials previously published or written by another person except where due reference is made in the text. All substantive contributions by others to the work presented, including jointly authored publications, is clearly acknowledged.



…….

Anh Kieu Nguyen, November 2017

Abstract

National brands and store brands face fierce competition in terms of shelf space. Recent decades have witnessed store brands occupying more and more shelf space in a great number of supermarkets at the expense of national brands. Shelf space is a powerful tool for retailers to compete with manufacturers. However, while the impact of shelf space on consumer choice of national brands has been studied, very little is known about the influence of shelf space on the choice of store brands.

This study addresses the question; should retailers use shelf space as a tool to gain more sales for their private labels? An online choice experiment (mimicking an in-store shelf arrangement) was conducted to compare the effects of the number of facing of a brand and its vertical position on shelf on consumer choice of national brands and store brands. This study included survey to examine factors that could affect the strength of shelf space's impact on brand choice, including consumer perceived quality of store brands, consumer perceived risk of store brands, consumer perceived risk of product category purchase and consumer past usage of store brands.

Results showed that while consumer choice of national brands significantly increased as a result of the increase in the number of facings, consumer choice of store brands was not affected by facing quantity, nor vertical position. The effect of shelf space on store brands was consistent across different product categories and across different groups of consumers, despite their levels of perceptions towards store brands or product categories, as well as their store brand past usage. Nevertheless, the effect of shelf space on national brands varied across product categories. It also depended on how the consumer perceived quality, and risk associated with buying store brands, and risk in category decisions. It also depended upon how frequently the consumer used store brands in the past.

This study provides new insights into the effect of shelf space on brand choice. Our results show that the effect of shelf space is not the same for the two types of brands. Indeed, it is less likely that retailers can gain more sales for store brands by allocating more shelf facings to them, or by moving them to a favourable vertical position. The findings suggest that the choice of store brands may be driven by factors other than shelf space. For national brands, the results suggest that managers need to consider characteristics of product categories, consumer perception and past usage of store brands to organize shelf space effectively. Considering the above implications, this study is believed to make an important contribution to store brand management.

Table of content

1 INTRODUCTION 1
1.1 Background of the study 1
1.2 Purpose of the research 2
1.3 Research questions 2
1.4 Overview of methods 4
1.5 Structure of the thesis 5
1.6 Contribution of the study 6
2 CRITICAL REVIEW OF LITERATURE IN SHELF SPACE 7
2.1 Overview 8
2.1.1 Studies that build models of shelf allocation for retail stores 8
2.1.2 Studies that examine the impact of shelf space on sales 9
2.2 Effect of the number of facings and vertical position on brand choice 10
2.2.1 Frank and Massy, 1970 10
2.2.2 Cox, 1970 12
2.2.3 Curhan, 1972 13
2.2.4 Dreze et al, 1994 14
2.2.5 Chandon et al, 2009 15
2.2.6 Valenzuela and Raghubir, 2010 18
2.3 Major limitations of previous studies 19
2.4 Why does shelf space affect brand choice? 21
2.4.1 Consumer decision-making process 21
2.4.2 The role of cues in consumer decision making 23
2.4.3 Salience as an extrinsic cue 24
2.5 Summary 31
3 CONCEPTUAL FRAMEWORK 33
3.1 Overview of store brands 34
3.2 Consumer factors determine choice between national brands and store brands 37
3.2.1 Quality perception 39
3.2.2 Risk perception 46
3.2.3 Past usage 52
3.3 Summary 59
4 METHODS 63
4.1 Research questions 64
4.2 Research design 64
4.2.1 Instruments 64
4.2.2 Validity and reliability of measurements 74
4.2.3 Sample and sample size 75
4.3 Data Collection 76
4.4 Data Analysis 78
4.4.1 Data Screening 78
4.4.2 Identification of outliers 78

4.4.3 Descriptive analysis 79
4.4.4 Multinomial logistic regression analysis 80
4.4.5 Binary logistic regression analysis 80
4.4.6 Moderation analysis 81
4.4.7 Additional analysis 82
5 PRESENTATION AND ANALYSIS OF DATA 83
5.1 Filtering eligible participants 84
5.2 Data screening 85
5.3 Outliers 86
5.4 Descriptive analysis 87
5.5 Confirmatory factor analysis 100
6 FINDINGS 103
6.1 Control effect 104
6.2 Shelf effect 106
RQ1: How does shelf space affect brand choice? 106
RQ2: How does the impact of shelf space on brand choice differ between national brands and store brands? 109
RQ3: How does the impact of shelf space on brand choice differ between product categories? 111
6.3 Moderation analysis 117
RQ4: How does consumers' perceived quality of store brands moderate the relationship between shelf space and brand choice in different product categories? 117
RQ5: How does consumers' perceived risk of store brands moderate the relationship between shelf space and brand choice in different product categories? 121
RQ6: How does consumers' perceived risk of category moderate the relationship between shelf space and brand choice? 126
T-test 126
RQ7: How does consumer's past usage moderate the relationship between shelf space and brand choice in different product categories? 131
6.4 Additional analysis 134
7 SUMMARY, DISCUSSION AND CONCLUSIONS 135
7.1 Summary of the study 136
7.2 Discussion 137
7.2.1 Discussion of shelf effect 137
7.2.2 Discussion of moderation effect 143
7.3 Implications for practice 150
Shelf space as a factor to boost choice 150
Can shelf space be used to boost the sales of store brands? 151
The importance of product category characteristics 153
Consumer perceptions and store brand past usage that matter 153
7.4 Limitations of the study and future research 154

7.5 Conclusion 155
References 157
Appendix A Firth logistic regression analysis of SB choice in LPQ and HPQ consumers – Facing test 172
Appendix B Firth logistic regression analysis of SB choice in LPQ and HPQ consumers – Position test 173
Appendix C Firth logistic regression analysis of SB choice in LPR and HPR consumers – Facing test 175
Appendix D Firth logistic regression analysis of SB choice in LPR and HPR consumers - Position test 176
Appendix E Firth logistic regression analysis of SB choice in LPRC and HPRC consumers - Facings test 178
Appendix F Firth logistic regression analysis of SB choice in LPRC and HPRC consumers - Position test 179
Appendix G Firth logistic regression analysis of SB choice in non-buyers, light buyers, medium buyers and heavy buyers of store brands - Facing test 181
Appendix H Firth logistic regression analysis of SB choice in non-buyers, light buyers, medium buyers and heavy buyers of store brands - Position test 183
Appendix I Online survey 186

List of tables

Table 1: Summary of literature in shelf space at brand level 20
Table 2: Summary of constructs 74
Table 3: Total participants 84
Table 4: Number of participants after data screening 85
Table 5: Number of choice outliers in each category 86
Table 6: Demographic characteristics of the sample 88
Table 7: Descriptive analysis of perception variables 90
Table 8: Distribution of participants according to their rate of quality of SB 92
Table 9: Distribution of participants according to their past usage of product categories 93
Table 10: Distribution of participants according to their past usage of store brands 93
Table 11: Amount of money spent on each purchase occasion 94
Table 12: Choice share of brands 95
Table 13: Distribution of SB choice according to the level of SB quality rating 97
Table 14: Distribution of SB choice between LPQ group and HPQ group 98
Table 15: Distribution of SB choice between LPR group and HPR group 98
Table 16: Distribution of SB choice between LPRC group and HPRC group 99
Table 17: Distribution of SB choice according to consumers' past usage 100
Table 18: Factor loading scores of all constructs 101
Table 19: Convergent validity and discriminant validity score 101
Table 20: Model fit statistics and threshold values 101
Table 21: Brands removed from the test of control effect 105
Table 22: Model fit information for the test of control effect 105
Table 23: Cross tabulation of facing quantity and choice 106
Table 24: Logistic regression analysis of choice as a function of facing quantity 107
Table 25: Overall changes in the odds of choice as a result of changes in facing quantity 107
Table 26: Cross tabulation of vertical position and choice 108
Table 27: Logistic regression analysis of choice as a function of vertical position 108
Table 28: Changes in the odds of choice (in percentage) a result of changes in position 109
Table 29: Logistic regression analysis of choice of NB and SB as a function of facing quantity 110
Table 30: Comparison of changes in choice between NB and SB as a result of changes in facing quantity 110
Table 31: Logistic regression analysis of choice of NB and SB as a function of vertical position 111
Table 32: Logistic regression analysis of choice of NB and SB as a function of facing quantity in seven categories 113
Table 33: Comparison of changes in the odds of choice between NB and SB 114
Table 34: Logistic regression analysis of choice of NB and SB as a function of vertical position in seven categories 115

Table 35: Independent sample t-test of perceived quality of SB – Facing test 117
Table 36: Comparison of changes in the odds of NB choice
between LPQ and HPQ consumers – Facing test 119
Table 37: Independent sample t-test of perceived quality of SB - Position test 120
Table 38: Independent sample t-test of perceived risk of SB - Facing test 121
Table 39: Comparison of changes in the odds of choice
between LPR and HPR consumers – Facing test 122
Table 40: Independent t-test of perceived risk of SB - Position test 123
Table 41: Comparison of changes in the odds of choice
between LPR and HPR consumers – position test 124
Table 42: Independent sample t-test of perceived risk of category - Facing test 126
Table 43: Comparison of changes in the odds of choice
between LPR and HPR consumers – position test 128
Table 44: Independent sample t-test of perceived risk of category - Position test 129
Table 45: Comparison of changes in the odds of choice
between non-buyers, light buyers, medium buyers and heavy buyers - Facing test 132
Table 46: Logistic regression analysis of rating of SB quality as a function of choice .. 134

List of figures

Figure 1: The development of store brands in different countries……37
Figure 2: Conceptual framework……62
Figure 3: Manipulation of facings…….....67
Figure 4: Manipulation of vertical positions……..68

Abbreviations

NB: National brands

SB: Store brands

LPQ: Low perceived quality

HPQ: High perceived quality

LPR: Low perceived risk

HPR: High perceived risk

LPRC: Low perceived risk of category

HPRC: High perceived risk of category purchase

F: Frequency

P: Percentage

1 INTRODUCTION

1.1 Background of the study

Shelf space allocation, that is, the amount of space and the position of a brand on a shelf, can influence consumers' choice within a physical grocery retail outlet (Chandon et al., 2009). Specifically, the sales volume of a particular brand varies according to its position or the number of facings on a shelf. It has been found that moving a brand from the bottom row, to an eye-level row (51-53 inches above the floor) increases sales by 39% on average (Dreze et al., 1994). Frank and Massy (1970) found that brand sales could increase by 60% from adding one more row of facings. Shelf space can be seen as an effective marketing tool for retailers and manufacturers to increase their brands' exposures to consumers and gain more sales (Valenzuela and Raghubir, 2010). The impact of shelf space on brand sales has been found in various product categories, although its magnitude may vary across categories (Curhan, 1972).

National brands and store brands face fierce competition in terms of shelf space (Fernandez and Suarez, 2005). Recent decades have witnessed store brands occupying more and more shelf space in a great number of supermarkets at the expense of national brands. Shelf space is a powerful tool for retailers to compete with manufacturers. However, while the impact of shelf space on consumer choice of national brands has been identified in a number of studies, very little is known about the influence of shelf space on the choice of store brands.

It has been widely agreed among researchers that consumers treat national brands, and store brands differently as their perceptions differ in terms of quality and risk associated

with the purchases of these two types of brands (Hoch and Banerji, 1993, Baltas et al., 1997, Batra and Sinha, 2000, Bao et al., 2011b, Dursun et al., 2011, Nenycz-Thiel and Romaniuk, 2014, Rubio et al., 2014). Differences in perception could lead to differences in the way consumers interpret brand-related information gathered from marketing cues at the point of purchase (Richardson et al., 1996, Bao et al., 2011a, Dursun et al., 2011, González Mieres et al., 2006). The degree to which consumers rely on marketing cues to select national brands, or store brands could also vary according to their level of knowledge of brands (Alba and Hutchinson, 1987, Hsu and Lai, 2008). Therefore, there is reason to believe that the magnitude of the effect of shelf space on brand choice differs between national brands, and store brands. However, so far too little attention has been paid to this issue, which provides the motivation to the present study.

1.2 Purpose of the research

The objectives of this research are twofold. Firstly, it will investigate how changes in the number of facings and vertical position of a brand could affect brand choice. The focus is to compare the impact of shelf space on the choice of national brands and store brands. Horizontal position is excluded from our study as the centrality, the left and the right position of a brand could change when shoppers move around to navigate products. Secondly, it will examine how consumers' perceived quality of store brands, perceived risk of store brands, perceived risk of the category and how consumers' past usage of store brands moderate the relationship between shelf space and brand choice. These factors have been selected for the study as they have been seen as major factors that determine consumer choice between store brands and national brands (Myers, 1967, Bettman, 1974, Hoch and Banerji, 1993, Baltas et al., 1997, Batra and Sinha, 2000, Erdem et al., 2004, Nenycz-Thiel and Romaniuk, 2014, Rubio et al., 2014).

1.3 Research questions

As findings from previous studies (Chandon et al., 2009, Cox, 1970, Dreze et al., 1994, Frank and Massy, 1970, Valenzuela and Raghubir, 2010) regarding how shelf space could have an impact on brand choice were inconsistent, this study will investigate the

overall effect of shelf space on brand choice to identify how changes in the number of facings, and vertical positions could influence the choice of brands.

Thus, the following question was raised:

RQ1: How does shelf space affect brand choice?

Store brands have developed drastically in recent decades and have become a serious threat to national brands. They occupy more and more space in a great number of supermarkets today. Indeed, retailers consider shelf space a powerful tool gain more sales for their private labels and compete with manufacturers. However, too little is known about how shelf space could have an impact on consumer choice of store brands. This study aims to uncover whether the effect of shelf space on store brands is the same for national brands. Therefore, the second research question is:

RQ2: How does the impact of shelf space on brand choice differ between national brands and store brands?

Previous studies have found that the relationship between shelf space and choice is complicated and differs according to categories (Desmet and Renaudin, 1998, Dreze et al., 1994). Therefore, this study aims to investigate how changes in shelf space could affect brand choice in different categories. This study also aims to explain and compare the effect of shelf space on the choice of national brands, and store brands in different categories. Therefore, the following question was raised:

RQ3: How does the impact of shelf space on brand choice differ between product categories?

Perceived quality, perceived risk and past usage are seen as major factors that determine consumer choice between store brands and national brands (Bao et al., 2011a, Dursun et al., 2011, Rubio et al., 2014). Those factors are also believed to moderate the

relationship between shelf space and brand choice as they affect the way the consumer processes information and utilizes cues. Consumer beliefs about quality of store brands are built into a schema and this schema determines how the consumer gather, organize and interpret new data (Dursun et al., 2011). Perceived risk and past usage could have an impact on the way consumers utilize information in the environment. Specifically, perceived risk influences the amount, sources and types of information that the consumer acquires at the point of purchase (Howard and Jagdish, 1969). Past usage determines the extent to which the consumer relies on marketing cues to evaluate alternatives. Depending on their level of knowledge, consumers could rely more or less on marketing cues to make buying decision (Alba and Hutchinson, 1987). These points invite the following questions:

RQ4. How does consumer perceived quality of store brands moderate the relationship between shelf space and brand choice in different product categories?

RQ5. How does consumer perceived risk of store brands moderate the relationship between shelf space and brand choice in different product categories?

RQ6. How does consumer perceived risk of product category moderate the relationship between shelf space and brand choice in different product categories?

RQ7. How does consumer past usage of store brands moderate the relationship between shelf space and brand choice in different product categories?

1.4 Overview of methods

To answer the question as to whether retailers should use shelf space as a tool to gain more sales for their private labels, an online choice experiment was implemented to compare the effect of facing quantity and vertical position on consumer choice of national brands, and store brands. An online survey was also conducted for the purpose of this study to examine factors that could affect the strength of shelf space's impact on

brand choice, including consumer perceived quality of store brands, consumer perceived risk of store brands, consumer perceived risk of product category and consumer past usage of store brands.

An experimental design was selected for the study for two reasons. Firstly, an experiment is seen as one of the strongest research designs since it enables researchers to have control over the environment, and collect the best possible data to explain the causal relationship between variables (Seltman, 2012). Secondly, experiments enable researchers to use random assignment, which is a technique used to ensure valid estimation of the causal effects (Alferes, 2012).

A survey was used for this study because it is the most commonly used tool for market researchers to collect information relating to consumer opinions about products or brands (Cooper et al., 2006). By using questionnaires, we were able to measure consumers' perceptions and past usage of store brands and categories.

Data was analyzed using SPSS (Statistical Package for Social Science). The analysis of data was divided into three main groups:

- Descriptive analysis: Descriptive analysis was used to report information acquired from the data.
- Analysis of shelf space effect: This study employed binary logistic regression to analyze the effect of shelf space on brand choice.
- Analysis of moderation effect: This study employed subgroup analysis to examine the moderating role of consumer perceptions and past usage of store brands and of categories.

1.5 Structure of the thesis

The research is structured as follows. Chapter 1 provides an introduction of the study. Chapter 2 conducts a critical review of literature on shelf space. In Chapter 2, we will discuss the findings from previous studies about the impact of shelf space on brand choice and indicate the knowledge gap that needs to be addressed. Chapter 3 provides a conceptual framework of the study. It will review the literature on store brands to

demonstrate the development process of store brands to date. It will then go on to examine factors that determine consumer choice between national brands and store brands. The aim is to build the theoretical framework to explain why changes in shelf space could have different impacts on national brands and store brands and how the effect of shelf space could be moderated by consumer perceptions and past usage of store brands. Chapter 4 will discuss the methods used to collect and analyze data. Chapter 5 is the presentation and analysis of data. This chapter describes the data cleaning process and reports the results of descriptive analysis. Findings of the study will be presented in Chapter 6. Finally, Chapter 7 will summarize the key issues of the study, discuss the findings in detail, and provide implications for management and recommendations for future research.

1.6 Contribution of the study

This study makes crucial contributions to academia and management. In terms of *academia*, this study extends academic knowledge on why shelf space could have an effect on brand choice. This study is the first that presents the mechanism explaining the effect of shelf space in a systematic way using cue utilization and salience theory. The explanation provides more insight into what attributes of shelf space make a meaningful marketing cue, as well as how it could affect consumer perceptions and visual attention and consumer choice. In terms of *management,* this study provides significant recommendations for both retailers and manufacturers on how to use shelf space to influence consumer choice in each product category. The study's findings enable managers to identify to what extent changes in shelf space could have an effect on brand choice, and how marketers could use shelf space as an addition of quality signal for well-promoted brands or as a compensation for poorly promoted brands. More importantly, this study finds retailers are less likely to gain sales by allocating advantageous shelf space to their private labels, since shelf space appears to have little effect on consumer choice. For manufacturers, this study provides insight into how they could use shelf space to promote national brands in considering consumer evaluation of store brands and how frequently they have used store brands in the past.

2 CRITICAL REVIEW OF LITERATURE IN SHELF SPACE

This chapter is structured as follows. Firstly, it will give an overview of literature on shelf space to show the development of studies on shelf space from the early 1960s until present day. Secondly, it will discuss in detail findings from previous studies on the impact of shelf facings and vertical positions of a brand on consumer's brand choice (or sales in another word). Strengths and weaknesses of the related studies will be summarized in the next section. Then factors that explain the impact of shelf space on brand choice will be examined. Finally, a summary of the gap in literature will be provided.

2.1 Overview

The history of literature on shelf space can be traced back to the early 1960s with the first known experimental study conducted by Cox (1964) to uncover how shelf space management affects sales. This study encouraged interest in the relationship between shelf space and sales among researchers, leading to an increase in the number of studies on shelf space at the end of 1960s. In retail stores, while the number of shelves is limited, the number of products continually grows. Thus, shelf space allocation has become a real challenge for both retailers and manufacturers (Chandon et al., 2009). From the perspective of manufacturers, the challenge is even bigger as they have to compete for shelves to display their products. Therefore, the topic of shelf management continued to attract the attention of researchers in the following years, evidenced by numerous published studies from the 1970s through 2015 (Cox, 1970, Frank and Massy, 1970, Curhan, 1972, Curhan, 1973, Campo and Gijsbrechts, 2005, Dreze et al., 1994, Hwang et al., 2005, Chandon et al., 2009, Valenzuela and Raghubir, 2010, Porcheddu and Venturi, 2011, Hendrickson and Ailawadi, 2014).

Overall, literature of shelf space could be categorized into two main groups:

- Studies that build models of shelf allocation for retail stores;
- Studies that examine the impact of shelf space on sales.

2.1.1 Studies that build models of shelf allocation for retail stores

This section accounts for a large part of literature in shelf space. The number of studies in this category heavily increased in the 1990s and 2000s with a wide range of authors such as Urban (1969), Corstjens and Doyle (1981), Zufryden (1986), (Dreze et al., 1994), Urban (1998), Yang and Chen (1999), Yang (2001), Lim et al. (2004), Hwang et al. (2005), Hariga et al. (2007), Reyes and Frazier (2007), Bai and Kendall (2008), Murray et al. (2010), Tsai and Huang (2014). All these studies aimed at building a model for sales optimization based on mathematical programming for shelf allocation in retail stores.

The theoretical ground used by researchers to build their shelf allocation model suggests that the number of facings, and vertical position of a brand on shelf could have an effect on brand sales.

Corstjens and Doyle (1981) built a model of shelf space on the basis that consumer demand is determined by the amount of shelf space allocated to the product. Thus, shelf space could be seen as a function of product demand. Since the total shelf space is limited, while the number of products continuously increases, the model is helpful for retailers to optimize the amount of space that should be given to each product to maximize sales.

The model developed by Urban (1998) aimed at solving the problem of allocating multiple products on shelf. The author believed that the sale of a particular product varies according to its position on shelf. For this reason, each product should be allocated a certain position instead of being placed anywhere on the shelf. The model developed by Urban was strongly supported by Hwang et al. (2005). Hwang et al. also believed that the placement of a product in a vertical position on a shelf has a significant impact on its sales and, as a result, they included the effect of shelf level in their model.

Yang and Chen (1999) took a different approach. Similarly to Corstjens and Doyle (1981), the model developed by Yang and Chen included the impact the number of facings had on sales. This was based on the assumption that the number of facings could determine consumer demand of a particular product. Dreze et al. (1994) also considered the number of shelf facings in building their model. However, according to the authors, facing area has a stronger influence on demand compared to the quantity of facings. One facing for a product with bigger size will have a different effect compared with one facing for a smaller size. It suggests that research on the effect of the number of facings needs to consider different product sizes. Yang and Chen's argument was supported by Dreze et al. (1994).

2.1.2 Studies that examine the impact of shelf space on sales

This section accounts for a small part of shelf space literature, including important studies such as Wilkinson et al. (1982), Cox (1970), Frank and Massy (1970), Curhan

(1972), Dreze et al. (1994), Campo and Gijsbrechts (2005), Chandon et al. (2009), Valenzuela and Raghubir (2010), Hendrickson and Ailawadi (2014), Porcheddu and Venturi (2011). The vast majority of studies on shelf space have been conducted at category level while only a small number of studies have been performed at brand level. This is due to researchers paying more attention to how shelf space affects the total sales of a product category, rather than the sales of individual brands. In fact, manufacturers require information regarding how changes in shelf space may impact brand sales to determine how much space, and what position on shelf they should strive to place their brands (Cox, 1970). Therefore, the scarcity of studies on the relationship between shelf space and brand sales could be seen as a disadvantage for manufacturers.

In the studies on shelf space and brands, researchers have examined the impact of shelf positions and facing quantity on the total sales of the brand (Cox, 1970, Frank and Massy, 1970, Curhan, 1972, Dreze et al., 1994) or on brand choice (Chandon et al., 2009, Valenzuela and Raghubir, 2010). To reach this outcome, researchers in the 20th century usually conducted shelf experiments in real stores (field experiments). In comparison, most researchers in the 21st century used simulated shopping environments or choice sets to collect necessary data (laboratory experiments). In the following section, results of each particular study will be discussed in details.

2.2 Effect of the number of facings and vertical position on brand choice

Quantity of shelf space is defined as the total number of facings given to a brand that consumers can see in the front of its area on a shelf. Vertical position of a brand refers to the row the brand is placed on a shelf. There are somewhat diverse findings relating to the impact of the amount of facings and vertical position of a brand on brand choice.

2.2.1 Frank and Massy, 1970

Frank and Massy (1970) conducted an observational experiment with seven large national grocery brands all of which had high purchase frequency. The grocery product was consumed by the majority of American households and was heavily promoted by

both retailers and manufacturers. The weekly sales data was collected from 30 stores for a 63-week period.

Number of facings

To investigate the impact of the number of facings, the authors changed the number of rows given to each brand. Findings indicate that in stores with high sales volume, consumers' weekly purchases increase by 60% by adding one more row of facing. This effect did not apply for lower volume stores.

Vertical position

To examine the impact of vertical position on brand sales, the authors placed the brand on different shelf levels: the second row from the floor, the third row from the floor and the fourth row and above from the floor. The study also examined the impact of the bottom row; however, sales data relating to the bottom row was eliminated from the analysis due to collinearity. Findings indicate that for stores with high sales volume, when the brands were placed on the lower row, the sales for those with small package size increased while the sales for those with medium size decreased (but no explanation was given in terms of why this was the case). However, overall, vertical position did not have a significant effect on brand sales.

The study by Frank and Massy has a number of limitations. *Firstly*, as the authors used uncontrolled experimentation, it is hard to interpret the causal relationship between shelf space and sales due to possible confounding effects of other factors (Sackett and Wennberg, 1997). One question that should be asked is where does the sales increase come from? The observational data did not tell whether the sales increased because the amount of facings was increased, or the store managers increased the number of facings because consumer demand for this product increased. Therefore, it is impossible to conclude that the increase in unit sales resulted from a space increase, because the decision may have been made to avoid quick stock-out for a brand that had a good sales outcome previously. If this was the case, the increase of facings could be seen as the result of previous sales but not the reason explaining the increase in sales later on. The fact that weekly sales only increased in high volume stores might support this point.

One major criticism of the study by Frank and Massy is that the effect of shelf space may have been overestimated due to confounding effect of stores' sales volume.

Secondly, the sales data was collected over 63 weeks. Due to such a long period of observation, it may be too optimistic to conclude that changes in sales fully resulted from changes in the number of facings or the vertical position of the brand. Indeed, marketing cues at the point of purchase are not the only factor that determines brand choice. Other factors could influence the sales volume of a brand, including but not limited to, mental availability, and consumer knowledge (Alba and Hutchinson, 1987, Sinha and Batra, 1999). These factors are accumulated over time as a result of consumers' exposure to advertisements, consumer consumption or other forms of interaction with the brand (Alba and Hutchinson, 1987) and could strongly affect the consumer information processing and buying decision not only at the point of purchase but also in the subsequent purchases. Thus, in the study by Frank and Massy, the effect of changes in shelf space can be confounded with the effect of other out-of-store factors. *Those above limitations suggest that a controlled experiment could be a better method to test the effect of shelf space.*

2.2.2 Cox, 1970

Cox investigated the relationship between shelf space given to a brand, and the total unit sales of that brand. Two different types of products were examined including staple products, and impulse products. For impulse product brands, the authors investigated brands that have high consumer acceptance, and low consumer acceptance. (Consumer acceptance of a brand refers to consumer purchase frequency and intention to buy the brand in the future (Gielens and Steenkamp, 2007)). Two selected products were powdered coffee cream, and salt, of which powdered coffee cream is seen as an impulse product, and salt is staple product. In each category the author examined two leading brands. The experiment was conducted in six large supermarkets within the Weingarten food chain in Houston, Texas (United States).

Number of facings

To examine how changes in shelf space impacts on brand sales, the total number of facings for the two product categories was kept constant, however the proportion of

shelf space given to each brands was changed. Findings indicated that for staple product brands, the total unit sales for the salt brand did not change when the number of facings increased. There was also no relationship between shelf space and unit sales of impulse product brands with low consumer acceptance. However, for impulse product brands with high consumer acceptance, the unit sales increased when the amount of facings given to the brand increased. From the findings, a conclusion may be drawn that the impact of the amount of shelf space on sales is different in different product categories. However, more importantly, even though when the increase in the amount of shelf space can lead to increase in sales, "the additional revenue generated by extra shelf spaces for a brand may not compensate for the cost of obtaining the shelf space" (Cox, 1970). Thus, as the author recommended, manufacturers should not spend time and money on buying more shelf space for their brands.

While the study by Cox made an important contribution in terms of methodology when it took into consideration consumer acceptance level, it suffers from a big weakness. The author tested a very small number of leading brands in each product category yet did not examine brands with small market share. Therefore it is unclear if the impact of shelf space quantity is still the same for smaller brands. Due to this limitation, the generalization of the findings may be questioned. Curhan (1973) illustrates that experiments of which investigated a limited number of products and brands have had little impact on practical management. *Thus, it is suggested that further research should examine a larger number of brands with different market shares.*

2.2.3 Curhan, 1972

Number of facings

Curhan investigated the impact of the amount of facings on unit sales of different grocery products. Based on the assumption that the relationship between shelf space and unit sales can be affected by elements other than the amount of facings, the author examined various factors including, but not limited to package size, retail price, brand type (national brands and store brands), market share, repurchase frequency. To examine the effect of shelf space on different types of brands, national brands and store brands of approximately 500 grocery products were tested in four large supermarkets.

Unit sales were observed for 5 to 12 weeks before and after the changes were made. The study showed that private label or store brands are more responsive to changes in shelf space than national brands. The mean of space elasticity (defined as the ratio of relative change in unit sales to relative change in shelf space) for national brands is 0.176 while it is 0.294 for private labels.

The study by Curhan can be seen as the first one that uses brand type as the independent variable in the model to calculate space elasticity. *However, no explanation was given in terms of why store brands and national brands repsond differently to changes in the number of facings. Further research is needed to answer this question*.

2.2.4 Dreze et al, 1994

To investigate the impact of shelf facings on national brand sales, the authors carried out a quasi-experimental field study in six stores of a leading supermarket chain in Chicago, United States. In the study, Dreze and his colleagues did not use the number of facings as they believe that the effect of facings is different for items that have different sizes. Thus, the authors used square inches to measure the amount of space of a particular brand. In the experiment, the authors increased or decreased the number of facings of brands. Each store was randomly selected for a control condition (old facing amount and vertical position was applied) or test condition (changes in facing and position were applied). A 4-week warm-up period was applied to allow consumers to become familiar with the new settings and minimize their confusion due to novelty. Eight product categories including analgesics, bottled juices, canned soup, canned seafood, cigarettes, dish detergents, frozen entrees and refrigerated juices were selected for the experiment.

Number of facings

In comparison the data of 16 weeks before the amount of shelf space was changed and 16 weeks after that (all promotional sales were eliminated from the dataset), the authors found that brand sales did not change when the number of facings of the brand changed. This finding held for six out of the eight categories. Thus, they concluded that in general, manufacturers could not get high returns of investments by acquiring more shelf space for their brands. Refrigerated juices and canned soup appeared to be

exceptional cases as some brands gained up to 50% increase in sales when they had more facings. However, no explanation was given in terms of why these categories are more responsive to the increase in facing quantity.

Vertical position

To investigate the impact of vertical position on brand sales, the authors placed brands in varying vertical positions. To remove brand effect, the top brands were placed in the worst positions (the bottom row). To reduce the effect of price, the authors separated packages with different size by approximately 3.6 meters to hinder consumers from making intra-brand price comparisons. It is found that by moving a brand from the bottom row, to the eye-level row (51-53 inches above the floor) sales increased by 39% on average. Brands received the minimum sales when they were placed on the bottom row, and maximum sales when they were placed in the eye-level row. The author concluded that the eye-level shelf position is the best position of all. The effect of location on brand choice is significant in all tested categories, including analgesics, bath tissues, bottled juices, canned seafood, canned soup, cereals, and refrigerated juices.

This study's finding completely contrasts the findings by Frank and Massy (1970) who found that position did *not* have a significant impact on brand sales. As already mentioned, when the sales data was collected over a long period of time, it might be hard to conclude that changes in sales fully resulted from changes in shelf space as a wide range of other factors may influence the sales volume of a brand, such as mental availability, brand familiarity, consumer satisfaction with the previous purchases and consumer knowledge (Alba and Hutchinson, 1987, Sinha and Batra, 1999, Romaniuk and Sharp, 2003). As the findings by Frank and Massy (1970) and Dreze et al. (1994) did not control confounding factors, their findings could differ according to the difference in confounding effect.

2.2.5 Chandon et al, 2009

The study by Chandon and colleagues examine how in-store marketing activities (shelf space and price) and out-of-store factors (shopping goals, shopping traits, demographics, market share and past usage) could have an impact on consumer visual attention, evaluation and choice. This can be seen in the first study that attempts to

explain the mechanism behind the influence of shelf space on brand choice. The study marked an important change in the method adopted to examine the impact of shelf space on choice. Instead of carrying out a field experiment, the authors conducted a lab experiment. The authors examined 12 brands. 11 brands were top national brands in the marketplace of two product categories, soap and pain reliever. The 12th brand (European brand) was unknown to participants. By choosing products with brick design package, the authors could minimize the possibility that people simply choose the brand based on package shape or size. Thus, the confounding effect of package shape and size was well controlled.

Number of facings

The authors used three levels of facings: 4 facings, 8 facings and 12 facings. To collect data for choice, participants were required to look at the pictures of supermarket shelves on a 4x5-foot screen placed about 80 inches in front of them. After looking at the picture of each product category, participants indicated the name of the brand that they wanted to buy. The results showed that going from four to 12 facings increased choice by 60% for brands with low market share. For well-established brands, the increase in facings just added 9% more. This result contradicts Frank and Massy's results, which found that adding more rows increased sales for big brands only. It also contrasts Dreze et al. (1994) finding that increasing the number of facings does not increase the brand's sales whatsoever.

Chandon et al. (2009) found that the effect of facings is the same for two tested categories, which are soap and pain relievers. Using eye-tracking method, the authors found that the number of facings influenced participants' visual attention and therefore affected their choice. These two categories have the same brick-designed package and are not much different in terms of size. As stimuli with the same shape and size attract equal visual attention (Orquin et al., 2012), four (or eight, or 12) facings of soap could attract the same level of visual attention as four (or eight, or 12) facings of pain relievers. This may be the reason explaining why the effect of the number of facings is the same for two categories.

The study found that the effect of shelf space on choice varies according to brand past usage. Doubling the amount of facings for a brand with low market share increased choice by 67% in occasional users; however, for average brands and consumers, it increased choice by only 10%. *This finding indicates that past brand usage plays a very important role in driving choice and can have an impact on the relationship between shelf space and sales.*

Vertical position

In the experiment, the authors manipulated four levels of vertical position (first, second, third and bottom row). The choice outcomes were compared between the top two and the bottom two rows, between the middle two rows and one of the two extreme rows (first and bottom row), and between the first row and the bottom row. The study found that in comparison with the bottom shelf, positioning a brand on the top shelf increased choice by 20%. Moving the brand from the top shelf or the bottom shelf to one of the middle shelves leads to the decrease in choice by more than 10%. However, the changes in choice were not statistically significant. The results sharply contrast findings by Dreze et al. (1994) whom found that the bottom row is the worst position for sales, calling for more research in the area.

It is noticeable that Chandon et al.'s findings relating to shelf facing and shelf position sharply contrast findings of previous studies that employed the field experiment method. This suggests that the context of the experiment matters. Chandon and colleagues conducted the experiment in a laboratory where the researchers have control over confounding factors. The choice data was collected once at the point of purchase, but not over a long period of time. As all other factors were kept constant and only the number of facings and position of brands were changed, it is possible to say that changes in brand choice result from changes in shelf space. In terms of method, the controlled experiment performed by Chandon et al. could be seen as a big improvement in comparison with previous studies on shelf space.

However, one large limitation is evident in Chandon et al.'s study. The manipulation of the shelf position was not conducted independent of the number of facings; thus, position effect might result from the interaction effect of shelf position and shelf

facings. To identify the effect of position, the number of facings needs to be kept constant to eliminate the effect of shelf facings. *Further research needs to address this shortcoming*.

While the study by Chandon et al. provided us with a great overview of the interaction effect of in-store and out-of-store factors on brand choice, the fact that it only examined two product categories, which are soap and pain reliever, could be seen as a limitation. As previous studies found that the effect of shelf space on choice varies according to product categories (Curhan, 1972, Dreze et al., 1994), more product categories should be investigated to have a better generalizability of the result.

2.2.6 Valenzuela and Raghubir, 2010

Vertical position

The authors examined the effect of five vertical positions. Five brands of wine without price tags and descriptions were placed on five different rows (one brand per row). Participants were required to choose one brand only. The results are completely different from Chandon et al. (2009)'s findings. Brands placed on the 2nd and 3rd rows were chosen more than those placed on the 1st, the 4th and the 5th rows.

With regard to the study by Valenzuela and Raghubir (2010), the biggest shortcoming is that the authors used a choice set of five items representing five brands of only one category. This condition could hardly reflect the actual number of brands in a retail store for the most part of grocery products. Thus, it is unclear if the choice is still the same when there are more alternatives. It is also unclear if the effect of vertical position is the same for other product categories. As Bettman and Luce (1998) state, in the context where the number of alternatives increase, consumers will use different strategies to process information and make choice. While the experimental design allows the authors to focus on the impact of vertical position, it creates an unrealistic shopping environment, which might not ensure realistic choices. It seems that the authors paid more attention to the internal validity at the expense of external validity, thus the generalization of results is questionable. *Therefore, more research with higher level of external validity (more brands and more items per brand) is needed to identify the effect of shelf position on choice.*

2.3 Major limitations of previous studies

After reviewing literature in shelf space, some major limitations of previous studies were briefed as follows:

- The effect of shelf space was confounded with the effect of other factors (store volume, package design and other out-of-store factors) when uncontrolled experiments were applied;
- The vast majority of studies investigated a small number of leading brands, thus the generalization of findings is questionable;
- The vast majority of studies only focused on the effect of shelf space on national brands. Only one study compared the effect between national brands and store brands and found differences; however, no explanation was given;
- Experimental studies only investigated a small number of product categories, thus the generalization of findings is questionable.
- Findings about the impact of shelf facings and positions on brand choice are so inconsistent between studies. Thus, it is impossible to give a firm conclusion of how many facings and which vertical position will increase brand choice.

Besides the limitations mentioned above, quasi-experimental studies (Frank and Massy, 1970, Cox, 1970, Curhan, 1972, Dreze et al., 1994) share a common limitation in terms of methodology. By measuring the impact of shelf space on unit brand sales, these studies could not tell exactly how much choice was influenced by changes in the number of facings or vertical position. According to Van Heerde et al. (2003), unit sales can be strongly affected by category incidence and purchase quantity, two factors that are not influenced by marketing activities. Approximately 70% of sales result from category incidence and decisions regarding of how much to purchase. Thus, the effect of shelf space could be overestimated. The studies by Chandon et al. (2009) and Valenzuela and Raghubir (2010) have overcome this limitation by focusing on choice but not on the sales volume (each participant was allowed to have only one choice for each product category). Thus, it is possible to identify the impact of changes in shelf facing and shelf position on changes in brand choice.

