
A Behavioral Approach for Comparing Supermarket Brands in Individual Decision Making

Bachelor Graduation Thesis

Chong Peng - 4 August 2016

Erasmus School of Economics

International bachelor of Economics and Business Economics

Class of 2013

Summary

This paper investigates individual preferences for different supermarket brands using people's willingness to travel as a proxy for their strength of preference. A survey is designed ad hoc to study the ratings of participants for the biggest two supermarket chains—Albert Heijn and Jumbo, on price, store image, promotion, own brands and status quo bias, using 7-point Likert Scales. These ratings were used to understand what contributes to people's preference for a certain supermarket brand. Results show that the determinants for supermarket brand preference and for maximum biking distance to the preferred supermarket, given that another chain store is right within reach, are not the same. Moreover, people who prefer a particular supermarket brand are not necessarily willing to spend more time to go there, which is different from what classical economics theory predict.

Table of Contents

Table of Contents	1
Introduction	2
Literature Review	3
2.1 Price.....	3
2.2 Store Image (service, store design, layout and merchandise)	4
2.3 Promotion	5
2.4 Store-brands	6
2.5 Status Quo Bias	7
Research Design and Data	8
3.1 Case study—two supermarkets in the Netherlands.....	8
3.1.1 Albert Heijn	8
3.1.2 Jumbo	9
3.1.3 Albert Heijn and Jumbo Comparison	9
3.2 Survey design.....	9
3.3. Survey Data	11
Methodology	14
Results	15
Conclusion	19
Appendix	21
Bibliography	31

Introduction

There has been a growing literature on the level of individual spatial decision making through behavioral economics methodologies since the identification of behavior in the economic sense got widely recognized last century (cf. Cadwallader, 1975; Downs, 1970; Golledge, A., & F., 1972). Especially, Cadwallader (1975) substantiated the claim that using subjectively measured variables to understand consumer spatial behavior is better than in terms of their more objective counterparts.

Behavioral theories are also being widely used for retailer industry to help better understand consumer behavior and adjust business strategies accordingly. It is now well-recognized that when a consumer goes to a supermarket, many things other than his pure commodity need will influence his decisions, from which supermarket to go, what brand to buy, to shopping frequency and purchase amount. Even music, which is generally thought of as an entertainment medium, can significantly influence both the pace of in-store traffic flow and the daily gross sales volume purchased by consumers (Milliman, 1982). Other factors, such as price, supermarket design, service and quality are also well-investigated for their impact on individual consumer decision makings when a specific supermarket brand is chosen. However, there are not many researches currently available that vertically compare the overall impact of these factors on consumer decision making between different supermarkets.

Based on several judging criteria for supermarkets, how would a customer rate his degree of affinity toward a specific supermarket brand? What would be the most important factor to impact on a customer's preference to supermarkets? How much time is he willing to sacrifice in order to go to his preferable supermarket, instead of a less preferred one downstairs? Questions like these are of great value and importance for supermarket retailers to understand consumer preferences but have not been thoroughly studied in the supermarket industry yet, which leads to the aim and interest of this paper. The **research question** is thus formulated as follow:

How can behavioral economics be applied to explain individual consumer decision making for comparing different supermarket brands?

Based on existing studies on specific influencing factors, and consumer data collected by survey, this paper tries to investigate the abovementioned research question with sub-hypotheses about potential influencing factors.

The remaining of this paper is structured as follows: firstly, a literature review will be shown to explain the relevance and contribution of this study to existing researches; after that, research design and survey data will be elaborated. Methodology for the data analysis and the according result will follow afterwards. In the final part conclusion will be drawn on the result of the hypotheses. Limitations of this study as well as future suggestions will be discussed at the end.

Literature Review

2.1 Price

Economic concepts being relevant to and may be profitably used by research in behavioral analysis is one of the fundamental tenets of behavioral economics (Hursh, 1984). For example, demand has been one of the most useful and frequently adopted concept in behavioral economics analysis (Foxall, Schrezenmaier, & Oliveira-Castro, 2006). The analysis of demand is usually based on the parameters of demand curves to regress quantity of a commodity on its price (negatively correlated by economic law), with elasticity and intensity being the two main parameters (Hursh, 1984). The analyses of Foxall, Schrezenmaier and Oliveira-Castro (2006) proved the predictions from economic theory and behavioral economics for demand elasticity coefficients. Moreover, they argued that individual differences in demand elasticity are relatively consistent across time, which indicates that consumers' preference is stationary and valid overtime. Therefore, it can be deduced from the previous analyses of demand that, leaving out income effect, if the price in a supermarket is relatively high, consumers will demand less commodities from this supermarket, and are therefore less willing to go there. This leads to the first hypothesis of this paper:

Hypothesis 1: Price level negatively influences consumers' affinity for a supermarket brand.

Nevertheless, some studies have shown that information attention and retention are imperfect for grocery shoppers when making purchasing decisions (Dickson & Sawyer, 1990). Moreover, their findings showed that price did not play an important in purchase decision making. More than half of the shoppers could not recall the price of the item they had just placed in their shopping basket, and less than half were aware that the product they selected was selling at a discounted price (Dickson & Sawyer, 1990), which seems contrary to the classical economic theories.

2.2 Store Image (service, store design, layout and merchandise)

Although price impact seems to have a strong theoretical support, there are other voices rising against price having a large influence on supermarket choice, a compelling one among which is from Sirohi, Mclaughlin and Wittink (1998) at Cornell University. In this paper, they used reliable data collected by a selected market research supplier for a large, east coast supermarket chain via phone interviews of 16,096 shoppers in the United States. Moreover, they used Lohmoller's (1981) Partial-Least-Squares (PLS) algorithm to estimate the model parameters. Their results indicated that price did not play an important role in customers' perceptions of merchandise quality, especially when other cues were readily available to consumers. Instead, service quality was claimed to be the most critical determinant of merchandise quality perception by far (Sirohi, Mclaughlin, & Wittink, 1998). A good service provision and facility design by customer-contact employees could enhance the consumers' perceptions of overall merchandise quality, which have significant impacts on overall customer store loyalty intentions. This finding also complies with the result of an earlier interview with supermarket customer representatives in the United States, which indicated that an average customer cared much about the lack of human contact, the problems of locating items, and the discourteous service (Lozar, 1974).

As a consequence of diversity in marketing strategy, store design and commitment to serving customers' needs, store image perceptions across supermarkets vary in a large degree. A strong relationship was expected between store image and attitude towards the store brand (Richardson, Jain, & Dick, 1994, 1996). Especially, the effect of merchandise for the supermarket brand Albert Heijn was found to be stronger than in the case of Edah and Aldi in the Netherlands (Semeijn, van Riel, & Ambrosini, 2004).