Table 1: Summary of literature in shelf space at brand level

Authors	Type of brands	Method	Test	Results		Limitations	
				Facings	Vertical position		
Frank and Massy, 1970	Leading national brands	In-store experiment	Unit sales	Adding one more row of facings increases sales by 60% for big brands in stores with high sales volume.	Small effect on sales	Only test leading brands. Confounding effect of other in-store and out-of-store factors	These studies examined the effect of shelf space on unit sales. However, unit sales can be strongly affected by category incidence and purchase quantity. These two factors are not influenced by marketing activities.
Cox, 1970	Leading national brands	In-store experiment	Unit sales	Impact of the amount of facings varies across categories. Benefit from additional sales cannot compensate the cost to buy shelf space.	Did not examine	Test small number of leading brands.	
Curhan, 1972	National brands and private brands	In-store experiment	Space elasticity	Sales increase by 5% on average when increasing the number of facings. Store brands are more responsive to changes in shelf facings than national brands.	Did not examine	Unclear why store brands are more responsive to changes in the number of facings as compared to national brands.	
Dreze et al, 1994	National brands	In-store experiment		No effect	Moving a brand from the bottom row to the eye-level row increase sales by 39% on average.	Confounding effect of package design: some brands have similar package.	
Chandon et al, 2009	National brands	Lab experiment		Going from 4 to 12 facings increase choice by 60% for low-market-share brands and by 9% for high-market-share brands.	Moving a brand from the bottom row to the top row increased choice by 20%	Investigate a small number of product categories	
				Effect of shelf facings varies according to brand past usage.	Moving a brand from the top row to the middle row decrease choice by more than 10%		
Valenzuela and Raghubir, 2010	National brands	Lab experiment		Did not examine	Brands placed on the 2nd and 3rd rows were chosen more than those placed on the 1st, the 4th and the 5th rows.	Limited number of brands were tested	

2.4 Why does shelf space affect brand choice?

Before explaining the impact of shelf space on brand choice, it is necessary to understand how consumers make buying decision. The knowledge of the consumer decision-making process will provide insights into how consumers rely on information from environment to give evaluations of competing brands and make choice.

2.4.1 Consumer decision-making process

The concept of decision-making has been developed since the 1940s within the framework of *normative theory* that emphasizes the outcome of decisions, and then gradually was shifted to *behavioral decision theory* that emphasizes the process of making decisions.

According to the normative decision theory, consumers make decisions in order to meet their norms. They have full knowledge of alternatives and make choice based on unlimited information (Svenson, 1996, Bettman and Luce, 1998). The theory assumes that people have stable preferences and these preferences guide them through their choice decision. Differently, the behavioral decision theory considers decision makers as limited information processors (Simon, 1955). They could not process all information of alternatives but focus on some alternatives that could satisfy their needs and wants. Thus their decisions are given within a bounded rationality framework but not perfectly rational as assumed by the normative decision theory (Gigerenzer and Gaissmaier, 2011). In this sense, decision-making could be understood as adaptive information processing to reach final choices when consumers interact with the environment (Payne et al., 1992, Bettman and Luce, 1998). This point of view normally applies for complex decision-making contexts, when:

- The number and complication level of alternatives and attributes increase (e.g., there are more products to choose, products are different in size or package design, products' attributes at the same time meet consumers' expectation and bring potential consequences as well);
- It is difficult to process the information relating to specific attributes (e.g., unclear information, the information is too new);

- Consumers feel uncertain about attributes' values (e.g., uncertain about their reliability, consumers do not have enough information about available options);
- There is only a small number of attributes shared between alternatives (Bettman et al., 1990).

Decision-making process has been examined in various studies by authors such as Russo and Leclerc (1994), Senter and Wedell (1999), Doran (2000), Edwards and Fasolo (2001), Koklic and Vida (2011) or Mihart (2012). It could be seen as a single-stage process or multiple-stage process (Elrod et al., 2004, Koklic and Vida, 2011, Mihart, 2012). The single-stage process view suggests that consumers make choice by screening alternatives and select the first one that could satisfy their demand (Elrod et al., 2004). While this mechanism could apply for simple choice tasks, it could not explain the choice process in complex duties. In a more complex context, choice-making process involves more stages including screening, considering, eliminating some alternatives, and selecting (Fader and Hardie, 1996, Lye et al., 2008). Doran (2000) stated that consumer decision-making process includes four stages, including problem recognition, information search, evaluation of alternatives and purchase decision. More specifically, problem recognition refers to the process where the consumer identifies their need for a particular product; information search refers to the process in which the consumer seeks and processes purchase-related information; evaluation of alternatives refers to the process in which the consumer gives judgments to each alternative based on processed information in the previous stage in order to come to the final stage of making choice. Basically, Doran's point of view was strongly supported by Koklic and Vida (2011) and Mihart (2012).

Whereas researchers hold different views about specific stages of the decision-making process, they shared the belief that consumer preferences and choices are not fully formed in advance but at the point of purchase as a result of the choice context. Thus information processing plays an essential part in the decision-making process (Payne et al., 1992, Svenson, 1996, Bettman and Luce, 1998, Lye et al., 2008). To process information, consumers acquire inputs from the environment and interpret the inputs to build their own knowledge of the stimulus. They use the knowledge to evaluate

alternative and make choice (Payne et al., 1992, Svenson, 1996, Bettman and Luce, 1998, Lye et al., 2008). Information from the environment can be acquired when consumers interact with marketing stimuli and when they buy, use or hear about products through advertising, word of mouth communication or interactions with salespersons (Alba and Hutchinson, 1987). Information acquired by consumers is seen as cues on which consumers rely to make choice (Richardson et al., 1994).

2.4.2 The role of cues in consumer decision making

In decision theory, the term "cue" refers to stimulus, attribute or information (Gimba, 1999). According to Olson and Jacoby (1972), cue is defined as information including color, price, opinions, taste, or feel. This information can be seen as an indirect indicator of quality. According to Schellinck (1980), cue is understood as "a characteristic, event, quality or object external to a person that is encoded and used to categorize a stimulus object". Even though cue is defined differently in different studies, a common understanding is that people use cues to build perception of the stimulus and give choice decision (Olson and Jacoby, 1972).

There are two kinds of cues: intrinsic cues and extrinsic cues. Intrinsic cues are attributes of the product, such as ingredients, smell, taste, and texture (Dawar and Parker, 1994). Extrinsic cues are product-related information provided by marketers which can be categorized into: i) product-related attributes, such as brand name, price, packaging; and ii) contextual attributes, such as shelf space, shelf location, aisle width, store layout, store design (Dodds and Monroe, 1985, Bettman et al., 1998, Chandon et al., 2009, Valenzuela and Raghubir, 2010, Guido, 2012). This study examines the effect of shelf space, which is a contextual cue, on consumer choice of brand.

Contextual cues may affect choice because they can i) provide information about available alternatives; ii) give the consumer a reason to choose one alternative but not the other one; iii) create new knowledge or change actual experience of the consumer regarding of the product (Shafir et al., 1993). More specifically, consumers use the information given by contextual cues to discriminate between competing brands (Richardson et al., 1994). From there, their perception of brands is built. Thus,

differences in marketing stimuli will lead to differences in perception and differences in choice (Dick et al., 1995, De Wulf et al., 2005). According to the cue utilization theory developed by Olson and Jacoby (1972), consumers rely on both intrinsic and extrinsic cues to interpret product quality. However, when they do not have much confidence in making evaluation of alternatives, they will rely more on extrinsic cues to make buying decision (DelVecchio, 2001).

Shelf space is an important contextual cue, thus consumers can use it as a signal of quality and make choice decision based on it. However, a question should be raised as to what attriubutes of shelf space can cause an effect on consumer perception and choice? Indeed, what theory can explain for the effect? Answers for these questions can be found in the theory of salience, which is addressed in the next part.

2.4.3 Salience as an extrinsic cue

Traditionally, the concept of salience has been principally used in social psychology to refer to human behaviours (Guido, 2012). Since the 1970s, this concept was ued in the field of human perception to refer to social stimuli (people and attributes). In marketing context, salience of a physical stimulus is defined as prominence, which could make a stimulus become more distinguishable compared to others (Orquin and Mueller Loose, 2013). Among a variety of attributes that make a stimulus prominent, the stimulus's size and position are two important factors (Valenzuela and Raghubir, 2010).

Salience effect of size

The salience effect of size on choice has been examined in a number of studies. Most studies found that larger size stimuli are more likely to be associcated with positive evaluation from consumers, and this effect might be explained by the enhancement of visual attention (Lohse, 1997, Janiszewski, 1998, Wedel and Pieters, 2000, Rayner et al., 2008, Orquin and Loose, 2013, Peschel and Orquin, 2013). Other studies believe that size can have a direct impact on perception but not through visual attention (Freedman, 1979, Lakoff and Johnson, 1980, Keltner and Haidt, 2003). As the size of the stimulus can affect consumer perceptions (both indirectly and directly), it can affect their choice.

Effect of size on perception through visual attention

Visual attention is defined as the cognitive process through which people select information to process from a visual scene (Deubel and Schneider, 1993). It is "a collection of paintbrushes (neurons) that are trying to paint stimuli (objects in the environment) on a canvas (the visual cortex)" (Janiszewski et al., 2013, p. 1260). The observer can interpret the canvas through perceptual processes. Although there are different ways to define visual attention, a shared understanding is that visual attention provides information for cognitive activities (Pieters and Warlop, 1997).

According to *salience-based attention theory*, items with bigger surface size is more salient than those with smaller sizes (Orquin and Mueller Loose, 2013). Salient objects are more likely to be extracted from the background compared to non-salient ones. This view is supported by numerous studies stating that the initial focus of visual attention strongly depends on the physical traits of stimuli (Theeuwes et al., 2004, Belopolsky et al., 2007, Belopolsky and Theeuwes, 2010). Salient objects that are outstanding from the background will attract visual attention automatically (Nordfang et al., 2013) since the salience detection mechanism of human can work very fast and reliably (Hou and Zhang, 2007). Once detected, the salient part of the scene is brought into the fovea, which is the central area with higher resolution in comparison with peripheral areas, then it will be processed more specifically (Ouerhani et al., 2004). Thus, while one object receives more attention, others will probably receive less or no attention at all (Janiszewski et al., 2013). The study of Pieters and Wedel (2007) on gaze duration to advertisements and the study by Orquin et al (2012) on the impact of product packaging's size and saliency on fixation likelihood well evidenced the attraction of salient stimuli.

In a study by Pieters and Wedel (2007), the authors examined gaze duration given to a brand, pictorial, headline and body text elements of 17 full-page advertisements to test ad memorization, ad appreciation, brand learning, and brand evaluation of consumers. To collect data, the authors used an eye tracking equipment that allows participants to move their heads within a virtual box of 30 centimeters. The result indicated that the ads with larger surface sizes attract more visual attention from participants independent of their goals. Lohse (1997) also found that compared to colour, surface size helps increase

fixation likelihood and total fixation duration to a larger extent. According to Peschel and Orquin (2013), surface size significantly helps increase fixation likelihood. In other words, larger objects are more likely to attract visual attention than smaller ones.

The effect of visual attention on perception has been examined in a variety of studies (Bashinski and Bacharach, 1980, Sperling and Dosher, 1986, Dosher and Lu, 2000, Carrasco et al., 2002, Morrone et al., 2002, Eckstein et al., 2002, Raymond et al., 2003, Janiszewski et al., 2013). It is believed that visual attention could enhance perception thus reducing stimulus uncertainty (Sperling and Dosher, 1986, Palmer and Bejou, 1994, Eckstein et al., 2002) and inhibiting the observer's responses to other stimuli (Raymond et al., 2003, Janiszewski et al., 2013).

Attention could help increase neural responses to a location by directing overt attention to it (Orquin and Loose, 2013). Overt visual attention, in its turn, helps enhance visual processing as it takes the location into the fovea where there are many more sensory neurons, resulting in greater response to stimuli compared to areas that are outside the fovea. This method could strengthen the visual signal of a location while decreasing the accessibility of other locations in observers' perception whilst reducing the likelihood of those locations being attended. Thus, the perception of the attended object is stronger compared to the unattended one (Raymond et al., 2003). As a result, they are more likely to be put in the consideration set and then selected.

Shomstein and Yantis (2002) hold a slightly different view in explaining the effect of attention on perception. According to their view, visual attention may enhance consumer perception through two mechanisms: sensory enhancement and attentional prioritization. *Sensory enhancement* is the mechanism through which attention could improve the quality of a stimulus representation as an outcome of the competition of sensory neurons (Desimone and Duncan, 1995). More specifically, when a stimulus appears in a multi-element scene, its strength of representation will be weaker than when it is presented alone as it has to compete with other stimuli for attention. However, spatial cues or feature-related cues could help enhance the signal of the stimulus and compete successfully with other ones. Once the stimulus was attended its representation became stronger than those that were outside the focus of attention, thus

it could reduce the time required to discriminate the stimulus' features as well as the time for the information to be recorded into memory and trigger a response from the brain (Mangun, 1995). *Attentional prioritization* is a simpler mechanism to explain how attention could improve efficiency in perception. According to this mechanism, the observer simply gives more priority to the attended stimulus, than to unattended in the order of search (Shomstein and Yantis, 2002). Therefore, they are more likely to be chosen.

The effect of size on choice through visual attention was supported by Chandon et al (2009). The authors found that the effect of facings on brand choice was completely mediated by consumer visual attention. Increasing facings from four to eight increased the probability of noticing the brand by 28%. Choice was also increased by 67% for low-market-share brands, and by 10% for average-market-share brands. To conclude, by increasing the number of facings for a brand, brand choice may increase, due to the salient effect of size on visual attention.

Direct effect of size on perception

In marketing, salience is not only a matter of visual attention but also a matter of intepretation. Literature shows that salience indeed has an impact on consumer perception and thus, could lead to changes in perception. To explain, the salience of a stimulus provides the consumers with more information of a particular stimulus, and thus, affects the outcome of information processing. Therefore, salience can have a strong impact on choice (Guido, 2012).

The explanation for the effect of size on perception can be found in the study of Lakoff and Johnson (1980). The authors found that there is a strong correlation between physical size, and physical strength. Bigger animals are more powerful and are believed to be more dangerous than smaller ones (Freedman, 1979). Bigger people are more physically powerful and thus have more advantages in relationships, especially during childhood and adolescence (Felson, 2002). In adulthood, taller people have more opportunities in promotions compared to shorter people (Young and French, 1996). It is evident that objects of a larger physical size are often associated with more positive

evaluations. As discussed in Keltner and Haidt (2003), size, or vastness, is associated with fame, authority, prestige and power.

In shelf space area, Chandon et al. (2009) found that increasing from four to 12 facings improved evaluation by 17%, and choice by 15%. This finding revealed that the salient effect of size on consumer perceptions is an important explanation for the increase in brand choice.

Salience effect of position

Shelf position is another factor that could make a stimulus salient. Vertical position of a brand on shelf can also influence consumer choice through visual attention (Dreze et al., 1994) and perception (Chandon et al., 2009, Valenzuela and Raghubir, 2010). Dreze et al. (1994) found that brands placed on the eye-level shelf always gain the maximum sales while Chandon et al. (2009) and Valenzuela and Raghubir (2010) found that consumer perception of the brand changes according to its vertical position on shelf.

Visual attention at eye level

Brands placed at eye-level on shelf are salient because they fall within the natural viewing angle of consumers (Carrasco, 2011). Real world experience demonstrates that it is easy for people to fixate on an object when it is placed at the viewer's eye level, since it does not require their physical efforts to capture the object. Eye fixations are closely linked to head movement (Hendrickson and Ailawadi, 2014). As Hendrickson and Ailawadi (2014) explained, if we keep the head still, it would not create a right angle if taking the ground as one line and our vertebra as the other line. In fact, our head inclines forward a little bit. Hence, we normally do not look straight ahead but look down for around 15 degrees. No effort has to be made with our normal gaze. Naturally, we can direct our eyes from about 10 degrees above, to 30 degrees below eye level and, with comfort, extend the vision to 25 degrees above and 35 degrees below eye level. To look beyond this range, we have to make heavier head movements, and thus, can feel uncomfortable. Since people tend avoid such uncomfortable movements, they are most likely to keep their head still and use eye-level fixations.

Generally, we can only notice things within a narrow angle around the point that receives our fixations. Normally an object is recognizable if it lies within 2.6 degrees

(Rayner and Castelhano, 2007) or around 4 degrees from the point of fixation (Henderson et al., 2003). Even though the specific size of perceptual span is found differently in different studies, a shared understanding is that the area in which the information is processed and remembered is limited. Thus, objects that are far from eye level (above or below) are less likely to be noticed and brought into observers' perception. For this reason, they are less likely to be chosen.

Dreze et al. (1994) found that by moving a brand from the bottom row, to the eye-level row (51-53 inches above the floor) sales increased by 39% on average. Brands received the minimum sales when they were placed on the bottom row, and maximum sales when they were placed on the eye-level row. The effect was significant in all categories that were tested.

Vertical position and evaluation

In retail context, the position of a brand can affect the likelihood of the brand to be encountered in the consumer's sensory system. Consumers have their own schemas of the meaning of each position, and they use these schemas to distinguish brands on shelf as well as to make inferences of brands (Valenzuela and Raghubir, 2009). It means that position saliency is not the property of stimuli but this depends on the perception of the individual consumer. To explain, Neisser (1976) indicated that people might process information according a pre-developing format. For example, infants cannot perceive, as they do not have an initial format that allows them to acquire information. Only after a process of obtaining information and building initial format they could come to the perception stage. The conclusion could be drawn that perception is strongly influenced by individual interpretation. Therefore, consumer perception of the brand depends on how they make the meaning of the position of the brand on shelf.

There is a popular belief that "higher is better" (Meier and Robinson, 2004, Schubert, 2005). Objects that are at an upper, or higher position are normally associated with positive evaluations, while those at a lower position are associated with negative evaluations. For example, people say one goes up to Heaven, and down to Hell. They give "thumbs up" for good things and "thumbs down" for bad things. Happy people feel "up" while unhappy people feel "down". Meier and Robinson (2004) found that people

recognize words with positive meaning faster when they were placed at the top of a computer screen, whereas words with negative meanings were identified faster when they were placed at the bottom of the screen. Therefore, people tend to expect good things at an upper position and bad things at a lower position.

Another popular belief is that vertical position can indicate power (Schubert (2005). "Up" and "down" are often used as metaphors to imply the level of power people have. For example, people who are higher in the hierarchy are perceived to have more power compared to those who have lower status. In the hierarchical map, the most powerful person is at the top, while people with lower status are below. Those who are drawn at the bottom have the least power. Schubert (2005) found that people perceive labels placed at the top of a display to be more powerful in comparison with those placed at the bottom. Indeed, vertical dimension in physical space is believed to reflect the level of power.

In examining consumer perception of verticality, Nelson and Simmons (2009) found that people use the language of vertical position to explain cardinal direction. For example, they said go "up" to the North and go "down" to the South. Linking vertical position and cardinal direction illustrates that people perceive northbound travel as "uphill travel" and southbound travel as "downhill travel". They may think that northbound travel is more time-consuming, more difficult and costlier compared to southbound travel. Therefore, one would infer that products placed in north positions are of a higher quality compared to those placed in south positions (Valenzuela and Raghubir, 2010). Valenzuela and Raghubir (2010) found that consumers believe brands placed higher on shelf are of higher quality. In the experiment, the authors asked participants to rate the quality of five brands of wine placed on five vertical rows without product descriptions and price tags. Findings indicate that when the brand was moved to the lower row, the perceived quality was lower accordingly. This shows that consumers extract information about a brand from its vertical position on shelf.

To summarise, it is believed that shelf facings and shelf vertical position may impact brand choice by i) increasing consumer visual attention due to the salience effect of size and when the brand is placed at eye-level row (Chandon et al., 2009, Dreze et al., 1994);

and ii) changing consumer perceptions of the brand due the the salience effect of upper position (Chandon et al., 2009, Valenzuela and Raghubir, 2010).

2.5 Summary

Shelf space has attracted great attention from researchers since the early 1960s. A wide range of studies has been conducted to optimize models of shelf allocation for retail stores. A smaller number of other studies have focused on examining how shelf space could affect sales. However, the vast majority of studies have paid attention to the effect of shelf space on the sales of product categories. There have been only a few studies that examine the impact of shelf space on brand sales volume or brand choice, including Frank and Massy (1970), Cox (1970), Curhan (1972), Dreze et al (1994), Chandon et al (2009), and Valenzuela and Raghubir (2010).

Most studies at brand level stated that shelf space does have an impact on brand sales or brand choice. Explanation for the influence of the number of facings and vertical position can be found in the theory of salience. According to this theory, a stimulus can become salient as a result of its size and position. In terms of size, larger stimuli are more salient then smaller ones; they could attract consumers' visual attention, change their perception, or affect consumer perception directly. In terms of position, stimuli placed at eye-level position can attract consumer visual attention and affect their perceptions. Those placed on upper positions can gain better evaluations from consumers compared to those on lower positions. Changes in perceptions could lead to changes in choice. Thus, the salient effect of size and position could be seen as an explanation for the impact of shelf space on brand choice.

The critical review of the above-mentioned studies on shelf space has revealed some significant issues including:

- Findings regarding of the impact of shelf facings and vertical position of a brand on its sales are inconsistent between studies. Therefore, it is hard to draw conclusions regarding to what extent changes in the number of facings, and vertical position could impact on brand choice. Thus, further research is needed.

- Most studies have focused on national brands. Very little is known about how shelf space could affect the choice of store brands. The study by Curhan (1972) suggests that national brands and private labels respond differently to changes in the number of facings and vertical position on shelf. However, it is still unknown why it is the case. Thus, more research is a necessity.

The knowledge gap of literature on shelf space invites the following questions:

RQ1. How does shelf space affect brand choice?

RQ2. How does the impact of shelf space on brand choice differ between national brands and store brands?

RQ3. How does the impact of shelf space on brand choice differ between product categories?

The next chapter will address why store brands deserve more attention from researchers and a conceptual framework will be developed to explain how the relationship between shelf space, and brand choice may be moderated by consumer-related factors.

3 CONCEPTUAL FRAMEWORK

This chapter is structured as follows. Firstly, a review of literature in store brands is conducted to demonstrate the development process of store brands and provide justification as to why store brands deserve attention from researchers. Secondly, it will investigate factors that determine consumer choice between store brands and national brands and how these factors could moderate the impact of shelf space on brand choice. The chapter ends with a summary of the conceptual framework.

3.1 Overview of store brands

The development of store brands

The concept of "store brand" and "national brand" has been used to indicate different forms of brand ownership (Kotler and Armstrong, 2010). Store brands are brands developed by retailers, while national brands are brands developed by manufacturers. Store brands can carry the name of the retailer (for example, the private label of Woolworths Essentials produced by Woolworths, an Australian retailer) or a name that was created exclusively for that retailer (for example, Homebrand, which is a name created for Woolworths's own products). In marketing, store brand is also known as private label, private brand or distributor's brand (Richardson et al., 1994, Michael and Weitz, 2008) whereas national brand is also known as manufacturer brand.

The history of store brands started more than one hundred years ago in the United States when retailers such as A&P, the Great Atlantic and Pacific Tea Company developed their own brands (Hoch and Banerji, 1993). After that, store brands have experienced a strong development in the United States. In the late 1980s, store brands accounted for approximately 14% of supermarket sales in the United States. They were even more successful in Canada and Europe. In the 1990s, store brands developed heavily in the United Kingdom and Germany. By the end of the 1990s, store brands accounted for 20% of supermarket sales in Canada. In 2005, store brands accounted for 17% sales value in 38 countries in 80 consumer packed-good categories (Nielsen, 2005). In 2014, Europe was the store brand leader. One per every three dollars spent on consumer-packaged goods is spent on store brands. Store brands accounted for 45% value share in Switzerland, 41% in United Kingdom and Spain. In the Pacific region, store brands accounted for 21% of value market share in Australia, 13% in New Zealand. In North America, the dollar shares of store brands were 17.5% in the United States and 18.4% in Canada (Nielsen, 2014). In the United States, one of every five products sold in supermarkets is a store brand. These sales are a fourth of the rate sold in Switzerland, Belgium, Germany and France (Hoch, 1996; Jin and Suh, 2005). Not only available in developed countries, store brands have been growing quickly in developing economies such as South Africa (Nielsen, 2014). However, compared to developed regions including Europe, North America and the Pacific, where the value share of store brands

is above 15% on average, in developing regions such as Latin America, Asia and Africa/Middle East, the rate is below 10%. In China, India and Brazil, the value share of store brands is even lower, at 5% or less. The report by (Nielsen, 2014) highlights that the success of store brands is most noticeable in commodity-driven, high-purchase categories with low product differentiation (for example, milk and paper) and in regions where consumers are not fiercely brand-loyal. In regions where people are strongly brand-loyal, such as Asia, store brands have suffered from very slow development for the past ten years and have even regressed (Nielsen, 2014).

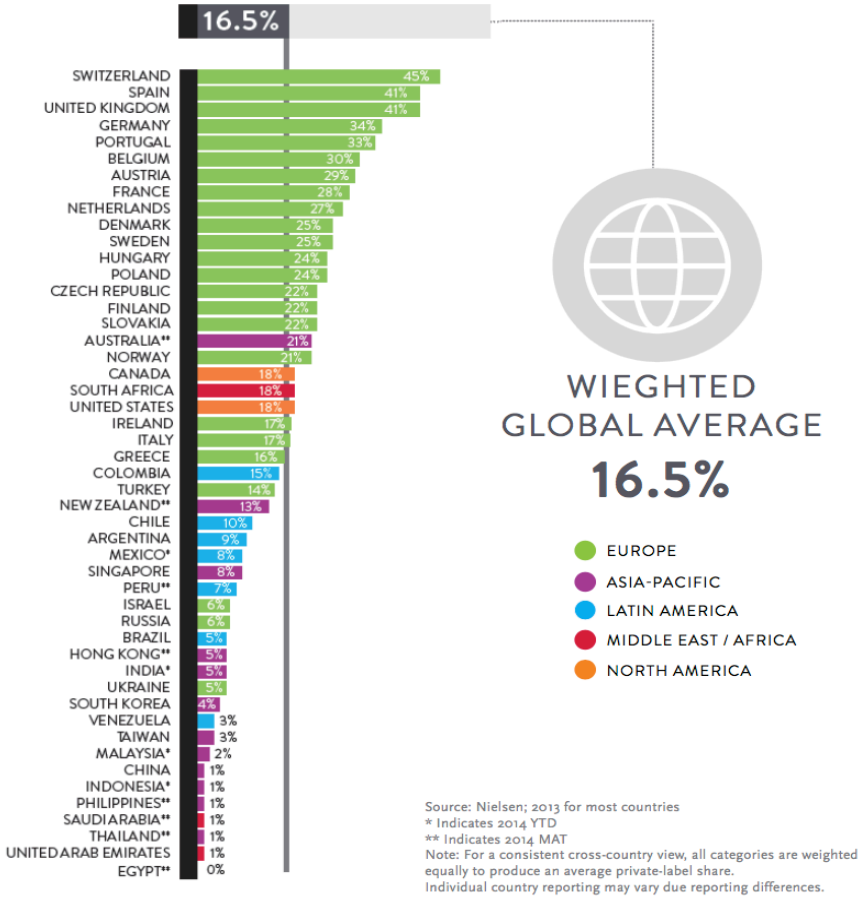
Although the success of store brands is not consistent across different regions, the global trend is very favorable for their development. Global sales of store brands grew by 5% while the rate is only 2% for national brands (Nielsen, 2005). Research by Nielsen using both online survey (launched in 60 countries and polled more than 30,000 online consumers) and retail and consumer purchasing data revealed that consumer perceptions of store brands are "overwhelmingly favorable" (Nielsen, 2014). Three-quarters of respondents believed that the quality of store brands has strongly improved over time. Therefore, consumers are more willing to buy, and more likely to consider store brands as a good alternative to national brands (Fall Diallo et al., 2013). For this reason, store brands are believed to grow heavily in the future.

The importance of store brands

Store brands are of strategic importance for retailers as they have brought them huge advantages including: i) higher profits; ii) higher market power and bargaining power; iii) increased distinctiveness of the retailer; and iv) increased store loyalty (Ailawadi et al., 2001).

High profitability can be seen as the ultimate reason for retailers to promote their own brands. Morris (2002) found that supermarkets could gain double profits as a result of a strong private label program. The gross margins on store brands are approximately 20% to 30% higher compared to manufacture brands (Hoch and Banerji, 1993). This is because store brands require minimal expenditure on advertising and branding. They require very low research and development costs, and also low production costs (Beneke, 2010).

Figure 1: The development of store brands in different countries



Source: Nielsen, 2013

It is quite obvious that store brands can create higher bargaining power for retailers. As retailers have full control of shelf space they can opt to allocate shelf space for their own brands at the expense of national brands (Hwang et al., 2009). This puts manufacturers under pressure to negotiate with retailers in order to gain good shelf placement. Consequently, they may have to accept less advantageous terms for their brands to be on the shelf. Ailawadi et al. (2001) reported that in many cases, manufactures have to accept to sell their products at lower price in negotiating for shelf space. As a result, retailers, especially those who have successful store brands, can gain much greater profit margins.

In addition, retailers develop store brands as a way to increase their distinctiveness from other retailers, and thus, to create higher store loyalty. Store brands are seen as unique products of a particular retailer, while national brands are available at various outlets.

Therefore, regular buyers of store brands are not only loyal to that particular brand, but also to that particular retailer (Collins and Burt, 2003). This is because switching to another brand is a demanding cognitive process, in which consumers have to switch retailers, face new brands, give new evaluations and make new choices. High psychological costs can be seen as a crucial factor which impede the consumer from switching stores (Collins and Burt, 2003).

While the success of store brands brings huge benefits to retailers, it puts manufacturers in a fierce competition and threatens their market share. Traditionally, manufacturers were not overly concerned about the existence of store brands, as store brands were always perceived to have inferior status as compared to national brands (Bao et al., 2011a). To explain, at the beginning of the development process, retailers have focused on producing cheap substitutes for national brands by cutting down all promotional expenses. However, in recent decades, store brands have changed from cheap brands to quality brands (De Wulf et al., 2005). Retailers have increasingly invested more on labeling, packaging and in-store promotions, as well as applying the same brand-building techniques as adopted by leading national brands (Lincoln and Thomassen, 2008). As a result, consumer perceptions of store brands have changed significantly and positively, explaining the increasing sales of store brands. To secure its market share, manufacturers must take the competition of store brands very seriously.

Due to their rapid development and strategic importance, it is not surprising that store brands have become the subject of various studies, including studies on shelf space. The next part will examine consumer factors that determine consumer choice between store brands and national brands. It will shed light on how consumer perception affects the degree to which consumers rely on extrinsic cues to make choice. The knowledge will provide an explanation as to why store brands and national brands might respond differently to changes in the number of facings and the vertical positions on shelf.

3.2 Consumer factors determine choice between national brands and store brands

A considerable amount of literature has been published on consumer factors that determine consumer choice between national brands and store brands. Most studies in

the 1960s and 1970s have focused on the investigation of consumer characteristics. However, it was found that consumer characteristics are not determinants of store brand purchases, as brand users' profiles do not differ (Uncles et al., 2012). Recent studies have agreed that general personality traits or demographic characteristics are not predictors of store-brand users, as people who buy store brands also buy national brands (Bao et al., 2011a, Dawes and Nenycz-Thiel, 2013). Bettman (1974) points out that demographic and socio-economic characteristics do not reveal much about the psychological process that drives choice. Indeed, the correlation between demographic or personality characteristics and consumer behavior is very weak (Fishbein, 1967, Kassarjian, 1971). Thus, the proposition that the choice between store brand and national brand is determined by consumer characteristics is not supported.

Later studies in 1980 shifted the focus on consumer perception and consumer experience (Bellizzi et al., 1981, Cunningham et al., 1982, Dunn et al., 1986, Rosen, 1984). Findings indicate that consumers have different perceptions of store brands and national brands in terms of price, quality and risk associated with purchases. To continue this research stream, studies in the 1990s to present have put more emphasis on how consumer perception could affect store brand purchase. Various consumer psychological factors have been examined including, but not limited to quality perception, price-quality perception, perceived risk, extrinsic cue reliance, brand loyalty, familiarity of store brands, past usage (Richardson et al., 1996, Baltas et al., 1997, Baltas and Doyle, 1998, Burton et al., 1998, Batra and Sinha, 2000, Ailawadi et al., 2001, Garretson et al., 2002, Nenycz-Thiel and Romaniuk, 2014).

Among the above-mentioned factors, quality perception, risk perception and past usage can be seen as major factors that affect consumer choice between store brands and national brands (Baltas et al., 1997, Bao et al., 2011a, Batra and Sinha, 2000, Erdem et al., 2004, Hoch and Banerji, 1993, González-Mieres et al., 2006, Dursun et al., 2011, Rubio et al., 2014). Perceived quality strongly affects the way consumers gather, organize and interpret new data (Dursun et al., 2011). Perceived risk determines the amount, sources and types of information that the consumer uses to support their choice at the point of purchase (Taylor, 1974). Past usage affects the extent to which the consumer relies on marketing cues to evaluate alternatives (Richardson et al., 1996,

Nenycz-Thiel and Romaniuk, 2014). It is clear that these three factors could strongly influence the way consumers process information in the environment. Therefore, we propose that the effect of shelf space on store brand choice and national brand choice could differ according to consumers' level of perceived quality, perceived risk and personal experience of store brands.

The next part will discuss three factors; quality perception, risk perception and past usage, in detail. The knowledge is expected to shed light on why store brands and national brands could respond differently to changes in the amount of facings and vertical position on shelf as well as how the impact of shelf space could differ according to consumer perception and past usage of store brands.

3.2.1 Quality perception

Consumer perception of quality can be seen as one of major determinants of brand choice. Previous studies indicate that quality is the key for success of store brands (Hoch and Banerji, 1993, Steenkamp and Dekimpe, 1997, Miranda and Joshi, 2003). Although buyers of store brands are happy to make a trade-off between quality and price, the fact is that higher quality brands have higher market share (Hoch and Banerji, 1993). It was found that 73% of consumers agreed that quality of store brand is a very important factor in making decisions of store choice (Hoch and Banerji, 1993). In the study on the role of quality in store brand purchase intention, Dursun et al. (2011) found that perception of quality has a direct influence on the consumer's intention to buy the brand. As Bailey (1999) stated, consumers are willing to pay for higher quality brands. Thus, the conclusion is drawn that even though a low price is a big advantage of store brands (De Wulf et al., 2005), the quality is the key for consumer choice.

Definition of quality

Quality has been defined from various perspectives (Steenkamp, 1990, Zeithaml, 1988). Garvin (1984) categorized approaches of defining quality into five main groups as follows:

First is the transcendent approach, according to which quality is seen as the item's innate excellence that cannot be analyzed and only be recognized through experience of

the user. Thus, it is almost impossible to be defined precisely (Pirsig, 1974). In his book, Zen and the Art of Motorcycle Maintenance, Pirsig wrote: "Quality is neither mind nor matter, but a third entity independent of the two… even though cannot be defined, you know what it is" (Pirsig, 1974, p. 185, 213).

Second is the product-based approach, according to which quality is a "precise and measurable variable" (Garvin, 1984 , p. 25). Quality is reflected by the amount of ingredients or attributes of the product. From this point of view, a higher quality product will require higher cost, and thus, will be more expensive as compared to a lower quality product. An example of product-based definition can be found in Leffler (1982) Leffler (1982, p. 956): "Quality refers to the amounts of unpriced attributes contained in each unit of the priced attributes" and in Abbott (1955, quoted in Garvin (1984)): "Differences in quality amount to differences in the quantity of some desired ingredient or attribute".

Third is the user-based approach, which considers quality as something that "lies in the eyes of the beholder" (Garvin, 1984 , p. 27). According to this approach, quality is understood from consumers' perspectives. Products that satisfy consumer wants and needs will be seen as of highest quality. Edwards (1968, quoted in Garvin (1984)) wrote: "Quality consists of the capacity to satisfy wants…" Gilmore (1974, quoted in Garvin (1984)) also wrote: "Quality is the degree to which a specific product satisfies the wants of a specific consumer". Therefore, quality is associated with consumer satisfaction. According to Zeithaml (1988), perceived quality is the consumer's judgment about the superiority and excellence of a product.

Next is the manufacturing-based approach, in which quality is understood from the perspective of the manufacturer. Products that meet technical specifications are seen as having good quality and vice versus. According to this approach, improving quality needs to simplify engineering and production control, and thus, reduce cost. Gilmore (1974, p. 16) wrote: "Quality is the degree to which a specific product conforms to a design or specification".

Final is the value-based approach, which considers quality in the relationship between product performance and costs and prices. Thus, quality is equated with value. Broh

(1982) Broh (1982, p. 3) wrote: "Quality is the degree of excellence at an acceptable price and the control of variability at an acceptable cost".

Perceived quality

Quality as defined according to the product-based, and manufacturing-based approaches can be seen as objective quality, while quality as defined from the user-based perspective can be seen as subjective quality, or perceived quality. Various researchers have emphasized the difference between objective quality and perceived quality (Garvin, 1983, Dodds and Monroe, 1985, Holbrook and Corfman, 1985, Jacoby and Olson, 1985). While objective quality is verifiable and measurable based on predetermined standards, perceived quality refers to the consumer's judgment of a product's overall excellence or superiority, thus it can be very subjective (Zeithaml, 1988). For marketers, perceived quality is the most important approach as it enables them to understand what consumers think about their products (Ophuis and Van Trijp, 1995), and thus, how to improve product quality to attract more buyers. Based on this ground, perceived quality of store brands is believed to be the one of the most relevant factors that determines consumer choice between store brands and national brands.

Steenkamp (1990) stated that consumers' perception of quality is built through processing information gathered from quality cues. To evaluate the quality of store brands, consumers can use intrinsic cues or extrinsic cues (Richardson et al., 1994, Dick et al., 1995, Bao et al., 2011b). However, previous studies (Purwar, 1983, Dick et al., 1990, Richardson et al., 1994, Beneke, 2010, Bao et al., 2011b) found that consumers did rely more on extrinsic cues because some direct intrinsic cues, such as ingredient quality, are very difficult to assess while extrinsic cues can be interpreted more easily. Richardson et al. (1994) argued that consumers feel more confident in interpreting extrinsic cues than in interpreting intrinsic cues. According to Zeithaml (1988), at the point of consumption, consumers rely more on intrinsic cues to give judgments of the quality of product. However, at the point of purchase, extrinsic cues outweigh intrinsic cues in becoming the most important signals of quality. This is because intrinsic cues are not available at the point of purchase and the search for intrinsic information is difficult. For example, the consumer cannot taste or use the product at the point of

purchase to evaluate its quality. Therefore, they must rely on extrinsic factors such as price, brand name or shelf space to evaluate the brand.

Perceived quality of store brands

Among a variety of extrinsic quality cues, price and packaging can be seen as the two most important factors that influence consumers' perception of quality of store brands (Collins-Dodd and Lindley, 2003, Beneke, 2010, Fall Diallo et al., 2013, Nenycz-Thiel and Romaniuk, 2009).

Price as a major determinant of consumers' perception of store brand quality and has a long history in marketing studies (Nelson, 1970, Olson, 1977, Huber and McCann, 1982, Monroe and Krishnan, 1985, Rao and Monroe, 1989). According to Jin and Sternquist (2003), 40% of total time consumers spent on information searching was for price information. Beneke (2010) found that price was used as an indicator of quality. Consumers normally use price to evaluate the quality of a product because of several reasons: i) information on price is always available at the point of sale (Monroe, 1971); ii) the consumer is not sure about the availability of other cues to evaluate a product's quality; iii) price is the least ambiguous cue; and iv) price is measurable (Shapiro, 1968). As store brands are always sold at the lowest price in a product category (De Wulf et al., 2005), consumers believe that store brands are of inferior quality as compared to national brands.

However, low prices of store brands can be explained by various factors but not necessarily because they use inferior quality ingredients (Kumar and Steenkamp, 2007). Firstly, store brands are often imitations of national brands and can be tested in a few of the retailer' own stores before mass selling, thus the cost for research and development can be minimized, which results in reduced price. Secondly, in comparison with manufacturers, retailers spend much less on packaging as they normally use slightly lower quality materials and simpler package design (Beneke, 2010). Thirdly, and most importantly, the vast majority of retailers often minimize the cost for branding, distribution or advertising (Fielding, 2006), therefore their own brands' price is significantly reduced. Despite these facts, consumers believe that low price implies low quality; hence they perceive store brands as inferior quality alternatives of manufacture

brands (Dick et al., 1995, Walker, 2006). Briefly, in consumer perception, the value of store brands is consolidated through price, but not quality.

Product packaging is another extrinsic cue that considerably influences consumers' perception of store brand quality. Packaging can be seen as a part of the product, or brand if it has a functional benefit (for example, a dripless spout in detergent) (Zeithaml, 1988), or as an attribute related to the product, or the brand, but not a physical part of the product itself (Olson and Jacoby, 1972). From the perspective of consumers, packaging plays a crucial role in communicating information about the brand because it is the first thing that consumers see before making the decision of what brand to buy (Ampuero and Vila, 2006). In self-service sales systems, package is more important as it has been used to inform consumers about the benefits that they could receive by consuming the product (Fielding, 2006). According to Silayoi and Speece (2007), packaging can be seen as a symbol that implies the meaning of the brand. Therefore, packaging can convey a message about the brand's quality (Underwood et al., 2001, Löfgren and Witell, 2005). According to Richardson et al. (1994), compared to national brands, store brands are normally poorly packed, thus they are perceived as having inferior quality. In their study, Richardson and colleagues found that although store brands use good ingredients, their quality was still evaluated unfavorably as their packaging has an inexpensive appearance. In this way store brands have been punished for their extrinsic cues.

Briefly, under the impact of low price and poor packaging, traditionally store brands have been perceived as having lower quality compared to the quality of national brands. Consumers also believed that as compared to national brands, store brands have higher variation in quality (De Wulf et al., 2005). Myers (1966) wrote: "Private label brands were shown to be significantly different from national brands as measured by ranking, rating, and semantic indices across a wide range of product and brand types. National advertising, differences in product or package quality, and the impressions of lower private brand quality that might be created by their lower prices, are the major factors contributing to differentiation".

However, consumer perception is changing, as store brands have changed positioning from cheap brands, to quality brands (Sheinin and Wagner, 2003). Facing increasingly intense competition with national brands, retailers have realized they need to upgrade the image of store brands and nurture store brands like any other national brand (Bao et al., 2011a). Therefore, many retailers have invested more in branding as they use the same marketing techniques for national brands to promote their store brands across various categories (Steenkamp et al., 2010). For this reason, the price gap between national brands and store brands decreases and thus, the negative price-quality inference is weakening. Many retailers have now invested more in packaging to compete with national brands, thus fostering positive consumer attitude toward store brands (Verhoef et al., 2002). In some categories, store brands are seen as premium offerings leaving national brands behind. The success of "President's Choice" chocolate chip cookie and cola in Canada is a good example of this in practice. Loblaws (2007) reported that "President's Choice" cola out-sold Coca-Cola in a retail outlet. The success of store brands in several categories has improved store brands' perceived quality. Therefore, so far perceived quality of store brands can be categorized into two groups: i) equal to quality of national brands, and ii) inferior than quality of national brands. However, those who believe that store brands are of inferior quality as compared to national brands account for the majority of consumers (De Wulf et al., 2005).

Moderating role of perceived quality in the relationship between shelf space and brand choice

Consumers' belief regarding the quality of store brands has become a schema (Crocker et al., 1984). A schema is "a general knowledge structure used for understanding" which is built based on prior knowledge and stored in memory (Crocker et al., 1984). Schema has a crucial impact on how people gather, organize and interpret new data. In the marketing context, quality schema strongly influences the way the consumer collects and interprets new information from marketing activities at the point of purchase (Meyers-Levy and Tybout, 1989). In other words, the consumer's quality schema affects how he or she utilizes in-store extrinsic cues to make choice. Thus, consumers with different schemas can use, and interpret extrinsic cues in different ways. If this knowledge is applied to the shelf space context, it is expected that

consumers with high-perceived quality of store brands (HPQ) and those with lower-perceived quality of store brands (LPQ) differ in weighting the changes in the number of facings and vertical position of a brand on shelf.

A question should be raised as to what the difference is. A large number of studies have suggested that people are more likely to attend to the stimulus that is incongruent with their schemas (Berlyne, 1970, McArthur, 1981). In social settings, incongruent individuals and strange stimuli attract more attention (McArthur, 1981). Crocker et al. (1984) stated that in a condition without time pressure, people tend to process incongruent information as compared to congruent information. Srull (1981) also said that people are more likely to recall incongruent information than congruent information, and thus, information that is opposite to their belief would receive more processing.

According to Meyers-Levy and Tybout (1989), in a situation where people face with schema incongruity, new objects could increase arousal and require more cognitive elaboration to process the information and resolve the incongruity. While schema congruity can lead to favorable responses, they are not very note-worthy, and thus, could not generate much cognitive effort as compared to incongruity. As moderate incongruity is seen as interesting and positively valued (Mandler, 1982), it could result in more positive reactions in comparison with those caused by schema congruity. (Meyers-Levy and Tybout, 1989) found that consumers evaluate products more positively when the products are incongruent to consumers' belief. However, Mandler (1982) argued that as the extent of incongruity could affect consumers' overall feelings, only resolvable incongruity can lead to positive responses. Extreme incongruity is more likely to result in a negative evaluation, as it cannot be resolved.

The congruence theory could be applied to shelf space context. Consumers believe that brands placed with a higher number of facings, or higher vertical position on shelf is of higher quality (Chandon et al., 2009, Valenzuela and Raghubir, 2010). For consumers who believe that store brands are of equal or higher quality than that of national brands (HPQ consumers), increasing the number of facings of store brands is believed to be congruent with their quality schema of store brands. In contrast, the increase in the

number of facings is believed to be incongruent with quality schema of consumers who consider store brands are of a lower quality than that of national brands. *Therefore, it could be expected that increasing the number of facings of a store brand or moving it to a higher position will generate more choices from consumers who believe that store brands are of lower quality compared to that of national brands (LPQ consumers)*. Thus, LPQ consumers are more likely to choose store brands over national brands. *The same change in shelf space for a national brand is believed to have lower effect on LPQ consumers, as it is congruent to their quality schema.* For this reason, *store brands could be more responsive to changes in shelf space than national brands* as LPQ consumers account for the majority part of the pool of consumers. Nevertheless, as only moderate incongruity can generate positive evaluation, it is expected that consumer choice will increase when the number of facings, or vertical position of the store brand changes to a certain extent. It would be unlikely that consumer choice keeps increasing when the amount of facings for the store brand continues to be increased, or when its position is kept higher.

Based on the knowledge of consumer perceived quality, this study raised the following question:

> ***RQ4. How does consumer perceived quality of store brands moderate the relationship between shelf space and brand choice in different product categories?***

3.2.2 Risk perception

Risk perception is seen as a pivotal aspect in consumer decision-making (Taylor, 1974). As mentioned in the "Consumer decision-making process" section, classical economic theory assumes that consumers make choice based on complete information, which means they have full knowledge of alternatives at the point of purchase (Bettman et al., 1998). However, behavioral decision theory considers decision makers as limited information processors (Simon, 1955). Thus, consumers make choices based on incomplete and imperfect information. As a result, they face a risk with their buying decision. In decision theory, risk is understood as the situation where a decision maker knows about the consequences of alternatives and their likelihoods of happening.

However, in consumer behavior research, risk refers to the situation where a consumer does not have prior knowledge of consequences of alternatives or their likelihoods of happening (Dowling and Staelin, 1994).

Definition of risk

The concept of perceived risk was initially examined by (Bauer, 1960). According to Bauer, "Consumer behavior involves risk in the sense that any action of a consumer will produce consequences which he cannot anticipate with anything approximating certainty, and some of which at least are likely to be unpleasant" (Bauer, 1960 , p. 24). It is noticeable that perceived risk, as defined by Bauer, not only refers to the information processing prior to purchase but also to the post-purchase processes. Perceived risk is distinguished with actual risk. As Bauer stated, perceived risk is the risk that exists in the consumer's perception. Perceived risk is the consumer's subjective belief about potentially negative outcomes of his/her purchase decision while actual risk is the objective outcome of the decision. According to Bauer, it is subjective risk but not objective risk that motivates consumer behavior. This statement has been strongly supported by (Cases, 2002, Harridge-March, 2006, Kim et al., 2008). As found in Cases (2002), although different factors, such as price and perceived quality can affect consumers' buying decision, perceived risk is the most pivotal determinant since it can prevent consumers from further consideration and purchasing.

After the study of Bauer, the concept of perceived risk has become a major topic of marketing research. Researchers have focused on identifying components and dimensions of perceived risk. Cox (1967) developed the definition of perceived risk to a higher level by stating that consumers make choice because they want to meet certain needs and gain satisfaction, which means their behaviors are goal-oriented. When they realize that they may not attain their goals, risk is perceived. According to Cox (1967), underlying factors of perceived risk include:

- *Goal uncertainty*: the consumer may be uncertain why he/she buys a brand, at what level he or she can accept the brand or how the brand is important to him/her;

- *Product uncertainty*: the consumer is unsure about which brand can satisfy his/her buying goals as he/she has neither a clear definition of brand, model, style, size… nor a method to evaluate alternatives. For example, the consumers might not know what attributes are associated with the product performance or which brand is better than the others.

- *Adverse consequences:* when the consumer perceives possibly negative consequences by buying (or not buying) the brand. If risk is involved, the consumer could fail to achieve his/her goals and face a certain degree of dissatisfaction. He/she also faces some kind of loss, for example, loss of opportunity to buy alternatives and loss of self-esteem (Cox, 1967, Gergen and Bauer, 1967). Compared to Bauer, the concept of perceived risk developed by Cox has been expanded to the amount of loss when the consumer's needs were not met and the consumer's feeling or the degree of uncertainty about potentially negative consequences.

Most studies have agreed with Bauer (1960) and Cox (1967) that components of risk are uncertainty and adverse consequences (Toh and Heeren, 1982, Urbany et al., 1989). Hisrich et al. (1972) added another type of uncertainty that relates to psychological factors. According to the authors, there is a strong correlation between self-confidence, expectation and uncertainty. When the consumer has low self-confidence, they might feel more uncertain than those with high self-confidence in a purchase situation. Moreover, the consumer's expectation is also associated with a degree of uncertainty. When the disparity between the expected and the actual performance of the brand is higher, the consumer would feel more uncertain. Vann (1984) distinguished between internal uncertainty, and external uncertainty. As Vann stated, internal uncertainty refers to the goal and product uncertainty since it results from the consumer lacking the necessary knowledge. External uncertainty is what the consumer cannot control as it stems from the outside environment.

However, Peter and Ryan (1976) did not agree that uncertainty is a valid construct of perceived risk. The authors wrote: "Paradoxically, if perceived risk were equivalent to uncertainty, then if a consumer were perfectly (subjectively) certain that a brand is

totally unacceptable for purchase there would be no uncertainty or perceived risk, be definition. However, if there is no uncertainty and no perceived risk in this situation, why is the brand "totally unacceptable"?" (Peter and Ryan, 1976 , p. 187). Therefore, risk should only be defined in terms of consumer expectation of losses, or adverse consequences in other words. Peter and Ryan's point of view was strongly supported by Stone and Winter (1987). Stone and Winter indicated that when the consumer is more certain about the expectation, they will feel more risk when buying the brand.

Perceived risk is believed to affect consumer choice in different ways (Bauer, 1960). According to Bauer, the consumer evaluates the degree of risk every time he or she buys a brand. Kotler and Armstrong (2010) indicate that consumers tend to avoid risks, as they want to avoid the negative feeling of making mistakes in a purchase situation. Therefore, they often try to search for information that enables them to evade risks and avoid the fear of making a wrong purchase decision.

Perceived risk is normally addressed in the first stage of the consumer purchasing process (Dowling and Staelin, 1994). The consumer decision-making process is comprised of four stages including problem recognition, information search, evaluation of alternatives and purchase decision (Payne et al., 1991). In the first stage, problem recognition, consumers perceive risk when "they recognize the need for a product or service" (Cunningham et al., 2005, p. 360). Risk is perceived in this stage because it is when the consumer might feel uncertain about what they want (goal uncertainty), what to choose (product uncertainty) and what level of losses might happen (adverse consequences). In the next stages, which are information search and evaluation of alternatives, consumers develop strategies to reduce, or avoid risk (Cox, 1967, Cunningham, 1967, Beatty and Smith, 1987).

Dimensions of risk

Risk can be categorized according to different dimensions. Previous studies put emphasis on these four main types of risks, which are functional risk (performance risk), financial risk, psychological risk and social risk (Richardson et al., 1996, DelVecchio, 2001, Liljander et al., 2009, Méndez Luis et al., 2011).

Although store brands have experienced great success in various product categories, consumers still prefer national brands to store brands (Rubio et al., 2014). Buying a store brand is perceived as riskier than buying a national brand because of two main reasons: i) perceived quality of store brands is lower than that of national brands in the majority of product categories (Batra and Sinha, 2000, De Wulf et al., 2005); and ii) there are more extrinsic cues that signal good quality for national brands than for store brands (De Wulf et al., 2005). As the perceived risk of store brands principally results from the consumer's concern of quality, one could say that functional risk is the most important type of risk when it comes to the choice between national brands and store brands. Noticeably, the level of perceived risk varies across grocery product categories as it closely relates to category complexity and category quality variation (DelVecchio, 2001). Category complexity refers to consumer perception of the difficulty and expensiveness of technology required for the production. Some categories, such as canned and frozen fruit and vegetables, vitamins and sugar, require simple, cheap technology or the technology is well established. Therefore, the perceived risk will be lower as compared to that of categories requiring sophisticated technology, such as paper, battery, laundry soap, cleanser and frozen entrees (Hoch and Banerji, 1993). Category variation refers to consumer perception of the difference in quality between competing brands of a category (Bettman, 1974). Quality variation is believed to be the most important determinant of perceived risk level of a category. When quality variation is high, perceived risk level is high (Leavitt, 1954, Montgomery, 1975). To summarize, risk involved in consumer choice between store brands and national brands normally includes two aspects: perceived risk of store brands and perceived risk of category purchase.

Moderating role of perceived risk in the relationship between shelf space and brand choice

When risk is perceived, consumers develop different strategies to reduce risk to make choice decisions with relative confidence and ease (Bauer, 1960). Risk reduction has two aims: i) reducing the level of uncertainty; or ii) reducing the amount at stake (Cox, 1967). According to Cox (1967), to reduce the level of uncertainty, consumers can rely on their own past experience by purchasing the same brand they bought last time if the

brand was satisfactory. They can also rely on the experience of others by asking friends, or acquaintances about their experience with the brand, or they can use precautionary measures by purchasing the best brand in the marketplace. To reduce the amount at stake, consumers may reduce their hopes to gain by lowering their level of aspiration. Besides, they can reduce the penalties for failures by avoiding the risky situation, which means not reducing the hopes to gain but completely removing them (Cox, 1967). Levitt (1967) identified five basic strategies to reduce risk, including: i) information acquisition and processing; ii) goal reduction; iii) loyalty; iv) investment reduction; and v) decision avoidance. Sheth and Venkatesan (1968) focused on i) information seeking; ii) pre-purchase deliberation, and iii) reliance on brand image. Among different risk reduction strategies, information seeking and processing is normally the first and major strategy to be used, as consumers are information processing and problem-solving mechanisms (Bauer, 1960, Bettman, 1970).

According to Cox (1967), the level of perceived risk can significantly influence the degree to which consumers seek information to support their buying decision. As Ring et al. (1980) found, when risk is perceived, the consumer will take more time to process information about the brand to reduce the potential amount of risk. In a lower risk situation, the amount of time spent on information processing is less. That is to say the consumer information need is determined by how much risk is perceived.

Perceived risk also strongly influences how consumers select the sources, types and the amount of information that could meet their information requirements (Cox, 1967). As found by Hugstad et al. (1987), "perceived risk explains a great deal about the way that information is acquired... Consumers do use different information search behaviors across situations that have different levels of perceived risk". More specifically, in purchase situations with high level of perceived risk, consumers acquire information from more sources than they do in situations where the perceived risk is moderate or low. Hugstad et al. (1987) also found that in high-risk situations, consumers have the propensity to rely more on personal information, such as friends, families, acquaintances, and especially salespeople. Cox (1967) found that consumers are more likely to use marketer-dominated sources of information when the amount of perceived risk is low which results in the consumer's uncertainty of performance (functional risk).

Cox's finding was strongly supported by Liu (2010). In the study on the moderating role of perceived risk in the relationship between extrinsic cues and behavioral intentions, Liu (2010) found that when functional risk is low, extrinsic cues that signal good product quality have a stronger effect on purchase intention, than in situations where functional risk is high. Applying this knowledge to the shelf space context, the conclusion could be drawn that when consumers' perceived risk of product category is high, they are less likely to rely on changes in the number of facings and vertical position of a brand to make choice. When the perceived risk level is low, consumers are more likely to rely on extrinsic cues to buy. Thus, *the effect of shelf space on brand choice might be weaker for consumers with high level of perceived risk as compared to consumers with low level of perceived risk*.

In terms of risk of store brands, it is expected that changes in shelf space of a store brand have stronger effect for consumers who believe that purchasing store brands involves low risk. However, the same changes for a national brand is expected to have stronger impact on consumers who believe that purchasing store brands involves high risk. It is because consumers tend to switch to other brand when the perceived risk is high and the alternative is believed to be of better quality (Liu, 2010).

Based on the knowledge of consumer perceived risk, this study raised the following questions:

> ***RQ5. How does consumer perceived risk of store brands moderate the relationship between shelf space and brand choice in different product categories?***
>
> ***RQ6. How does consumer perceived risk of product category moderate the relationship between shelf space and brand choice in different product categories?***

3.2.3 Past usage

Past usage is another important factor that moderates the relationship between extrinsic cues and brand choice, as it influences the way the consumer searches and interprets information and evaluates alternatives (Alba and Hutchinson, 1987). Past usage creates

direct experience and builds consumer knowledge, which is believed to have a strong effect on the consumer's next purchase (Bloemer, 1995, Macdonald and Sharp, 2000, Oh, 2000, Olsen, 2002, Lin and Chang, 2003, Esch et al., 2006, Ji and Wood, 2007, Wood and Neal, 2009, Sahin et al., 2011).

Knowledge is conceptualized as information archived in memory (Blackwell et al., 2001). Consumer knowledge can be seen as a construct with two components: expertise and familiarity (Alba and Hutchinson, 1987). Expertise refers to the consumer's ability to successfully perform product-related tasks and familiarity refers to consumer accumulate experiences relating to the product. Expertise is the result of objective and subjective knowledge (Bettman and Park, 1980, Park et al., 1994). While objective knowledge is what the consumer actually knows about the product or brand, subjective knowledge is the consumer's perception of what he/she knows about the product or brand (Bettman and Park, 1980, Brucks, 1985). Familiarity results from a wide range of product-related activities, such as acquiring and processing information and consuming the product (Alba and Hutchinson, 1987). Although consumer knowledge is accumulated from different sources (advertising, word-of-mouth or past usage), past usage can be seen as the most important source as it gives the consumer direct experience of the brand (Brucks, 1985).

Consumers' prior knowledge has been examined in various studies as a pivotal element that affects the way the consumer processes information and utilizes extrinsic cues (Alba and Hutchinson, 1987, Bettman and Park, 1980, Johnson and Russo, 1984, Rao and Monroe, 1988, Selnes and Troye, 1989, Rao and Sieben, 1992, Raju et al., 1995, Dodd et al., 2005, Chocarro et al., 2009). Literature has shown that consumer's knowledge strongly moderates the relationship between extrinsic cues and brand choice, since the amount of prior knowledge determines the types and amount of information used for brand evaluation, and hence, brand choice (Steenkamp, 1990).

Consumers' knowledge about products and the way it is organized in a consumer's memory has been conceptualized as consumers' cognitive structure, which refers to the encoded representations of information in memory (Lutz, 1975, Marks and Olson, 1981). As Hayes-Roth (1977) stated, information about a brand is stored in memory and

creates product schema. The schema is strengthened when the consumer has more experiences and it develops into a stable structure as a result of multiple accumulated experiences. In a purchase situation, brand-related schemas are activated and create a cognitive structure to guide the consumer to what information to attend, how to encode, store and interpret it (Marks and Olson, 1981). It could be said that cognitive structure provides a frame for consumers to differentiate between various brands. As Alba and Hutchinson (1987) stated, there is a big difference between experts and novices in the way they structure their knowledge and use it to support their decisions.

In measuring how information about brands or products is organized within a cognitive structure, Kanwar et al. (1981) proposed three dimensions including dimensionality, articulation and abstraction. Dimensionality refers to "the number of salient, activatable concepts stored in memory" (Kanwar et al., 1981, p. 123). Consumers with higher dimensionality are able to use more concepts in a purchase situation to support their choice decision. Articulation is defined as "the number of category representations or levels for each salient dimension in memory" (Kanwar et al., 1981, p. 123). Consumers with higher articulation are better in differentiating competing stimuli. It could be said that consumers with higher dimensionality and articulation can conduct more cognitively complex behaviors as compared to those with lower dimensionality and articulation. Abstraction is understood as a characteristic of cognitive structure, which refers to "the degree of abstractness of the salient, activatable dimensions stored in the structure" (Kanwar et al., 1981, p. 123). Consumers with higher level of abstraction are able to use more abstract cognitive structure with less effort compared to those with lower level of abstraction.

According to Alba and Hutchinson (1987), cognitive structure has a strong impact on the consumer's degree of analysis and depth of analysis. Degree of analysis is understood as the extent to which the consumer acquires and processes information that is helpful for their purchase task. Analytic processing requires much effort from the consumer, as the consumer has to extend the information search to make sure that relevant information is included, while irrelevant information is ignored or discounted. To do this, the consumer must know what information is relevant and what information is not. For this reason, consumers with better understanding of competing brands are

more likely to seek new information before purchasing because they are able to identify new relevant information (Johnson and Russo, 1984).

Depth of analysis refers to the extent to which the consumer understands and evaluates information about the brand. As the novices have less knowledge about the brand, they may fail to evaluate the importance of brand-related information and thus, find it less helpful (Fiske et al., 1983). In such cases, they are more likely to make choice based on the compensatory rule, in which the consumer evaluates all available attributes and uses the surplus on one attribute of the stimulus to compensate for the shortage on another attribute (Park, 1976). Alternatively the consumer may select to process a subset of information to simplify their choice task (Alba and Hutchinson, 1987). However, this might be a non-analytical process since the novice may select certain information and eliminate other based on expediency, but not on the importance of the information. Russo and Dosher (1983) said that consumers with cognitive limitations are more likely to ignore important information to make their choice task easier. They are also more likely to rely on peripheral cues to support their choice (Celsi and Olson, 1988). In contrast, knowledgeable consumers are able to process information at a more abstract level (Marks and Olson, 1981).

To explain, Alba and Hutchinson (1987) said that experienced consumers have better cognitive structure, and thus, their analytic processing will be more efficient compared to novices. According to Alba and Hutchinson, consumers' ability to analyze information is improved as a result of increased familiarity with the brand. When familiarity increases, task performance increases accordingly as less cognitive effort is required to accomplish the task. More specifically, in a purchase situation, consumers must conduct a series of mental and physical activities. As cognitive effort required for one activity is reduced, resources for other activities will become available. As a result, the consumer can process a larger amount of information to support their decision-making process. Novices, however, are more likely to face an information overload; therefore, they are less likely to utilize information as experienced consumers do. Rao and Monroe (1988) concluded that users of a brand are able to use more cues then non-users in a purchase situation. Applying this knowledge to the shelf space context, *one might expect that users of brands are more likely to be affected by the number of facings*

and vertical position as compared to non-users. Specifically, users of store brands will be more affected by changes in shelf space for store brands than non-users.

However, it is expected that the increase in the number of facings for both store brands and national brands will have less effect on heavy buyers of store brands, than light buyers and medium buyers. It has been argued that consumers who are rich in experience have more confidence in assessing quality of the brand (Bao et al., 2011b, Hsu and Lai, 2008). Their perception of a brand is mainly built based on the information gathered prior to the purchase, but not on information acquired at the point of purchase, as their cognitive structures used to discriminate between competing brands have been well established (Bettman and Jacoby, 1976). As Bettman (1974) stated, consumer experience will decrease perceived risk, while increasing perceived quality of the brand, thus the consumer is more likely to believe that their choice will be satisfactory. Therefore, they are less likely to rely on extrinsic cues to process information about alternatives and make choice.

Explanation for the above statement can be found in the Howard-Sheth model of buying behavior and the information processing mechanism developed by Bettman and his associates (Howard and Jagdish, 1969, Bettman and Zins, 1977, Howard, 1977). According to the Howard-Sheth model of buying behavior, consumers' experiences are conceptualized as a problem-solving task including three levels: extensive problem solving, limited problem solving and routinized response behavior. The consumer faces *extensive problem-solving situation* when he/she does not have, or has very little knowledge of brands, therefore he/she does not have clear criteria to guide choice and does not have a well-developed concept of the product category. To make choice, the consumer must extend the information search to reduce brand ambiguity. He/she may carry out prolonged consideration to decide which brand to buy. In *limited problem-solving situations*, the consumer encounters a new brand in a product category that he/she knows before. He/she has clear criteria for choice and a well-developed concept of product category. However, the consumer does not have specific brand preference because his/her knowledge is inadequate to make an evaluation, or because he/she has tried several brands and has favored them equally. *Routinized response behaviour* refers to a situation where the consumer has well-established knowledge about available

brands in his/her evoked set. Hence, he/she has a clear preference of one brand over others and can make choice without confusion. As the consumer has adequate experiences of brands, he/she does not need to take, or takes very little external information search (Howard and Jagdish, 1969, Howard, 1977). From the three situations mentioned above, it is evident that as consumers have different levels of knowledge about products or brands as they are driven by different information searching mechanisms.

The model developed by Howard has been well supported by Bettman and Kakkar (1976). According to Bettman and Kakkar, there are three main mechanisms of information processing including constructive mechanism, analytic implementation rule and preprocessed choice. Consumers who use *constructive mechanism* develop heuristics to evaluate alternatives and make a choice at the point of purchase, when they are in the store. The heuristics are constructed using preexisting rules stored in the consumer's memory. As the rule for selecting a brand is just completed at the point of purchase, it will vary in different buying situations depending on what alternatives are available, and how easy preexisting rules can be retrieved from memory. Constructive mechanisms are more likely to be used when the consumer has little experience of brands, or when it is difficult to make a choice. Thus, when the consumer faces the choice for the first time, or when he/she encounters changes in a buying situation, constructions of heuristics will be the most likely to occur (Bettman and Zins, 1977). *Analytic implementation* rule and *preprocessed choice* are used when the consumer has well-developed criteria to make choice before coming in a store. The evaluation of alternatives may have been made based on advertisements, word-of-mouth or other out-of-store sources. Using the analytic implementation rule means that the consumer has identified criteria for choice prior to the point of purchase, and then makes choice at the point of purchase. In case of preprocessed choice, the consumer has already decided which brand to buy before arrival to a store. To compare the three mechanisms, Bettman and Zins wrote: "…consider possible types of processing for a decision about breakfast cereals. If an analytic implementation process were used a housewife might have a preexisting rule of "choose the brand of cereal with the highest protein level," and must determine which cereal in fact has the highest level. In the case of preprocessed choice,

the consumer would already know Brand X had the highest protein, and would simply choose Brand X. With a constructive choice process, the consumer might develop the highest protein rule on the spot, developing a rationale for this rule after considering other possibilities." (Bettman and Zins, 1977, p. 76).

Constructive mechanism, analytic implementation rule and preprocessed choice can be seen as the equivalent to extensive problem solving, limited problem solving and routinized response behaviors (Purwar, 1983). Constructive mechanism and extensive problem solving both imply that consumers lack experience with brands or products, thus they will make a decision based on available information. Analytic implementation rule and limited problem solving imply that consumers have limited experience with brands or products and they do not have strong preferences for any particular brands due to inadequate knowledge; however, they have preexisting criteria to make choice and will evaluate brands according to their criteria. Preprocessed choice and routinized response behaviors imply that consumers have considerable experience with brands, or products, have well-developed criteria for choice and have strong preferences for a particular brand.

From the analysis of different information processing mechanisms above, it could be postulated that experienced consumers rely on their own knowledge to evaluate alternatives and make choice. Those who have limited, and especially no experience will seek more cues to support their choice. Applying this knowledge to the shelf space context, *it is proposed that heavy buyers of store brands will continue to buy store brands, independent of changes in shelf space for both store brands and national brands. Therefore, the impact of shelf space on heavy buyers of store brands could be weaker compared to non-buyers, light buyers and medium buyers.*

Another justification for this statement is that heavy buyers of store brands are more likely to buy store brands in their next purchases due to habit. Past usage could affect future purchase by creating habitual consumption, according to which the consumer simply consumes the same brand he/she used last time (Wood and Neal, 2009). Habits of use, in its turn, could lead to the habit of choice, which means the consumer chooses the brands he/she bought last time (Murray and Häubl, 2007). Habits are normally

triggered when consumers find themselves in the recurring circumstances. About 45% people tend to repeat their behaviors in daily life (Vogel et al., 2008). They go to the same store, buy the same brands with the same quantity (Seetharaman, 2004, Vogel et al., 2008) and keep the same pattern of consumption (Ji and Wood, 2007).

The habit of use could be explained by the theory of cognitive lock-in (Payne et al., 1993, Shapiro, 1999, Johnson et al., 2003). Specifically, when the consumer has more experience of using a particular product, the cognitive cost of thinking and using it will decrease and the probability to continue to use that product in the future will increase (Johnson et al., 2003). The habit of use is the result of a trial-and-error learning process through which the consumer learns about the product characteristics and how to use it efficiently. It is time-consuming since errors could happen during the trial process. However, over time the task will become easier once the consumer understands more clearly about the product and is able to develop the automated skill that is not transferred to alternative products (Ratchford, 2001, Murray and Häubl, 2007). Switching to other products certainly requires the consumer to struggle with the trial-and-error-learning process again, and that is something that he/she usually wants to avoid (Murray and Häubl, 2007). Therefore, heavy buyers of store brands are more likely to buy store brands in the next purchase.

Based on the understanding of consumer knowledge, this study raised the following question:

> ***RQ7. How does consumer past usage of store brands moderate the relationship between shelf space and brand choice in different product categories?***

3.3 Summary

Store brands, which are brands developed by retailers, have a history of more than 100 years of development. Store brands have grown significantly in various product categories in 2000s. Global sales of store brand grew by 5% while the rate is only 2% for national brands (Nielsen, 2005). Store brands are of strategic importance for retailers as they bring them significant advantages, including: i) higher profits; ii) higher market

power and bargaining power; iii) increased distinctiveness of the retailer; and iv) increased store loyalty. Due to their rapid development and its strategic importance, it is not surprising that store brands have become the subject of various studies, including studies on shelf space.

Perceived quality, perceived risk and past usage can be seen as major factors that determine consumer choice between store brands and national brands. These factors are also believed to moderate the relationship between shelf space and brand choice as they affect the way the consumer processes information and utilizes cues. Consumer belief about quality of store brands is built into a schema and this schema determines how the consumer gathers, organizes and interprets new data. In comparison with congruent information, information that is moderately incongruent to consumers' schemas can result in positive evaluation from consumers and generate more choice. It is possible that increasing the number of facings of a store brand, or moving it to a higher position will generate more positive evaluations from consumers who believe that store brands are of lower quality compared to that of national brands. Thus, choice in LPQ consumers could increase significantly. The same change in shelf space for a national brand is believed to have lower effect on these consumers, as it is congruent to their quality schema. Thus, it is expected that store brands and national brands respond differently to changes in shelf space.

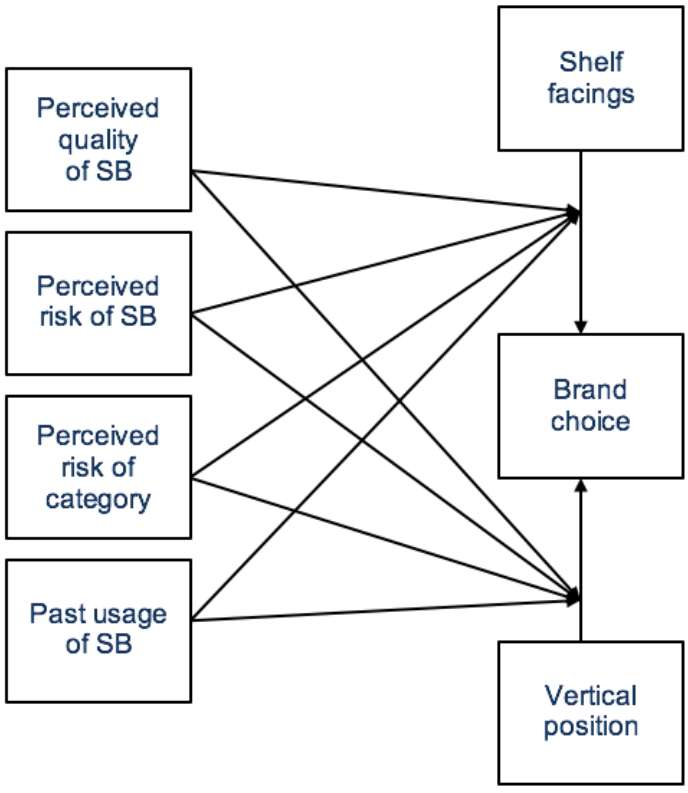
While differences in perceived quality can result in differences in the level of responsiveness of store brands and national brands, changes in shelf space, perceived risk and past usage could have an impact on the way consumers utilize information in the environment. Specifically, perceived risk influences the amount, sources and types of information that the consumer acquires at the point of purchase. When the perceived risk level is high, consumers acquire information from more sources than they do in situations where the perceived risk is moderate or low and they tend to rely more on personal information, such as friends, families, and acquaintances to support their choice. When the perceived risk level is low, consumers are more likely to rely on extrinsic cues to buy. Perceived risk in this study includes two dimensions: perceived functional risk of store brands and perceived risk of category. Past usage determines the extent to which the consumer relies on marketing cues to evaluate alternatives.

Depending on their level of knowledge, consumers could rely more, or less on marketing cues to make buying decisions.

As these above-mentioned factors strongly influence the consumer information processing, they may also determine the strength of the effect of extrinsic cues on choice. Based on this framework, this study will examine the moderating role of perceived quality, perceived functional risk of store brands, perceived risk of category and past usage in the relationship between shelf space and brand choice.

From the seven research questions that were raised, this study proposes a conceptual framework as follows:

Figure 2: Conceptual framework



In this framework, facing quantity and vertical position are two independent variables. Brand choice is the dependent variable. Perceived quality of store brands, perceived

functional risk of store brands, perceived risk of category and past usage of store brands are four moderators that can affect the strength of the relationship between facing quantity, vertical position and brand choice.

4 METHODS

This chapter is structured as follows. Firstly, it will present the research questions that the research aims to answer. Following the research questions is the discussion of research design. This section will provide detailed description of the experimental design and the survey questionnaire used in the study. It will also discuss the validity and reliability of the measurements and issues relating to sample size and data collection. To conclude is the Data analysis section, in which methods and statistical tools used to analyze data will be described.

4.1 Research questions

This research aims at answering the following questions:

1. *How does shelf space affect brand choice?*
2. *How does the impact of shelf space on brand choice differ between national brands and store brands?*
3. *How does the impact of shelf space on brand choice differ between product categories?*
4. *How does consumer perceived quality of store brands moderate the relationship between shelf space and brand choice in different product categories?*
5. *How does consumer perceived risk of store brands moderate the relationship between shelf space and brand choice in different product categories?*
6. *How does consumer perceived risk of product category moderate the relationship between shelf space and brand choice in different product categories?*
7. *How does consumer past usage of store brands moderate the relationship between shelf space and brand choice in different product categories?*

4.2 Research design

This study conducted a quantitative analysis to examine the impact of shelf space on brand choice and how consumer's perceived quality of store brands, perceived functional risk of store brands, perceived risk of category and past usage of store brands affect the relationship between shelf space and brand choice. Quantitative analysis is seen as a good method to explain the opinions of respondents in mathematics to get effective results, as the conclusions are not influenced by the researcher's experiences and perceptions (Brandimarte and InterScience, 2011). According to Brandimarte, a quantitative method is able to maximize objectivity and generalizability of findings.

4.2.1 Instruments

To collect data, this study used a choice experiment and a questionnaire as the two main instruments. Both the experiment and questionnaire were conducted online.

Choice experiment

An experiment can be seen as one of the strongest research designs since it enables researchers to collect the best possible data to explain the causal relationship between variables (Seltman, 2012). Using an experiment, the researcher is able to control the experimental environment and manipulate independent variables based on his/her proposed theoretical framework. Therefore, experiments allow researchers to identify the cause-and-effect relationship between independent variables and dependent variables, and establish theoretical patterns (Kuehl, 2000). Experiments enable researchers to use random assignment, which is a technique to ensure valid estimation of the causal effects (Alferes, 2012). To describe, after recruiting a pool of participants, the researcher will randomly assign each participant to one of experimental conditions. The random nature of assignment ensures that the selection procedure is unbiased, and thus, the results are valid. Random assignment has been considered as the best strategy for researchers to establish causal relationship between independent variables and dependent variables (Alferes, 2012). Because of the outlined strengths of an experiment, this study used this method to examine consumers' brand choice under the influence of shelf space.

There are two broad categories of an experiment; between-subjects design and within-subjects design. This study used a mixed design of between-subjects and within-subjects to combine the benefits of each category. *Within-subjects design* is a powerful research design that allows the researcher to observe participants' behaviors in different conditions. It can reduce the errors associated with individual differences (e.g., age, gender) and environmental differences (e.g., temperature or the size of the room where the experiment is conducted) since one participant is assigned to all treatment conditions (Charness et al., 2012). *Between-subjects design* allows the researcher to test multiple variables and multiple levels of a variable at the same time, thus the researcher can observe the differences between experimental conditions. The researcher has full control over the assignment of individuals to experiment conditions to create and treat different groups equally (Charness et al., 2012). It also allows random assignment of participants to each treatment condition to avoid bias. More importantly, between-subjects design reduces errors resulted from the use of repeated measures and allows

generalization of repeated measures over the randomized groups (Miller, 2005). The use of a mixed design of between-subjects and within-subjects enables researchers to maximize the advantages of these two methods. Therefore, it has been selected for the choice experiment aspect of this study.