The existing research result for the importance of store image leads to the second hypothesis of this paper:

Hypothesis 2: Store image positively influences consumers' affinity for a supermarket brand.

2.3 Promotion

Consumers' attitude and behavior is negatively affected by long-term promotion in several theories (Mela, Gupta, & Lehmann, 1997). For instance, self-perception theory suggests that consumers seem to associate their behavior with the presence of promotion, instead of with their personal preference for the brand, which thereby makes consumers more promotion prone (Dodson, Tybout, & Sternthal, 1978). On the other hand, there are also some theories supporting the positive effect of promotion. One of the most theories, which is known as learning theory, implies that a brand can be helped by promotion through increased familiarity and experience (Dodson, Tybout, & Sternthal, 1978).

Empirical research has shown that in the short-term, promotions have a large effect on consumers' brand choice (e.g., Guadagni and Little 1983; Gupta 1988; Kamakura and Russell 1989). For medium-term effect, Ehrenberg, Hammond and Goodhardt (1994) concluded that consumer promotions had significant effect on neither subsequent brand sales nor brand loyalty, using data from four weeks before and four weeks after major promotions. Based on these findings, Dodson, Tybout and Sternthal (1978) investigated the long-term impact of promotion on consumers' brand choice behavior using a unique dataset that included store environment and purchase history of more than 1500 household from January 1984 to March 1992 for one frequently purchased good in one market. In their findings, consumers had become more and more price and promotion sensitive over time. The effect was much larger for non-loyal consumers, who are relatively more price-sensitive, than loyal consumers, who are less price-sensitive. The authors also conjectured that, however, market shares of brands might not see any long-term trends. To summarize, promotions were found to have significantly large "bad" effects on consumers' price and promotion sensitivities.

Based on the current theoretical study for promotion, the third and fourth hypotheses of this paper are raised as follow:

Hypothesis 3: Promotion does not have a significant effect on consumers' affinity for a supermarket brand.

Hypothesis 4: Promotion attracts consumers to be more willing to go to a specific supermarket chain store.

2.4 Store-brands

Besides national brands (also known as A-brands), retailers usually also sell their own-brand products, brands that are exclusively sold to a particular store chain and compete in several product categories with major national brands (Semeijn, van Riel, & Ambrosini, 2004). The role of store brands is becoming more and more important in the Western world due to a set of interrelated factors: increased concentration in retailing enables retailers to develop their own brands, consumers' less attachment to existing national brands, and their more and more positive attitude toward store brands (Steenkamp & Dekimpe, 1997). Store brands are perceived to have almost the same quality as A-brands by many consumers and are sold at a much lower price. On average, store brands (private label products) are 10-30 percent cheaper than national brands (Baltas, 1997).

Quality is a major factor in consumer purchase decisions. Steenkamp and Dekimpe (1997) quantified the power of store brands along two dimensions: the intrinsic loyalty of their customer base and their conquering power to attract potential switchers. The absolute and relative strength of Albert Heijn (AH), as the leading Dutch store brand, was evaluated in 19 product categories by Steenkamp and Dekimpe based on its position along the abovementioned dimension. Perceived quality emerged as a prone factor underlying AH's conquering power. The research showed that the higher the perceived quality of AH store brand, both absolute and relative to its competitors, the greater its conquering power was. The conquering power was found to be also strongly correlated with AH's market share. Thereafter, the authors implicated that improving quality is a prime way to build market share.

However, even for leading supermarkets like AH, the power of the store brand varies dramatically across product categories, both in an absolute and a relative sense (Steenkamp & Dekimpe, 1997). Moreover, store image is observed to act as an important indicator of store brand quality (Dick, Jain, & Richardson, 1995).

The store brand analysis therefore leads to the following hypotheses:

Hypothesis 5: Store-brand products variety positively influences consumers' affinity for a supermarket brand.

Hypothesis 6: Store-brand products quality positively influences consumers' affinity for a supermarket brand.

2.5 Status Quo Bias

Status Quo bias was firstly demonstrated by Samuelson and Zeckhauser (1988) using a questionnaire in which people were faced with a series of decision making problems that were framed with and without a pre-existing status quo position. It turned out that subjects had the tendency to maintain the status quo when such a position was offered to them. This effect has been found in many important real-life decisions such as the retirement program, as shown by a study among college professors in the United States to examine the U.S. equity mutual fund. The result showed that people maintained the retirement plans they had chosen previously, even if the plan was no longer the optimal choice (Kempf & Ruenzi, 2006).

Possible explanations for this irrational behavior include endowment effect and loss aversion. The former hypothesis states that people ascribe more value to things merely because they own them. The most famous example of endowment effect in the literature is from a study by Daniel Kahneman, Jack Knetsch & Richard Thaler in 1990. In the study, participants were given a mug and were then allowed to trade it for an equally valued pen. They found that the amount of money participants are willing to accept as a compensation for the mug ("willingness to accept") was approximately twice higher than the amount of money they are willing to pay to acquire a mug ("willingness to pay"), simply because they own the mug (Kahneman, Knetsch, & Thaler, 1990).

Another hypothesis of loss aversion is referred to people's tendency to strongly prefer avoiding losses to acquiring gains, which was firstly proposed by Amos Tversky and Daniel Kahneman (1979). Experiments have shown that the psychological influence of loss is approximately twice as powerful as an equal gain.

In terms of supermarket decision making in this paper, the status quo bias seems plausible for affecting people's judgment on their preferences for a supermarket brand, which therefore leads to the last hypothesis of this paper:

Hypothesis 7: Status quo bias significantly affects people's affinity for a supermarket brand.

Research Design and Data

An survey was designed and conducted to determine the structural relationships between people's fondness for a supermarket brand and possible influencing factors including price, store image, promotion, product quality and status quo bias. In this section, the survey design and corresponding data are discussed.

3.1 Case study—two supermarkets in the Netherlands

For convenience reasons the hypotheses will be tested using supermarkets data in the Netherlands. Store brand penetration is around 20% in this market (Wileman & Jary, 1997). For this study, the most well-known grocery chain with the largest Dutch market share, Albert Heijn (AH), is chosen. Moreover, the second largest grocery chain, Jumbo, is also selected as a comparison with Albert Heijn. These two selected chains vary substantially in market position, pricing strategy and store image.