Experiment description

The choice experiment aims at measuring participants' brand choice at the point of purchase under the influence of changes in the number of facings and vertical position of brands. To fulfill this goal, the experiment has to meet the following requirements:

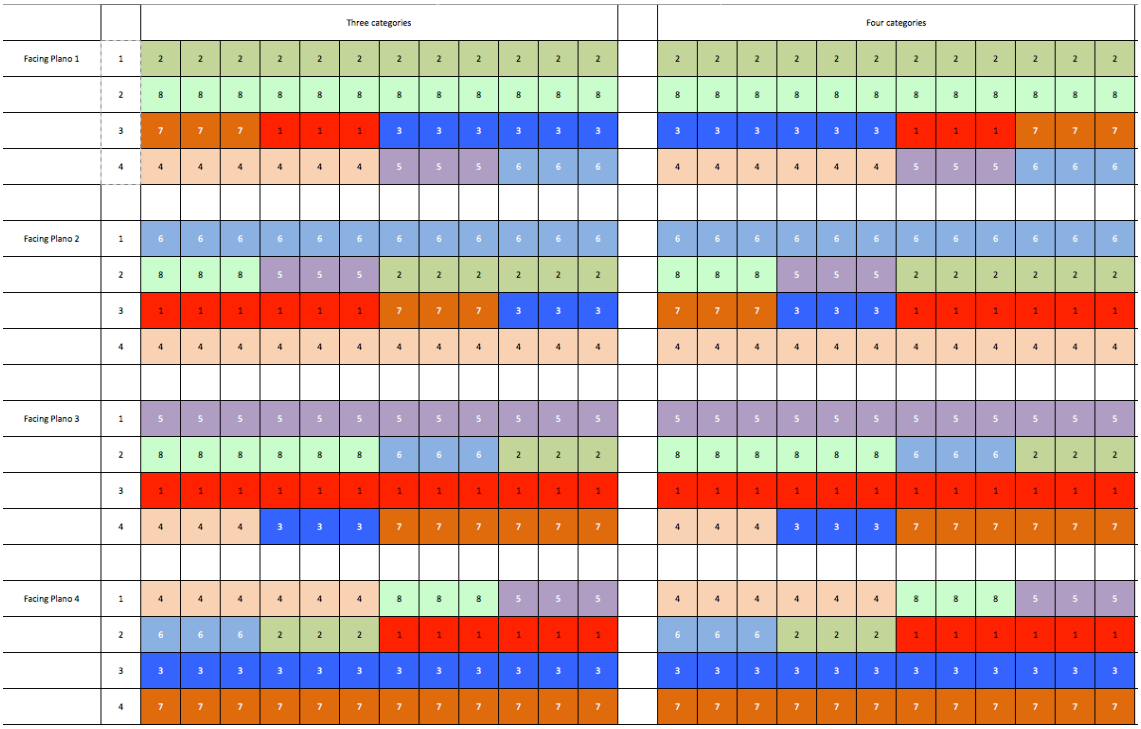
- Able to manipulate shelf layouts in which store brands and national brands are placed with different number of facings and in different vertical positions on shelf;
- Able to examine the impact of the number of facings on brand choice and the impact of vertical position on brand choice independently;
- Able to examine various brands and product categories that have been currently sold in the Australian market;
- Able to control irrelevant variables in all experimental conditions;
- Able to record participants' choice.

Manipulation of the number of facings

The study tested three levels of facing quantity, which are three facings, six facings, and 12 facings (the brand occupies one full row on shelf). With these three levels, we are able to test the effect of doubling the amount of facings from a small change (three to six) to a bigger change (six to 12), and really big changes (three to 12). As previous studies found that brands placed in the central of the display are chosen more, while there is no difference in terms of choice between those on the left, and those on the right side (Valenzuela and Raghubir, 2010, Chandon et al., 2009, Atalay et al., 2012), in this study all brands were placed either on the right side or the left side of the shelf to avoid central effect. To balance the effect of vertical position, it was ensured that the change in the number of facings was conducted at all levels of vertical position. In total, four

four-row planograms and eight brands for each out of seven product categories are manipulated.

Figure 3: Manipulation of facings



**Store brand was labelled as number 1 in the planogram.*

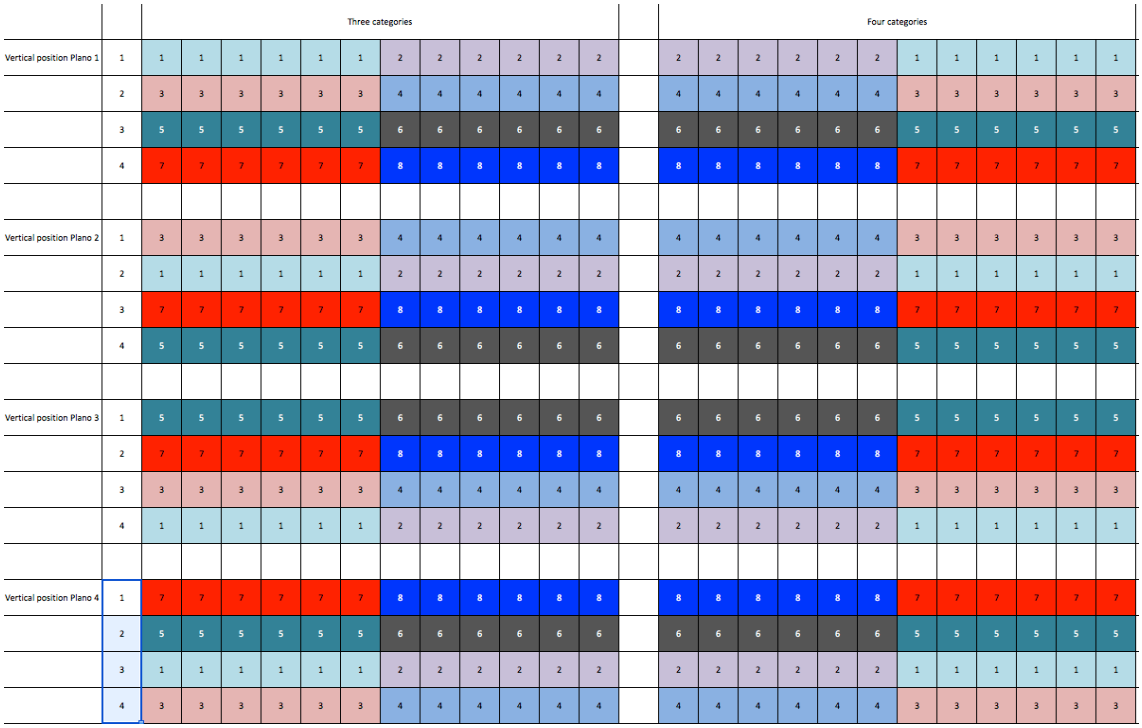
Manipulation of vertical position

To manipulate vertical positions of brands, the study also used four-row planograms. There are four different planograms to test four levels of vertical position, including the top row, the second row, the third row and the bottom row. As the study aims to examine the effect of vertical position in comparison with each other (higher versus lower positions), the four-row design is satisfactory. As the experiment was conducted online, brand names must be presented clearly for participants to recognize brands. An image of four-row shelf ensures that brand names are big enough for participants to recognize.

To examine the effect of vertical position, the number of facings of all brands was kept constant in four planograms and equal to each other (six facings for each brand) to avoid the effect of the quantity of facings. Brands were displayed either on the right side

or the left side of the shelf to avoid central effect. They were placed from the bottom row to the top row across four planograms.

Figure 4: Manipulation of vertical positions



**Store brand was labeled as number 1 in the planogram*

Product category and store brand selection

Seven product categories were selected for the study, including two groups of food products (canned tomatoes, chocolate, orange juice) and non-food products (dishwashing liquid, laundry powder, paper towel, shampoo). These product categories differ in levels of involvement[1], thus the research findings may be generalizable to other product categories also (Kapferer and Laurent, 1985, Murphy and Enis, 1986). Moreover, store brands of these categories are widely available and compete with national brands for consumer choice (Nenycz-Thiel and Romaniuk, 2014), enabling us to make an effective comparison between two types of brands.

[1] Product involvement is understood as "the interest a consumer finds in a product class". MITTAL, B. & LEE, M.-S. 1989. A causal model of consumer involvement. *Journal of economic psychology,* 10**,** 363-389.. The interest results from the consumer's perception that the product could meet their goals and values.

Store brands of these categories were selected from Coles and Woolworths, two large retailers that make up 70% market share in Australia (http://www.roymorgan.com/findings/7234-woolworths-coles-aldi-iga-supermarket-market-shares-australia-march-2017-201705171406). For Coles, the chosen brand is "Coles" because in November 2016, Coles decided to eliminate its several private labels such as Coles Smart Buy and Simply Less to replace them with "Coles" brand (http://www.news.com.au/finance/business/retail/coles-catching-up-with-aldi-in-private-label-satisfaction-woolworths-struggling/news-story/cfd05db201b3aa209333de9ad34317cd). For Woolworths, "Woolworths homebrand" and "Woolworths" were chosen. "Woolworths homebrand" is one of the biggest store brands in Australia with approximately $1.4 billion annual sales and nearly 1000 product lines. "Woolworths" is a newly created brand to compete with private labels of Aldi retailer (http://www.smh.com.au/business/retail/woolworths-makes-homebrand-homeless-in-private-label-shift-20160327-gns0p2.html). Since "Coles", "Woolworths homebrand" and "Woolworths" are important private labels in the Australian market they were selected for this study.

Confounding

As the purpose of an experiment is to seek evidence of the effect of independent variables on dependent variables, it is essential that all changes in the dependent variables are the result of the manipulation of the independent variables. Therefore, it is necessary that the independent variables are the only factors that change from one experimental condition to another. Otherwise, it is impossible to interpret the experiment's outcome. Thus, irrelevant variables (or confounding) must be well controlled.

According to Miller (2005), confounding factors can be categorized into two groups: subjective variables (e.g., participants' characteristics) and situational variables (e.g., environmental conditions and other external factors). *Subjective variables* were well controlled by the repeated measure design. As mentioned above, the use of within-subject design makes sure that each subject participates in all experimental conditions, thus we have the same subjects to test across different categories. Therefore, differences

in participants' characteristics no longer mattered. With repeated measure design, the researcher is able to analyze how each subject's scores differ in different conditions to obtain an effective result of the effect of the independent variables. For this reason, this study decided to repeatedly measure each participant's choice in seven product categories.

The order of performing the tasks in an experiment can be a crucial confound (Miller, 2005). The effectiveness of the first task and the next ones might be very different because of two reasons: i) the participant has learnt from the first task and might behave differently in the next task; ii) the participant has become fatigue or bored, and therefore lost their attention. Thus, order effects need to be controlled by randomizing technique, in which each participant performs the task in a different randomized order (Alferes, 2012). In our experiment, the planogram of each product category was presented to respondents in different randomized order to eliminate order effects.

Situational variables in this study's experiment include a variety of brand and product-related factors such as logo, pack color, pack size or price. Such elements could seriously confound the effect of independent variables, which are the number of facings and vertical position, if they are different from one experimental condition to another. Therefore, all these confounds must be controlled to make sure that it is possible to establish the causal relationship between shelf space and brand choice. Miller (2005) argued that the best way to control the effect of situational variables is to keep them constant in all experiment conditions. Thus, any changes in the dependent variable can be explained by the changes in independent variables. In our experiment, we kept all brand and product-related factors constant in all planograms and just manipulated the number of facings and vertical position of brands. Thus, any change in brand choice can be explained by changes in shelf space. As the effect of confounds was successfully controlled, the experiment's internal validity is enhanced.

Experimental procedure

Participants were allocated into two big groups. Group 1 was allocated to the test of facing quantity. Group 2 was allocated to the test of vertical position. In the facing quantity test, participants were divided into four sub-groups. Each sub-group looked at

one of four planograms of a product category and selected a brand that they would buy. The task was repeated with other remaining categories. The order of presented product category was randomized. In the vertical position test, the procedure is similar. Before the choice task, participants were asked two questions:

1. How much of your household's grocery shopping do you do?
    - None
    - Less than half
    - About half
    - Most or all

2. *How many times have you bought the following products within the last 12 months?*
    - Canned tomatoes
    - Block chocolate
    - Dishwashing liquid
    - Laundry powder
    - Orange juice
    - Paper towels
    - Shampoo

Only those who do about half, or most, or all of their household's grocery shopping and bought at least four of the products listed were recruited for the choice experiment. Non-users of categories were excluded as this study aims at examining how shelf space could affect the choice of category users. Participants performed the choice task with the product categories that they bought within the last 12 months. For example, a participant who bought canned tomatoes, block chocolate, dishwashing liquid and laundry powder performed the choice task with these four categories. They did not have to do the choice task with orange juice, paper towels and shampoo.

After participants answered these two above questions, the shelf image of each category was presented on the screen in a randomized order. Participants were required to look at the shelf carefully and select a brand they want to buy. To select the brand, participants simply clicked on the brand image and the choice was recorded. After participants made

choice with all product categories that they bought within the last 12 months, the experiment finished.

Survey

The second instrument used by this study's experiment is survey. A survey is the most used tool for market researchers to collect information relating to people's opinions about products or brands (Cooper et al., 2006).

In this study, the survey was divided into two parts:

Part 1 aims to:

- Measure respondents' quality perceptions of store brands;
- Measure respondents' functional risk perceptions of store brands;
- Measure respondents' risk perceptions of seven product categories (canned tomatoes, chocolate, orange juice, dishwashing liquid, laundry powder, paper towel, shampoo);
- Measure respondents' past usage of store brands.

Part 2 includes general questions about respondents' demographics for categorization purpose.

To measure the items in Part 1, this study used the 5-point Likert scale developed by Laurent and Kapferer (1985), in which 1=Disagree; 2=Somewhat disagree; 3=Neither disagree nor agree; 4=Somewhat agree; 5=Agree. Respondents were asked to indicate their level of agreement to statements about quality perceptions relating to store brands, risk perceptions of product categories and functional risk perceptions of store brands. To measure consumer past usage of store brands, a question was asked of consumers' to measure their purchase frequency during the past 12 months. To make sure that participants understand what is store brand, a definition of store brand was presented before questions related to store brands.

Below are definitions and measurements of the constructs.

Perceived quality of store brands

Definition: Consumer's judgment about the superiority and excellence of store brands (Zeithaml, 1988). This construct is measured using three items developed by Dick et al. (1995) as follows:

- Store brands are of excellent quality overall.
- There is a great difference in overall quality between national brands and store brands.
- There is a great difference in reliability of ingredients between national brands and store brands.

Perceived functional risk of store brands

Definition: Consumer's judgment of the probability that store brands will not perform properly (Dick et al., 1995). This construct is measured using three items developed by Dick et al. (1995) and González-Mieres et al. (2006) as follows:

- The purchase of store brand grocery items is risky because the quality of store brands is inferior.
- Since store brands are of poor quality, buying them is a waste of money.
- I'm suspicious of the quality of store brands.

Perceived risk of product category

Definition: The perceived importance of negative consequences if the consumer bought a wrong brand in a particular product category (Laurent and Kapferer, 1985). This construct is measured using four items developed by Laurent and Kapferer (1985) and Sinha and Batra (1999) as follows:

- It is not a big deal if I make a mistake in choosing a brand of this product.
- If I bought a wrong brand of this product, it wouldn't matter much.
- If, after I bought a brand of this product, my choice proved to be wrong, I would be very upset

- When I am choosing a brand of this product, I make that choice very carefully.

Consumer past usage of store brands

To identify consumers' past usage of store brands, we asked respondents the following question: *How many times have you bought the following products within the last 12 months?*

Table 2: Summary of constructs

Construct	Items for measurements	References	Scale
Perceived quality of store brands	Store brands are of excellent quality overall.	(Dick et al., 1995)	5-point Likert scale
	There is a great difference in overall quality between national brands and store brands.		
	There is a great difference in reliability of ingredients between national brands and store brands.		
Perceived functional risk of store brands	The purchase of store brand grocery items is risky because the quality of store brands is inferior.	(Dick et al., 1995, González-Mieres et al., 2006)	5-point Likert scale
	Since store brands are of poor quality, buying them is a waste of money.		
	I'm suspicious of the quality of store brands.		
Perceived risk of category	It is not a big deal if I make a mistake in choosing a brand of this product.	(Laurent and Kapferer, 1985, Sinha and Batra, 1999)	5-point Likert scale
	If I bought a wrong brand of this product, it wouldn't matter much.		
	If, after I bought a brand of this product, my choice proved to be wrong, I would be very upset		
	When I am choosing a brand of this product, I make that choice very carefully.		
Consumer past usage of store brands	How many times have you bought the following products within the last 12 months?		

4.2.2 Validity and reliability of measurements

It is of crucial importance to test the validity and reliability of the measurements. This study used the measurements that were adopted in many previous studies (Laurent and Kapferer, 1985, Dick et al., 1995, Sinha and Batra, 1999, González-Mieres et al., 2006). According to Cooper et al. (2006), it is not always necessary to invent, refine and pretest the measurements. It is plausible to use existing questionnaires that have been developed by studies in the same area. Indeed, the use of existing questionnaires could

enhance content validity of the measurements as they have been tested multiple times. Thus, the measurements of this study met the requirement of content validity.

Measures for perceived quality of store brands, perceived functional risk of store brands and perceived risk of category consist of multiple items on 5-point Likert scales. The confirmatory factor analysis was conducted with SPSS AMOS to test the convergent and discriminant validity of the measurement scales. To ensure convergent validity, standardized factor loading estimates should be 0.4 irrespective of sample size (Steven, 1992); the average variance extracted (AVE) should be 0.5 or higher; and the reliability estimate should be 0.6 or higher. To ensure discriminant validity, AVE estimates for two factors should be greater than the square of the correlation estimates between the two factors.

4.2.3 Sample and sample size

Sample size is an important factor in a study since it could strongly affect the reliability of factor analysis and the research outcome (Hair, 1998). According to Cooper et al. (2006), sample size needs to meet the requirement of the data analysis method. As this study use binary logistic regression to measure the impact of shelf space on brand choice, the sample size needs to meet requirements of this analysis method. As Hosmer et al. (2013) suggested, a sample of minimum 10 observations per independent variable in the model is required, but 20 observations per variable will give more accurate outcomes.

We recruited 405 people for the choice experiment and survey. The number of participants per product category is below:

1. Canned tomatoes: 336
2. Block chocolate: 360
3. Dishwashing liquid: 386
4. Laundry powder: 362
5. Orange juice: 327

6. Paper towels: 376

7. Shampoo: 390

As each participant made one choice per category, in total we had 2,537 observations. On average, we had approximately 1,270 observations for each independent variable (the number of facings and vertical position). The number of observations exceeds the requirement of the binary logistic regression. A larger sample size is often more desirable than a smaller sample size because it could improve the precision of the outcome, narrower the error range, and thus, lead to higher confidence level of the estimate (Cooper et al., 2006).

4.3 Data Collection

Both the choice experiment and the survey questionnaire of this study were conducted using an online method. This study used online method because of its multiple advantages. Firstly, by using an online method respondents are able to participate and complete the survey at any time. Secondly, people can access the survey from any geographical area where Internet connection is available which helps to strongly increase sample size, and shorten the time required to collect a desired sample size. Also, as the survey can reach a wide range of people, the power and reliability of the data can be considerably improved (Cooper et al., 2006). Last but not least, as it is able to use the "Force response" function for online survey, the possibility of missing data is minimized.

For the purpose of this study Toluna, a professional market research company, was employed to conduct the data collection. The questionnaire was sent to the Toluna's project manager for review. After reviewing, the project manager transformed the questionnaire to Toluna's platform and launched the test link. The researcher tested the link several times to make sure that all information was correct, all requirements were met and the survey ran smoothly.

To get the correct choice outcomes for the choice experiment, it is of crucial importance to ensure that participants could look at the whole planogram of each product category before making choice. For this reason, when participants came to the choice experiment

section, they were asked to look at the picture of a product category. After that, they were asked to click on “Next” button to go to the choice task. In the choice task, participants clicked on a particular brand to choose it. The “Next” button was only activated five seconds after the image appeared on the screen, ensuring that participants could look at the whole planogram successfully. This manipulation check was implemented several times to make sure that the procedure was successful.

To check participants’ attention, “trap” questions were included throughout the questionnaire. Respondents were required to click on either “Disagree” or “Agree” for these questions. Responses of those who have two or more wrong answers for the “trap” questions would be removed from the data set and new participants would be recruited. As it is important to get precise outcomes for the survey, this function was also tested very carefully.

The last function to be noticed is the “Force response”. The researcher checked carefully to make sure that respondents could not go to the next question without answering the previous one.

After the survey passed the test, it went live. Firstly, a pilot study with 40 participants (10% of the intended sample size) was conducted. Data was sent to the researcher to check for validity and reliability of measurements. After being checked, the survey was launched to the full sample size. After the data was successfully collected from the desirable sample size, the project manager submitted the raw data file in SPSS format to the researcher and closed the project.

The survey was divided into four main parts. Part 1 includes questions to identify qualified participants. Those whom qualified for the survey continued to Part 2, which is the choice experiment. After finishing the choice experiment, respondents continued to Part 3 to answers questions about store brands and particular product categories that had been tested in the experiment. Finally, respondents answered questions about demographics.

4.4 Data Analysis

This study used SPSS (Statistical Package for Social Science) to analyze the data. The major steps include:

4.4.1 Data Screening

The data file was examined for missing data. As the study's survey used "Force response" function, respondents must answer one question to be allowed to go the next one. Hence, item nonresponse did not happen. However, there was missing data due to the specific design of the choice experiment. As mentioned above, respondents only did the choice task with categories they have bought within the last 12 months. For example, if they bought canned tomatoes, block chocolate, dishwashing liquid and laundry detergent, they would perform choice task with these categories. The remaining categories, which are orange juice, paper towels and shampoo would be skipped. As skip patterns were used, there was no data on choice of categories that respondents have not bought within the last 12 months. Missing data coming from non-users were excluded from the analysis since this study is only interested in the choice of category users.

The data file was also examined for meaningful data. Respondents that gave the same score for all answers would be deleted as the information was evaluated as not useful.

After the pilot study, it was identified that the time required to complete the survey took a minimum of 5 minutes. Those respondents who spent less than five minutes were removed from the data due to low reliability of answers, as too short duration of responses most probably hinders participants from reading and answering questions carefully.

4.4.2 Identification of outliers

As Toluna managed to get the desired sample size with equal distribution of demographic groups in terms of age, gender, education, etc., there were no outliers for demographic variables. This study focused on examining outliers of independent and dependent variables.

To identify outliers of categorical variables (choice variables), a frequency table to identify brands with unusually low choice frequency was created. To identify outliers of perception variables, univariate detection method was employed. Standard scores (z-scores) were calculated for each perception variable, including perceived quality of store brands, perceived risk of store brands and perceived risk of categories. Those cases with z-scores exceeding ±3 can be identified as outliers (Hair, 1998). To identify observations with unusual combination of values across all variables as a whole, the study used multivariate detection method. The score of Mahalanobis D^2 was calculated. Those cases with D^2 score ≤ 0.001 are seen as outliers (Hair, 1998). Having identified outliers successfully, each individual case was carefully checked to determine whether to retain, or remove it from the dataset.

4.4.3 Descriptive analysis

A descriptive analysis to report information acquired from the data was conducted for the purpose of this study. Results from the descriptive analysis can provide simple summaries about the sample and the measures. Descriptive analysis can also help further clarify the conclusions drawn from observations. In this study, the descriptive analysis focused on the frequency distribution of:

- Respondents' demographics
- Description of perception variables
- Respondents' evaluation of quality of store brands
- Respondents' purchase frequency of seven product categories.
- Respondents' purchase frequency of store brands of seven product categories.
- Respondents' spending per purchase occasion
- Choice share of brands in seven product categories
- Choice share of store brands according to level of quality rating
- Choice share of store brands according to consumers' perceptions and past usage

Perception variables were described using the mean and standard deviation.

4.4.4 Multinomial logistic regression analysis

This study used multinomial logistic regression to test the effect of category order. Multinomial logistic regression is suitable to predict the relationship between independent and dependent categorical variables that contain more than two categories (Hair, 1998). For the test of control effect, the dependent variable is brand choice with eight categories (equal to eight brands of each category). The independent variable is category order with seven categories (from the first order to the seventh order). Maximum likelihood estimation was used to examine the probability of categorical membership. The result was analyzed to identify whether category order had a significant impact on brand choice.

4.4.5 Binary logistic regression analysis

This study used binary logistic regression to test the effect of shelf space on brand choice. Logistic regression is a predictive analysis used to explain the relationship between on dependent binary variable and one or more independent variables. Basically, the binary logistic regression makes prediction of group membership of the outcome. Therefore, the results are presented in the form of an odds ratio. Logistic regression is especially useful when the relationship between dependent variable and independent variables is non-linear (Tabachnick and Fidell, 2007).

This study used binary logistic regression to explain the relationship between shelf space (facing and vertical position) and brand choice. The analysis predicted the odds of a brand to be chosen under the influence of the number of facings and its position on shelf.

Binary logistic regression requires the following assumptions to be met:

i) The dependent variable should be measured on a dichotomous scale. In this study, the dependent variable is brand choice. When the brand was chosen, it was coded as “yes”. When the brand was not chosen, it was coded as “no”.

ii) The independent variable(s) can be continuous or categorical. In this study, independent variables include the number of facings and vertical position. Two variables are categorical.

iii) The independence of observations must be ensured and the dependent variable should have mutually exclusive and exhaustive categories. This study's experiment was designed to ensure that each participant contributes a single observation. For each product category, participants were allowed to make only one choice. The outcome was "yes" or "no" but not something in between.

4.4.6 Moderation analysis

This study used subgroup analysis to identify how consumers' perceptions and past usage could moderate the relationship between shelf space and brand choice. Subgroup analysis method enables us to compare the strength of the relationship between shelf space and brand choice between groups. It is able to create the relationship between variables that are not supported or weakly supported by moderated regression analysis (Bloom and Michalopoulos, 2013). Therefore, the moderation effect of variables could be more easily detected.

To achieve the purpose of subgroup analysis, consumers were divided into different groups based on their level of perception and past purchase frequency.

To classify participants based on level of perception, participants were ranked according to perception scores, which were calculated using the Dimension Reduction command in SPSS. Then they were divided at the median into High Perceived-Quality group (HPQ) and Low Perceived-Quality group (LPQ).

To classify participants based on past purchase frequency of store brands, this study employed the 50:30:20 approach (Anschuetz, 1997). According to this approach, buyers were divided into light, medium and heavy buyers in the proportions of 50:30:20, which are buyers' contributions to brand sales (Anschuetz, 2002). This approach is believed to ensure consistency across categories and brands that were purchased at different frequencies. For the purpose of this study, participants were divided into:

- Non-buyers: those who did not buy store brands or categories within the past 12 months
- Light buyers: the bottom 50% of buyers as a proportion of the total number of buyers
- Medium buyers: the middle 30% of buyers as a proportion of the total number of buyers
- Heavy buyers: the top 20% of buyers as a proportion of the total number of buyers.

This study tested how shelf space affects the choice of national brands and store brands among these above consumer groups in each product category.

To test how shelf space affects consumer choice of national brands, a logistic regression with brand choice as the outcome, and shelf space (the number of facings and vertical position) as the predictors was performed separately with each group. To test how shelf space affects consumer choice of store brands, the Firth logistic regression was performed for each group. The Firth logistic regression is a good analysis tool for rare event data, which means when the outcome has very low prevalence. Instead of using maximum likelihood estimation, which requires a large sample size to produce accurate outcomes, Firth logistic regression is an exact logistic regression that can provide exact estimation of group membership. As it was found that the frequency of store brands choice was low in some groups of consumers, this method is believed to be the most suitable.

4.4.7 Additional analysis

A binary logistic regression was performed to test the relationship between consumer rating of store brand quality and brand choice. The result was expected to provide more insights into how consumers choose store brands.

5 PRESENTATION AND ANALYSIS OF DATA

This chapter is structured as follows. Firstly, it will present the process of filtering eligible participants to collect data, followed by data screening and outlier identification process. Next, it will report descriptive statistics, including results regarding participants' demographics, perception and brand choice. Following the descriptive analysis is the confirmatory factor analysis, aiming at checking the validity of the constructs used in the study. The next section is the presentation of the results of the data analysis for the seven research questions. The chapter ends with the additional analysis, which was conducted to further explain the main findings.

5.1 Filtering eligible participants

The researcher employed Toluna, a professional market research company, to conduct the data collection. The intended sample size was 200 for the facing test and 200 for the position test. Respondents were invited to participate in the experiment and survey via email.

To select the final participants, the study employed two filtering processes. *The first filtering process* was performed using questions about people's gender and age, their responsibility in their household's grocery shopping and their past purchases of seven tested product categories. For demographic factors, the target was to achieve relatively equal distributions of different groups of gender and age. For household grocery shopping responsibility criterion, those who do about a half or most or all of the household's grocery shopping were eligible to participate in the experiment and survey. Regarding the past purchases of the seven product categories, those who bought at least four, out of seven product categories were eligible to participate. *The second filtering process* was performed using "trap" questions, aiming at filtering unreliable responses. "Trap" questions were placed randomly in the questionnaire, according to which participants were asked to click on a specific option. There were five traps in total and those who gave wrong response for two or more traps were removed from the data set. New participants were recruited to fill in the survey.

After the filtering process, 405 people were successfully recruited for the choice experiment and survey. The number of participants per product category for each test is presented in Table 3 below:

Table 3: Total participants

Category	Facing test	Position test	Total
Canned tomatoes	168	171	339
Block chocolate	184	180	364
Dishwashing liquid	191	199	390
Laundry powder	185	181	366
Orange juice	174	157	331
Paper towels	187	192	379
Shampoo	196	198	394

5.2 Data screening

The data screening process focused on the examination of meaningful data using Excel. After calculating the standard deviation score of each respondents' responses, nine cases were found with standard deviation scores of <0.5, which is very close to the group mean (Hair, 1998). By investigating each case individually, it was found that these respondents gave the same answer (*Neither disagree nor agree*) for most of the questions that asked about their perceptions of store brands and product categories. As information from these responses was not useful for the analysis, these cases were deleted from the dataset.

By looking at the duration of time spent on completing the choice task and answering the questionnaire, four cases were found with total duration of completion time to be less than five minutes. As the time spent on the survey was too short, it was unlikely that participants gave thoughtful and accurate responses. Thus, these cases were deleted from the dataset as the information that they provided was evaluated as unreliable.

In total, 13 cases were deleted from the dataset. The original sample size was 405. After the deletion, there were 392 cases left, among which 196 cases were for the facing test and 196 cases were for the position test. Table 4 presents the total sample size and the number of respondents who qualified for the choice experiment and the survey.

Table 4: Number of participants after data screening

Category	Facing test	Position test	Total
Canned tomatoes	162	166	328
Block chocolate	178	174	352
Dishwashing liquid	184	193	377
Laundry powder	167	152	319
Orange juice	178	176	354
Paper towels	182	186	368
Shampoo	189	192	381

5.3 Outliers

A steam and leaf plot was implemented to identify outliers of choice variables for the purpose of this study. The outlier detection for the facings test, and position test were conducted separately. The result showed 18 outliers in the facing test and nine outliers in the position test. By examining these cases, it was found that some brands received a very low choice frequency and these cases were identified as outliers. Table 5 presents the number of outliers found in the choice variable of the facing test and position test. "F" indicates "Frequency" and "P" indicates "Percentage".

Table 5: Number of choice outliers in each category

Category	Brand	Facing test		Position test	
		F	**P**	**F**	**P**
Canned tomatoes	La Gina	3	1.9%	n/a	n/a
Block chocolate	Dream	3	1.7%	n/a	n/a
Dishwashing liquid	Ecostore	3	1.6%	3	1.6%
Laundry powder	Aware	3	1.8%	n/a	n/a
Paper towels	Maxima	3	1.6%	3	1.6%
Shampoo	Woolworths homebrand	3	1.6%	3	1.6%
Total		**18**	**-**	**9**	-

We also investigated these cases in other variables to detect if they were unusual. The results showed that they are unusual for choice variable only. This study looks at the big picture and is not concerned with any individual brand. To look at all brands, the total choice of national brands, in comparison with total choice of store brands is examined and therefore all of these cases were kept in the dataset for further analysis. In the shampoo category, the outliers are especially interesting as this is the category where store brands got the lowest choice frequency. Thus, they were retained in the dataset for investigation of moderation effect.

To detect *univariate outliers* of perception variables, standard scores (z-scores) were used. According to Hair (1998), the threshold values of z-scores for sample sizes larger than 80 can range from 3 to 4. It means those cases with z-scores exceeding ±3 can be identified as outliers. As the sample size of this study is larger than 80 (196 for each test), the cut-off value of 3 was applied. The result showed all standard scores below 3. Thus, there were no univariate outliers.

To detect *multivariate outliers*, the Mahalanobis D^2 score was used. This study used the threshold value D^2 score = .001 (Hair, 1998). Those cases with D^2 score ≤ .001 are seen as outliers. The result showed three cases with D^2 score < .001. In investigating these cases individually, it was found that the respondents selected the *"Don't know"* option to answer two questions regarding of perceived quality of store brands and perceived risk of store brands. However, these cases were not identified as outliers in the univariate test, thus there is a reason to believe that they are not truly unusual and but still a part of the population (Hair, 1998). Therefore, these cases were retained in the dataset for further analysis.

5.4 Descriptive analysis

Demographic characteristics of the sample

Table 6 summaries the demographic profiles of participants of both tests. In terms of age, people from 25 to 34 years old and from 65 years old and above accounted for the largest part of participant pool (19.6% and 19.1% respectively), followed by those in the group of 35 to 44 years old and 45 to 54 years old (17.1% and 17.9% respectively). The remaining are those from 18 to 24 years old and from 55 to 64 years old. Regarding gender, 51.8% were male and 48.2% were female. Approximately 60.2% of participants were married and 27% were single. 81.6% of participants were responsible for most, or all of their household grocery shopping. In terms of education, people who completed high school and university account for 33.2% and 31.4% respectively, followed by those who have TAFE education at 24.2%. Relating to occupation, 20.2% of participants were retired, followed by professional and technical people (14.5%), manager/officer/proprietor (12.2%) and clerical staff (11.5%). Students accounted for 5.1% of the total pool. In terms of annual income, those who earn from $25,000 to $49,999 accounted for the largest part (25.5%). There was an even distribution between those who have annual income from $50,000 to $74,999, from $75,000 to $99,999 (18.9% and 18.4% respectively). 38.3% of participants live in a two-member family. The percentage of people who live in a one-member family and three-member family were close at 18.9% and 19.9% respectively. Only 7.1% of participants' families have five or more members.

Table 6: Demographic characteristics of the sample

Demographic	Frequency (N=392)	Percentage
Age		
18-24	44	11.2%
25-34	77	**19.6%**
35-44	67	17.1%
45-54	70	17.9%
55-64	59	15.1%
65 and above	75	19.1%
Gender		
Male	203	51.8%
Female	189	48.2%
Marital status		
Single	106	27.0%
Married/De facto	236	**60.2%**
Widowed	12	3.1%
Divorced	30	7.7%
Other	8	2.0%
Shared responsibility in household grocery shopping		
About half	72	18.4%
Most or all	320	**81.6%**
Education		
High school	130	**33.2%**
TAFE	95	24.2%
University	123	31.4%
Post graduate university	39	9.9%
Other	5	1.3%
Occupation		
Retired	79	**20.2%**
Professional/technical	57	14.5%
Manager/Officer/Proprietor	48	12.2%
Clerical	45	11.5%
Homemaker	33	8.4%
Unemployed	24	6.1%
Other	21	5.4%
Student	20	5.1%
Sales	18	4.6%
Service worker	17	4.3%
Labourer	15	3.8%
Tradesperson	8	2.0%
Machine operator	7	1.8%
Income		
Under $25,000	47	12.0%
$25,000-$49,999	100	**25.5%**
$50,000 - $74,999	74	18.9%
$75,000 - $99,999	72	18.4%
$100,000 -$149,999	63	16.1%
$150,000 and over	36	9.2%

Table 6 (cont.)

Demographic	Frequency (N=392)	Percentage
Number of people in family		
One	74	18.9%
Two	150	**38.3%**
Three	78	19.9%
Four	62	15.8%
Five or more	28	7.1%
Location of residence		
NSW	129	**32.9%**
VIC	94	24.0%
QLD	78	19.9%
WA	44	11.2%
TAS	10	8.4%
SA	33	2.6%
NT	3	0.8%
ACT	1	0.3%

Bold values indicate the highest proportion in each demographic characteristic.

Description of perception variables

Descriptive analysis of participants' perceptions of store brands and product categories is performed for both facing test and position test (N=392), as participants of the two tests were asked the same questions.

Table 7 presents the results of the descriptive analysis in three constructs; perceived quality of store brands, perceived risk of store brands and perceived risk of category. In total, there were 10 items of measurements. All items were measured by 5-point Likert scale, specifically: *1=Disagree; 2=Somewhat disagree; 3=Neither disagree nor agree; 4=Somewhat agree; 5=Agree*. In this study, the mean score of the scale is 3.

Regarding perceived quality of store brands, participants did not entirely agree that "Store brands are of excellent quality overall". Thus, this item got the lowest mean score accordingly (M = 2.59, SD = 1.16). However, respondents also did not agree that there is a great difference in overall quality between national brands and store brands (M = 3.38, SD = 1.20) and there is a great difference in reliability of ingredients between national brands and store brands (M = 3.37, SD = 1.22) (Coding for these values was reversed, thus lower scores were for "agree" and higher scores were for "disagree").

Regarding perceived risk of store brands, most respondents gave high score to the value "I'm suspicious of the quality of store brands" (M = 3.20, SD = 1.32). However, they

did not really agree with the statement "The purchase of store brand grocery items is risky because the quality of store brands is inferior" (M = 2.98, SD = 1.28) or "Since store brands are of poor quality, buying them is a waste of money" (M = 2.74, SD = 1.31).

In terms of perceived risk of category, the mean score of values varies across categories. The mean score of all values of chocolate, laundry powder and shampoo were greater than 3. In all seven categories, the highest score was for the value "When I'm choosing a brand of this product, I make that choice very carefully" (M_{Tomatoes} = 3.47, SD = 1.17; $M_{\text{Block chocolate}}$ = 4.11, SD= .95; $M_{\text{Dishwashing liquid}}$ = 3.71, SD = 1.10; $M_{\text{Laundry powder}}$ = 3.95, SD = .99; $M_{\text{Orange juice}}$ = 3.83, SD = 1.06; $M_{\text{Paper towels}}$ = 3.37, SD = 1.18; M_{Shampoo} = 4.16, SD = .94). The lowest mean scores were for two values, "It is not a big deal if I make a mistake in choosing a brand of this product" and "If I bought a wrong brand of this product, it wouldn't matter much" in paper towel category (M = 2.46, SD = 1.19 and M = 2.44, SD = 1.21 respectively). (Coding for these values was reversed, thus lower scores were for "agree" and higher scores were for "disagree"). The second lowest scores of these two values belong to canned tomatoes (M = 2.53 for both values, SD = 1.18 for the former value and 1.20 for the second value).

Table 7: Descriptive analysis of perception variables

Constructs	Mean	Std. Deviation	Minimum	Maximum
Perceived quality of store brand				
Store brands are of excellent quality overall.	2.59	1.16	1	5
There is a great difference in overall quality between national brands and store brands.	3.38	1.20	1	5
There is a great difference in reliability of ingredients between national brands and store brands.	3.37	1.22	1	5
Perceived risk of store brands				
The purchase of store brand grocery items is risky because the quality of store brands is inferior.	2.98	1.28	1	5
Since store brands are of poor quality, buying them is a waste of money.	2.74	1.31	1	5
I'm suspicious of the quality of store brands.	3.20	1.32	1	5
Perceived risk of canned tomatoes				
It is not a big deal if I make a mistake in choosing a brand of this product.	2.53	1.18	1	5
If I bought a wrong brand of this product, it wouldn't matter much.	2.53	1.20	1	5
If, after I bought a brand of this product, my choice proved to be wrong, I would be very upset.	2.76	1.28	1	5
When I am choosing a brand of this product, I make that choice very carefully.	3.47	1.17	1	5

Table 7 (cont.)

Constructs	Mean	Std. Deviation	Minimum	Maximum
Perceived risk of block chocolate				
It is not a big deal if I make a mistake in choosing a brand of this product.	3.18	1.32	1	5
If I bought a wrong brand of this product, it wouldn't matter much.	3.19	1.36	1	5
If, after I bought a brand of this product, my choice proved to be wrong, I would be very upset.	3.21	1.32	1	5
When I am choosing a brand of this product, I make that choice very carefully.	4.11	.95	1	5
Perceived risk of dishwashing liquid				
It is not a big deal if I make a mistake in choosing a brand of this product.	2.69	1.23	1	5
If I bought a wrong brand of this product, it wouldn't matter much.	2.67	1.26	1	5
If, after I bought a brand of this product, my choice proved to be wrong, I would be very upset.	2.79	1.24	1	5
When I am choosing a brand of this product, I make that choice very carefully.	3.71	1.10	1	5
Perceived risk of laundry powder				
It is not a big deal if I make a mistake in choosing a brand of this product.	3.03	1.29	1	5
If I bought a wrong brand of this product, it wouldn't matter much.	3.06	1.31	1	5
If, after I bought a brand of this product, my choice proved to be wrong, I would be very upset.	3.00	1.25	1	5
When I am choosing a brand of this product, I make that choice very carefully.	3.95	.99	1	5
Perceived risk of orange juice				
It is not a big deal if I make a mistake in choosing a brand of this product.	2.88	1.21	1	5
If I bought a wrong brand of this product, it wouldn't matter much.	2.88	1.24	1	5
If, after I bought a brand of this product, my choice proved to be wrong, I would be very upset.	3.01	1.28	1	5
When I am choosing a brand of this product, I make that choice very carefully.	3.83	1.06	1	5
Perceived risk of paper towels				
It is not a big deal if I make a mistake in choosing a brand of this product.	2.46	1.19	1	5
If I bought a wrong brand of this product, it wouldn't matter much.	2.44	1.21	1	5
If, after I bought a brand of this product, my choice proved to be wrong, I would be very upset.	2.61	1.24	1	5
When I am choosing a brand of this product, I make that choice very carefully.	3.37	1.18	1	5
Perceived risk of shampoo				
It is not a big deal if I make a mistake in choosing a brand of this product.	3.24	1.29	1	5
If I bought a wrong brand of this product, it wouldn't matter much.	3.31	1.29	1	5
If, after I bought a brand of this product, my choice proved to be wrong, I would be very upset.	3.21	1.27	1	5
When I am choosing a brand of this product, I make that choice very carefully.	4.16	.94	1	5

Evaluation of quality of store brands

Table 8 presents the frequency and percentage of respondents according their answer for the question "Please rate the quality of store brands in the following product category". The distribution was similar between categories with the highest proportion of respondents believing that store brands are of good quality, followed by the group of respondents who think that store brands are of fair quality. Shampoo was an exceptional case where the number people who believed that store brands of this category are of poor quality was higher than the number of those who thought store brands are of fair quality (24.5% as compared to 22.4% respectively). 21.7% of respondents did not know about the quality of store brand in laundry powder. This number is 17.1% for laundry powder, 14.5% for orange juice and 12.8% for block chocolate. Overall, more than 10% of respondents did not know about the quality of store brands in all seven categories.

Table 8: Distribution of participants according to their rate of quality of SB

Category	Poor		Fair		Good		Don't know	
	F	P	F	P	F	P	F	P
Canned tomatoes	39	9.9%	83	21.2%	229	**58.4%**	41	10.5%
Block chocolate	88	22.4%	126	32.1%	128	**32.7%**	50	12.8%
Dishwashing liquid	62	15.8%	101	25.8%	184	**46.9%**	45	11.5%
Laundry powder	66	16.8%	111	28.3%	148	**37.8%**	67	17.1%
Orange juice	58	14.8%	102	26.0%	175	**44.6%**	57	14.5%
Paper towels	50	12.8%	107	27.3%	204	**52.0%**	31	7.9%
Shampoo	96	24.5%	88	22.4%	123	**31.4%**	85	21.7%

Bold values indicate the highest proportion in each category.

Consumer past usage of seven product categories

Table 9 presents the distribution of respondents based on their past purchase frequency of seven product categories. The distribution pattern is quite similar for all product categories with light buyers accounts for the largest part, followed by medium buyers, heavy buyers and non-buyers. Orange juice and paper towels are two categories with the highest proportion of heavy buyers (19.1% and 18.4% respectively). Compared to other categories, orange juice has the highest percentage of consumers who did not buy this category (18.6%), followed by canned tomatoes with 16.3%.

Table 9: Distribution of participants according to their past usage of product categories

Category	Non-buyers		Light buyers		Medium buyers		Heavy buyers	
	F	P	F	P	F	P	F	P
Canned tomatoes	64	16.3%	165	**42.1%**	98	25.0%	65	16.6%
Block chocolate	40	10.2%	167	**42.6%**	119	30.4%	66	16.8%
Dishwashing liquid	15	3.8%	184	**46.9%**	147	37.5%	46	11.7%
Laundry powder	38	9.7%	184	**46.9%**	126	32.1%	44	11.2%
Orange juice	73	18.6%	151	**38.5%**	93	23.7%	75	19.1%
Paper towels	24	6.1%	192	**49.0%**	104	26.5%	72	18.4%
Shampoo	11	2.8%	189	**48.2%**	148	37.8%	44	11.2%

Bold values indicate the highest proportion in each category.

Consumer past usage of store brands of seven product categories

Table 10 presents the distribution of respondents who are users of seven product categories based on their past purchases of store brands of each category. The distribution pattern is quite similar for block chocolate, dishwashing liquid, laundry powder, orange juice, paper towels and shampoo. Non-buyers of store brands accounted for the largest part as compared to light buyers, medium buyers and heavy buyers. The percentage of non-buyers was highest for shampoo (77.4%), followed by block chocolate and laundry powder (approximately 64%). Compared to other product categories, store brands of canned tomatoes and paper towels gained more acceptances from consumers, thus the percentage of non-buyers was the lowest (approximately 39%). The proportion of light buyers was the highest in paper towels (30.7%), followed by dishwashing liquid, orange juice and laundry powder (around 20%). For shampoo, light buyers accounted for just 11.5%. In terms of medium buyers, the highest percentage of medium buyers was found in canned tomatoes (30.5%), followed by paper towels (19.8%). The percentage of medium buyers was lowest in shampoo (6.6%). Canned tomatoes also had the highest proportion of heavy buyers (16.5%), followed by paper towels (10.1%). In the remaining categories, heavy buyers accounted for less than 10%.

Table 10: Distribution of participants according to their past usage of store brands

Category	Non buyers		Light buyers		Medium buyers		Heavy buyers		Total
	F	P	F	P	F	P	F	P	
Canned tomatoes	126	**38.4%**	48	14.6%	100	30.5%	54	16.5%	328
Block chocolate	225	**63.9%**	66	18.8%	43	12.2%	18	5.1%	352
Dishwashing liquid	210	**55.7%**	90	23.9%	49	13.0%	28	7.4%	377
Laundry powder	226	**63.8%**	69	19.5%	36	10.2%	23	6.5%	354

Table 10 (cont.)

Category	Non buyers		Light buyers		Medium buyers		Heavy buyers		Total
Orange juice	183	**57.4%**	66	20.7%	44	13.8%	26	8.2%	319
Paper towels	145	**39.4%**	113	30.7%	73	19.8%	37	10.1%	368
Shampoo	295	**77.4%**	44	11.5%	25	6.6%	17	4.5%	381

Bold values indicate the highest proportion in each category.

Consumer spending per purchase occasion

Table 11 presents the amount of money that consumers spent on each purchase occasion for seven product categories. Approximately 30% to 40% of respondents did not know how much they spent on each purchase occasion. Among those who were able to make estimation, the vast majority spent $5 or less each time they shopped for seven categories. 27.6% of total respondents spent from $6 to $10 when purchasing shampoo. This number was 23.2% in laundry powder. Only 1.5% spent from $6 to $10 when buying canned tomatoes. The percentage of respondents who spent from $11 to $15 was the highest in the laundry powder category (9.4%), followed by shampoo (5.4%). In the remaining categories, those who spent within this range accounted for only about 1%. The percentage of respondents who spent more than $15 per purchase occasion accounted for 6.1% in laundry powder and less in other categories.

Table 11: Amount of money spent on each purchase occasion

Category	$1 to $5		$6 to $10		$11 to $15		more than $15		Don't know		Total
	F	P	F	P	F	P	F	P	F	P	
Canned tomatoes	194	**49.5%**	6	1.5%	1	0.3%	16	4.1%	111	44.6%	328
Block chocolate	251	**64.0%**	28	7.1%	0	0.0%	9	2.3%	64	26.5%	352
Dishwashing liquid	241	**61.5%**	35	8.9%	5	1.3%	9	2.3%	87	26.0%	377
Laundry powder	106	27.0%	91	23.2%	37	9.4%	24	6.1%	134	**34.2%**	319
Orange juice	229	**58.4%**	19	4.8%	0	0.0%	7	1.8%	137	34.9%	354
Paper towels	250	**63.8%**	19	4.8%	3	0.8%	10	2.6%	86	28.1%	368
Shampoo	147	**37.5%**	108	27.6%	21	5.4%	14	3.6%	91	26.0%	381

Bold values indicate the highest proportion in each category.

Choice share of brands in seven product categories

Table 12 presents the frequency of brand choice in seven categories. As the distribution of choice share is similar in both facing test and position test, the data was combined in one table.

Regarding *national brands*, the highest percentage of choice was for Val Verde in canned tomatoes (23.2%), Dairy Milk in block chocolate (40.6%), Morning Fresh and

Earth Choice in dishwashing liquid (more than 25%), Omo in laundry powder (22.3%), Daily Juice and Berri in orange juice (more than 23%), Viva in paper towels (31.3%) and Head & Shoulders and Pantene in shampoo (more than 18%).

With *store brands*, store brand of canned tomatoes (Woolworths homebrand) got the highest percentage of choice (23.5%) while store brand of shampoo (also Woolworths homebrand) got the lowest choice proportion (1.6%). Store brands got the second highest choice percentage in paper towels (24.2%) and stood for the third position in dishwashing liquid (17.5%). In block chocolate, laundry powder and orange juice, store brand choice accounted for approximately 10% of choice.

Table 12: Choice share of brands

Category	Frequency	Percentage
Canned tomatoes		
Woolworths homebrand	**77**	**23.5%**
Val Verde	76	23.2%
SPC	61	18.6%
Heinz	40	12.2%
Ardmona	32	9.8%
Annalisa	24	7.3%
Cento	9	2.7%
La Gina	9	2.7%
Total	**328**	**100%**
Block chocolate		
Dairy Milk	143	40.6%
Lindor	56	15.9%
Lindt Excellence	50	14.2%
Coles	**34**	**9.7%**
Whittakers	32	9.1%
Supreme	21	6.0%
Green & Black	8	2.3%
Dream	8	2.3%
Total	**352**	**100%**
Dishwashing liquid		
Morning Fresh	101	26.8%
Earth choice	96	25.5%
Coles	**66**	**17.5%**
Palmolive	37	9.8%
Sunlight	32	8.5%
Fairy	23	6.1%
Ajax	16	4.2%
Ecostore	6	1.6%
Total	**377**	**100%**

Table 12 (cont.)

Category	Frequency	Percentage
Laundry powder		
Omo	71	22.3%
Surf	62	19.4%
Radiant	44	13.8%
Cold Power	44	13.8%
Fab	36	11.3%
Coles	**34**	**10.7%**
Biozet Attack	19	6.0%
Aware	9	2.8%
Total	**319**	**100.0%**
Orange juice		
Daily Juice	84	23.7%
Berri	83	23.4%
Golden Circle	49	13.8%
Just Juice	46	13.0%
Woolworths	**43**	**12.1%**
Nippy's	28	7.9%
Ocean Spray	12	3.4%
Crusta	9	2.5%
Total	**354**	**100%**
Paper towels		
Viva	115	31.3%
Woolworths homebrand	**89**	**24.2%**
Quilton	55	14.9%
Naturale	42	11.4%
Ultra Clean	41	11.1%
Tuff Mate	10	2.7%
Safe	10	2.7%
Maxima	6	1.6%
Total	**368**	**100%**
Shampoo		
Head & shoulders	72	18.9%
Pantene	70	18.4%
Nature organics fruits	67	17.6%
Treseme	50	13.1%
Palmolive	46	12.1%
Sunsilk	38	10.0%
Dove	32	8.4%
Woolworths homebrand	**6**	**1.6%**
Total	**381**	**100%**

Bold values indicate choice share of store brands.

Choice share of store brands according to level of quality rating

Table 13 presents the distribution of store brand choice based on respondents' rate of the quality of store brands in each category. As the distribution of choice share is similar for both the facing test and position test, the data was combined in one table.

In all product categories, the highest percentage of choice was found in the group of respondents who believed that store brands are of good quality (approximately 70% of total choices or more), followed by those who thought store brands are of fair quality (from approximately 15% to 26%). Respondents who believed that store brands are of poor quality chose store brands the least (less than 56% in all categories). The percentage of choice was also very low among those who did not know about the quality of store brands in canned tomatoes, block chocolate, laundry powder, paper towels and shampoo (around 5% or less).

Table 13: Distribution of SB choice according to the level of SB quality rating

Category	Poor		Fair		Good		Don't know		Total
	F	P	F	P	F	P	F	P	
Canned tomatoes	1	1.3%	7	9.1%	65	**84.4%**	4	5.2%	77
Block chocolate	2	5.9%	9	26.5%	22	**64.7%**	1	2.9%	34
Dishwashing liquid	1	1.5%	11	16.7%	47	**71.2%**	7	10.6%	66
Laundry powder	0	0.0%	5	14.7%	27	**79.4%**	2	5.9%	34
Orange juice	1	2.3%	6	14.0%	30	**69.8%**	6	14.0%	43
Paper towels	1	1.1%	22	24.7%	61	**68.5%**	5	5.6%	89
Shampoo	0	0.0%	1	16.7%	5	**83.3%**	0	0.0%	6

Bold values indicate the highest proportion in each category.

Choice share of store brands based on the level of perceived quality of store brands

Table 14 presents the distribution of store brand choice based on respondents' levels of perceived quality of store brands. As the distribution of choice share is similar for both the facing test and position test, the data was combined in one table.

In all categories, the percentage of choice in respondents with Low-Perceived Quality (LPQ) of store brands was approximately 35% or less. It was much lower as compared to the proportion of choice of High-Perceived Quality (HPQ) respondents (64% or more). The biggest difference was found in orange juice where choice in LPQ consumers accounted for 21.4% while that of HPQ consumers was 78.6%.

Table 14: Distribution of SB choice between LPQ group and HPQ group

Category	Low perceived quality		High perceived quality		Total
	F	P	F	P	
Canned tomatoes	16	21.3%	59	78.7%	75
Block chocolate	11	32.4%	23	67.6%	34
Dishwashing liquid	22	35.5%	40	64.5%	62
Laundry powder	8	24.2%	25	75.8%	33
Orange juice	**9**	**21.4%**	**33**	**78.6%**	**42**
Paper towels	30	35.3%	55	64.7%	85
Shampoo	2	33.3%	4	66.7%	6

Bold values indicate the category with highest difference in choice frequency between LPQ group and HPQ group.

Choice of store brands based on the level perceived risk of store brands

Table 15 presents the distribution of store brand choice based on respondents' levels of perceived risk of store brands. As the distribution of choice share is similar for both facing test and position test, the data was combined in one table.

In all categories, except shampoo, the percentage of choice in respondents with High-Perceived Risk (HPR) of store brands was approximately 30% or less. It was much lower as compared to the proportion of choice of Low-Perceived Quality (LPR) respondents (67% or more). The biggest difference was found in the orange juice category, where choice from HPR respondents accounted for only 14.3% while this number was 85.7% in LPR respondents. In shampoo, the distribution was equal between LPR and HPR respondents (50%).

Table 15: Distribution of SB choice between LPR group and HPR group

Category	High perceived risk		Low perceived risk		Total
	F	P	F	P	
Canned tomatoes	16	21.9%	57	78.1%	73
Block chocolate	11	32.4%	23	67.6%	34
Dishwashing liquid	15	24.2%	47	75.8%	62
Laundry powder	7	20.6%	27	79.4%	34
Orange juice	**6**	**14.3%**	**36**	**85.7%**	**42**
Paper towels	22	25.9%	63	74.1%	85
Shampoo	3	50.0%	3	50.0%	6

Bold values indicate the category with highest difference in choice frequency between LPR group and HPR group.

Choice of store brands based on the level of perceived risk of category

Table 16 presents the distribution of store brand choice based on respondents' levels of perceived risk of category purchase. As the distribution of choice share is similar for both facing test and position test, the data was combined in one table.

In all categories, except for paper towels, the percentage of choice in respondents with High-Perceived Risk of Category (HPRC) was approximately 40% or less. It was much lower as compared to the proportion of choice of Low-Perceived Risk of Category (LPRC) respondents (60% or more). The biggest difference was found in shampoo category, where choice from HPRC respondents accounted for only 16.7% while this number was 83.3% in LPRC respondents. In paper towels category, the distribution was equal between LPRC and HPRC respondents (50.6% and 49.4% respectively).

Table 16: Distribution of SB choice between LPRC group and HPRC group

Category	High perceived risk of category		Low perceived risk of category		Total
	F	P	F	P	
Canned tomatoes	28	36.4%	49	63.6%	77
Block chocolate	8	23.5%	26	76.5%	34
Dishwashing liquid	20	30.3%	46	69.7%	66
Laundry powder	13	38.2%	21	61.8%	34
Orange juice	13	30.2%	30	69.8%	43
Paper towels	45	50.6%	44	49.4%	89
Shampoo	**1**	**16.7%**	**5**	**83.3%**	**6**

Bold values indicate the category with highest difference in choice frequency between LPRC group and HPRC group.

Choice of store brands based on consumer past usage of store brands

Table 17 presents the distribution of store brand choice based on respondents' past usage of store brands. As the distribution of choice share is similar for both facing test and position test, the data was combined in one table.

The distribution of choice is not consistent between categories. Compared to other groups of buyers, choice percentage was highest among light buyers of canned tomatoes (37.7%), block chocolate (35.3%), dishwashing liquid (47%) and shampoo (50%). However, for laundry powder and paper towels, the highest proportion of store brand choice was for medium buyers (37.5% and 38.2% respectively). Orange juice was the only category where non-buyers and medium buyers contributed the equally highest

percentage of choice (29%). Heavy buyers of shampoo did not buy store brands in this category.

Table 17: Distribution of SB choice according to consumers' past usage

Category	Non buyers		Light buyers		Medium buyers		Heavy buyers		Total
	F	P	F	P	F	P	F	P	
Canned tomatoes	2	3%	29	**38%**	19	25%	27	35%	77
Block chocolate	8	24%	12	**35%**	11	32%	3	9%	34
Dishwashing liquid	8	12%	31	**47%**	14	21%	13	20%	66
Laundry powder	5	16%	11	34%	12	**38%**	4	13%	32
Orange juice	9	29%	6	19%	9	**29%**	7	23%	31
Paper towels	7	8%	29	33%	34	**38%**	19	21%	89
Shampoo	1	17%	3	**50%**	2	33%	0	0%	6

Bold values indicate the highest proportion in each category.

5.5 Confirmatory factor analysis

The measurement scales were tested using AMOS. Among three constructs that need to be tested, which are perceived quality of store brands, perceived functional risk of store brands and perceived risk of category, the first two constructs are applied to all seven tested product categories. The construct of perceived risk of category measures consumers' opinion in each tested product categories; therefore, the confirmatory factor analysis was conducted for each product category and the mean scores of seven categories were used to evaluate the overall validity of all measurement scales.

The first model showed poor model fit statistics with the average variance extracted score (AVE) < .5, indicating inadequate convergent validity (Hair, 1998). The maximum shared square variance (MSV) and the average shared squared variance (ASV) were greater than AVE, suggesting that the latent construct could be better explained by other factors but not its own observed variables (Hair, 1998). Thus, the discriminant validity is not ensured. It was found that factor loading score of the third item of perceived risk of category (*If, after I bought a brand of this product, my choice proved to be wrong, I would be very upset*) was .37 in canned tomatoes and .39 in laundry powder, which is less than the threshold of .4 (Stephens, 1992). It indicates that this item might not converge on the latent construct. To improve the convergent validity of the measurement, this item was deleted. The second model showed satisfactory levels of both AVE (>.5) and construct reliability (CR>.7) (Hair et al, 2010), indicating that

internal consistency of the measurements exits and the items represent the same latent construct. MSV and ASV scores were also improved; both are smaller than AVE score. Table 18 presents factor-loading scores of all measurements and Table 19 summarizes convergent validity and discriminant validity scores.

Table 18: Factor loading scores of all constructs

Construct	Factor loading
Perceived quality of store brands	
Store brands are of excellent quality overall.	.47
There is a great difference in overall quality between national brands and store brands.	.87
There is a great difference in reliability of ingredients between national brands and store brands.	.84
Perceived functional risk of store brands	
The purchase of store brand grocery items is risky because the quality of store brands is inferior.	.88
Since store brands are of poor quality, buying them is a waste of money.	.85
I'm suspicious of the quality of store brands.	.76
Perceived risk of category	
It is not a big deal if I make a mistake in choosing a brand of this product.	.82
If I bought a wrong brand of this product, it wouldn't matter much.	.88
When I am choosing a brand of this product, I make that choice very carefully.	.49

Table 19: Convergent validity and discriminant validity score

Construct	CR	AVE	MSV	ASV
Perceived quality of store brands	.78	.56	.55	.32
Perceived risk of store brands	.79	.57	.56	.29
Perceived risk of category	.78	.56	.08	.06

Model fit statistics are also satisfactory (χ^2/df = 3.23, NFI = .93, IFI = .95, CFI = .95, PNFI = .62, PCFI = .64, PGFI = .51, RMSEA = .07, GFI = .96, AGFI = .92). Table 20 reports these scores and the threshold value used for this study.

Table 20: Model fit statistics and threshold values

Indices	Score	Threshold	References
CMIN/DF	3.23	≤ 5	(Hair and Jnr, 2009)
NFI	.93	>.90	(Bentler and Bonett, 1980)
IFI	.95	>.90	(Meyers et al., 2006)
CFI	.95	>.90	(Bentler and Bonett, 1980)
PNFI	.62	>.5	(Meyers et al., 2006)
PCFI	.64	>.5	(Hair and Jnr, 2009)

Table 20 (cont.)

Indices	Score	Threshold	References
PGFI	.51	>.5	(Hair and Jnr, 2009)
RMSEA	.07	<.08	(Meyers et al., 2006)
SRMR	.07	<.09	(Hair and Jnr, 2009)
GFI	.96	>.90	(Tabachnick and Fidell, 2007)
AGFI	.92	>.80	(Hair and Jnr, 2009)

6 FINDINGS

This chapter is structured as follows. Firstly, it will report the effect of category order on consumer choice of brand. Next, it will present the impact of shelf facings and shelf vertical positions on brand choice, how the impact differs between national brands and store brands as well as between categories. Coming next is the result of moderation analysis, which reveals how consumer perceived quality of store brands, consumer perceived risk of store brands, consumer perceived risk of category and consumer past usage of store brands moderate the relationship between shelf space and brand choice. The chapter ends with the additional analysis, which provide information about what factor has the biggest impact on consumer choice of store brands.

Inferential statistics were used to test seven research questions. There were two tests for each question, including facing test and position test. To investigate the three first research questions, a binary logistic regression was conducted to predict brand choice using the number of facings and vertical position as predictors. To test RQ1, all categories and brands were included in the logistic regression in order to predict the overall probability of brand choice when the number of facings and vertical position of brands change. To answer RQ2, the logistic regression was performed separately for two groups (national brands and store brands). This method enables us to compare the effect of shelf space on choice between national brands and store brands. To answer RQ3, the logistic regression was performed for each individual product category and with brand type as subgroup. This method enables us to compare the effect of shelf space on brand choice between national brands and store brands in each product category.

To test RQ4, RQ5, RQ6 and RQ7, subgroup analysis using binary logistic regression was conducted for different groups of consumers. Consumers were divided according to their level of perceived quality and perceived risk (high versus low) and their past usage of store brands (non-buyers, light buyers, medium buyers and heavy buyers). This method enables us to compare the strength of the relationship between shelf space and brand choice between different groups of consumers. Before testing the impact of shelf space on brand choice, a test of control effect using multinomial logistic regression was performed in order to investigate the impact of category order on choice.

6.1 Control effect

A multinomial logistic regression was conducted to predict brand choice using category order as predictor. Choices in the facing test and in the position test were combined. Brands with choice frequency less than 10 were removed from the test to increase the accuracy of analysis outcome (Hosmer et al., 2013). Table 21 presents the brands that were removed from the analysis.

Table 21: Brands removed from the test of control effect

	Frequency
Canned tomatoes	
Cento	9
La Gina	9
Block chocolate	
Green & Black	8
Dream	8
Dishwashing liquid	
Ecostore	6
Laundry powder	
Aware	9
Orange juice	
Crusta	9
Paper towels	
Maxima	6
Shampoo	
Woolworths homebrand	6

The test was performed separately for each product category. The threshold value of .05 was used for the test of statistical significance. Overall, the test of full model in seven product categories was statistically insignificant ($p>.05$). The outcome of Hosmer-Lemeshow tests showed significant result for all categories ($p<.001$), indicating a poor fit between the model and the data. The Wald test showed insignificant results for all product categories ($p>.05$), indicating that category order did not have a significant effect on brand choice. Details of -2 Log likelihood, Chi-Square value, degree of freedom and *p* value for each category are presented in Table 22.

Table 22: Model fit information for the test of control effect

	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	**Chi-Square**	**df**	**p-value**
Canned tomatoes (N=310)				
Intercept Only	153.72			
Final	115.38	38.34	30	.14
Block chocolate (N=336)				
Intercept Only	141.74			
Final	114.16	27.58	30	.59
Dishwashing liquid (N=339)				
Intercept Only	151.73			
Final	109.56	42.17	30	.71
Laundry powder (N=310)				
Intercept Only	170.01			
Final	135.18	34.83	36	.52
Orange juice (N=333)				
Intercept Only	159.94			
Final	117.06	42.88	30	.62

Table 22 (cont.)

	Model Fitting Criteria	Likelihood Ratio Tests		
Paper towels (N=342)				
Intercept Only	121.78			
Final	99.96	21.82	24	.59
Shampoo (N=375)				
Intercept Only	174.99			
Final	144.89	30.09	36	.74

6.2 Shelf effect

RQ1: How does shelf space affect brand choice?

Facings

A cross tabulation was performed to examine the relationship between the number of facings and choice. Table 23 shows the frequency and percentage of choice at each level of facing. Overall, brands placed on shelf with 12 facings were more likely to be chosen (15%) compared to brands placed on shelf with six facings (12.6%) and brands with three facings (11.2%). Pearson Chi-Square χ^2 (2, N=9920) = 21.049, p <.001 indicates that there is a statistically significant association between the number of facings and brand choice (3 = three facings; 6 = six facings; 12 = 12 facings).

Table 23: Cross tabulation of facing quantity and choice

Facing		Choice		
		No	**Yes**	**Total**
3	F	4403	557	4960
	P	89%	11%	100%

Table 23 (cont.)

Facing		Choice		
6	F	2168	312	2480
	P	87%	13%	100%
12	F	2109	371	2480
	P	85%	15%	100%

A binary logistic regression analysis was performed on brand choice as outcome and the number of facings as predictor. In total, 9920 observations were included in the analysis. The test of the full model with predictor showed a statistically significant result, χ^2 (2, N=9920) = 20.57 with p <.001, indicating that brand choice is impacted by the number of facings. However, Cox & Snell R Square = .002 and Nagelkerke R Square = .004, indicating a weak relationship between the number of facings and *individual respondent's* brand choice as the number of facings can explain only from

0.2% to 0.4% of the variance in choice. However, classification was impressive with 87.5% of observations were correctly predicted.

Table 24 shows regression coefficients, standard errors, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios at each level of facing quantity. Specifically, when the number of facings of a brand was increased from three to 12, the odds of choice increased by 39.1%. The impact of facing quantity was significant, χ^2 (1, N=9920) = 20.94 with p <.001. When the number of facings was increased from six to 12, the odds of choice increased by 22% and the impact was also significant with χ^2 (1, N=9920) = 5.64, p <.05. Increasing from three to six facings also increased the odds of choice, by 13.8%, but the effect was insignificant (χ^2 (1, N=9920) = 2.92 with p >.05).

Table 24: Logistic regression analysis of choice as a function of facing quantity

Change in facing quantity	B	SE	Wald	Exp(B)	95% C.I.for Exp(B)	
					Lower	Upper
3 to 6	.13	.08	2.92	1.14	.98	1.32
3 to 12	***.33******	.07	20.94	1.39	1.21	1.60
6 to 12	***.2****	.08	5.64	1.22	1.04	1.44

** p<.05; *** p<.001*

Table 25 presents the change (in percentage) in the odds of choice as a result of changes in the number of facings. Positive values indicate the increase in choice and negative values indicate the decrease in choice percentage.

Table 25: Overall changes in the odds of choice as a result of changes in facing quantity

Facing quantity	Odds of choice
3 to 6	13.8%
3 to 12	***39.1%***
6 to 12	***22%***

Bold values indicate significant effect.

Space elasticity was calculated as the ratio of changes in choice to changes in the number of facing. The observed mean shelf space elasticity is 0.26.

Position

A cross tabulation was performed to examine the relationship between vertical position and brand choice. Table 26 shows the frequency and percentage of choice at each level of vertical position. Overall, brands placed on the top row and the bottom row were more likely to be chosen (13.3% and 13.1% respectively) in comparison with brands

placed on the second row (11.4%) and third row (12.1%). However, Pearson Chi-Square χ^2 (2, N=9912) = 5.270, p <.05 indicates that there is a statistically insignificant association between vertical position and brand choice.

Table 26: Cross tabulation of vertical position and choice

Position		Choice		
		No	**Yes**	**Total**
Top row	F	2148	330	2478
	P	86.7%	13.3%	100%
Second row	F	2161	279	2440
	P	88.6%	11.4%	100%
Third row	F	2178	300	2478
	P	87.9%	12.1%	100%
Bottom row	F	2186	330	2516
	P	86.9%	13.1%	100%

A logistic regression with vertical position as predictor and brand choice as outcome was conducted to further investigate the relationship between position and choice. In total, 9912 observations were included in the analysis. The test of the full model with predictor using maximum likelihood estimation showed a statistically insignificant result, χ^2 (3, N=9912) = 5.30 with p >.05, indicating that brand choice was unreliably predicted by vertical position. Classification was impressive with 87.5% of observations correctly predicted. Overall, the effect of vertical position on brand choice was insignificant.

Although the overall model indicated insignificant impact of vertical position on choice, the regression coefficients using Wald chi-square showed that moving a brand from the top row to the second row had a significant impact on choice (χ^2 (2, N=9920) = 4.01 with p<.05). Specifically, when a brand was moved from the top row to the second row, the odds of the brand to be chosen increased by 19.6%. Table 27 shows regression coefficients, standard errors, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios at each level of vertical position (1 = top row, 2 = second row, 3 = third row, 4 = bottom row).

Table 27: Logistic regression analysis of choice as a function of vertical position

Position	B	SE	Wald	Exp(B)	95% C.I.for EXP(B)	
					Lower	Upper
1 to 4	.02	.08	.04	1.02	.86	1.20
2 to 4	-.16	.09	3.25	.86	.72	1.01
3 to 4	-.09	.09	1.15	.91	.77	1.08

Table 27 (cont.)

Position	B	SE	Wald	Exp(B)	95% C.I.for EXP(B)	
1 to 2	***.17****	.09	4.01	1.19	1.00	1.41
2 to 3	-.07	.09	.54	0.94	.79	1.12

** p<.05.*

Table 28 presents the change (in percentage) in the odds of choice as a result of changes in vertical position.

Table 28: Changes in the odds of choice (in percentage) a result of changes in position

Position	Odds of choice
1 to 4	1.8%
2 to 4	-14.5%
3 to 4	-8.8%
1 to 2	***19***%
2 to 3	-6.3%

Bold values indicate significant effect.

As the overall effect of position on choice is insignificant, the space elasticity was not calculated.

RQ2: How does the impact of shelf space on brand choice differ between national brands and store brands?

Facing

The test of the full model with predictor showed statistically significant results for national brands, χ^2 (2, N=8680) = 24.25 with p <.001, indicating that consumer choice of national brands was reliably predicted by the number of facings. However, Cox & Snell R Square = .003 and Nagelkerke R Square = .005 indicate a weak relationship between facing quantity and individual's brand choice as the number of facings can only explain from 0.3% to 0.5% of the variance in national brand choice. Classification was impressive with 87.8% of observations were correctly predicted.

Regarding store brands, the test showed an insignificant result, χ^2 (2, N=1240) = .66 with p >.05, indicating that changes in the number of facings did not have a significant impact on consumer choice of store brands. 85.4% of total observations were correctly classified.

Table 29 shows regression coefficients, standard errors, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios at each level of the number of facing. For

national brands, when the number of facings was increased from three to 12, the odds of choice increased by 45.9%. The effect of facings on choice was significant with χ^2 (1, N=8680) = 24.61, p <.001. When the number of facings was increased from six to 12, the odds of choice increased by 32.5%. The effect was also significant with χ^2 (1, N=8680) = 9.09, p <.01. Increasing from three to six facings also increased the odds of choice, by 10.1%, but the effect was insignificant with χ^2 (1, N=8680) = 1.27 and p >.05.

For store brands, in contrast, increasing the number of facings led to decrease in the odds of choice. Specifically, increasing from three to six facings decreased the odds of choice by 8%; increasing from three to 12 facings decreased the odds of choice by 16.8% and increasing from six to 12 facings decreased the odds of choice by 9.6%. However, the effect was insignificant with p>.05.

Table 29: Logistic regression analysis of choice of NB and SB as a function of facing quantity

	B	SE	Wald	Exp(B)	95% C.I.for Exp(B)	
					Lower	Upper
National brands						
3 to 6	.10	.09	1.27	1.10	0.93	1.30
3 to 12	***.38******	.08	24.61	1.46	1.26	1.69
6 to 12	***.28****	.09	9.09	1.33	1.10	1.59
Store brands						
3 to 6	-.08	.19	.19	.92	.63	1.34
3 to 12	-.18	.23	.66	.83	.53	1.30
6 to 12	-.10	.20	.25	.90	.61	1.34

*** p<.01; ***p<.001*

Table 30 compares the change (in percentage) in the choice of national brands and store brands as a result of changes in the number of facings.

Table 30: Comparison of changes in choice between NB and SB as a result of changes in facing quantity

Facing quantity	National brands	Store brands
3 to 6	10.1%	-8.0%
3 to 12	***45.9%***	-16.8%
6 to 12	***32.5%***	-9.6%

Bold values indicate significant effect.

The observed mean of shelf space elasticity for national brands is 0.55.

Position

The test of the full model with predictor showed statistically insignificant results for both national brands, χ^2 (2, N=8673) = 3.49 with p>.05, and store brands, χ^2 (2, N=1239) = 3.144 with p>.05. It indicates that vertical position did not reliably predict consumer choice of neither national brands nor store brands. 87.7% of observations of national brands and 86.4% of observations of store brands were correctly classified.

Table 31 shows regression coefficients, standard errors, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each level of the number of facing. According to the Wald statistics, for both types of brands, the odds of choice increased when the brand was moved from the top row to the second row or to the bottom row. In contrast, the odds of choice decreased when the brand was moved from the second or third row to the lower row. However, the impact was insignificant with p>.05. It indicates that overall, changes in vertical position did not have a significant effect on brand choice of national brands or store brands.

Table 31: Logistic regression analysis of choice of NB and SB as a function of vertical position

	B	SE	Wald	Exp(B)	95% C.I.for EXP(B)	
					Lower	Upper
National brands						
1 to 4	.01	.09	.01	1.01	.85	1.20
2 to 4	-.13	.09	2.02	.88	.73	1.05
3 to 4	-.10	.09	1.20	.90	.76	1.08
1 to 2	.14	.09	2.25	1.15	.96	1.38
2 to 3	-.03	.10	.11	.97	.81	1.17
Store brands						
1 to 4	.08	.23	0.13	1.09	.70	1.69
2 to 4	-.33	.25	1.76	.72	.45	1.17
3 to 4	-.03	.23	.02	.97	.62	1.52
1 to 2	.41	.24	2.79	1.50	.93	2.42
2 to 3	-.29	.25	1.39	.75	.46	1.21

All Wald statistics are non-significant.

RQ3: How does the impact of shelf space on brand choice differ between product categories?

Facing

The test of the full model with predictor showed statistically significant result for national brands in three categories, which are canned tomatoes, orange juice and

shampoo. For other categories, the model showed insignificant results (p >.05). For store brands, the model showed insignificant result for six categories (p >.05). (Shampoo was eliminated from the analysis of store brands due to very low choice frequency (3 choices, equal to 1.5%)).

More specifically, with regard to national brands, for canned tomatoes, χ^2 (2, N=1134) = 10.08, p <.01; for orange juice, χ^2 (2, N=1246) = 16.62, p<.01; for shampoo, χ^2 (2, N=1323) = 13.63, p <.01. The result indicates that the number of facings reliably predicted consumer choice in these categories. However, for canned tomatoes and shampoo, Nagelkerke R Square = 0.018, meaning only 1.8% of the variance in brand choice can be explained by changes in the number of facings. For orange juice, the rate is 2.5%. The classification was accurate for 89.2% of observations for canned tomatoes, 87.6% for orange juice and 85.9% for shampoo.

Table 32 shows regression coefficients, standard errors, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios at each level of the number of facing. With regards to national brands, *for canned tomatoes*, when the number of facings was increased from three to six, the odds of choice decreased by 56.1%. The effect was significant with χ^2 (1, N=1134) = 7.44, p <.01. When the number of facings was increased from six to 12, the odds of choice increased by 32.5%. The effect was also significant with χ^2 (1, N=1134) = 7.43, p <.01. Increasing from three to 12 facings also increased the odds of choice, by 7.3%, but the effect was insignificant with χ^2 (1, N=1134) = 0.75 and p >.05.

For orange juice, when the number of facings was increased from three to six, the odds of choice increased by 95.1%. The effect was significant with χ^2 (1, N=1246) = 9.56, p<.01. When the number of facings was increased from three to 12, the odds of choice increased by 109%. The effect was significant with χ^2 (1, N=1246) = 13.16, p <.001. Increasing from three to 12 facings also increased the odds of choice by 75.9%, but the effect was insignificant with χ^2 (1, N=1246) = 0.09, p >.05.

For *shampoo*, when the number of facings was increased from three to 12, the odds of choice increased by 92.9%. The effect was significant with χ^2 (1, N=1323) = 13.32, p<0.001. When the number of facings was increased from six to 12, the odds of choice

increased by 76.9%. The effect was significant with χ^2 (1, N=1323) = 6.44, p<.05. Increasing from three to six facings also increased the odds of choice by 68.5%, but the effect was insignificant with χ^2 (1, N=1323) =0.17, p>.05.