3.1.1 Albert Heijn

Albert Heijn is the oldest and largest Dutch supermarket chain with more than 966 stores and around 35% market share (Dutch News, 2016). Albert Heijn carries a premium image in the Netherlands because of its focus on quality stores and products. The AH stores sell approximately 4000 products under its own brand—ranging from low price of AH Basic,

AH to the premium AH Bio with organic products. The grocery chain operates in three main formats: the neighborhood grocery store, the larger Albert Heijn XL supermarket, and the Albert Heijn to go convenience store. It also offers online shopping for delivery and pickup through ah.nl. All in all, AH has an undoubtedly predominant market position and a good reputation for its good service and quality in the Netherlands. It is also the Dutch supermarket that has the largest advertising budget, which focuses on promoting the store image and store brands as well as free monthly magazines (Semeijn, van Riel, & Ambrosini, 2004).

3.1.2 Jumbo

Jumbo is the second largest retailer in the Netherlands and is growing rapidly due to a rise in the number of its supermarket stores. It is now around 500, giving the company 20% of the Dutch market share (Dutch News, 2014). This family-owned business owes its success to an effective formula of “the lowest price, the greatest range, the best service”. Jumbo was awarded the “best retail chain” title in 2010 (Stichting Retail Jaarprijs), and the “Customer Centric DNA Awards 2011”, which is awarded to the best customer-oriented company in the Netherlands. Recently Jumbo was the sector winner in the Dutch Customer Performance Index (DCPI) (GlobalG.A.P., 2014).

3.1.3 Albert Heijn and Jumbo Comparison

Compared to Albert Heijn, Jumbo has much fewer national brands and private label brands varieties. Its price strategy is more “everyday low price”, for example selling bananas constantly for 99 cents per kilo to attract customers, which is different from the “high-low” strategy of AH, which offers a large variety of weekly bonus products with discounts, despite of its normally higher prices. However, it is also noticeable that for some product categories, the normal selling price in Jumbo can be more expensive than Albert Heijn. Nevertheless, with an overall image of having “low price, good quality and service”, Jumbo has become more and more popular and even a threat to the market leader, Albert Heijn.

3.2 Survey design

A survey consisting of two parts with 5 questions intotal was designed to help testing the hypotheses. The first question consisted of 9 **criteria** to judge for AH and Jumbo: *price, service, store design and decoration, easiness of finding products, weekly discount, fresh*

product (vegetables, milk, meat, bread) quality, A-brand product variety, own-brand product quality and own-brand product variety.

Among these criteria,

“**price**” is represented by “*price*”;

“**store image**” is represented by “*service*”, “*store design and decoration*”, “*easiness of finding products*” and “*A-brand product variety*”;

“**promotion**” is represented by “*weekly discount*”;

“**store brands**” is represented by “*fresh product quality*”, “*own-brand product quality*” and “*own-brand variety*”.

Respondents were asked to indicate their preferences for AH and Jumbo on 7-point Likert type scales (*AH definitely better, AH much better, AH slightly better, No preference to Jumbo slightly better, Jumbo much better and Jumbo definitely better*).

After specifying their preferences for these 9 aspects, the respondents were then asked to rate their willingness to go to their preferred supermarket in question 1, suppose both AH and Jumbo are with 5-minute biking distance. The rating was still based on 7-point Likert type scales (*I will go to AH definitely more, AH much more, AH slightly more, no preference to Jumbo slightly more, Jumbo much more and Jumbo definitely more*).

In the next question, based on their choices in question 2, respondents would be asked to specify the *maximum biking time* they would accept to go to the supermarket they liked more, instead of going to the other one right beside their home, if they were not in a hurry. 11 minutes biking time from Erasmus University Rotterdam to Blaak train station in Rotterdam, based on Google Maps, was given as a reference.

The second part of this survey contained the remaining two questions, which were targeted to investigate status quo bias. Respondents chose their nationalities (*Dutch/international*) in question 4. Specifically, if the respondents had two citizenships including the Netherlands, they would choose based on where they stayed the most when they grew up). In the last question, participants were asked to express their agreement with statement “*my friends told me that AH/Jumbo was a very good Dutch supermarket when I firstly arrived in the Netherlands, and many of my Dutch or non-Dutch friends go there, so I*

also go there often” if they are international, or “my parents always go to AH/Jumbo so I also choose the same, because I have been using its products for years and am already familiar with this supermarket brand” if they are Dutch, from “definitely disagree”, “disagree”, “slightly disagree”, “neither agree nor disagree” to “slightly agree”, “agree” and “definitely agree”.

The sample of this survey is student-based, which has been proved useful by many previous studies for consumer behavior (cf. Biswas et al., 1999; Halstead et al., 1994; Sinha and DeSarbo, 1998; Sparks and Hunt, 1998; Stafford, 1998; Van Riel et al., 2001). Students are an important part of the shopping population and usually seek for cheap products. Therefore they are more price sensitive, which can thus be considered experienced with supermarket brand choices for price, promotion and store brands, etc.

3.3. Survey Data

One hundred and ten participants filled out the survey. Data were screened manually and six cases were deleted from the sample for the later methodological regression analysis, since some key answers were missing. However, for the answers they filled in, they would still be counted in the following data distribution analysis.

Table 1: Question 1 answers regarding 9 judging criteria for AH and Jumbo (109 participants)

	PRICE	SERVICE	DESIGN	EASINESS	DISCOUNT	FRESH QUALITY	A BRAND VARIETY	OWN QUALITY	OWN VARIETY
AH DEFINITELY	4 (3.67%)	12 (11.01%)	20 (18.35%)	15 (13.76%)	15 (13.76%)	14 (12.84%)	15 (13.76%)	10 (9.17%)	11 (10.09%)
AH MUCH	5 (4.59%)	26 (23.85%)	38 (34.86%)	20 (18.35%)	26 (23.85%)	26 (23.85%)	28 (25.69%)	31 (28.44%)	30 (27.52%)
AH SLIGHTLY	15 (13.76%)	23 (21.10%)	23 (21.10%)	25 (22.94%)	29 (26.61%)	23 (21.10%)	23 (21.10%)	29 (26.61%)	21 (19.27%)
NO PREFERENCE	25 (22.94%)	40 (36.70%)	19 (17.43%)	42 (38.53%)	30 (27.52%)	37 (33.94%)	39 (35.78%)	33 (30.28%)	36 (33.03%)
JUMBO SLIGHTLY	39 (35.78%)	6 (5.50%)	7 (6.42%)	6 (5.50%)	4 (3.67%)	7 (6.42%)	3 (2.75%)	4 (3.67%)	8 (7.34%)
JUMBO MUCH	13 (11.93%)	1 (0.92%)	2 (1.83%)	1 (0.92%)	4 (3.67%)	2 (1.83%)	1 (0.92%)	2 (1.83%)	3 (2.75%)
JUMBO DEFINITELY	8 (7.34%)	1 (0.92%)	0 (0.00%)	0 (0.00%)	1 (0.92%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