Table 32: Logistic regression analysis of choice of NB and SB as a function of facing quantity in seven categories

	Facing quantity	B	SE	Wald	Exp(B)	95% C.I.for Exp (B)	
						Lower	Upper
National brands							
Canned tomatoes	3 to 6	***.82*** **	.30	7.44	.44	.24	.79
	3 to 12	.07	.22	.10	1.07	.70	1.64
	6 to 12	***.89*** **	.33	7.43	2.45	1.29	4.65
Block chocolate	3 to 6	.11	.22	.23	1.11	.72	1.71
	3 to 12	.28	.20	1.98	1.32	.90	1.95
	6 to 12	.17	.24	.52	1.19	.74	1.91
Dishwashing liquid	3 to 6	-.39	.24	2.51	.68	.42	1.10
	3 to 12	.12	.20	.34	1.12	.76	1.66
	6 to 12	.50	.27	3.48	1.65	.98	2.79
Laundry powder	3 to 6	.42	.22	3.63	1.52	.99	2.33
	3 to 12	.41	.21	3.80	1.51	1.00	2.28
	6 to 12	-.01	.24	.00	.99	.62	1.60
Orange juice	3 to 6	***.67*** **	.22	9.65	1.95	1.28	2.97
	3 to 12	***.73*** ***	.20	13.16	2.09	1.40	3.11
	6 to 12	.07	.22	.09	1.07	.69	1.66
Paper towels	3 to 6	.29	.23	1.62	1.34	.86	2.09
	3 to 12	.30	.22	1.91	1.35	.88	2.06
	6 to 12	.01	.25	.00	1.01	.62	1.65
Shampoo	3 to 6	.09	.21	.17	1.09	.72	1.66
	3 to 12	***.66*** ***	.18	13.32	1.93	1.36	2.74
	6 to 12	***.57*** *	.23	6.44	1.77	1.14	2.75
Store brands							
Canned tomatoes	3 to 6	-.35	.44	.62	.71	.30	1.67
	3 to 12	-.28	.50	.31	.76	.29	2.01
	6 to 12	.07	.45	.02	1.07	.44	2.60
Block chocolate	3 to 6	.14	.62	.05	1.15	.34	3.88
	3 to 12	-.03	.74	.00	.97	.23	4.18
	6 to 12	-.16	.62	.07	.85	.25	2.89
Dishwashing liquid	3 to 6	.87	.54	2.66	2.39	.84	6.82
	3 to 12	.03	.67	.00	1.03	.28	3.81
	6 to 12	-.85	.54	2.51	.43	.15	1.22
Laundry powder	3 to 6	-.75	.54	1.92	.47	.16	1.37
	3 to 12	-.63	.62	1.05	.53	.16	1.78
	6 to 12	.12	.60	.04	1.13	.35	3.67
Orange juice	3 to 6	-.39	.54	.53	.68	.24	1.95
	3 to 12	.13	.58	.05	1.14	.37	3.56
	6 to 12	.52	.54	.93	1.69	.58	4.88
Paper towels	3 to 6	-.20	.41	.24	.82	.37	1.82
	3 to 12	-.35	.49	.52	.70	.27	1.83
	6 to 12	-.15	.43	.13	.86	.37	2.00

** p<.05; ** p<.01; ***p<.001*

Table 33 compares the percentage of change in the odds of choice as a result of changes in the number of facings between national brands and store brands in seven product categories.

Table 33: Comparison of changes in the odds of choice between NB and SB

	National brands	Store brands
Canned tomatoes		
3 to 6	***-56.1%***	-29.2%
3 to 12	7.3%	-24.2%
6 to 12	***144.5%***	7%
Block chocolate		
3 to 6	11.1%	14.5%
3 to 12	32.2%	-2.6%
6 to 12	19%	-14.9%
Dishwashing liquid		
3 to 6	-31.9%	139.2%
3 to 12	12.2%	2.5%
6 to 12	64.9%	-57.1%
Laundry powder		
3 to 6	51.8%	-52.8%
3 to 12	50.9%	-46.9%
6 to 12	-0.6%	12.5%
Orange juice		
3 to 6	***95.1%***	-32.4%
3 to 12	***109%***	13.9%
6 to 12	7.1%	68.5%
Paper towels		
3 to 6	33.5%	-17.9%
3 to 12	34.7%	-29.7%
6 to 12	0.9%	-14.3%
Shampoo		
3 to 6	9%	n/a
3 to 12	***92.9%***	n/a
6 to 12	***76.9%***	n/a

Bold values indicate significant effect.

Position

The test of the full model with predictor showed statistically insignificant results for both national brands and store brands in all product categories. (For store brands, shampoo was eliminated from the analysis of store brands due to very low choice frequency (3 choices, equal to 1.5%)). It indicates that vertical position did not reliably predict consumer choice of all categories. On average, more than 85% of total observations (of seven product categories) were correctly predicted.

Table 34 shows regression coefficients, standard errors, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios at each level of position. According to the Wald statistics, there were only two exceptional cases where changes in position had a significant effect on brand choice. Firstly, for block chocolate, moving a brand from the top row to the bottom row decreased the odds of choice by 40%. Secondly, for dishwashing liquid, moving a brand from the second row to the bottom row decreased the odds of choice by 38%. Other changes did not have significant impact on brand choice in these two categories. For national brands of remaining categories and store brands of all tested categories, none of the changes in vertical position had significant effect on brand choice.

Table 34: Logistic regression analysis of choice of NB and SB as a function of vertical position in seven categories

	Position	B	SE	Wald	Exp(B)	95% C.I.for EXP(B)	
						Lower	Upper
National brands							
Canned tomatoes	1 to 4	.52	.27	3.84	1.68	1.00	2.82
	2 to 4	.28	.28	1.01	1.32	.77	2.26
	3 to 4	-.02	.29	.01	.98	0.55	1.73
	1 to 2	.24	.25	.97	1.28	.79	2.07
	2 to 3	.30	.28	1.18	1.35	.79	2.31
Block chocolate	1 to 4	***-.51****	.24	4.31	.60	.37	.97
	2 to 4	-.40	.24	2.79	.67	.42	1.07
	3 to 4	-.18	.23	.63	.83	.53	1.30
	1 to 2	-.11	.26	.17	.90	.54	1.49
	2 to 3	-.22	.25	.78	.81	.50	1.30
Dishwashing liquid	1 to 4	-.44	.23	3.55	.64	.41	1.02
	2 to 4	***-.49****	.24	4.26	.62	.39	.98
	3 to 4	-.37	.23	2.64	.69	.44	1.08
	1 to 2	.05	.25	.03	1.05	.64	1.72
	2 to 3	-.11	.25	.20	.90	.55	1.46
Laundry powder	1 to 4	.24	.25	.93	1.27	.78	2.05
	2 to 4	.04	.27	.02	1.04	.61	1.75
	3 to 4	.04	.25	.03	1.04	.64	1.72
	1 to 2	.20	.27	.57	1.22	.73	2.05
	2 to 3	-.01	.27	.00	.99	.58	1.70
Orange juice	1 to 4	.07	.23	0.09	1.07	.68	1.68
	2 to 4	-.27	.25	1.17	.77	.47	1.24
	3 to 4	-.32	.25	1.72	.72	.45	1.17
	1 to 2	.33	.24	1.88	1.39	.87	2.24
	2 to 3	.06	.26	.05	1.06	.64	1.76

Table 34 (cont.)

	Position	B	SE	Wald	Exp(B)	95% C.I.for EXP(B)	
Paper towels	1 to 4	.21	.25	.69	1.23	.76	1.99
	2 to 4	-.12	.26	.21	.89	.53	1.48
	3 to 4	.10	.25	.15	1.10	.67	1.81
	1 to 2	.32	.25	1.66	1.38	.84	2.27
	2 to 3	-.22	.26	.72	.80	.49	1.33
Shampoo	1 to 4	.09	.23	.17	1.10	.71	1.71
	2 to 4	.15	.22	.42	1.16	.75	1.79
	3 to 4	.12	.23	.26	1.12	.72	1.74
	1 to 2	-.05	.22	.06	.95	.62	1.46
	2 to 3	.03	.22	.02	1.03	.67	1.58
Store brands							
Canned tomatoes	1 to 4	-.04	.48	.01	.96	.37	2.48
	2 to 4	-.62	.53	1.37	.54	.19	1.52
	3 to 4	-.62	.53	1.37	.54	.19	1.52
	1 to 2	.58	.55	1.13	1.79	.61	5.22
	2 to 3	.00	.59	.00	1.00	.32	3.17
Block chocolate	1 to 4	.10	.74	.02	1.11	.26	4.75
	2 to 4	.30	.71	.18	1.35	.34	5.40
	3 to 4	-.31	.80	.15	.73	.15	3.48
	1 to 2	-.20	.71	.08	.82	.21	3.30
	2 to 3	.61	.76	.64	1.84	.41	8.23
Dishwashing liquid	1 to 4	.33	.54	.37	1.39	.48	4.03
	2 to 4	-.18	.60	.09	.84	.26	2.71
	3 to 4	.54	.53	1.05	1.71	.61	4.81
	1 to 2	.51	.56	.82	1.67	.55	5.02
	2 to 3	-.72	.55	1.72	.49	.17	1.43
Laundry powder	1 to 4	.38	.80	.22	1.46	.30	7.02
	2 to 4	-.13	.85	.03	.88	.17	4.62
	3 to 4	.09	.85	.01	1.09	.21	5.81
	1 to 2	.51	.80	.41	1.67	.35	7.99
	2 to 3	-.22	.85	.07	.80	.15	4.24
Orange juice	1 to 4	-.38	.68	.31	.68	.18	2.61
	2 to 4	-.03	.62	.00	.98	.29	3.28
	3 to 4	-.30	.69	.19	.74	.19	2.84
	1 to 2	-.36	.68	.27	.70	.18	2.67
	2 to 3	.28	.69	.16	1.32	.34	5.04
Paper towels	1 to 4	.17	.47	.13	1.18	.47	2.95
	2 to 4	-.72	.55	1.70	.49	.17	1.44
	3 to 4	-.03	.47	.00	.97	.39	2.45
	1 to 2	.89	.55	2.62	2.43	.83	7.12
	2 to 3	-.69	.55	1.58	.50	.17	1.47

*$p<.05$

6.3 Moderation analysis

A direct logistic regression analysis on brand choice as outcome and the number of facings and vertical position as predictors was conducted separately for subgroups of consumers of national brands. For store brands, the Firth logistic regression was performed to have an exact prediction of choice for two groups of consumers.

RQ4: How does consumers' perceived quality of store brands moderate the relationship between shelf space and brand choice in different product categories?

Facing

T-test

An independent samples t-test was conducted to compare the mean score of perceived quality between consumers with Low-Perceived Quality (LPQ) and those with High-Perceived Quality (HPQ). The result showed that the means of LPQ group (M = -.78, SD = .64, N = 95) and HPQ group (M = .78, SD = .53, N = 95) were significantly different; t(188) = -18.30, p <.001.

Table 35: Independent sample t-test of perceived quality of SB – Facing test

Group	N	M	SD	SE
LPQ	95	-.78	.64	.07
HPQ	95	.78	.53	.05

Moderation analysis

National brands

The study showed that the strength of the relationship between shelf facings and brand choice is different between LPQ and HPQ consumers of canned tomatoes, block chocolate, orange juice and shampoo. For the remaining categories, including dishwashing liquid, laundry powder and paper towels, the results showed that changes in the number of facings did not have significant impact on neither LPQ nor HPQ consumers. Thus, there is no convincing evidence of the moderating role of quality perception in the relationship between shelf facings and brand choice in these three categories.

For canned tomatoes, the results showed that changes in the number of facings have a significant effect on brand choice of both groups; however, LPQ consumers were more likely to be influenced when the number of facings increased from six to 12 while HPQ were more likely to be influenced when the number of facings increased from three to six. Specifically, increasing from six to 12 facings significantly increased the odds of choice in LPQ group by 146.5%. The same change did not have a significant impact on brand choice among HPQ consumers. Increasing from three to six facings significantly decreased the odds of choice in the HPQ group by 66.4%. This change just had insignificant impact in the LPQ group.

For block chocolate, the result showed that increasing from three to 12 facings significantly increased the odds of choice by 69.6% among LPQ consumers. For HPQ consumers, changes in the number of facings did not have a significant impact on brand choice.

For orange juice, the result showed that changes in the number of facings have a significant effect on brand choice of both LPQ and HPQ groups. However, LPQ consumers were more likely to be influenced when the number of facings was increased from three to 12 while HPQ consumers were more likely to be affected when the number of facings was increased from three to six. Specifically, increasing from three to 12 facings increased the odds of choice among LPQ consumers by 138.5%. For HPQ group, such change did not have significant impact. Increasing from three to six facings increased the odds of choice by 151.8% among HPQ consumers. This change did not have a significant impact on LPQ consumers.

For shampoo, the results showed that changes in the number of facings have a significant effect on brand choice of both LPQ and HPQ groups; however, the magnitude of the effect was different between two groups. Specifically, increasing the number of facings from three to 12 increased the odds of choice by 78.3% in the LPQ group. For the HPQ group, the increase in the odds of choice was 97.7%. Increasing from six to 12 significantly increased the odds of choice among LPQ consumers by 104.8%. For HPQ consumers, this change caused an increase by 48.8%; however, the effect was insignificant.

A comparison of the percentage of change in the odds of choice between LPQ consumers and HPQ consumers is presented in Table 36 below.

Table 36: Comparison of changes in the odds of NB choice between LPQ and HPQ consumers – Facing test

	LPQ	HPQ
Canned tomatoes		
3 to 6	-43.3%	***-66.4*%**
3 to 12	39.8%	-17.5%
6 to 12	***146.5*%**	145.6%
Block chocolate		
3 to 6	-6.4%	9.4%
3 to 12	***69.6*%**	-6.8%
6 to 12	81.2%	-14.8%
Dishwashing liquid		
3 to 6	-49.7%	-4.2%
3 to 12	-10.9%	35.6%
6 to 12	77%	41.7%
Laundry powder		
3 to 6	46%	43.6%
3 to 12	59.2%	32.7%
6 to 12	9	-7.6
Orange juice		
3 to 6	45.7%	***151.8*%**
3 to 12	***138.5*%**	81.1%
6 to 12	63.8%	-28.1%
Paper towels		
3 to 6	26.8%	40.7%
3 to 12	48.6%	27%
6 to 12	17.2%	-9.7%
Shampoo		
3 to 6	-12.9%	32.9%
3 to 12	***78.3*%**	***97.7*%**
6 to 12	***104.8*%**	48.8%

Bold values indicate significant impact.

Store brands

For store brands, the result showed that changes in shelf facings did not have significant impact on the LPQ group nor the HPQ group in all categories ($p>.05$). The conclusion could be drawn that the study did not find convincing evidence for the moderating role of quality perception in the relationship between shelf facing and the choice of store brands. Details about regression coefficients, Chi-square and *p* value are presented in Appendix A.

Position

T-test

An independent samples t-test was conducted to compare the mean score of perceived quality between consumers with LPQ and those with HPQ. The result showed that the means of LPQ group (*M* = -.85, *SD* = .66, N = 92) and HPQ group (*M* = .81, *SD* = .53, N = 97) were significantly different; t(187) = -19.07, p <.001.

Table 37: Independent sample t-test of perceived quality of SB - Position test

Group	N	M	SD	SE
LPQ	92	-.85	.66	.07
HPQ	97	.81	.53	.05

Moderation analysis

National brands

The result showed for national brands of block chocolate, moving a brand from the second row to the bottom row significantly decreased the odds of choice among LPQ consumers by 52%. Among HPQ consumers, it decreased the odds of choice by 18%; however, the effect was insignificant. Other changes did not have a significant impact on LPQ consumers nor HPQ consumers in all categories. Overall, results show no convincing evidence of the moderating role of quality perception in the relationship between shelf position and brand choice.

Store brands

For store brands, the results showed that changes in shelf position did not have a significant impact on the LPQ group, nor the HPQ group in all categories (p>.05). The study did not find convincing evidence for the moderating role of quality perception in the relationship between shelf position and the choice of store brands. Details about regression coefficients, Chi-square and *p* value are presented in Appendix B.

RQ5: How does consumers' perceived risk of store brands moderate the relationship between shelf space and brand choice in different product categories?

Facing

T-test

An independent samples t-test was conducted to compare the mean score of perceived risk between consumers with Low-Perceived Risk (LPR) and those with High-Perceived Risk (HPR). The result showed that the means of the LPR group (M = -.90, SD = .53, N = 87) and the HPR group (M = .68, SD = .61, N = 103) were significantly different; t(188) = -18.87, p<.001.

Table 38: Independent sample t-test of perceived risk of SB - Facing test

Group	N	M	SD	SE
LPR	87	-.90	.53	.06
HPR	103	.68	.61	.06

Moderation analysis

National brands

The study showed that the strength of the relationship between shelf facings and brand choice is different between LPR and HPR consumers of laundry powder, orange juice, paper towels and shampoo. For the remaining categories including canned tomatoes, block chocolate and dishwashing liquid, the result showed that changes in the number of facings did not have significant impact on LPR nor HPR consumers. Thus, there is no convincing evidence of the moderating role of risk perception in the relationship between shelf facings and brand choice in these three categories.

For laundry powder, increasing from three to six facings significantly increased the odds of choice among HPR consumers by 107.3%. For LPR consumers, this change did not have a significant impact on brand choice.

For orange juice, the result shows that changes in the number of facings have a significant effect on brand choice of both LPR and HPR groups. However, LPR consumers were more likely to be influenced when the number of facings was increased from three to six, while HPR consumers were more likely to be affected when the

number of facings was increased from three to 12. Specifically, increasing from three to six facings increased the odds of choice in LPR consumers by 145.3%. For the HPR group, such change did not have a significant impact. Increasing from three to 12 facings increased the odds of choice by 137.7% in HPR consumers. This change did not have significant impact on LPR consumers.

For paper towels, increasing from three to six facings significantly increased the odds of choice among LPR consumers by 105.4%. This change did not have significant impact on HPR consumers.

For shampoo, the result showed that changes in the number of facings has a significant effect on brand choice of the HPQ group, but not on the LPQ group. Specifically, increasing the number of facings from three to 12 increased the odds of choice by 110.1% in HPR consumers. Increasing from six to 12 significantly increased the odds of choice among HPR consumers by 126.7%. These changes did not have significant impact on LPR consumers.

A comparison of the percentage of change in the odds of choice between LPR, and HPR consumers is presented in Table 39 below.

Table 39: Comparison of changes in the odds of choice between LPR and HPR consumers – Facing test

	LPR	HPR
Canned tomatoes		
3 to 6	-66.6%	-48.6%
3 to 12	-3.2%	20.2%
6 to 12	189.5%	133.8%
Block chocolate		
3 to 6	-12.9%	5.6%
3 to 12	-8.4%	75.6%
6 to 12	5.2%	66.2%
Dishwashing liquid		
3 to 6	-3.4%	-49.1%
3 to 12	32.6%	2.5%
6 to 12	37.2%	101.5%
Laundry powder		
3 to 6	-15%	***107.3%***
3 to 12	36.8%	56.1%
6 to 12	61%	-24.7%

Table 39 (cont.)

	LPR	HPR
Orange juice		
3 to 6	***145.3%***	48.1%
3 to 12	75.9%	***137.7%***
6 to 12	-28.3%	60.6%
Paper towels		
3 to 6	***105.4%***	-2.5%
3 to 12	55.9%	28.9%
6 to 12	-24.1%	32.2%
Shampoo		
3 to 6	14.5%	-7.4%
3 to 12	59.5%	***110.1%***
6 to 12	39.4%	***126.7%***

Bold values indicate significant impact.

Store brands

For store brands, the results showed that changes in shelf facings did not have significant impact on the LPR group, nor the HPR group in all categories (p>.05). The study did not find convincing evidence for the moderating role of risk perception in the relationship between shelf facings and the choice of store brands. Details about regression coefficients, Chi-square and *p* value are presented in Appendix C.

Position

T-test

An independent samples t-test was conducted to compare the mean score of perceived risk between consumers with LPR and those with HPR. The result showed that the means of LPR group (*M* = -.81, *SD* = .59, N = 94) and HPR group (*M* = .95, *SD* = .53, N = 88) were significantly different; t(180) = -21.25, p <.001.

Table 40: Independent t-test of perceived risk of SB - Position test

Group	N	M	SD	S.E
LPR	94	-.81	.59	.06
HPR	88	.95	.53	.06

Moderation analysis

National brands

The study showed that the strength of the relationship between shelf position and brand choice is different between LPR and HPR consumers of block chocolate, dishwashing

liquid, paper towels and shampoo. For the remaining categories, including canned tomatoes, laundry powder and orange juice, the result showed that changes in the position did not have significant impact on LPR, nor HPR consumers. Thus, there is no convincing evidence of the moderating role of risk perception in the relationship between shelf position and brand choice in these three categories.

For block chocolate, moving a brand from the top row to the bottom row significantly decreased the odds of choice among LPR consumers by 65.6%. The same change did not have a significant impact on HPR consumers.

For dishwashing liquid, moving a brand from the top row, the second row and the third row to the bottom row significantly decreased the odds of choice among HPR consumers by 49%, 56.4% and 52.2% respectively. The same changes did not have a significant impact on HPR consumers.

For paper towels, moving a brand from the top row to the second row significantly increased the odds of choice by 127% among HPR consumers. The same change did not have significant impact on HPR consumers

For shampoo, moving a brand from the top row to the bottom row significantly increased the odds of choice among LPR consumers by 109.1%. The same change did not have significant impact on HPR consumers.

A comparison of the percentage of change in the odds of choice between LPR, and HPR consumers is presented in Table 41 below.

Table 41: Comparison of changes in the odds of choice between LPR and HPR consumers – position test

	LPR	HPR
Canned tomatoes		
1 to 4	241.2%	11.7%
2 to 4	127.6%	-1.5%
3 to 4	68%	-22.4%
1 to 2	49.9%	13.4%
2 to 3	35.5%	26.9%

Table 41 (cont.)

	LPR	HPR
Block chocolate		
1 to 4	***-65.6%***	-10.6%
2 to 4	-31%	-37%
3 to 4	4.6%	-33.6%
1 to 2	-50.1%	41.9%
2 to 3	-34%	-5.2%
Dishwashing liquid		
1 to 4	-18.7%	***-49%***
2 to 4	-2%	***-56.4%***
3 to 4	12.5%	***-52.2%***
1 to 2	-17.1%	16.9%
2 to 3	-12.9%	-8.7%
Laundry powder		
1 to 4	14.1%	29.8%
2 to 4	22.4%	-15.9%
3 to 4	-18.8%	3.1%
1 to 2	-6.8%	54.4%
2 to 3	50.7%	-18.4%
Orange juice		
1 to 4	15.8%	-3.2%
2 to 4	-18.3%	-29%
3 to 4	-29.2%	-27.4%
1 to 2	41.7%	36.3%
2 to 3	15.3%	-2.2%
Paper towels		
1 to 4	-12.9%	62.9%
2 to 4	28.8%	-28.3%
3 to 4	-0.7%	18.2%
1 to 2	-32.4%	***127.1%***
2 to 3	29.8%	-39.3%
Shampoo		
1 to 4	***109.1***	-30.5%
2 to 4	73.7	-11.5%
3 to 4	69.2	-10.3%
1 to 2	20.4	-21.4%
2 to 3	2.6	-1.4%

Bold values indicate significant impact.

Store brands

For store brands, the result showed that changes in shelf position did not have significant impact on the LPQ group nor the HPQ group in all categories (p>.05). Therefore, the study did not find convincing evidence for the moderating role of risk perception in the relationship between shelf position and the choice of store brands. Details about regression coefficients, Chi-square and *p* value are presented in Appendix D.

RQ6: How does consumers' perceived risk of category moderate the relationship between shelf space and brand choice?

Facings

T-test

An independent samples t-test was conducted to compare the mean score of perceived risk of category between consumers with Low Perceived Risk of Category (LPRC) and those with High Perceived Risk of Category (HPRC) across seven categories. The result showed that the means of LPRC group and HPRC group were significantly different in all categories (p<.001) (see Table 42). For canned tomatoes, t(194) = -18.07, p<.001; for block chocolate, t(194) = -23.44, p<.001; for dishwashing liquid, t(194) = -18.81, p<.001; for laundry powder, t(194) = -22.07, p<.001; for orange juice, t(194) = -20.70, p<.001; for paper towels, t(194) = -17.71, p<.001; and for shampoo t(194) = -22.60, p<.001.

Table 42: Independent sample t-test of perceived risk of category - Facing test

Group	N	M	SD	SE
Canned tomatoes				
LPRC	102	-.77	.53	.05
HPRC	94	.90	.76	.08
Block chocolate				
LPRC	102	-.88	.56	.06
HPRC	94	.89	.48	.05
Dishwashing liquid				
LPRC	104	-.79	.55	.05
HPRC	92	.87	.68	.07

Table 42 (cont.)

Group	N	M	SD	SE
Laundry powder				
LPRC	107	-.77	.61	.06
HPRC	89	1.01	.48	.05
Orange juice				
LPRC	106	-.76	.55	.05
HPRC	90	.95	.61	.06
Paper towels				
LPRC	115	-.69	.52	.05
HPRC	81	.88	.73	.08
Shampoo				
LPRC	89	-.96	.59	.06
HPRC	107	.80	.50	.05

Moderation analysis

National brands

The study shows that the strength of the relationship between shelf facings and brand choice is different between LPRC and HPRC consumers of canned tomatoes, laundry powder, orange juice, and shampoo. For the remaining categories, including block chocolate, dishwashing liquid and paper towels, the result showed that changes in the number of facings did not have a significant impact on LPRC nor HPRC consumers. Thus, there is no convincing evidence of the moderating role of perceived risk of category in the relationship between shelf position and brand choice in these three categories.

For canned tomatoes, HPRC consumers were more likely to be influenced by changes in the number of facings than LPRC consumers. Increasing from three to six facings significantly decreased the odds of choice among HPRC consumers by 68%. Increasing from six to 12 facings significantly increased the odds of choice among HPRC consumers by 214.1%. The same changes did not have a significant impact on LPRC consumers.

For laundry powder, increasing from three to 12 facings significantly increased the odds of choice among LPRC consumers by 99.9%. The same change did not have a significant impact on HPRC consumers.

For orange juice, increasing from three to six facings significantly increased the odds of choice among LPRC consumers by 118%. The same change did not have a significant impact on HPRC consumers. Increasing from three to 12 facings significantly increased the odds of choice among LPRC consumers by 106.5%. The same change also significantly increased the odds of choice among HPRC consumers; however, the magnitude of the effect was slightly higher increasing by 114.1%.

For shampoo, increasing from three to 12 facings significantly increased the odds of choice among LPRC consumers by 136.9%. The same change did not have a significant impact on HPRC consumers.

A comparison of the percentage of change in the odds of choice between LPRC consumers and HPRC consumers is presented in Table 43 below.

Table 43: Comparison of changes in the odds of choice between LPR and HPR consumers – position test

	LPRC	HPRC
Canned tomatoes		
3 to 6	-40.2%	***-68%***
3 to 12	15.8%	0.7%
6 to 12	93.5%	***214.1%***
Block chocolate		
3 to 6	49.8%	-14.8%
3 to 12	58.6%	14%
6 to 12	5.9%	33.8%
Dishwashing liquid		
3 to 6	-22.1%	-39.1%
3 to 12	38.2%	-5.9%
6 to 12	77.3%	54.5%
Laundry powder		
3 to 6	75.3%	34.3%
3 to 12	***99.9%***	16.6%
6 to 12	14%	-13.1%
Orange juice		
3 to 6	***111.8%***	75.5%
3 to 12	***106.5%***	***111.4%***
6 to 12	-2.5%	20.5%

Table 43 (cont.)

	LPRC	HPRC
Paper towels		
3 to 6	79.2%	9.9%
3 to 12	29.9%	37.4%
6 to 12	-27.5%	25.1%
Shampoo		
3 to 6	34.3%	-11.5%
3 to 12	***136.9%***	58.7%
6 to 12	76.4%	79.3%

Bold values indicate significant impact.

Store brands

For store brands, the result showed that changes in shelf facings did not have significant impact on the LPQ group nor the HPQ group in all categories ($p>.05$). Thus, the study did not find convincing evidence for the moderating role of perceived risk of category in the relationship between shelf facings and the choice of store brands. Details about regression coefficients, Chi-square and *p* value are presented in Appendix E.

Position

T-test

An independent samples t-test was conducted to compare the mean score of perceived risk of category between consumers with LPRC and those with HPRC across seven categories. The result showed that the means of LPRC group and HPRC (see Table 44) group were significantly different in all categories ($p<.001$). For canned tomatoes, $t(194) = -18.53$, $p<.001$; for block chocolate, $t(191) = -22.74$, $p<.001$; for dishwashing liquid, $t(194) = -18.99$, $p<.001$; for laundry powder, $t(191) = -20.22$, $p<.001$; for orange juice, $t(194) = -19.76$, $p<.001$; for paper towels, $t(194) = -19.62$, $p<.001$; and for shampoo, $t(194) = -23.88$, $p<.001$.

Table 44: Independent sample t-test of perceived risk of category - Position test

Group	N	M	SD	S.E
Canned tomatoes				
LPRC	100	-.77	.53	.05
HPRC	96	.73	.60	.06
Block chocolate				
LPRC	97	-.80	.50	.05
HPRC	96	.87	.52	.05

Table 44 (cont.)

Group	N	M	SD	S.E
Dishwashing liquid				
LPRC	98	-.77	.50	.05
HPRC	98	.79	.64	.06
Laundry powder				
LPRC	96	-.83	.49	.05
HPRC	97	.75	.59	.06
Orange juice				
LPRC	111	-.72	.55	.05
HPRC	85	.88	.58	.06
Paper towels				
LPRC	108	-.70	.50	.05
HPRC	88	.95	.68	.07
Shampoo				
LPRC	98	-.84	.51	.05
HPRC	98	.83	.47	.05

Moderation analysis

National brands

The result showed that the strength of the relationship between shelf position and brand choice is different between LPRC and HPRC consumers of block chocolate. For the remaining categories, vertical position did not have a significant impact on LPRC nor HPRC consumers. Thus, there is no convincing evidence of the moderating role of perceived risk of category in the relationship between shelf position and choice in the remaining categories.

Specifically, *for block chocolate*, moving a brand from the top row, the second row or the third row to the bottom row significantly decreased the odds of choice among LPRC consumers by 57.9%, 60.3% and 53.1% respectively. These changes did not have significant impact on HPRC consumers.

Store brands

For store brands, the result showed that changes in shelf position did not have a significant impact on the LPQ group nor the HPQ group in all categories ($p>.05$). Thus, the study did not find convincing evidence for the moderating role of quality perception in the relationship between shelf facings and the choice of store brands. Details about regression coefficients, Chi-square and *p* value are presented in Appendix F.

RQ7: How does consumer's past usage moderate the relationship between shelf space and brand choice in different product categories?

Facings

The result showed that the strength of the relationship between shelf facings and brand choice is different between non-buyers, light buyers, medium buyers and heavy buyers of store brands. Each group reacted differently to changes in the number of facings in all categories except for block chocolate.

For canned tomatoes, changes in the number of facings had a significant impact on non-buyers. Specifically, increasing from three to six facings decreased the odds of choice among non-buyers by 66.3% and increasing from six to 12 facings increased the odds of choice by 255.6%. For light buyers, medium buyers and heavy buyers, changes in the number of facings did not have significant impact on brand choice.

For dishwashing liquid, the number of facings also had a significant impact on choice among non-buyers. Specifically, increasing from three to six facings decreased the odds of choice among non-buyers by 46.9% and increasing from six to 12 facings increased the odds of choice by 98.7%. For light buyers, medium buyers and heavy buyers, changes in the number of facings did not have a significant impact on brand choice.

For laundry powder, light buyers and medium buyers were more likely to be influenced by changes in the number of facings as compared to non-buyers and heavy buyers. Specifically, increasing from three to six facings decreased the odds of choice among light buyers by 656.8% (more than six times) and increasing from three to 12 facings increased the odds of choice by 467.6% (nearly five times). For medium buyers, increasing from three to 12 increased the odds of choice by 366.7% (nearly four times). Changes in the number of facings did not have a significant impact on heavy buyers of store brands.

For orange juice, heavy buyers of store brands were also less likely to be influenced by changes in the number of facings. Increasing from three to six facings significantly increased the odds of choice by 82.9% among non-buyers, by 209.8% (two times) among light buyers and by 5635% (nearly six times) among medium buyers. Increasing from three to 12 facings significantly increased the odds of choice by 467% (nearly five

times) among light buyers and by 906.2% (nine times) among medium buyers. None of the changes mentioned above had significant impact on heavy buyers' choice.

For paper towels, non-buyers of store brands were more likely to be influenced by changes in the number of facings as compared to light buyers, medium buyers and heavy buyers. Increasing from three to six facings significantly increased the odds of choice by 90%. Changes in the number of facings did not have significant impact on the three remaining groups of consumers.

For shampoo, changes in the number of facings had a significant impact on non-buyers, light buyers and heavy buyers, but not on medium buyers. Increasing from three to 12 facings significantly increased the odds of choice by 59.5% among non-buyers, by 84% among light buyers and by 940% (more than 9 times) among heavy buyers. Increasing from six to 12 facings significantly increased the odds of choice among non-buyers by 77.2%. Changes in the number of facings did not have significant impact on medium buyers of store brands.

A comparison of the percentage of change in the odds of choice between Non-Buyers (NB), Light Buyers (LB), Medium Buyers (MB), and Heavy Buyers (HB) of store brands is presented in Table 45 below.

Table 45: Comparison of changes in the odds of choice between non-buyers, light buyers, medium buyers and heavy buyers - Facing test

	Non buyers	Light buyers	Medium buyers	Heavy buyers
Canned tomatoes				
3 to 6	***-66.3%***	-9.7%	-64.3%	-72.2%
3 to 12	19.9%	15.2%	2.3%	-47%
6 to 12	***255.6%***	27.5%	186.4%	90.5%
Block chocolate				
3 to 6	6.6%	-13.5%	13.7%	569.2%
3 to 12	18.3%	18.3%	103.9%	521.4%
6 to 12	11%	36.7%	79.3%	-7.1%
Dishwashing liquid				
3 to 6	***-46.9%***	-8.6%	-16.7%	116.7%
3 to 12	5.4%	25.5%	61.3%	-35%
6 to 12	***98.7%***	37.4%	93.5%	-70%
Laundry powder				
3 to 6	40.4%	***656.8%***	-15.2%	0
3 to 12	17%	***467.6%***	***366.7%***	78.8%
6 to 12	-16.7%	-25%	450%	0

Table 45 (cont.)

	Non buyers	Light buyers	Medium buyers	Heavy buyers
Orange juice				
3 to 6	82.9%	***209.8%***	***563.5%***	50.9
3 to 12	31.3%	***467%***	***906.2%***	186.7
6 to 12	-28.2%	83%	51.7%	90
Paper towels				
3 to 6	***90%***	-4.5%	-2.2%	11.9
3 to 12	24.4%	45%	56.6%	6.8
6 to 12	-34.6%	51.8%	60.2%	-4.5
Shampoo				
3 to 6	-10%	232.3%	-39.1%	766.7%
3 to 12	***59.5%***	284%	306.2%	940%
6 to 12	***77.2%***	***15.6%***	566.7%	***20%***

Bold values indicate significant impact.

Store brands

For store brands, the result showed that changes in shelf facings did not have a significant impact on any group of consumers in all categories (p>.05). Thus, the study did not find convincing evidence for the moderating role of past usage in the relationship between shelf facings and the choice of store brands. Details about regression coefficients, Chi-square and *p* value are presented in Appendix G.

Position

National brands

The result shows that changes in vertical position were more likely to affect non-buyers of store brands for canned tomatoes and orange juice. For *canned tomatoes*, moving a brand from the top row to the bottom row increased the odds of choice by 127.9% among non-buyers. For *orange juice*, moving a brand from the third row to the bottom row decreased the odds of choice by 64.9%.

Store brands

For store brands, the result showed that changes in shelf position did not have significant impact on any group of consumers (p>.05). Thus, the study did not find convincing evidence for the moderating role of past usage in the relationship between shelf facings and the choice of store brands. Details about regression coefficients, Chi-square and *p* value are presented in Appendix H.

6.4 Additional analysis

As the result showed that the number of facings did not significantly influence consumer choice of store brands, an additional analysis was performed to find out what does. As perception and past usage variables have been proven to have a significant impact on consumer choice (Batra and Sinha, 2010; Chandon et al., 2009), we were not interested in conducting further investigation using these variables. Instead, we were interested in figuring out whether consumer choice was affected by their actual rating of store brand quality. Therefore, a binary logistic regression was conducted with store brand quality rating as predictor and choice of store brand as outcome.

The test of the full model with predictor showed a statistically significant result, χ^2 (3, N=9920) = 161.596 with p <.001, indicating that the rating of store brand quality reliably predicted consumer choice of store brands. It could predict 5% of the variance in brand choice. Classification was impressive with 98.2% of observations correctly predicted.

Table 46 shows regression coefficients, standard errors, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios at each level of rating. The Wald statistics showed that when store brands were rated as of fair quality as compared to poor quality, the odds of choice increased by almost seven times. When they were rated as of good quality, the odds of choice increased by more than 17 times. Even when consumers did not really know about the quality of store brands, the odds of choice as compared to when store brands were rated as poor quality still increased by nearly six times.

Table 46: Logistic regression analysis of rating of SB quality as a function of choice

Rating	B	SE	Wald	Exp(B)	95% C.I.for EXP(B)	
					Lower	Upper
Fair	***1.93******	.43	20.20	6.86	2.96	15.88
Good	***2.85******	.41	47.61	17.34	7.71	38.98
Don't know	***1.77******	.46	15.10	5.87	2.40	14.32

*Reference category: Poor; *** p < .001*

7 SUMMARY, DISCUSSION AND CONCLUSIONS

This chapter is structured as follows. The chapter will begin with a summary of the study to give an overview of why the study was conducted, what research questions it aims to answer and what methods the study employed to collect and analyse data. After the summary, the chapter will focus on a deep discussion of the findings, including findings on the relationship between shelf space and brand choice and findings on the moderation effect. Coming after the discussion of findings are implications for practice. Then, the chapter will describe the limitations of the study and recommendations for future research. This chapter will end with a conclusion of the whole study.

7.1 Summary of the study

This study compared the impact of shelf space on consumer choice of national brands and store brands. This study explored how the relationship between shelf space and brand choice could be moderated by consumer's perceived quality of store brands, perceived functional risk of store brands, perceived risk of category and consumer past usage of store brands.

This research aimed to answer the following questions:

1. *How does shelf space affect brand choice?*
2. *How does the impact of shelf space on brand choice differ between national brands and store brands?*
3. *How does the impact of shelf space on brand choice differ between product categories?*
4. *How does consumer perceived quality of store brands moderate the relationship between shelf space and brand choice in different product categories?*
5. *How does consumer perceived risk of store brands moderate the relationship between shelf space and brand choice in different product categories?*
6. *How does consumer perceived risk of product category moderate the relationship between shelf space and brand choice in different product categories?*
7. *How does consumer past usage of store brands moderate the relationship between shelf space and brand choice in different product categories?*

To answer the seven stated research questions, the study employed a quantitative method. An online choice experiment and survey was designed to collect data on choice and on consumers' perceptions. The study included 392 participants (196 for the facing experiment and 196 for the position experiment) randomly recruited by Toluna Company.

The choice experiment aimed at measuring participants' brand choice at the point of purchase under the influence of changes in the number of facings and vertical position of brands. For this purpose, the research created shelf planograms in order to manipulate

the number of facings and vertical position of brands on shelf. Participants looked at the picture of the shelf and picked the brand they wanted to buy.

The survey aimed at measuring respondents' perception and past usage of store brands and product categories. This study used the 5-point Likert scale developed by Laurent and Kapferer (1985), in which *1=Disagree; 2=Somewhat disagree; 3=Neither disagree nor agree; 4=Somewhat agree; 5=Agree*. To measure consumer perceptions, respondents were asked to indicate their level of agreement to statements about perceptions relating to store brands and product categories. To measure the consumers' past usage of store brands, consumers were asked about their purchase frequency during the past 12 months.

To investigate the first three research questions, a binary logistic regression was conducted to predict brand choice using the number of facings and vertical position as predictors. To test the remaining questions, subgroup analysis using logistic regression was conducted for different groups of consumers divided according to their perception scores and past usage of store brands.

7.2 Discussion

7.2.1 Discussion of shelf effect

According to cue utilization theory, consumers tend to rely on extrinsic cue to get information about alternatives, especially when they are not certain about what brand to buy (Olson and Jacoby, 1972). Shelf space is seen as an extrinsic cue or, more specifically, contextual cue (Bettman and Luce, 1998). Thus, consumers can use shelf space as a signal of quality and make choice decisions based on it. Explanation for the influence of shelf space can be found in the theory of salience. According to this theory, a stimulus can become salient as a result of its size and position (Wedel and Pieters, 2007, Guido, 2012). In terms of size, larger stimuli are more salient then smaller ones, thus they could attract consumers' visual attention and change their perception (Orquin and Loose, 2013). Or they could affect consumer perceptions directly but not via visual attention (Guido, 2012). Therefore, increasing the number of facings is believed to enhance consumer evaluation of the brand and lead to more choices. In terms of

position, stimuli placed at an eye-level position can attract consumer visual attention and affect their perceptions (Carrasco, 2011). Those placed at an upper position can gain better evaluation from consumers compared to those at a lower position (Valenzuela and Raghubir, 2010). Therefore, products placed at an upper position could gain more choices. Saliency theory was applied in this study to determine whether shelf space could have an impact on brand choice. The next section will discuss the specific findings.

How does shelf space affect brand choice?

Facing

The study found that in overall, the number of facings of a brand on shelf had a significant impact on brand choice. Specifically, increasing the number of facings of a brand on shelf increased the odds of choice for that brand. The odds of choice were maximized when the brand occupied a full row on shelf. Noticeably, the magnitude of the impact varies according to the absolute number of facings being added. Adding nine facings increased the odds of choice for the brand by 39.1% while adding six facings caused an increase of 22%. Adding three facings did not have a significant effect on choice. It means that the more facings being added for a brand, the more choice the brand would receive. This finding was expected, as according to the salience theory, larger stimuli are more likely to attract the consumer's visual attention and get higher evaluation. Therefore, they are more likely to be chosen. However, as only 0.4% of the variance in choice is explained by the changes in the number of facings, the conclusion is drawn that brand choice is influenced more by factors other than shelf facings.

The overall finding was supported by Chandon et al. (2009) and Eisend (2014). However, it sharply contrasts with the finding by Dreze et al. (1994) who found brand sales did not change when the number of facings of the brand changed. The difference in findings could be explained by the following reasons. Firstly, Dreze and his colleagues examined the total sales of the brand while this study focused on brand choice. According to Van Heerde et al. (2003), unit sales can be strongly affected by category incidence and purchase quantity, two factors that are not influenced by marketing activities. Approximately 70% of sales result from category incidence and

decisions regarding how much to purchase. Secondly, Dreze et al. (1994) used an uncontrolled experiment where the effects of shelf facings could be confused with other in-store and out-of-store factors. Thus, the effect of shelf space may have been under-estimated.

Position

This study found overall shelf position did not have a significant impact on brand choice. The result is unexpected as it contradicts the theory of salience, according to which stimuli placed on the higher rows on shelf receive a more positive evaluation and therefore, are more likely to be chosen (Valenzuela and Raghubir, 2010). The result is inconsistent with the study by Valenzuela and Raghubir (2010). However, it supports Chandon et al. (2009)'s conclusion that changing the vertical position of the brand did not significantly affect brand choice.

The result does not support the theory of visual attention, according to which stimuli placed at eye-level attracts the most visual attention from consumers and more likely to be chosen. The experimental design may be the main reason explaining this result. As the study used an online experiment with a four-row planogram, participants could capture the whole shelf without much effort. Therefore, the effect of eye-level attention might not work. Thus, brand choice was not significantly influenced.

How does the impact of shelf space on brand choice differ between national brands and store brands?

Facing

The study found that national brands were more responsive to changes in shelf space in comparison with store brands. While changes in the number of facings significantly influenced the odds of national brands to be chosen, they did not have a statistically significant impact on the odds of store brand choice.

For national brands, the magnitude of the facing effect was consistent with the main finding of the overall effect of facings. Specifically, the greater number of facings that was added for a brand increased the likelihood of the brand being chosen. The odds of choice were maximized when the brand occupied a full row on shelf. Adding nine facings increased the chance of the brand being chosen by 45.9% and adding six facings

caused an increase of 22%. Adding three facings did not cause a significant impact on choice.

For store brands, in contrast, adding more facings led to a decrease in choice. The greater number of facings that were added reduced the likelihood of the brand being chosen. Although the impact of shelf facings on store brand choice was statistically insignificant, the negative direction of the relationship is note-worthy. It suggests that to promote the sales of store brands, manufacturers may need to attempt other marketing solutions rather than adding more shelf facings for their brands. This result is in contrast with the finding by Curhan (1972) that private brands are more responsive to changes in shelf facings than national brands.

The findings are not as we predicted. As discussed in the Literature Review chapter, there is some evidence that consumers believe brands with a greater number of facings, or higher vertical position on shelf are of higher quality due to the salience effect (Chandon et al., 2009, Valenzuela and Raghubir, 2010). For consumers who believe that store brands are of equal, or higher quality than that of national brands (HPQ consumers), increasing the number of facings for store brands is believed to be congruent with their quality schema of store brands. However, it is incongruent with the quality schema of consumers who believe store brands are of lower quality than that of national brands (LPQ consumers). According to Meyers-Levy and Tybout (1989), people are more likely to respond to stimuli that are incongruent with their schemas; therefore, it is expected that increasing the number of facings will generate more positive evaluations and more choices from LPQ consumers. As the vast majority of respondents believed that store brands are of lower quality than national brands, we expected that store brands are more responsive to the increase in shelf facings compared to national brands.

Nevertheless, the results were contradictory to our initial belief that store brands are responsive to the increase of the number of facings. Thus, the conclusion may be drawn that incongruent information did not lead to more choices. According to Valenzuela et al. (2013), when the information in the environment is incongruent with consumers' schemas, they may find the shopping difficult and confusing; therefore, the probability

of finalizing a purchase would be lower. In contrast, as national brands are responsive to the increase in shelf facings (shelf space elasticity is 0.55), there is reason to believe that congruent information could lead to more favorable responses in consumers. This suggests that manufacturers should place brands in congruence with consumers' quality schemas to increase the likelihood of the brands being bought.

Position

Consistent with the main finding of the overall effect, this study did not find evidence to confirm that shelf position has an effect on national brands and store brands. Thus, it is impossible to conclude whether national brands or store brands are more responsive to changes in shelf position. As mentioned above, the experimental design used may be the reason explaining the findings.

How does the impact of shelf space on brand choice differ between product categories?

Facing

Previous literature emphasized that the impact of shelf space differs according to categories (Cox, 1970, Curhan, 1972, Desmet and Renaudin, 1998, Dreze et al., 1994). Cox (1970) found that staple product brands are less responsive to changes in shelf space in comparison with impulse product brands. Dreze et al. (1994) found that even different product categories in the staple product group respond differently to the increase in the number of facings. Therefore, instead of making comparisons between groups of products, specific product categories should be compared with each other to get a full picture of the impact of shelf space on brand choice.

This study's finding supports conclusions from previous studies, that the effect of shelf space on consumer choice differs according to product categories. The study found that changes in facing quantity had a significant impact on consumer choice of national brands in three categories, including canned tomatoes, orange juice and shampoo. Facings did not have significant effect on choice for block chocolate, dishwashing liquid, laundry powder and paper towels. Regarding store brands, none of the above categories were responsive to changes in shelf facings. This finding is consistent with the finding regarding the overall relationship between shelf space and store brands.

Noticeably, national brands of canned tomatoes, orange juice and shampoo responded very differently to changes in shelf facings. Doubling the number of facings had strong effect on choice for canned tomatoes. However, the brand did not consistently get more choices when the number of facings was doubled. The odds of choice heavily decreased by 56.1% when the number of facings was doubled from three to six, but heavily increased by 144.5% when the number of facings was doubled from six to 12. This finding confirms that consumers of canned tomatoes were positively responsive to big changes in the number of facings, yet negatively responsive to small changes. However, further research is required to determine why this was the case.

The impact of shelf facings on consumer choice of national brands of orange juice followed a different pattern. Increasing shelf facings from three to six increased the odds of choice by 95.1%; yet adding extra six facings did not cause a significant impact on brand choice. Increasing facings from three to 12 increased the odds of choice by 109%. This finding tells us that the odds of choice for a brand does not change much regardless of the brand being placed on shelf with six, or 12 facings. This finding is supported by Chandon et al. (2009).

Unlike canned tomatoes and orange juice, national brands of shampoo were strongly responsive to the maximization of facing quantity. The greater number of facings that were added increased the likelihood of the brand being chosen. Adding six facings increased the odds of choice by 76.9% while adding nine facings increased the odds of choice by 92.9% for national brands of shampoo.

Results from three categories suggest that maximization of the number of facings was the most effective way to increase the likelihood of the brand to be chosen. However, placing a brand on shelf with the least number of facings did not always cause a disadvantage for the brand. This result in congruent with the finding by Parker and Lehmann (2011) which suggested that brands with fewer facings on shelf could get more choice thanks to the scarcity effect. According to the authors, consumers could infer that a brand becomes scarce because preceding consumers have bought them a lot; therefore, scarcer brands are seen to be more popular and could potentially be chosen more.

Even though national brands of canned tomatoes, orange juice and shampoo were responsive to changes in shelf space, the relationship between the number of facings and choice was quite weak. This suggests that consumers were influenced more by factors other than shelf facings. This result is supported by Chandon et al. (2009), who found that consumers' evaluation and choice is mainly driven by out-of-store factors.

Regarding store brands, there was no clear evidence of the impact of shelf facings on choice of store brands for any category. Thus, there is reason to believe that consumer choice of store brands is predominantly determined by factors other than shelf facings. This suggests that facings should not be used as a marketing tool to encourage consumer choice of store brands.

Position

The study found two cases where the odds of choice for national brands changed significantly under the influence of position. For block chocolate and dishwashing liquid, the odds of choice decreased by approximately 50% when brands were moved to the bottom row. This finding is supported by Dreze et al. (1994) that the bottom row is the worst row on shelf as brands receive minimum sales. Other categories were not responsive to any change in shelf position. As the overall effect of shelf position on choice was weak for all categories, there is no evidence to show that shelf position affects consumers' perception and choice.

7.2.2 Discussion of moderation effect

Previous studies have stated that consumer choice can be strongly influenced by their perception of quality and risk as well as their past usage of store brands (Bao et al., 2011a, Dursun et al., 2011, Rubio et al., 2014). While perceived quality heavily affects the way consumers gather, organize and interpret new data (Dursun et al., 2011), perceived risk determines the amount, sources and types of information the consumer uses to support their choice at the point of purchase (Howard and Jagdish, 1969). Past usage affects the extent to which the consumer relies on marketing cues to evaluate alternatives (Richardson et al., 1996). As these factors could significantly influence the way consumers utilize information in the environment, the strength of the relationship

between shelf space on store brand choice and national brand choice is believed to differ according to consumers' levels of perceptions and past usage of store brands. Based on this assumption, we investigated the impact of shelf space on different groups of consumers. As the result showed that changes in shelf space (facing and position) did not have significant impact on consumers of store brands, the discussion will focus on national brands. The discussion of store brand will be presented at the end.

How does consumers' perceived quality of store brands moderate the relationship between shelf space and brand choice in different product categories?

Facing

As consumers with different quality schemas of store brands differ in utilizing extrinsic cues to make choice (Meyers-Levy and Tybout, 1989), it is believed that they differ in weighting the changes in the number of facings of a brand. Therefore, shelf space would have a different effect on consumers according to their level of quality perception. In this study, the moderation role of perceived quality was observed in national brands of four product categories, including canned tomatoes, block chocolate, orange juice and shampoo.

For all above-mentioned product categories, the maximization of the number of facings is more effective for LPQ consumers than for HPQ consumers. Going from three to 12 facings was found to be the most effective change for LPQ consumers of block chocolate and orange juice. Yet, going from six to 12 facings is more effective for LPQ consumers of canned tomatoes and shampoo. Compared to LPQ consumers, HPQ consumers of canned tomatoes, block chocolate and orange juice were less likely to be affected by the maximization of the number of facings. HPQ consumers of shampoo could be seen as an exceptional case as increasing facings from three to 12 had a significant impact on their choice. HPQ consumers of canned tomatoes and orange juice were more responsive when the number of facings was increased from three to six but unexpectedly their choice decreased for canned tomatoes, and increased for orange juice.

This finding is not as we predicted. We predicted that increasing the number of facings for national brands would be less effective for LPQ consumers as it is congruent with their quality schemas. What was found from the data showed that both LPQ consumers and HPQ consumers were responsive to changes in the number of facings; however, the LPQ group was more responsive to the maximization of shelf facings while the HPQ group was more responsive to a moderate change in shelf facings.

Position

The moderating role of perceived quality in the relationship between shelf space and brand choice was not observed in the position test for both national brands and store brands. The conclusion could be drawn that no matter how consumers perceive the quality of store brands, the way they react to changes in the vertical position of the brand does not change.

How does consumer perceived risk of store brands moderate the relationship between shelf space and brand choice in different product categories?

The moderating role of perceived risk of store brands was observed for national brands in both the facing test and position test.

Facing

The study found that perceived risk of store brands moderated the impact of shelf space on brand choice for laundry powder, orange juice, paper towels and shampoo. Changes in shelf facings significantly influenced HPR consumers in three categories (laundry powder, orange juice and shampoo) and LPR consumers in two categories (orange juice and paper towels).

For laundry powder and shampoo, the impact of shelf facings was stronger for HPR consumers and weaker for LPR consumers. HPR consumers of laundry powder were very responsive when the number of facings was increased from three to six, while HPR consumers of shampoo were very responsive to the maximization of the number of facings (increasing from three and six, to 12 facings). In contrast, for paper towels, the impact of shelf facings was stronger for the LPR group and weaker for the HPR group.

For orange juice, although shelf facings had a significant impact on both groups, two groups reacted differently to changes in shelf facings depending on how many facings

were added. Adding three facings was more effective for the LPR group; however, the HPR group was only responsive when adding nine facings.

It was evident that consumers with different levels of perceived risk of store brands reacted very differently to changes in shelf facings in different product categories. This finding supports Dreze et al. (1994) who conclude that the impact of shelf space on sales is very complicated and category-specific. This indicates that HPR consumers did not necessarily switch brands although there is signal showing that the alternative is of higher quality.

Position

Interestingly, the study found that LPR consumers and HPR consumers of block chocolate, dishwashing liquid, paper towels and shampoo reacted differently to changes in vertical positions of brands.

Overall, the impact of position was strongest for HPR consumers of dishwashing liquid as moving brands from other rows, to the bottom row caused a decrease in the odds of choice by approximately 50%. For block chocolate and shampoo, the impact of moving a brand from the top row to the bottom row was stronger for LPR consumers than for HPR consumers. However, while it caused a decrease in the odds of choice among LPR consumers of block chocolate, it caused an increase among LPR consumers of shampoo. The impact of moving a brand from the top row to the second row was stronger for HPR consumers of paper towels than for LPR consumers.

This finding tells us that the bottom row is not always the worst row on shelf, and moving a brand to a higher vertical position does not necessarily increase choice. Moreover, although LPR consumers of block chocolate, dishwashing liquid and shampoo were more responsive when a brand was moved to the bottom row, it is unclear whether perceived risk of store brands was truly the explanation since the effects were opposite depending on each category.

Findings regarding shelf facings and shelf position showed that the moderating role of perceived risk of store brands did not follow any definite pattern but worked differently in different categories. Our assumption that the effect of shelf space on national brand

choice is weaker for LPR consumers and stronger for HPR consumers is not applicable for all product categories. The finding suggests that in-store marketing activities need to be designed based on specific characteristics of the category.

How does consumer perceived risk of category moderate the relationship between shelf space and brand choice in different product categories?

When risk is perceived, consumers tend to rely on personal information to make choice decision. However, when risk is low, they are more likely to rely on extrinsic cues in the environment (Cox, 1970). Therefore, the impact of shelf space on brand choice is believed to differ between the LPRC group and the HPRC group. For perceived risk of category, the study assumed that the effect of shelf space on brand choice is weaker for consumers with high levels of perceived risk of category as compared to consumers with low levels of perceived risk of category.

Facing

This study found that perceived risk of category moderated the impact of shelf facings on national brand choice for canned tomatoes, laundry powder, orange juice and shampoo. For store brands, there is no evidence to show that perceived risk of store brands could moderate the impact of shelf space on choice.

For canned tomatoes, the impact of shelf facings was stronger for HPRC consumers than for LPRC consumers. In contrast, for laundry powder and shampoo, the impact of shelf facings was stronger for LPRC group than for HPRC group.

For orange juice, although shelf facings had significant impact on both groups, two groups reacted differently to changes in shelf facings depending on how many facings were added. Adding three or nine facings was effective for LPRC consumers as it led to an increase of more than 100% in the odds of choice. However, HPRC consumers were only responsive when nine facings were added. In comparison with LPRC consumers, adding nine facings was slightly more effective for HPRC consumers than for LPRC group.

The assumption that the effect of shelf space on brand choice is weaker for HPR consumers and stronger for LPR consumers is not applicable for all product categories, suggesting that there is no one-size-fit-all shelf space solution for different categories.

Position

In the position test, the moderating role of perceived risk of category was only observed in the block chocolate category. Moving a brand from other rows to the bottom row had a stronger impact for LPRC consumers than for HPRC consumers. In other categories, there is no evidence to show that perceived risk of category could strengthen, or weaken the impact of shelf space on brand choice. Overall, it could be said that perceived risk of category did not play an important role in the relationship between shelf position and brand choice.

How does consumer past usage moderate the relationship between shelf space and brand choice in different product categories?

Consumer past usage is believed to affect the relationship between shelf space and brand choice. This study found that non-buyers of store brands, light buyers, medium buyers and heavy buyers reacted differently to changes in shelf facing of national brands in all product categories; however, the strength of the effect on each particular group depends on specific categories. There was no evidence to show the moderating impact of past usage on the relationship between shelf position and choice. Therefore, the discussion will focus on shelf facing.

Heavy buyers of store brands were less likely to be affected by changes in the number of facings in comparison with non-buyers, light buyers and medium buyers. The only exceptional case was found for shampoo, when doubling the number of facings from six to 12 significantly increased the odds of choice among light buyers and non-buyers and among heavy buyers as well.

Non-buyers of store brands of canned tomatoes, dishwashing liquid, paper towels and shampoo were more responsive to shelf facings than light buyers and medium buyers. However, for laundry powder and orange juice, the impact of shelf facings was stronger for light buyers and medium buyers than for non-buyers.

For canned tomatoes and dishwashing liquid, doubling the number of facings caused significant changes in choice among non-buyers. Going from three to six facings decreased the odds of choice while going from six to 12 facings strongly increased the odds of choice for non-buyers in both categories. For paper towels, the impact of going

from three to six facings was only significant for non-buyers. For shampoo, doubling the number of facings from six to 12 had a significant impact for non-buyers, light buyers and heavy buyers. However, the impact was strongest for non-buyers. Going from three to 12 facings was only effective among non-buyers.

For laundry powder and orange juice, light buyers and medium buyers were most responsive to changes in facings. The odds of choice impressively increased when going from three to six or 12 facings. However, non-buyers and heavy buyers were not significantly influenced by these changes.

The finding that heavy buyers of store brands were less responsive to changes in shelf facings of national brands was expected. Heavy buyers are believed to be more confident in evaluating store brand's quality and less likely to rely on rely on extrinsic cues to look for alternatives. They also tend to continue to buy store brands as a habit to reduce cognitive effort for the purchase. Therefore, they are less likely to be influenced by changes in shelf facings for national brands.

Shelf facings having a strong impact on choice among light buyers and medium buyers of store brands of laundry powder and orange juice suggests that these groups were more likely to switch to national brands when the environment provides favorable information for national brands. However, light and medium buyers of store brands of canned tomatoes, dishwashing liquid, paper towels and shampoo were less likely to switch to national brands under the influence of extrinsic cues. In contrast, consumers who did not use store brands of these categories were more likely to respond to changes in shelf space.

Discussion of store brands

We expected that the consumer's perception and past usage of store brands moderate the relationship between shelf space and brand choice. More specifically, we predicted that:

- Increasing the number of facings for a store brand will have more impact on consumers who believe that store brands are of lower quality to that of national brands.

- Increasing the number of facings for a store brand will have more impact on consumers who believe that purchasing store brands involves low risk.
- Increasing the number of facings for a store brand will have more impact on consumers who believe that the particular product category is of low risk.
- Increasing the number of facings for a store brand will have more impact on users of store brands than non-users.

However, the study did not find any evidence to show that perceived quality of store brands, perceived risk of store brands, perceived risk of product categories and past store brand usage could moderate the impact of shelf space on store brand choice. The additional analysis indicated that the choice of store brands was directly affected by how consumers rate store brands' quality in each category. It suggests that to encourage consumers to buy store brands, retailers should pay more attention on improving store brands' quality rather than investing in giving them more shelf space than they already have.

7.3 Implications for practice

Shelf space as a factor to boost choice

This study extends our knowledge regarding how salience could have an effect on choice in a retail context. Salient objects are more likely to influence consumer visual attention and perception; therefore, they could influence consumer choice. As mentioned in the literature review, shelf space is believed to have an effect on consumer choice thanks to the salience effect of size and position. *Regarding size*, brands with more facings on shelf are more salient; thus, they are more likely to receive more visual attention, higher evaluation and more choice (Chandon et al., 2009). *Regarding position,* brands placed in a higher row are more salient (Valenzuela and Raghubir, 2010). However, brands are most salient when they are placed at the eye-level row on shelf (Dreze et al., 1994). Therefore, brands placed on the higher row are more likely to receive higher evaluation and more choice. Brands are most likely to be chosen when they are placed on the eye-level row, as visual attention effect is strongest here (Dreze et al., 1994).

From what we found from this study, it seems that size has stronger effect on choice than position does. Therefore, salience caused by different factors could lead to different impacts on consumer choice. Increasing the number of facings can significantly cause either an increase or decrease in choice depending on the specific product categories. However, moving a brand to a higher row does not necessarily lead to changes in choice. It is unclear whether the brand could get maximum choice when it is placed on the eye-level row, as we did not test the effect of eye-level row. Nevertheless, from this study's experimental design, the conclusion is drawn that when the number of facings allocated for brands are equal and when consumers are able to see the whole shelf easily (they do not have to make extra physical effort to select the brand), choice is not changed no matter where the brand is placed on shelf. This suggests that vertical position does not necessarily cause changes in choice by influencing consumer perceptions. The overall picture emerging from this study is that changing the physical availability of brands is more likely to have significant impact on brand choice than changing their position on shelf.

However, as only a small percentage of variance in choice can be explained by changes in shelf space salience effect of size is just one of in-store factors that could influence consumer choice. This finding is indeed a credible reflection of how consumers buy brands in supermarkets. The retail environment is full of extrinsic cues designed to drive consumer attention and perception as well as to sway their preferences. Therefore, consumers tend to process and be influenced by a combination of cues instead of relying on one kind of cue to make choice. Thus, even though size is a source of salience; it alone does not make a full impact on consumer choice. Since consumers tend to use marketing cues in an additive or compensatory manner (Parker, 2011), retailers and manufacturers could use shelf facing as an addition of quality signal for well-promoted brands, or as a compensation for poorly promoted brands.

Can shelf space be used to boost the sales of store brands?

The competition for shelf space between national brands and store brands has become fierce in recent decades (Fernandez and Suarez, 2005). This competition can be seen as unequal as retailers have full control of shelf space (Rubio, 2014). As a result, they

allocate more shelf space for their own brands and reduce space for national brands. Manufacturers believe that store brands occupy much more advantageous space compared to national brands (Fernandez and Suarez, 2005). In some categories, store brands are clearly overexposed, occupying too much space "which is not proportional to their market share" (Rubio, 2014). By ensuring full distribution and good shelf space arrangement for store brands, retailers want to increase their physical availability and maximize choices (Amrouche and Zaccour, 2007).

However, results of this study reveal that retailers are less likely to encourage consumer choice of store brands by allocating more facings to them, or by moving them to a more favorable position. Changes in shelf space did not have a significant impact on consumer choice of store brands. The result is consistent across all seven tested product categories and all consumer groups regardless of their perceptions of store brands and categories, as well as their past usage of store brands. As pointed out by Fernandez and Suarez (2005), retailers should be mindful of the over-exposure of store brands and should periodically re-evaluate the relationship between shelf space and profitability. Indeed, retailers could lose profits if they do not allocate adequate space for national brands.

This study found that consumer choice of store brands was significantly affected by how they rate store brand quality. Therefore, it is product quality and not shelf space that matters. This suggests that decreasing the gap between the quality of store brands and the quality of national brands rather than giving store brands more advantageous shelf space would be a more effective strategy for retailers in competition with manufacturers. Manufacturers, in contrast, appear to have more options available to compete with retailers. They could either invest more in shelf facing and use it as a signal of quality for their brands to encourage choice, or they could ensure that the quality gap between national brands and store brands is as large as possible. The finding that favorable shelf space given to store brands may not benefit retailers could give manufacturers a higher bargaining position in the negotiation for shelf space.

The importance of product category characteristics

This study supports conclusions from previous studies that the effect of shelf space on consumer choice varies according to product categories. According to Desmet and Renaudin (1998), various product category attributes could moderate the relationship between shelf space and choice, including but not limited to impulse buying rate of the category and promotional intensity or sales seasonality. Cox (1970) established that the effect of shelf space on choice of staple product brands is the same as the effect on impulse product brands. Dreze et al. (1994) stated that the impact of shelf space on choice even differs between categories in the same product group. This study, once again, asserts that the relationship between shelf space and brand choice is complicated and category-specific. While the salience of size leads to more choices in one category, it could decrease choices in the other. Therefore, manufacturers and retailers need to consider product category characteristics to employ a suitable shelf space setting.

More specifically, in considering how many facings should be given for a brand, retailers must consider to what extent the additional facings could affect choice in each category. It is because the effect of giving a brand a full row is different from adding three or six facings. Some categories (such as shampoo as found in this study) are more responsive to the maximization of shelf facings while other categories (such as canned tomatoes) are more responsive to doubling the number of facings. Also, it is noteworthy that adding more facings could lead to reverse effect in some categories, which means choices decrease. This means that in some categories, brands do not necessarily get advantages when they are placed with higher number of facings on shelf. Briefly, any changes in shelf space must be conducted with great caution and based on deep knowledge of the category.

Consumer perceptions and store brand past usage that matter

This study indicates that the impact of shelf space on the choice of national brands could differ according to how consumers think about store brands and product categories as well as how frequently they used store brands in the past. The moderating role of consumer perception of risk of a product category in the relationship between shelf space and national brand choice is not a surprising finding. Product category

characteristics were found to be a crucial factor that determines the strength of the impact of extrinsic cues on choice. However, the effect of consumer perceptions and past usage of store brands on the relationship between shelf space and the choice of national brands should be noted.

The study's finding tells us that store brands could be seen as a permanent competitor of national brands within the mind of consumers. Indeed, how consumers react to marketing activities that promote national brands could depend on how highly they evaluate store brands in general and store brands of each product category in particular. Besides, consumer past usage of store brands can determine how likely store brand users are to switch to national brands under the impact of extrinsic cues. Therefore, the decision of how to allocate shelf space for national brands needs to take into account consumer perceptions and past usage of store brands.

7.4 Limitations of the study and future research

Firstly, the online experimental method did not allow us to test the effect of eye-level row on choice. Using a four-row planogram, we were able to compare the choice when the brand was placed on different rows and results did not show much difference. However, we were not able to tell whether the choice could change if the brand was placed on the eye-level row. Besides, choices could differ if participants had to make extra effort to get the brand on shelf if the brand was placed on the top row or the bottom row in a real store context. However, the online experiment did not allow us to test this condition. Furthermore, visual processing as well as perceptions related to locations of products may be different offline. Therefore, consumer choice might differ in a real store as compared to an online store. Future research could overcome this shortcoming by conducting a simulation shopping experiment in a laboratory. A simulation shopping experiment will create a more realistic shopping environment where participants can act as if they were in store.

Secondly, this study used a controlled experiment to test the effect of shelf space on choice. The strength of this method is that it allowed us to identify the effect of shelf space with other factors being kept constant. However, the weakness is that it did not allow us to test the interaction effect of shelf space and other in-store factors such as

package design, package size and price. As consumers tend to be influenced by a combination of extrinsic cues, future research could conduct an experiment with less control to test the interaction effect.

Thirdly, although this study had very interesting findings relating to the effect of shelf space on choice, we were unable to tell why it was the case. We did not know why increasing the number of facings of a brand could decrease brand choice in some categories. We were also unsure why the effect of shelf space on store brands, if any, was negative in many categories. Future research could focus on the adverse impact of shelf space on brand choice and measure the changes in consumer inferences and preferences under the impact of changes in shelf space using repeated experimental design.

Last but not least, this study was able to test only seven product categories. Even though the tested categories covered a wide range (food and non-food products, general use and impulse buy products), it might need to include more categories for the outcome to be generalized. Also, the widening of product categories hopefully enables researchers to find a pattern of the effect of shelf space on brand choice.

7.5 Conclusion

Manufacturers have spent millions of dollars per year to buy shelf space in supermarkets, making it "the most expensive real estate of the world" (Kaikati and Kaikati, 2006). This study found that the number of facings allocated for a brand could significantly affect the likelihood of the brand to be chosen. However, vertical position seems not having an effect on consumer choice as long as it does not affect the consumer's physical effort spent for getting the brand. Therefore, the allocation of facings for brands should receive attention from retailers and manufacturers. Most interestingly, the study revealed that while national brands were quite responsive to changes in the number of facings, consumer choice of store brands did not change regardless of how many facings were allocated for them and what position they were placed on shelf. This finding suggests that manufacturers could use shelf facings to boost choice of national brands. However, to promote the sales of store brands, retailers should pay attention to factors other than shelf space. Regarding product categories, this

study supports previous research on shelf space by asserting that the effect of shelf space on choice significantly varies according to specific categories. Therefore, it is recommended that any changes in shelf space need to be conducted with care and based on deep knowledge of the characteristics of categories. Finally, this study asserts that the effectiveness of using shelf space as a marketing tool to boost consumer choice of national brands may depend on how consumers think about store brands, as well as how frequently they've used store brands in the past. Therefore, manufacturers need to take into account the status of store brands in the mind of consumers to decide what shelf planogram should be applied.

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Appendix A Firth logistic regression analysis of SB choice in LPQ and HPQ consumers – Facing test

	Facings	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
Canned tomatoes							
LPQ	3 to 6	-.25	.75	-1.65	1.30	.11	.74
	3 to 12	-2.39	1.59	-7.32	.05	3.66	.06
	6 to 12	-2.14	1.53	-7.03	.08	3.52	.06
HPQ	3 to 6	-.20	.57	-1.29	.91	.12	.73
	3 to 12	.51	.62	-.67	1.72	.72	.40
	6 to 12	.71	.57	-.38	1.81	1.62	.20
Block chocolate							
LPQ	3 to 6	.62	1.00	-1.14	2.96	.44	.51
	3 to 12	.18	1.22	-2.39	2.75	.02	.88
	6 to 12	-.44	1.00	-2.79	1.33	.22	.64
HPQ	3 to 6	-.43	.75	-1.83	1.11	.34	.56
	3 to 12	-.19	.86	-1.88	1.50	.05	.82
	6 to 12	.24	.74	-1.28	1.63	.11	.74
Dishwashing liquid							
LPQ	3 to 6	1.51	0.93	-.03	3.78	3.65	.06
	3 to 12	.05	1.22	-2.52	2.62	.00	.97
	6 to 12	-1.46	.93	-3.73	.09	3.38	.07
HPQ	3 to 6	.18	.65	-1.04	1.51	.08	.78
	3 to 12	-.25	.80	-1.86	1.29	.10	.75
	6 to 12	-.43	.70	-1.91	0.85	.41	.53
Laundry powder							
LPQ	3 to 6	-1.64	1.04	-4.03	.25	2.88	.09
	3 to 12	-1.06	1.06	-3.47	.85	1.16	.28
	6 to 12	.58	1.21	-1.98	3.14	.23	.63
HPQ	3 to 6	-.34	.65	-1.58	.95	.28	.60
	3 to 12	-.31	.73	-1.76	1.10	.19	.67
	6 to 12	.03	.67	-1.34	1.31	.00	.96
Orange juice							
LPQ	3 to 6	-1.37	1.03	-3.75	.51	2.03	.15
	3 to 12	.24	.84	-1.42	1.90	.09	.77
	6 to 12	1.61	1.03	-.28	3.99	2.78	.10
HPQ	3 to 6	-.07	.66	-1.31	1.28	.01	.91
	3 to 12	.18	.77	-1.33	1.68	.06	.81
	6 to 12	.25	.67	-1.12	1.51	.14	.71
Paper towels							
LPQ	3 to 6	-.71	.60	-1.87	.45	1.44	.23
	3 to 12	-.14	.67	-1.47	1.13	.05	.83
	6 to 12	.56	.65	-0.72	1.80	.77	.38
HPQ	3 to 6	.02	.59	-1.09	1.19	.00	.97
	3 to 12	-.43	.70	-1.80	.92	.39	.53
	6 to 12	-.45	.60	-1.66	.66	.60	.44
Shampoo							
LPQ	3 to 6	-.73	2.05	-5.96	4.51	.13	.72
	3 to 12	1.24	1.70	-1.75	6.24	.64	.42
	6 to 12	1.96	1.68	-1.01	6.96	1.69	.19
HPQ	3 to 6	1.07	1.60	-1.50	6.01	.56	.45
	3 to 12	-.12	2.06	-5.36	5.12	.00	.95
	6 to 12	-1.19	1.60	-6.13	1.37	.71	.40

Appendix B Firth logistic regression analysis of SB choice in LPQ and HPQ consumers – Position test

	Position	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
Canned tomatoes							
LPQ	1 to 2	-1.94	1.62	-6.89	0.66	2.03	.15
	1 to 4	-.17	.88	-2.02	1.47	.04	.84
	2 to 4	-2.11	1.56	-7.02	.22	3.05	.08
	3 to 4	-.75	1.02	-3.11	1.06	.61	.44
	2 to 3	1.36	1.71	-1.63	6.37	.78	.38
HPQ	1 to 2	-.16	.64	-1.41	1.07	.07	.80
	1 to 4	-.24	.65	-1.50	1.01	.14	.71
	2 to 4	-.40	.68	-1.72	.89	.37	.54
	3 to 4	-.82	.68	-2.16	.46	1.56	.21
	2 to 3	-.42	.67	-1.73	.86	0.42	.52
Block chocolate							
LPQ	1 to 2	.45	1.12	-1.67	2.92	.18	.67
	1 to 4	1.36	1.71	-1.63	6.37	.78	.38
	2 to 4	1.82	1.62	-.78	6.77	1.77	.18
	3 to 4	1.44	1.61	-1.14	6.39	1.08	.30
	2 to 3	-.38	.97	-2.33	1.58	.16	.69
HPQ	1 to 2	.00	.84	-1.66	1.66	.00	1.00
	1 to 4	-.20	.80	-1.81	1.34	.07	.80
	2 to 4	-.20	.80	-1.81	1.34	.07	.80
	3 to 4	-.82	1.03	-3.19	1.00	.73	.39
	2 to 3	-.62	1.06	-3.03	1.31	.38	.54
Dishwashing liquid							
LPQ	1 to 2	-1.73	1.58	-6.65	.69	1.79	.18
	1 to 4	-.38	.84	-2.04	1.28	.21	.65
	2 to 4	-2.10	1.59	-7.03	.33	2.77	.10
	3 to 4	-.30	.84	-1.96	1.37	.13	.72
	2 to 3	1.81	1.58	-.61	6.73	1.98	.16
HPQ	1 to 2	-.32	.68	-1.63	.99	.23	.63
	1 to 4	1.13	.76	-.30	2.70	2.40	.12
	2 to 4	.82	.75	-.59	2.36	1.29	.26
	3 to 4	1.31	.72	-.01	2.82	3.80	.05
	2 to 3	.49	.62	-.69	1.73	.66	.42
Laundry powder							
LPQ	1 to 2	-.35	1.23	-2.93	2.22	.09	.77
	1 to 4	1.49	1.70	-1.50	6.50	.95	.33
	2 to 4	1.14	1.69	-1.84	6.14	.54	.46
	3 to 4	1.62	1.71	-1.37	6.63	1.12	.29
	2 to 3	.48	1.23	-2.10	3.07	.16	.69
HPQ	1 to 2	-.12	.99	-2.10	1.86	.02	.90
	1 to 4	-.73	.95	-2.67	1.08	.63	.43
	2 to 4	-.85	.94	-2.78	0.95	.87	.35
	3 to 4	-.79	.95	-2.73	1.01	.75	.39
	2 to 3	.06	.98	-1.91	2.03	.00	.95
Orange juice							
LPQ	1 to 2	.82	1.70	-2.17	5.82	0.27	0.60
	1 to 4	.32	2.07	-4.92	5.56	0.03	0.87
	2 to 4	1.14	1.69	-1.84	6.14	0.54	0.46
	3 to 4	1.48	1.70	-1.51	6.48	0.93	0.34
	2 to 3	.34	1.23	-2.24	2.91	.08	.78

	Position	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
HPQ	1 to 2	.80	.78	-.68	2.40	1.12	.29
	1 to 4	-.90	.76	-2.47	.52	1.52	.22
	2 to 4	-.10	.70	-1.48	1.25	.02	.88
	3 to 4	-.80	.77	-2.37	.63	1.18	.28
	2 to 3	-.70	.79	-2.30	.79	0.84	.36
Paper towels							
LPQ	1 to 2	-.22	.92	-2.12	1.55	.06	.81
	1 to 4	-.05	.80	-1.66	1.50	.00	.95
	2 to 4	-.26	.88	-2.11	1.38	.09	.76
	3 to 4	-.76	.86	-2.59	.85	.85	.36
	2 to 3	-.50	.97	-2.46	1.46	.27	.60
HPQ	1 to 2	-1.03	.68	-2.41	0.24	2.52	.11
	1 to 4	.11	.61	-1.06	1.29	.04	.85
	2 to 4	-.92	.69	-2.31	0.37	1.93	.17
	3 to 4	.50	.63	-.71	1.74	.66	.42
	2 to 3	1.42	.70	.11	2.85	4.55	.3
Shampoo							
LPQ	1 to 2	.33	2.06	-4.91	5.57	.03	.87
	1 to 4	-.38	2.07	-5.62	4.86	.04	.85
	2 to 4	-.05	2.08	-5.29	5.19	.00	.98
	3 to 4	.87	1.70	-2.12	5.88	.31	.58
	2 to 3	.92	1.70	-2.07	5.93	.35	.56
HPQ	1 to 2	-1.29	1.70	-6.29	1.70	.70	.40
	1 to 4	1.37	1.70	-1.62	6.37	.79	.37
	2 to 4	.08	2.06	-5.16	5.32	.00	.97
	3 to 4	1.14	1.69	-1.84	6.14	.54	.46
	2 to 3	1.06	1.69	-1.93	6.06	.46	.50

Appendix C Firth logistic regression analysis of SB choice in LPR and HPR consumers – Facing test