In question 1, around 23% respondents of 109 participants had “No preference” between AH and Jumbo for “Price”, and around 36% chose “Jumbo slightly better”, far

exceeded the participants that chose AH (22% in total). However, for the remaining 8 judging criteria, AH performed seemingly better than Jumbo from the answers, especially for “*Store design and decoration*”, where 74.31% participants chose AH better and only 8.25% chose Jumbo to be better. For all the criteria except “*Price*”, at least 10% participants chose “*AH definitely better*”, on the contrary, only 1% or even none participant chose “*Jumbo definitely better*”. Total participants that chose Jumbo to perform better were less than or equal to 8.25% for all judging criteria, except for “*Own-brand Product Variety*” with 10.09%. Jumbo performed the worst for “*A-brand Variety*”, where only 4 participants (3.67%) chose Jumbo to be better than AH. The second worst for Jumbo was “*Own-brand Product Quality*” with 6 participants (5.5%) chose Jumbo to be better. It can also be seen from **Table 1** that many participants (above 36%) were indifferent between AH and Jumbo for “*Service*”, “*Easiness of finding products*”.

Table 2: Question 2 answers for supermarket preferences (107 answers)

	CHOICE COUNT
AH DEFINITELY MORE	25 (23.36%)
AH MUCH MORE	26 (24.30%)
AH SLIGHTLY MORE	20 (18.69%)
NO PREFERENCE	7 (6.54%)
JUMBO SLIGHTLY MORE	17 (15.89%)
JUMBO MUCH MORE	10 (9.35%)
JUMBO DEFINITELY MORE	2 (1.87%)

In question 2, 66.35% of 107 respondents preferred AH to Jumbo if they were at the same distance from home, especially, 23.36% chose to prefer “*AH definitely more*”, compared to only 1.87% with 2 respondents for “*Jumbo definitely more*”. It can be deduced from Table 2 that, even though Jumbo performed much better than AH regarding “*Price*”, more than two thirds of the participants still preferred AH.

Table 3: Question 3 answers for the maximum biking time

BIKING TIME	CHOICE COUNT		
MINUTES	Albert Heijn (69)	Jumbo (28)	No Preference (7)

0	1 (1.45%)	2 (7.14%)	7 (100.00%)
0-5	14 (20.29%)	5 (17.86%)	
5	33 (47.83%)	12 (42.86%)	
6-9	6 (8.70%)	2 (7.14%)	
10	11 (15.94%)	5 (17.86%)	
11-14	0 (0.00%)	0 (0.00%)	
15	4 (5.80%)	2 (7.14%)	

In question 3, 69 participants who chose AH as their preferred supermarket in the previous question filled in their maximum biking time to go to AH, instead of a Jumbo supermarket right beside their residence (**Table 3**). 28 participants who preferred Jumbo also filled in their biking times. In total, around 43% respondents (45) filled in “5 minutes” for their maximum biking time. It seems that “5” is somewhat a “magical” number for people to make supermarket spatial decisions. The second popular number is “10”, with around 16% and 18% respondents for AH and Jumbo, respectively. Nobody filled in biking time between 10 and 15 minutes. To summarise, except for a few participants who extremely like one supermarket brand and are willing to spend 15 minutes maximally to go there, most people can tolerate a biking time within 10 minutes in order to go to their preferred supermarket. It can also be observed that for a few participants, even if they prefer one specific supermarket brand, they are still not willing to spend any extra time at all to go there, not even one minute, given that they have a choice for buying groceries in a supermarket that they do not like the most, but right beside their home. The 7 answers of “0 minutes” under the column “No preference” in **Table 3** need to be explained. These answers are generated because in the previous question, 7 participants have chosen “No preference” between AH and Jumbo, therefore they need not answer question 3 and the default answer is set as zero, which makes sense because they do not have any preferences, and will make decisions based on merely distance.

In Question 4, 105 participants chose their nationalities, with 50 Dutch and 55 International, which is a good participation distribution (half-half) for the following question about the influence of friends on international students, and influence of family (parents) on Dutch students to investigate status quo bias. From **Table 4** it can be observed that 72.72% of 55 international students agreed with being influenced by friends about making

supermarket brand choices. The percentage is much lower for Dutch students, with only 46% of 50 Dutch students agreed on the influence by their parents.

Table 4: Question 5 answers for international students regarding friends influence

	INTERNATIONAL	DUTCH
1 DEFINITELY AGREE	9 (16.36%)	3 (6.00%)
2 AGREE	16 (29.09%)	8 (16.00%)
3 SLIGHTLY AGREE	15 (27.27%)	12 (24.00%)
4 NEITHER AGREE NOR DISAGREE	7 (12.73%)	8 (16.00%)
5 SLIGHTLY DIASGREE	3 (5.45%)	8 (16.00%)
6 DISAGREE	3 (5.45%)	6 (12.00%)
7 DEFINITELY DISAGREE	2 (3.64%)	5 (10.00%)
	55	50

Methodology

The survey data are analysed with Ordinary Least Square method using software STATA to regress the maximum biking distance and supermarket preference, respectively, on the 9 judging criteria in question 1 and influence of friends/parents in question 5.

Independent variables are interpreted in 7 numbers to represent the 7-point likert Scales. Based on the data, Albert Heijn is more preferred than Jumbo, so AH is positively interpreted in the linear regression model. More specifically, for the 10 variables “*Brand preference*”, “*price*”, “*service*”, “*store design and decoration*”, “*easiness of finding products*”, “*weekly discount*”, “*fresh product (vegetables, milk, meet, bread) quality*”, “*A-brand product variety*”, “*own-brand product quality*” and “*own-brand product variety*”, the answer “*AH definitely better*” is represented by “3”, “*AH much better*” is “2”, “*AH slightly better*” is “1”, “*No preference*” is “0”, “*Jumbo slightly better*” is “-1”, “*Jumbo much better*” is “-2”, “*Jumbo definitely better*” is “-3”. Similarly, for variables “*friends influence*” and “*family influence*”, the answer “*Definitely agree*” is interpreted as “3”, “*Agree*” is “2”, “*Slightly agree*” is “1”, “*Neither agree nor disagree*” is “0”, “*Slightly diasgree*” is “-1”, “*Disagree*” is “-2”, and “*Definitely disagree*” is “-3”.

Given two supermarkets, the less preferred supermarket is right within reach and the more preferred one farther away, a rational individual will be willing to spend sometime in order to go to his more preferred supermarket, according to classical economic theories. The maximum biking distance, as an dependent variable, measures the strength of the individual's affinity for that preferred supermarket brand, i.e. the farther this individual is willing to go, the stronger his affinity is. In this survey, participants were asked to fill in their maximum biking time, as a proxy for distance. If it is in favor of Albert Heijn, i.e. the respondent is willing to go to AH instead of Jumbo next to his residence, the data will be positive, vice versa, the data will be negative if it is in favor of Jumbo.

The regression analysis is formulated as follow:

$$\text{Max. Biking Distance} = \alpha + \beta_1 * \text{Price} + \beta_2 * \text{Service} + \beta_3 * \text{Design} + \beta_4 * \text{Easiness} + \beta_5 * \text{Discount} + \beta_6 * \text{Fresh}_{\text{Quality}} + \beta_7 * \text{A brand}_{\text{variety}} + \beta_8 * \text{Own}_{\text{Quality}} + \beta_9 * \text{Own}_{\text{variety}} + \beta_{10} * \text{International} + \beta_{11} * \text{Friends/Family}$$

Based on the p-value of each independent variable, insignificant variables can be removed to modify the regression model. Furthermore, F-test will be conducted to test the joint significance of the independent variables to ensure the validity of the regression. T-test will be conducted to test if the mean of the variables differ significantly. Moreover, OV test will be conducted to test if omitted variable bias exists. 5% significance level is used as the judgement; 10% significance level is used as a reference to show marginal significance.

Results

First of all, a regression model of supermarket brand preference (“*Preference*”) on the 9 judging criteria mentioned in question 1 and whether or not being International is conducted (**Table 5** in Appendix). It can be seen from the estimates that “*Price*” and “*Fresh_Quality*” have significant impact on supermarket brand preference at 1% significance level, despite that the coefficient estimate for price is still positive; “*Discount*” and “*Design*” at 5% significance level as well as “*Own_variety*” at 10% significance level. Citizenship (whether the correspondent being Dutch or International), service, easiness of finding products, A brand variety and own brand quality do not have significant effects on

brand preferences. Removing those insignificant variables leads to an increase of Adjusted R-squared from 0.5472 to 0.5634 and an increase of the significance level of “*Design*” and “*Own_variety*”; “*A-brand_variety*” becomes significant at 10% significance level. “*Preference*” is then separated into two subvariables by citizenship (“*Preference_International*” and “*Preference_Dutch*”) and used as dependent variables respectively for the same regression model. Estimates results are also shown in **Table 5**. It can be seen that for international respondents, the estimates of “*Design*” and “*Price*” become insignificant, instead, the estimate of “*Easiness*” is significant. Removing other insignificant variables leads to a more powerful estimates of “*Easiness*” and “*Own_variety*”; “*Discount*” becomes significant at 10% significance level. On the other hand, the estimates of “*Price*”, “*Design*”, “*Fresh Quality*” remain significant for Dutch respondents, “*Own_variety*” has lost its significance, and “*Discount*” becomes weakly significant. OV tests for three regressions after dropping irrelevant variables show that the null hypothesis of no omitted variables cannot be rejected at 5% significance level, therefore the linear regression analyses are representative to explain the dependent variable.

After estimating for supermarket brand preference as a whole, further regression of preference for Albert Heijn and Jumbo are regressed respectively as dependent variables. Other than the 9 judging criteria, “*Friends*” and “*Family*” are added as new variables standing for status quo bias. Results in **Table 6** show that for respondents who prefer AH in the sample, “*Price*” “*Design*” and “*Own_variety*” do not have a significant impact on their choices; “*Discount*” and “*Fresh_Quality*” have significant affect on preference for AH at 5% significance level, and “*Easiness*” at 10% significance level. OV test shows that omitted variable bias is not a concern. Among these respondents who prefer AH, 39 of them are international and 30 are Dutch. The same regressions are done again on international and Dutch respondents, respectively, with “*Friends*” nor “*Family*” being extra explanatory variables. The former turns out to be insignificant while the latter is. However, OV tests show that the null hypothesis of no omitted variable is rejected for the regression on International and Dutch respondents at 5% significance level, therefore the regression analyses are not representative to explain the dependent variable. Nevertheless, t-test shows that there is no significant difference between International and Dutch respondents who prefer AH (**Table 7**).

As for the regression for supermarket preference for Jumbo (“*Preference_Jumbo*”), it can be seen in **Table 8** that no variable has a significant influence on choosing Jumbo at 5%

significance level. For 16 Dutch subjects, “*Design*” is the only variable that has significant impact on preferring Jumbo to AH at 5% significance level. “*Family*” and “*Friends*” have no influencing power on the fondness of Jumbo. However, the sample size of Jumbo-preferred respondents as a whole is too small to reliably interpret the estimates. Nevertheless, international and Dutch respondents who prefer Jumbo have no significant difference for their degree of fondness (mean value of “*Preference*”) at 5% significance level (**Table 9**).

Result of t-test for “*Preference*” by citizenship, i.e. being international or Dutch also proved that there is no significant evidence to reject the null hypothesis of the mean value of “*Preference*” by international and Dutch being the same ($p\text{-value}=0.0959>0.05$), therefore it can be deduced that there is no significant difference between international and Dutch for the fondness of supermarket brands (**Table 10**).

By converting the value of variable “*Preference*” for Jumbo from negative to positive (-3, -2, -1 to 3, 2, 1), a comparison between the degree of fondness for AH and Jumbo can be done using t-tests. In **Table 11**, the result of t-test for “*Preference*” by supermarket brand, i.e. preferring AH or Jumbo, shows that there is significant evidence to reject the null hypothesis of equal mean values ($p\text{-value}=0.002<0.01$), therefore it can be deduced that there is significant difference between the degree of fondness for AH and Jumbo.

Another t-test for “*Price*” by supermarket brand preference is conducted followingly to test whether mean values of “*price*” are equal between 69 subjects who prefer AH and 28 subjects who prefer Jumbo (7 subjects have no preferences). The result in **Table 12** shows that there is significant evidence to reject the null hypothesis ($p\text{-value}=0.001<0.01$), therefore between subjects who prefer AH and subjects who prefer Jumbo, the mean value of their ratings for “*Price*” differ significantly, with mean for subjects who prefer AH being higher but still negative. If t-test for the mean value of “*Price*” is by citizenship, result shows that the null hypothesis is still rejected ($p\text{-value}=0.0481<0.05$) at 5% significance level, indicating that International students rated a higher value for “*Price*”, despite still being negative (**Table 13**). Similar t-tests are conducted for “*Service*” and “*Design*”, results in **Table 14** show that the mean values of these two variables differ significantly for 69 subjects who prefer AH and 28 subjects who prefer Jumbo (null hypotheses rejected). Both mean values are higher for the group of subjects who prefer AH.