	Facings	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
Canned tomatoes							
LPR	3 to 6	-.14	.57	-1.23	.97	.06	.80
	3 to 12	.15	.68	-1.16	1.46	.05	.82
	6 to 12	.29	.61	-.89	1.45	.24	.63
HPR	3 to 6	-1.07	.89	-2.94	.66	1.51	.22
	3 to 12	-.34	.84	-2.00	1.32	.17	.68
	6 to 12	.74	.88	-.98	2.59	.73	.39
Block chocolate							
LPR	3 to 6	-.26	.69	-1.58	1.14	.14	.71
	3 to 12	-.59	.88	-2.44	1.05	.49	.49
	6 to 12	-.33	.82	-2.10	1.15	.18	.67
HPR	3 to 6	1.31	1.55	-1.00	6.21	1.02	.31
	3 to 12	1.56	1.62	-1.03	6.51	1.27	.26
	6 to 12	.25	.85	-1.56	1.85	0.09	.76
Dishwashing liquid							
LPR	3 to 6	.17	.64	-1.02	1.49	.07	.79
	3 to 12	-.77	.88	-2.62	.88	.82	.37
	6 to 12	-.93	.77	-2.64	.41	1.76	.19
HPR	3 to 6	1.35	.95	-0.26	3.64	2.60	.11
	3 to 12	.67	1.09	-1.42	3.12	.41	.52
	6 to 12	-.67	.79	-2.42	.76	.80	.37
Laundry powder							
LPR	3 to 6	-.27	.64	-1.49	1.00	.19	.66
	3 to 12	-.07	.75	-1.55	1.37	.01	.92
	6 to 12	.20	.68	-1.17	1.48	.09	.76
HPR	3 to 6	-2.65	1.56	-7.58	-.24	4.77	.03
	3 to 12	-1.26	1.04	-3.66	.64	1.67	.20
	6 to 12	1.39	1.68	-1.58	6.39	0.83	.36
Orange juice							
LPR	3 to 6	.10	.62	-1.09	1.35	.03	.87
	3 to 12	.17	.73	-1.28	1.59	.06	.81
	6 to 12	.07	.68	-1.30	1.34	.01	.91
HPR	3 to 6	-1.51	1.09	-3.95	.58	2.06	.15
	3 to 12	.23	.91	-1.53	2.12	.07	.80
	6 to 12	1.74	1.03	-0.14	4.12	3.29	.07
Paper towels							
LPR	3 to 6	.44	.55	0.60	1.52	.69	.41
	3 to 12	-.13	.63	-1.35	1.09	.04	.84
	6 to 12	-.57	.56	-1.69	.50	1.08	.30
HPR	3 to 6	-.57	.75	-2.00	.98	.57	.45
	3 to 12	-.11	.84	-1.78	1.56	.02	.90
	6 to 12	.46	.75	-1.08	1.88	.38	.54
Shampoo							
LPR	3 to 6	.25	1.69	-2.73	5.25	.02	.88
	3 to 12	-.19	2.07	-5.43	5.05	.01	.93
	6 to 12	-.44	1.68	-5.44	2.53	.08	.78
HPR	3 to 6	.70	1.68	-2.27	5.70	.20	.66
	3 to 12	1.29	1.69	-1.69	6.29	.71	.40
	6 to 12	.59	1.20	-1.96	3.15	.25	.62

Appendix D

Firth logistic regression analysis of SB choice in LPR and HPR consumers - Position test

	Position	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
Canned tomatoes							
LPR	1 to 4	-.25	.66	-1.52	1.01	0.15	.70
	2 to 4	-.71	.65	-2.00	.52	1.27	.26
	3 to 4	-.81	.68	-2.16	.47	1.53	.22
	1 to 2	-.47	.69	-1.81	.85	.48	.49
	2 to 3	-.10	.71	-1.48	1.27	.02	.89
HPR	1 to 4	1.25	1.02	-.55	3.61	1.80	.18
	2 to 4	.10	1.23	-2.48	2.67	.01	.94
	3 to 4	.56	1.10	-1.54	3.01	.28	.60
	1 to 2	-1.15	1.02	-3.52	0.65	1.51	.22
	2 to 3	.46	1.11	-1.64	2.92	0.19	.67
Block chocolate							
LPR	1 to 4	.17	.80	-1.45	1.71	.04	.83
	2 to 4	.17	.80	-1.45	1.71	.04	.83
	3 to 4	-.91	1.01	-3.27	.88	.94	.33
	1 to 2	.00	.86	-1.69	1.69	.00	1.00
	2 to 3	-1.08	1.06	-3.49	.85	1.18	.28
HPR	1 to 4	.89	1.71	-2.10	5.90	.32	.57
	2 to 4	1.36	1.63	-1.23	6.31	.94	.33
	3 to 4	1.45	1.63	-1.14	6.40	1.08	.30
	1 to 2	.47	1.10	-1.63	2.92	.19	.66
	2 to 3	.09	.97	-1.86	2.05	.01	.92
Dishwashing liquid							
LPR	1 to 4	.38	.64	-.83	1.64	.37	.54
	2 to 4	-.03	.71	-1.41	1.33	.00	.97
	3 to 4	.15	.63	-1.04	1.38	.06	.81
	1 to 2	-.41	.67	-1.74	.85	.40	.53
	2 to 3	.18	.66	-1.07	1.49	.08	.78
HPR	1 to 4	-1.10	1.69	-6.10	1.88	.50	.48
	2 to 4	-.12	1.21	-2.68	2.44	.01	.92
	3 to 4	1.03	1.05	-.87	3.43	1.11	.29
	1 to 2	.98	1.69	-2.00	5.98	.40	.53
	2 to 3	1.15	1.04	-0.74	3.55	1.40	.24
Laundry powder							
LPR	1 to 4	.76	.92	-.95	2.67	.75	.39
	2 to 4	-.45	.99	-2.43	1.54	.21	.65
	3 to 4	-.08	1.01	-2.08	1.93	.01	.94
	1 to 2	-1.21	0.90	-3.09	.47	1.99	.16
	2 to 3	.37	0.99	-1.61	2.35	.15	.70
HPR	1 to 4	-1.10	1.70	-6.11	1.89	.50	.48
	2 to 4	.05	1.22	-2.52	2.62	.00	97
	3 to 4	.15	1.23	-2.42	2.73	.02	.90
	1 to 2	1.15	1.70	-1.84	6.15	.55	.46
	2 to 3	.10	1.23	-2.47	2.68	.01	.93
Orange juice							
LPR	1 to 4	-.50	.77	-2.07	.94	.45	.50
	2 to 4	-.11	.66	-1.39	1.17	.03	.87
	3 to 4	-.11	.73	-1.56	1.28	.02	.88
	1 to 2	.39	.76	-1.04	1.96	.28	.60
	2 to 3	.00	.73	-1.45	1.38	.00	1.00
Paper towels							
LPR	1 to 4	.34	.63	-.87	1.56	.31	.58
	2 to 4	-1.00	.73	-2.53	.34	2.09	.15
	3 to 4	.39	.58	-.73	1.53	.47	.49
	1 to 2	-1.34	.77	-2.92	.07	3.47	.06
	2 to 3	1.39	.73	.07	2.92	4.24	.04
HPR	1 to 4	.07	.79	-1.47	1.67	.01	.93

	Position	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
	2 to 4	-.05	.84	-1.71	1.61	.00	.95
	3 to 4	-.95	1.05	-3.34	0.96	.92	.34
	1 to 2	-.12	.79	-1.72	1.41	.02	.88
	2 to 3	-.90	1.05	-3.29	1.01	.83	.36
Shampoo							
LPR	1 to 4	1.01	1.70	-1.97	6.02	.43	.52
	2 to 4	.20	2.08	-5.05	5.44	.01	.92
	3 to 4	.90	1.69	-2.08	5.90	.33	.57
	1 to 2	-.82	1.70	-5.82	2.17	.27	.60
	2 to 3	.70	1.70	-2.28	5.71	.20	.66
HPR	1 to 4	.00	2.07	-5.24	5.24	.00	1.00
	2 to 4	-.12	2.06	-5.36	5.12	.00	.95
	3 to 4	1.24	1.70	-1.75	6.24	.64	.42
	1 to 2	-.12	2.06	-5.36	5.12	.00	.95
	2 to 3	1.36	1.69	-1.63	6.36	.78	.38

HPR consumers did not choose store brands of orange juice.

Appendix E Firth logistic regression analysis of SB choice in LPRC and HPRC consumers - Facings test

	Facing	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
Canned tomatoes							
LPRC	3 to 6	-.26	.60	-1.42	.93	.20	.66
	3 to 12	.22	.67	-1.08	1.53	.11	.74
	6 to 12	.48	.59	-.68	1.62	.68	.41
HPRC	3 to 6	-.47	.63	-1.69	.76	.58	.45
	3 to 12	-.84	.76	-2.40	.58	1.33	.25
	6 to 12	-.37	.72	-1.87	.97	.27	.60
Block chocolate							
LPRC	3 to 6	.23	.71	-1.07	1.72	.12	.74
	3 to 12	-.60	.91	-2.49	1.15	.46	.50
	6 to 12	-.83	.78	-2.56	.54	1.33	.25
HPRC	3 to 6	-.77	1.20	-3.32	1.78	.41	.52
	3 to 12	.71	1.10	-1.40	3.16	.44	.51
	6 to 12	1.48	1.09	-0.61	3.92	1.98	.16
Dishwashing liquid							
LPRC	3 to 6	.88	.61	-.24	2.16	2.32	.13
	3 to 12	-.20	.80	-1.82	1.35	.07	.80
	6 to 12	-1.08	.67	-2.51	.12	3.08	.08
HPRC	3 to 6	.49	1.00	-1.28	2.83	.26	.61
	3 to 12	.51	1.10	-1.58	2.96	.23	.63
	6 to 12	.02	.85	-1.79	1.62	.00	.98
Laundry powder							
LPRC	3 to 6	-.98	.68	-2.30	.35	2.14	.14
	3 to 12	-.48	.76	-1.98	.97	.42	.52
	6 to 12	.51	.69	-.89	1.83	.54	.46
HPRC	3 to 6	-.74	.89	-2.60	.98	.72	.40
	3 to 12	-.93	1.04	-3.32	.96	.91	.34
	6 to 12	-.20	1.09	-2.64	1.88	.04	.85
Orange juice							
LPRC	3 to 6	-.42	.63	-1.64	.85	.45	.50
	3 to 12	-.34	.72	-1.77	1.05	.23	.63
	6 to 12	.08	.66	-1.27	1.33	.02	.90
HPRC	3 to 6	-.53	.95	-2.46	1.40	.32	.57
	3 to 12	.80	.92	-.96	2.71	.81	.37
	6 to 12	1.33	.91	-.41	3.22	2.28	.13
Paper towels							
LPRC	3 to 6	.07	.58	-1.04	1.22	.02	.90
	3 to 12	-1.04	.77	-2.62	.38	2.04	.15
	6 to 12	-1.11	.69	-2.58	.14	3.00	.08
HPRC	3 to 6	-.46	.58	-1.58	.70	.63	.43
	3 to 12	.19	.63	-1.03	1.44	.10	.76
	6 to 12	.65	.57	-0.46	1.75	1.35	.25
Shampoo							
LPRC	3 to 6	1.15	1.60	-1.41	6.09	.66	.42
	3 to 12	1.02	1.69	-1.95	6.03	.44	.51
	6 to 12	-.12	1.08	-2.55	1.95	.01	.91

HPRC consumers did not choose store brands of shampoo.

Appendix F Firth logistic regression analysis of SB choice in LPRC and HPRC consumers - Position test

	Position	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
	Canned tomatoes						
LPRC	1 to 2	-.05	.70	-1.41	1.28	.01	.95
	1 to 4	-.07	.62	-1.27	1.13	.01	.91
	2 to 4	-.11	.70	-1.49	1.22	.03	.87
	3 to 4	-.68	.66	-2.00	.58	1.11	.29
	2 to 3	-.57	.74	-2.00	.85	.63	.43
HPRC	1 to 2	-.82	.91	-2.72	.94	.86	.36
	1 to 4	-.16	.79	-1.75	1.33	.04	.84
	2 to 4	-.98	.84	-2.78	.57	1.51	.22
	3 to 4	-.56	.86	-2.38	1.02	.47	.50
	2 to 3	.42	.98	-1.55	2.38	.19	.66
	Block chocolate						
LPRC	1 to 2	-.19	.86	-1.88	1.50	.05	.82
	1 to 4	.10	.81	-1.53	1.66	.01	.91
	2 to 4	-.09	.80	-1.71	1.45	.01	.91
	3 to 4	-.54	.87	-2.38	1.09	.41	.52
	2 to 3	-.45	.91	-2.34	1.31	.25	.62
HPRC	1 to 2	.60	1.10	-1.50	3.05	.32	.57
	1 to 4	1.01	1.70	-1.98	6.02	.42	.52
	2 to 4	1.61	1.62	-.97	6.56	1.37	.24
	3 to 4	1.01	1.70	-1.98	6.02	.42	.52
	2 to 3	-.60	1.10	-3.05	1.50	.32	.57
	Dishwashing liquid						
LPRC	1 to 2	-.67	.78	-2.26	.80	.79	.37
	1 to 4	-.05	.69	-1.40	1.27	.01	.94
	2 to 4	-.72	.75	-2.28	.69	1.00	.32
	3 to 4	.17	.62	-1.03	1.40	.07	.79
	2 to 3	.89	.72	-0.44	2.40	1.68	.20
HPRC	1 to 2	-.27	.76	-1.84	1.17	.14	.71
	1 to 4	1.17	.99	-.55	3.50	1.70	.19
	2 to 4	.90	1.05	-1.01	3.29	.83	.36
	3 to 4	1.20	1.02	-.60	3.56	1.65	.20
	2 to 3	.30	.80	-1.24	1.91	.15	.70
	Laundry powder						
LPRC	1 to 2	-2.34	1.58	-7.27	.08	3.55	.06
	1 to 4	.85	1.07	-1.08	3.26	.72	.40
	2 to 4	-1.49	1.70	-6.50	1.50	.95	.33
	3 to 4	.96	1.14	-1.19	3.46	.79	.38
	2 to 3	2.46	1.63	-.16	7.42	3.36	.07
HPRC	1 to 2	.85	1.07	-1.08	3.26	.72	.40
	1 to 4	-.34	1.12	-2.81	1.77	.10	.75
	2 to 4	.50	.92	-1.25	2.40	.32	.57
	3 to 4	-.65	1.10	-3.11	1.45	.38	54
	2 to 3	-1.16	1.05	-3.56	.75	1.39	.24
	Orange juice						
LPRC	1 to 2	.59	.86	-1.03	2.42	.50	.48
	1 to 4	-.79	.84	-2.59	0.76	.98	.32
	2 to 4	-.20	.72	-1.64	1.19	.08	.78
	3 to 4	-.45	.76	-2.02	1.00	.37	.54
	2 to 3	-.25	.79	-1.85	1.28	.11	.75
HPRC	1 to 2	-.10	.97	-2.06	1.86	01	.91
	1 to 4	.56	1.11	-1.55	3.02	.28	.60
	2 to 4	.46	1.11	-1.64	2.92	.19	.67
	3 to 4	.23	1.24	-2.35	2.81	.04	.85
	2 to 3	-.23	1.12	-2.70	1.89	.05	.83
	Paper towels						
LPRC	1 to 2	.01	.76	-1.48	1.48	.00	.98

	Position	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
	1 to 4	.00	.72	-1.40	1.40	.00	1.00
	2 to 4	.01	.76	-1.48	1.48	.00	.98
	3 to 4	.17	.70	-1.18	1.54	.06	.81
	2 to 3	.15	.74	-1.26	1.62	.05	.83
HPRC	1 to 2	-1.55	.80	-3.30	-.12	4.56	.03
	1 to 4	.28	.60	-0.89	1.46	.22	.64
	2 to 4	-1.27	.80	-3.03	.17	2.94	.09
	3 to 4	-.19	.63	-1.42	1.02	.09	.76
	2 to 3	1.08	.81	-.40	2.85	2.01	.16
Shampoo							
LPRC	1 to 2	.26	2.07	-4.98	5.50	.02	.90
	1 to 4	-.04	2.06	-5.27	5.20	.00	.99
	2 to 4	.22	2.07	-5.02	5.46	.01	.91
	3 to 4	1.65	1.61	-.92	6.60	1.46	.23
	2 to 3	1.43	1.62	-1.15	6.38	1.06	.30
HPRC	1 to 2	-1.14	1.69	-6.14	1.84	.54	46
	1 to 4	.97	1.70	-2.02	5.97	.39	.54
	2 to 4	-.17	2.07	-5.41	5.07	.01	.93
	3 to 4	-.13	2.07	-5.37	5.11	.00	.95
	2 to 3	.04	2.06	-5.20	5.28	.00	.98

Appendix G Firth logistic regression analysis of SB choice in non-buyers, light buyers, medium buyers and heavy buyers of store brands - Facing test

	Facings	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
Canned tomatoes							
Non-buyers	3 to 6	-1.65	1.70	-6.65	1.34	1.16	.28
	3 to 12	-1.32	1.71	-6.33	1.68	.73	.39
	6 to 12	.33	2.06	-4.91	5.57	.03	.87
Light buyers	3 to 6	.00	.83	-1.54	1.63	.00	1.00
	3 to 12	-.65	1.06	-2.73	1.31	.42	.52
	6 to 12	-.65	.87	-2.47	.90	.64	.42
Medium buyers	3 to 6	-.67	1.00	-2.68	1.20	.50	.48
	3 to 12	.76	1.06	-1.19	2.80	.59	.44
	6 to 12	1.44	1.10	-.56	3.61	2.00	.16
Heavy buyers	3 to 6	-.96	1.02	-2.98	.87	1.04	.31
	3 to 12	-.34	1.09	-2.46	1.68	.11	.74
	6 to 12	.62	.95	-1.12	2.46	.48	.49
Block chocolate							
Non-buyers	3 to 6	1.13	1.56	-1.25	6.05	.71	.40
	3 to 12	1.02	1.69	-1.95	6.03	.44	.51
	6 to 12	-.11	1.02	-2.48	1.75	.01	.91
Light buyers	3 to 6	-.51	.98	-2.33	1.44	.30	.59
	3 to 12	-.31	1.12	-2.46	1.83	.09	.77
	6 to 12	.20	.94	-1.72	1.95	.05	.83
Medium buyers	3 to 6	-.49	1.32	-2.87	2.14	.16	.69
	3 to 12	-.25	1.50	-3.09	2.57	.03	.85
	6 to 12	.24	1.27	-2.36	2.55	.04	.84
Heavy buyers	3 to 6	1.30	1.73	-1.66	4.48	.78	.38
	3 to 12	.20	2.52	-4.98	3.76	.01	.92
	6 to 12	-1.10	2.71	-6.42	2.65	.32	.57
Dishwashing liquid							
Non-buyers	3 to 6	-.42	.94	-2.34	1.50	.21	.65
	3 to 12	-.55	1.08	-2.98	1.53	.27	.60
	6 to 12	-.12	1.08	-2.55	1.95	.01	.91
Light buyers	3 to 6	1.78	.99	.13	4.10	4.53	.03
	3 to 12	1.06	1.23	-1.20	3.64	.86	.36
	6 to 12	-.72	.90	-2.56	.87	.76	.38
Medium buyers	3 to 6	-1.10	1.42	-3.87	1.64	.69	.41
	3 to 12	.06	1.36	-2.38	2.74	.00	.96
	6 to 12	1.16	1.22	-1.09	3.73	1.04	.31
Heavy buyers	3 to 6	.00	1.58	-2.79	2.79	.00	1.00
	3 to 12	-1.10	2.71	-6.42	2.65	.32	.57
	6 to 12	-1.10	2.42	-6.19	2.10	.43	.51
Laundry powder							
Non-buyers	3 to 6	-.45	1.20	-3.00	2.10	.14	.71
	3 to 12	-.11	1.21	-2.66	2.45	.01	.93
	6 to 12	.34	1.20	-2.21	2.89	.08	.77
Light buyers	3 to 6	-1.83	1.09	-3.98	.13	3.34	.07
	3 to 12	-1.13	1.22	-3.50	1.04	1.03	.31
	6 to 12	.70	1.02	-1.30	2.62	.51	.47
Medium buyers	3 to 6	-.96	1.15	-3.17	1.10	.83	.36
	3 to 12	-1.95	2.10	-7.05	1.06	1.51	.22
	6 to 12	-.99	2.02	-6.02	1.88	.40	.53
Heavy buyers	3 to 6	-.20	2.52	-3.76	4.98	.01	.92
	3 to 12	1.10	2.71	-2.65	6.42	.32	.57
	6 to 12	1.30	1.73	-1.66	4.48	.78	.38
Orange juice							
Non-buyers	3 to 6	-.64	1.20	-3.19	1.91	.29	.59
	3 to 12	1.26	1.05	-.65	3.67	1.66	.20
	6 to 12	1.90	1.04	.01	4.29	3.88	.05

	Facings	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
Light buyers	3 to 6	.14	1.11	-1.77	2.57	.02	.89
	3 to 12	-1.41	1.85	-6.47	1.71	.77	.38
	6 to 12	-1.55	1.64	-6.48	.83	1.42	.23
Medium buyers	3 to 6	-.45	1.22	-2.75	1.80	.16	69
	3 to 12	-1.13	1.33	-3.82	1.24	.88	.35
	6 to 12	-.68	1.27	-3.29	1.62	.34	.56
Heavy buyers	3 to 6	-.51	1.34	-3.19	1.88	.18	.68
	3 to 12	.59	1.65	-2.29	3.52	.18	.67
	6 to 12	1.10	1.75	-1.89	4.29	.55	.46
Paper towels							
Non-buyers	3 to 6	.87	1.60	-1.56	5.80	.39	.53
	3 to 12	1.03	1.74	-1.99	6.05	.43	.51
	6 to 12	.16	1.05	-2.24	2.06	.02	.88
Light buyers	3 to 6	.06	.64	-1.17	1.32	.01	.92
	3 to 12	-.78	.80	-2.40	.71	1.05	.31
	6 to 12	-.84	.74	-2.37	.50	1.46	.23
Medium buyers	3 to 6	-.21	.79	-1.73	1.29	.08	.78
	3 to 12	-.37	.90	-2.10	1.32	.18	.67
	6 to 12	-.16	.80	-1.71	1.35	.04	.84
Heavy buyers	3 to 6	.00	1.28	-2.37	2.37	.00	1.00
	3 to 12	.34	1.35	-2.09	2.83	.08	.78
	6 to 12	.34	1.35	-2.09	2.83	.08	.78
Shampoo							
Light buyers	3 to 6	0.86	1.81	-2.22	5.90	.28	.59
	3 to 12	1.86	1.91	-1.31	6.95	1.31	.25
	6 to 12	1.00	1.43	-1.74	3.78	.57	.45
Medium buyers	3 to 6	.00	2.53	-3.57	5.19	.00	1.00
	3 to 12	-1.30	2.82	-6.75	4.11	.34	.56
	6 to 12	-1.30	1.92	-6.38	1.87	0.62	.43

Non-buyers and heavy buyers of store brands did not choose store brands of shampoo.

Appendix H Firth logistic regression analysis of SB choice in non-buyers, light buyers, medium buyers and heavy buyers of store brands - Position test

	Position	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
Canned tomatoes							
Non-buyers	1 to 2	.22	2.11	-5.04	5.47	.01	.92
	1 to 4	.33	2.09	-4.92	5.57	.03	.87
	2 to 4	.54	2.10	-4.71	5.79	.07	.79
	3 to 4	1.64	1.72	-1.37	6.66	1.14	.29
	2 to 3	1.10	1.75	-1.93	6.12	.49	.49
Light buyers	1 to 2	.42	1.11	-1.56	2.87	.17	.68
	1 to 4	-1.72	1.06	-4.12	.08	3.49	.06
	2 to 4	-1.30	.80	-2.93	.18	2.95	.09
	3 to 4	-1.15	.81	-2.79	.34	2.26	.13
	2 to 3	.15	.88	-1.56	1.86	.03	.86
Medium buyers	1 to 2	-1.47	1.22	-4.02	.61	1.88	.17
	1 to 4	1.22	1.27	-0.95	3.80	1.19	.28
	2 to 4	-.25	1.50	-3.09	2.57	.03	.85
	3 to 4	.40	1.31	-1.89	3.02	.11	.74
	2 to 3	.65	1.26	-1.56	3.24	.32	57
Heavy buyers	1 to 2	-1.10	1.32	-3.77	1.18	.87	.35
	1 to 4	-.20	1.43	-2.97	2.56	.02	.88
	2 to 4	-1.30	1.29	-3.95	.94	1.27	.26
	3 to 4	-3.50	1.94	-8.61	-.64	6.11	.01
	2 to 3	-2.20	1.86	-7.23	.56	2.32	.13
Block chocolate							
Non-buyers	1 to 2	1.45	1.61	-1.12	6.40	1.10	.29
	1 to 4	-.94	1.69	-5.94	2.04	.37	.55
	2 to 4	.51	1.09	-1.57	2.95	.24	.63
	3 to 4	-.14	1.20	-2.69	2.42	.01	.91
	2 to 3	-.65	1.08	-3.08	1.43	.38	.54
Light buyers	1 to 2	-.86	1.83	-5.87	1.92	.31	.58
	1 to 4	1.37	1.73	-1.33	6.36	.89	.35
	2 to 4	.51	2.28	-4.79	5.82	.06	.81
	3 to 4	1.75	1.75	-.98	6.75	1.47	.23
	2 to 3	1.24	1.84	-1.57	6.26	.66	.42
Medium buyers	1 to 2	-.62	1.20	-2.90	1.61	.31	.58
	1 to 4	-.67	1.28	-3.11	1.61	.34	.56
	2 to 4	-1.29	1.20	-3.65	.84	1.41	.24
	3 to 4	-2.73	1.86	-7.79	.05	3.68	.06
	2 to 3	-1.44	1.80	-6.45	1.33	.94	.33
Heavy buyers	1 to 2	1.61	2.37	-1.91	s	.78	.38
	1 to 4	.79	2.49	-4.57	6.16	.13	.72
	2 to 4	2.40	2.15	-.97	7.61	1.93	.16
Dishwashing liquid							
Non-buyers	1 to 2	-.47	1.09	-2.91	1.61	.20	.65
	1 to 4	1.65	1.60	-.92	6.59	1.46	.23
	2 to 4	1.17	1.69	-1.80	6.18	.58	.45
	3 to 4	.12	2.06	-5.12	5.35	.00	.95
	2 to 3	-1.06	1.69	-6.06	1.92	.47	.50
Light buyers	1 to 2	.57	1.01	-1.31	2.59	.36	.55
	1 to 4	-.97	.98	-2.96	.83	1.10	.29
	2 to 4	-.39	.94	-2.21	1.36	.20	.66
	3 to 4	-.07	.86	-1.70	1.58	.01	.93
	2 to 3	.33	.89	-1.33	2.06	.15	.70
Medium buyers	1 to 2	-1.69	1.34	-4.42	.59	2.07	.15
	1 to 4	2.05	1.29	-.14	4.75	3.35	.07
	2 to 4	.37	1.42	-2.37	3.12	0.08	.78
	3 to 4	1.27	1.18	-.78	3.79	1.43	.23
	2 to 3	.90	1.23	-1.23	3.46	.66	.42

	Position	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
Heavy buyers	1 to 2	-.76	1.38	-3.49	1.67	.38	.54
	1 to 4	-1.95	2.10	-7.05	1.06	1.51	.22
	2 to 4	-2.71	2.16	-7.88	.37	2.91	.09
	3 to 4	-1.27	2.10	-6.37	1.79	.60	.44
	2 to 3	1.44	1.38	-0.92	4.20	1.40	.24
Laundry powder							
Non-buyers	1 to 2	-.30	2.08	-5.54	4.95	.02	.88
	1 to 4	.30	2.08	-4.95	5.54	.02	.88
	2 to 4	.00	2.07	-5.24	5.24	.00	1.00
	3 to 4	1.70	1.61	-.88	6.65	1.54	.21
	2 to 3	1.70	1.61	-.88	6.65	1.54	.21
Light buyers	1 to 2	-.34	1.27	-2.65	2.25	.08	.78
	1 to 4	1.30	1.92	-1.87	6.38	.62	.43
	2 to 4	.96	1.78	-1.77	5.96	.40	.53
	3 to 4	.79	2.49	-4.57	6.16	.13	.72
	2 to 3	-.17	2.03	-5.22	2.78	.01	.92
Medium buyers	1 to 2	.08	1.47	-2.69	2.67	.00	.95
	1 to 4	-.59	1.31	-3.05	1.78	.25	.62
	2 to 4	-.51	1.56	-3.42	2.18	.14	.71
	3 to 4	-.85	1.48	-3.70	1.72	.42	.52
	2 to 3	-.34	1.62	-3.30	2.59	.06	.81
Heavy buyers	1 to 2	-3.05	2.90	-8.98	.78	2.38	.12
	1 to 4	1.10	2.71	-2.65	6.42	.32	.57
	2 to 4	-1.95	2.25	-7.18	1.49	1.20	.27
	3 to 4	-2.40	2.15	-7.61	.97	1.93	16
	2 to 3	-.45	2.38	-5.79	4.88	.05	.83
Orange juice							
Non-buyers	1 to 2	-.66	1.11	-3.12	1.44	.39	.53
	1 to 4	.66	1.11	-1.44	3.12	.39	.53
	2 to 4	.00	1.22	-2.57	2.57	.00	1.00
	3 to 4	-.77	1.72	-5.78	2.23	.24	.63
	2 to 3	-.77	1.72	-5.78	2.23	.24	.63
Medium buyers	1 to 2	1.22	1.51	-1.58	4.10	.80	.37
	1 to 4	-1.22	1.51	-4.10	1.58	.80	.37
	2 to 4	.00	1.69	-3.02	3.02	.00	1.00
	3 to 4	-.79	1.55	-3.70	2.06	.32	.57
	2 to 3	-.79	1.55	-3.70	2.06	.32	.57
Heavy buyers	1 to 2	3.22	2.68	-.43	9.12	2.91	.09
	1 to 4	-.51	2.16	-5.64	2.82	.08	.77
	2 to 4	2.71	2.16	-.37	7.88	2.91	.09
	3 to 4	-.51	2.16	-5.64	2.82	0.08	.77
	2 to 3	-3.22	2.68	-9.12	0.43	2.91	.09
Paper towels							
Non-buyers	1 to 2	-2.28	1.63	-7.24	.33	2.87	.09
	1 to 4	1.97	1.65	-.66	6.93	2.06	.15
	2 to 4	-.31	2.08	-5.55	4.93	.02	.88
	3 to 4	.75	1.71	-2.25	5.75	.22	.64
	2 to 3	1.06	1.70	-1.93	6.06	.46	.50
Light buyers	1 to 2	-1.01	1.70	-5.98	1.65	.47	.49
	1 to 4	-1.00	.88	-2.86	.60	1.48	.23
	2 to 4	-2.01	1.63	-6.94	.37	2.58	.11
	3 to 4	-.07	.85	-1.74	1.52	.01	.94
	2 to 3	1.95	1.68	-.60	6.91	2.10	.15
Medium buyers	1 to 2	-.62	.95	-2.46	1.12	.48	.49
	1 to 4	1.04	1.12	-.96	3.23	1.03	.31
	2 to 4	.42	1.05	-1.48	2.47	.19	.67
	3 to 4	.59	1.06	-1.33	2.66	.36	.55
	2 to 3	.17	.88	-1.49	1.84	.04	.84
Heavy buyers	1 to 2	.00	1.58	-2.79	2.79	.00	1.00
	1 to 4	-.20	.97	-2.05	1.62	.05	.83
	2 to 4	-.20	1.57	-2.97	2.56	.02	.88
	3 to 4	.65	1.28	-1.56	3.24	.32	.57

	Position	Coefficient	Std. Error	Lower CI	Upper CI	Chi-Square	Sig.
	2 to 3	.85	1.79	-2.19	4.07	.32	.57
Shampoo							
Non-buyers	1 to 2	.19	2.04	-5.04	5.42	.01	.93
	1 to 4	-.16	2.04	-5.39	5.07	.01	.94
	2 to 4	.03	2.05	-5.20	5.26	.00	.99
	3 to 4	1.02	1.67	-1.95	6.01	.43	.51
	2 to 3	.99	1.67	-1.98	5.98	41	52
Light buyers	1 to 2	-.34	1.99	-5.42	2.86	.04	.85
	1 to 4	.79	1.88	-2.34	5.85	.23	.63
	2 to 4	.45	2.38	-4.88	5.79	.05	.83
	3 to 4	-.31	2.25	-5.61	4.98	.02	.88
	2 to 3	-.76	2.34	-6.09	4.56	.13	72
Medium buyers	1 to 2	.00	2.47	-5.36	5.36	.00	1.00
	1 to 4	.45	2.38	-4.88	5.79	.05	.83
	2 to 4	.45	2.38	-4.88	5.79	.05	.83
	3 to 4	1.89	2.01	-1.37	7.02	1.27	.26
	2 to 3	1.44	2.11	-1.89	6.59	.69	.41

Heavy buyers of store brands did not choose store brands of block chocolate when they were placed on the third and the bottom row; Light buyers of store brands did not choose store brands of orange juice; Heavy buyers of store brands did not choose store brands of shampoo.

Appendix I Online survey

This is a survey on how people choose grocery products. Please take your time to read the questions carefully and give the answers that best describe your experience or feeling. There are no right or wrong answers, we are just interested in your opinion. Your responses will be confidential and we do not collect identifying information such as your name, email address or IP address. Please click on the "Agree" button to continue.

- Agree
- Disagree

Thank you for your participation. First are some general questions about your grocery shopping.

1. How much of your household's grocery shopping do you do?
   - None
   - Less than half
   - About half
   - Most or all
2. How many times have you bought the following products within the last 12 months? (Please type a number. If you haven't bought the category or you don't remember, please type "n/a").
   - Canned tomatoes
   - Block chocolate
   - Dishwashing liquid
   - Laundry powder
   - Orange juice
   - Paper towels
   - Shampoo

Next, imagine you are doing your regular grocery shopping. Please look at the shelves and click on the brand you would choose. If you want to deselect that brand, please click on it one more time. Once you finish choosing a brand, please click "Next" to continue.

3. Please look at this shelf of CANNED TOMATOES and click on the brand that you would choose. You can choose one brand only.
   - Ardmona
   - Cento
   - Heinz
   - Woolworths homebrand
   - Annalisa
   - La Gina
   - SPC
   - Val Verde

4. Next, I'd like you to look at this shelf of BLOCK CHOCOLATE. Please click on the brand that you would choose. Again, please choose only one brand.
    - Green & Black
    - Whittakers
    - Lindor
    - Lindt Excellence
    - Dream
    - Dairy Milk
    - Coles
    - Supreme
5. Please look at the shelf of DISHWASHING LIQUID below and click on the brand that you would choose. You can choose only one brand.
    - Morning Fresh
    - Sunlight
    - Ajax
    - Earth choice
    - Palmolive
    - Fairy
    - Ecostore
6. Please look at the shelf of ORANGE JUICE below and click on the brand that you would choose. You can choose only one brand.
    - Just Juice
    - Daily Juice
    - Nippy's
    - Golden Circle
    - Berri
    - Woolworths
    - Ocean Spray
    - Crusta
7. To continue, please look at the shelf of LAUNDRY POWDER below and click on the brand that you would choose. You can choose only one brand.
    - Fab
    - Aware
    - Omo
    - Coles
    - Surf
    - Radiant
    - Biozet Attack
    - Cold Power
8. Next, please look at the shelf of PAPER TOWELS below and click on the brand that you would choose. You can choose only one brand.
    - Viva
    - Maxima
    - Naturale

- Woolworths hombrand
- Ultra Clean
- Tuff Mate
- Quilton
- Safe

9. Please look at the shelf of SHAMPOO below and click on the brand that you would choose. You can choose only one brand.
    - Head & Shoulders
    - Treseme
    - Palmolive
    - Pantene
    - Dove
    - Woolworths homebrand
    - Nature organics fruits
    - Sunsilk

You are doing great! Next, I'd like to ask you some questions about store brands and some products. A store brand is the retailer's own brand and often sold under the retailer's name, for example: Woolworths Select, Woolworths Essentials, Coles, Coles smart buy and Black & Gold. Please click "Next" to continue.

10. How many times have you bought STORE BRANDS of the following products in the last 12 months? (Please estimate if you do not remember exactly)
    - Canned tomatoes
    - Block chocolate
    - Dishwashing liquid
    - Laundry powder
    - Orange juice
    - Paper towels
    - Shampoo
11. Below is a list of statements regarding of what you think about store brands and national brands. A national brand is a brand developed by a manufacturer, for example: Pantene, Quilton, Omo and Sunlight. Please read the statements carefully and indicate your level of agreement with each statement.

	Disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Agree	Don't know
Store brands are of excellent quality overall.						
There is a great difference in overall quality between national brands and store brands.						
There is a great difference in reliability of ingredients						

between national brands and store brands. The purchase of store brand grocery items is risky because the quality of store brands is inferior. Since store brands are of poor quality, buying them is a waste of money. I'm suspicious of the quality of store brands. And now, please click on "Somewhat agree" to continue with the survey.						

12. When you buy these products in supermarkets, how much do you normally spend on them (in dollars and cents) on each occasion? (Please type a number. For example, if you spend $5.30, please type "5.30". If you do not remember, please type: "n/a")
    - Canned tomatoes
    - Block chocolate
    - Dishwashing liquid
    - Laundry powder
    - Orange juice
    - Paper towels
    - Shampoo
13. Please indicate your level of agreement with this statement for each product: "When I choose a brand of this product, it is not a big deal if I make a mistake".

	Disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Agree
Canned tomatoes Block chocolate Dishwashing liquid Laundry powder Orange juice Paper towels Shampoo					

14. Please indicate your level of agreement with this statement for each product: "If I bought a wrong brand of this product, it wouldn't matter much".

	Disagree (1)	Somewhat disagree (2)	Neither disagree nor agree (3)	Somewhat agree (4)	Agree (5)
Canned tomatoes					
Block chocolate					
Dishwashing liquid					
Laundry powder					
Orange juice					
Paper towels					
Shampoo					
And now, please click on "Disagree" to continue.					

15. Please indicate your level of agreement with this statement for each product: "If, after I bought a brand of this product, my choice proved to be wrong, I would be very upset".

	Disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Agree
Canned tomatoes					
Block chocolate					
Dishwashing liquid					
Laundry powder					
Orange juice					
Paper towels					
Shampoo					

16. Please indicate your level of agreement with this statement for each product: "When I am choosing a brand of this product, I make that choice very carefully".

	Disagree	Somewhat agree	Neither disagree nor agree	Somewhat agree	Agree
Canned tomatoes					
Block chocolate					
Dishwashing liquid					
Laundry powder					
Orange juice					
Paper towels					
Shampoo					

17. Please rate the quality of store brands of the following products.

	Very poor	Poor	Fair	Good	Very good	Don't know
Canned tomatoes						
Block chocolate						
Dishwashing liquid						
Orange juice						
Laundry powder						
Paper towels						
Shampoo						

Thank you for your participation so far. Next are some more general questions about you. Please click "Next" to continue.

18. What is the postcode for where you live?
19. And are you...? (Please circle correct option)
    - Male (1)
    - Female (2)
20. Which category below captures your age?
    - 18-24 (1)
    - 25-34 (2)
    - 35-44 (3)
    - 45-54 (4)
    - 55-64 (5)
    - 65 and above (6)
21. Are you...?
    - Single (1)
    - Married/De facto (2)
    - Widowed (3)
    - Divorced (4)
    - Other (5)
22. What is your present occupation?
    - Professional/technical (1)
    - Manager/Officer/Proprietor (2)
    - Clerical (3)
    - Sales (4)
    - Tradesperson (5)
    - Machine operator (6)
    - Labourer (7)
    - Service worker (8)
    - Retired (9)

- Homemaker (10)
- Student (11)
- Unemployed (12)
- Other (13)

23. What is your highest level of education completed?
    - High school (1)
    - TAFE (2)
    - University (3)
    - Post graduate university (4)
    - Other (5)
24. Please indicate your approximate total yearly household income before taxes. (Include total income of all adults living in your household)
    - Under $25,000 (1)
    - $25,001 - $49,999 (2)
    - $50,000 - $74,999 (3)
    - $75,000 - $99,999 (4)
    - $100,000 -$149,999 (5)
    - $150,000 and over (6)
25. Including yourself, how many people live in your household?
    - One (1)
    - Two (2)
    - Three (3)
    - Four (4)
    - Five or more (5)