The second step of the data analysis is to regress maximum biking time respondents are willing to spend (“*Max.biking distance*”) on the previously mentioned variables as well as “*Preference*” also being an explanatory variable. The linear regression estimates shown in **Table 17** indicate that “*Preference*”, “*Service*”, and “*Own_Quality*” have significant effects on “*Max.biking distance*”. However, OV test proves that there are omitted bias in this regression model. When “*Preference*”, “*A brand_variety*” and “*International*” are removed, “*Price*” and “*Fresh_Quality*” become strongly significant (<5% significance level), whereas “*Service*”, “*Own_Quality*” and “*Own_variety*” are only significant at 10% significance level. OV test proves this model does not suffer from omitted variable bias. Furthermore, a correlation matrix is conducted to test multicollinearity problem. The correlation coefficients show that all the correlations between variables are all very weak (<40%), hence there is no need to worry about the rise of multicollinearity problem (**Table 18**). A Wald test is also conducted to test the joint significance of the second regression. The null hypothesis of any of the estimates being zero is rejected (p-value=0.000<0.01), indicating that these four variables are jointly significant.

After regressing the maximum biking time as a whole, this dependent variable is separated into two subvariables by supermarket brand, i.e. if the individual chooses to bike to AH or Jumbo. Based on the estimates in **Table 19**, it can be seen that “*Fresh_Quality*”, “*Own_Quality*” and “*Service*” have significant influences on “*Max. biking distance_AH*” at 5% significance level and “*Price*” at 10% . Wald test also proves that “*Fresh_Quality*”, “*Own_Quality*”, “*Price*” and “*Service*” are jointly significant (p-value=0.0010<0.01). This model does not suffer from omitted variable bias, based on the p-value of OV test (0.0961>0.05). As for subjects who prefer Jumbo, only “*Preference*” turns out to a significant influence on their maximum biking time, after comparing regressions based on OV test and Wald test p-values.

Nevertheless, t-tests show that the maximum biking distance does not differ significantly between people who prefer AH and people who prefer Jumbo, which means, despite of the fact that the strength of preference for AH by people who prefer AH is statistically stronger than the strength of preference for Jumbo by people who prefer Jumbo, the maximum biking time they are willing to spend in order to go to their preferred supermarket does not differ significantly. The result also shows that the maximum biking time does not differ significantly between international and Dutch people (**Table 15** and **16**).

Conclusion

This paper investigates individual decision regarding supermarket brand preferences and spatial willingnesses through behavioral economics approach, which has been widely used for the retailer industry to study consumer behavior. Previous studies have shown that measuring variables subjectively is a better way to understand consumer spatial behavior than using more objective counterparts. However, most studies only use vertical analyses, i.e. the comparison within one specific supermarket for its own brands, store image, price, etc. A few studies use more than one supermarket brand, but the studied independent variables (influencing factors) are very limited. This paper adds value to existing studies for supermarket brand preferences by regressing psychological and classic economic influencing factors like price together, on brand preference as well as spatial biking distance in a behavioral approach to compare the affinity for different supermarkets. It generalises, articulates and compares the influencing factors of supermarket brand choices in prevalent academic views and adds more testing factors like status quo bias to study the difference between supermarket affinities based on the behavior of a sample composed of 104 individual students.

The research question of this paper is investigated using a survey designed ad hoc: how can behavior economics be applied to explain individual consumer decision making for comparing different supermarket brands. Five aspects for the largest two Dutch supermarket chains, Albert Heijn and Jumbo are compared in 7-point Likert scales: price, store image, promotion, store-brands and status quo bias. Regression results have shown that price, design, discount, fresh product quality and own brand variety have significant influences on preference. The positive coefficient estimate of price indicates that price level does not negatively influence consumers' preference for supermarket brands, therefore *hypothesis 1* is rejected. The significance of design and fresh product quality still show that store image in general positively influences supermarket preference, therefore *hypothesis 2* cannot be rejected. The positive coefficient estimate of Discount also shows that promotion has a significant positive effect on preference, leading to the rejection of *hypothesis 3*. As for store brands, variety does play an important role whereas store-brand quality seems to be unimportant, hence *hypothesis 5* is not rejected and *hypothesis 6* is rejected. Results have also

shown that neither friends have influences on international nor family have influences on Dutch students, leading to the rejection of *hypothesis 7*.

Around 66% respondents choose AH as their preferred supermarket. Product layout and own brand variety play an important role for international students. In comparison, store design and price are of great importance for Dutch students. Nevertheless, fresh products quality is something both international and Dutch people concern about, and significantly influences their preferences for retailers. For people who prefer AH, they are attracted by its weekly discount and fresh product quality. The regression cannot explain the dependent variable well for people who prefer Jumbo due to the small sample size. Participants are also asked to indicate the maximum biking time they are willing to spend in order to go to their preferred supermarket. Noticeably, “5 minutes” is the most prevalent answer. Regression analysis shows that price and fresh product quality are the two most important influencing factors. Discount does not play a significant role here, which leads to the rejection of *hypothesis 4*.

The findings also show that higher price level may attract people to like a supermarket brand even more. In the sample of this survey, most people prefer supermarket brand AH to Jumbo, even though the former is known to be more expensive. Moreover, store design, fresh quality as well as promotion also influence consumers' preferences. Status quo bias does not find its statistical support, which means that this psychological phenomenon is not found for supermarket brand choice decision making. It is not necessary for an individual who prefers a particular supermarket brand also to be willing to spend more time to go there, if another supermarket is right within reach. In extreme cases individuals are willing to spend even zero minute to go to their preferred supermarket, which is different from what classical economic theories predict. In general, people are willing to spend more time on the way, if they find fresh product quality of the destined supermarket is better, also if the price is higher, representing a more luxurious, reliable and quality store image.

The biggest limitation of this paper is that data sample is too small, which causes confusions and contradictions while dropping or adding certain variables, and might lead to inaccurate coefficient estimates. Suggestion for future study will be to enlarge the sample size and also include more explanatory variables such as gender, education background and

expected future salary, in the survey to better understand the participants and find a better regression model.

Appendix

Table 5 - Linear regression estimates of the determinants of supermarket preference

VARIABLES	PREFERENCE		PREFERENCE_INTERNATI ONAL		PREFERENCE_DUTCH	
CONSTANT	-0.3161889 (0.25287)	-0.3474554* (0.2035684)	-0.0979113 (0.3175354)	0.0334289 (0.2730332)	-0.5356593 (0.3762753)	-0.5887369* (0.3412139)
PRICE	0.2798013*** (0.0995471)	0.2901271*** (0.0905548)	0.1717471 (0.1426969)	0.2000706 (0.121091)	0.4354338** (0.19680547)	0.4243863** (0.1647091)
SERVICE	-0.0292309 (0.105105)		-0.0133756 (0.1787478)		0.0337167 (0.1680547)	
DESIGN	0.3057527** (0.1194489)	0.2856512*** (0.1039454)	0.0813996 (0.2139065)	0.3831874** (0.1657311)		0.4068395*** (0.14154567)
EASINESS	0.1798454 (0.1147619)	0.1755027 (0.1096522)	0.2971777* (0.1660452)	0.2986691** (0.1319167)	0.1969659 (0.2060165)	0.2043343 (0.1769871)
DISCOUNT	0.26354** (0.1147619)	0.2573618** (0.0991111)	0.2362839 (0.1423785)	0.2386756* (0.1354692)	0.2626029 (0.1714817)	0.2924084* (0.1628765)
FRESH_QUALITY	0.497426*** (0.1026322)	0.4853176*** (0.0959897)	0.405721*** (0.14517)	0.3133271*** (0.1270823)	0.6463378*** (0.2038428)	0.6940751*** (0.1818392)
A_BRAND VARIETY	-0.0297774 (0.1249203)	0.1985855* (0.1003724)	-0.0843818 (0.2070815)		0.0648984 (0.196865)	
OWN_QUALITY	-0.0794982 (0.1437256)		-0.2057911 (0.1951721)	-0.1590116 (0.1826744)	0.1214928 (0.2531085)	0.1494211 (0.1866727)
OWN_VARIETY	0.2489384* (0.1359867)	-2.066353** (0.098853)	0.449482* (0.1898727)	0.4142391** (0.1724208)	-0.0023652 (0.2548296)	
INTERNATIONAL	0.0229052 (0.2463065)					
FRIENDS	0.1166264 (0.1213765)					
FAMILY	0.1124111 (0.331)					
ADJUSTED R-SQUARED	0.5472	0.5634	0.5128	0.5393	0.5109	0.5433
OV-TEST P-VALUE	0.1158			0.1112	0.6962	

* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01;

Note: 54 observations for International and 48 for Dutch; 104 in total

Table 6 - Linear regression estimates of the determinants of preference for AH

VARIABLES	PREFERENCE		PREFERENCE_IN TERNATIONAL	PREFERENCE_ DUTCH
CONSTANT	1.097894*** (0.2088656)	1.12665*** (0.1859723)	1.448959*** (0.2643568)	0.8482101*** (0.2627676)

PRICE	0.1048288 (0.0736103)	0.1075232 (0.0649856)	0.0601771 (0.1004717)	0.2154173* (0.1218416)
SERVICE	-0.0058175 (0.0709795)		-0.0644606 (0.1205668)	-0.0662692 (0.0930411)
DESIGN	0.0998579 (0.0948802)	0.1004287 (0.0842813)	0.0361511 (0.1481252)	0.2483005** (0.1031922)
EASINESS	0.1373532* (0.0794351)	0.139765* (0.0763303)	0.2370452* (0.116108)	0.1112772 (0.109374)
DISCOUNT	0.1754675** (0.0763505)	0.1737788** (0.0725355)	-0.0209103 (0.1111525)	0.2461564** (0.0964112)
FRESH_QUALITY	0.1959434** (0.0804594)	0.202673*** (0.0730796)	0.2433078** (0.1189968)	0.046142 (0.1403019)
A BRAND_VARIETY	0.009779 (0.0865948)		-0.0925858 (0.1369203)	0.2236507* (0.1175462)
OWN_QUALITY	-0.0177089 (0.1204541)	-0.0214534 (0.1149942)	-0.304499* (0.1735023)	0.2314684 (0.1795362)
OWN_VARIETY	0.0790821 (0.1199474)	0.0829948 (0.1120897)	0.3415438** (0.1580723)	-0.2776811 (0.1856073)
INTERNATIONAL	0.0589891 (0.1767252)			
FRIENDS			0.0627194 (0.0840239)	
FAMILY				0.1919123** (0.0692797)
ADJUSTED R-SQUARED	0.3185	0.3506	0.2402	0.6064
OV-TEST P-VALUE		0.0665	0.0188	0.0393

* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01

Note: 39 observations for International and 30 for Dutch, 69 in total

Table 7 – t-test for Preference_AH by citizenship

. ttest Preference_AH, by(International)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	30	1.9	.1542501	.8448628	1.584523	2.215477
1	39	2.153846	.1247857	.7792865	1.901231	2.406462
combined	69	2.043478	.0977906	.8123094	1.84834	2.238616
diff		-.2538462	.1962984		-.6456595	.1379672

diff = mean(0) - mean(1) t = -1.2932
 Ho: diff = 0 degrees of freedom = 67
 Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
 Pr(T < t) = 0.1002 Pr(|T| > |t|) = 0.2004 Pr(T > t) = 0.8998

Table 8 - Linear regression estimates of the determinants of supermarket preference for Jumbo

VARIABLES	PREFERENCE		PREFERENCE_INTERN ATIONAL	PREFERENCE_DUTCH	
CONSTANT	-1.678695*** (0.2490407)	-1.625868*** (0.237423)	-1.911544** (0.6345831)	-1.676954** (0.4972647)	-1.44596*** (0.2559818)
PRICE	-0.1385599 (0.1317284)	-0.0689923 (0.1154119)	-0.3426071 (0.2318982)	0.1789544 (0.1956367)	0.187688 (0.1201468)
SERVICE	-0.0344958 (0.1603105)		-0.0095413 (0.3659235)	0.0653459 (0.2248925)	
DESIGN	-0.1437422 (0.1370042)	-0.1809003 (0.1056957)	-0.0137012 (0.5110842)	-0.3426667 (0.1737297)	-0.3304684*** (0.1011801)
EASINESS	0.2593525* (0.1481048)	0.1502451 (0.1145469)	0.2872233 (0.2313837)	0.2246853 (0.2446344)	
DISCOUNT	0.1177894 (0.1284703)	0.1031755 (0.123536)	0.3601598 (0.2252676)	0.0990193 (0.2274189)	
FRESH_QUALITY	0.100992 (0.1184686)	0.0993751 (0.1110915)	-0.0965537 (0.1907824)	0.2437378 (0.2264313)	
A BRAND VARIETY	-0.151144 (0.1633201)			0.0303888 (0.1907467)	
OWN_QUALITY	0.2438863 (0.1581597)	0.1673499 (0.1386705)		0.3649743 (0.3380811)	0.3378814* (0.1820441)
OWN_VARIETY	-0.0961117 (0.1497841)			-0.1686798 (0.2920438)	
FRIENDS			0.4422807 (0.6043105)		
FAMILY				-0.0216936 (0.2254264)	
ADJUSTED R-SQUARED	0.0839	0.1431	-0.2795	0.1647	0.4375
OV-TEST	0.1474	0.0760	0.8923	0.5848	0.5492
P-VALUE					

* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01; 28 observations, 12 International; 16 Dutch

Table 9 - t-test for Preference_Jumbo by citizenship

```
. ttest Preference_Jumbo, by(International)
```

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	16	-1.4375	.1572882	.6291529	-1.772752	-1.102248
1	12	-1.416667	.192996	.6685579	-1.841448	-.9918852
combined	28	-1.428571	.1198386	.6341265	-1.67446	-1.182683
diff		-.0208333	.2467402		-.5280151	.4863485

diff = mean(0) - mean(1) t = -0.0844
Ho: diff = 0 degrees of freedom = 26
Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.4667 Pr(|T| > |t|) = 0.9334 Pr(T > t) = 0.5333

Table 10 - t-test for preference by International and Dutch

```
. ttest Preference, by(International)
```

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	50	.68	.2431763	1.719516	.191319	1.168681
1	54	1.240741	.2288353	1.681589	.7817552	1.699726
combined	104	.9711538	.1681605	1.714907	.6376471	1.304661
diff		-.5607407	.3336275		-1.222489	.1010079

diff = mean(0) - mean(1) t = -1.6807
Ho: diff = 0 degrees of freedom = 102
Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.0479 Pr(|T| > |t|) = 0.0959 Pr(T > t) = 0.9521

Table 11 - t-test for preference by supermarket brand

```
. ttest Preference_Jumbo==Preference_AH, unpaired
```

Two-sample t test with unequal variances

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Preference_Jumbo	28	1.428571	.1198386	.6341265	1.182683	1.67446
Preference_AH	69	2.043478	.0977906	.8123094	1.84834	2.238616
combined	97	1.865979	.0824205	.8117479	1.702376	2.029583
diff		-.6149068	.1546748		-.9239321	-.3058816

diff = mean(Preference_Jumbo) - mean(Preference_AH) t = -3.9755
Ho: diff = 0 Satterthwaite's degrees of freedom = 63.7127
Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.0001 Pr(|T| > |t|) = 0.0002 Pr(T > t) = 0.9999

Table 12 - t-test for AH_Price and Jumbo_Price

. ttest Price_Jumbo==Price_AH, unpaired

Two-sample t test with unequal variances

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Price_~o	28	-1.321429	.2415425	1.278123	-1.817033	-.8258243
Price_AH	69	-.115942	.1645685	1.367009	-.4443334	.2124493
combined	97	-.4639175	.1465979	1.443822	-.7549121	-.172923
diff		-1.205487	.2922765		-1.791636	-.6193368

diff = mean(Price_Jumbo) - mean(Price_AH) t = **-4.1245**
Ho: diff = 0 Satterthwaite's degrees of freedom = **53.3227**

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = **0.0001** Pr(|T| > |t|) = **0.0001** Pr(T > t) = **0.9999**

Table 13 - t-test for Price by International and Dutch

. ttest Price, by(International) unpaired

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	50	-.74	.1636572	1.157231	-1.068881	-.4111186
1	54	-.2037037	.2121067	1.55866	-.6291359	.2217285
combined	104	-.4615385	.1372698	1.399883	-.7337807	-.1892962
diff		-.5362963	.2679047		-1.067978	-.0046147

diff = mean(0) - mean(1) t = **-2.0018**
Ho: diff = 0 Satterthwaite's degrees of freedom = **97.5092**

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = **0.0240** Pr(|T| > |t|) = **0.0481** Pr(T > t) = **0.9760**

Table 14 - t-test for Service and Design by supermarket brand preference

. ttest Service_AH==Service_Jumbo, unpaired

Two-sample t test with unequal variances

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Service~H	69	1.144928	.1589546	1.320376	.8277386	1.462117
Service~o	28	.5357143	.1888572	.9993384	.1482113	.9232173
combined	97	.9690722	.1281423	1.262055	.7147117	1.223433
diff		.6092133	.2468473		.116326	1.1021

diff = mean(Service_AH) - mean(Service_Jumbo) t = **2.4680**
Ho: diff = 0 Satterthwaite's degrees of freedom = **65.71**

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = **0.9919** Pr(|T| > |t|) = **0.0162** Pr(T > t) = **0.0081**

```
. ttest Design_AH==Design_Jumbo, unpaired
```

Two-sample t test with unequal variances

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Design~H	69	1.710145	.1401823	1.164442	1.430415	1.989874
Design~o	28	.5714286	.208475	1.103146	.1436732	.999184
combined	97	1.381443	.1272928	1.253689	1.128769	1.634118
diff		1.138716	.2512228		.6347514	1.642681

diff = mean(Design_AH) - mean(Design_Jumbo) t = 4.5327
 Ho: diff = 0 Satterthwaite's degrees of freedom = 52.661

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
 Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

Table 15 - t-test for biking distance _AH and _Jumbo

```
. ttest Distance_Jumbo==Distance_AH, unpaired
```

Two-sample t test with equal variances

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Distan~o	28	5.857143	.7466225	3.950755	4.3252	7.389086
Distan~H	69	5.927536	.4104968	3.409842	5.108403	6.74667
combined	97	5.907216	.3607941	3.553409	5.191046	6.623387
diff		-.0703934	.8003569		-1.659303	1.518516

diff = mean(Distance_Jumbo) - mean(Distance_AH) t = -0.0880
 Ho: diff = 0 degrees of freedom = 95

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
 Pr(T < t) = 0.4650 Pr(|T| > |t|) = 0.9301 Pr(T > t) = 0.5350

Table 16 - t-test for biking distance by _International and _Dutch

```
. ttest Distance_international==Distance_dutch, unpaired
```

Two-sample t test with equal variances

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Distan~l	54	3.037037	.8463193	6.219152	1.339535	4.734539
Distan~h	48	1.583333	.8941463	6.194827	-.215457	3.382124
combined	102	2.352941	.6158533	6.219814	1.131254	3.574628
diff		1.453704	1.231446		-.9894507	3.896858

diff = mean(Distance_inter~l) - mean(Distance_dutch) t = 1.1805
 Ho: diff = 0 degrees of freedom = 100

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
 Pr(T < t) = 0.8797 Pr(|T| > |t|) = 0.2406 Pr(T > t) = 0.1203

Table 17 - Linear regression estimates of the determinants of max. biking distance

VARIABLES	MAX. BIKING DISTANCE	
CONSTANT	0.69569 (0.8045195)	-0.5516813 (0.9324431)
PREFERENCE	3.003725*** (0.327173)	
SERVICE	0.943025*** (0.3317591)	0.8635206* (0.4516531)
FRESH_QUALITY	0.2981977 (0.3624149)	1.752345*** (0.4297029)
PRICE	0.2186856 (0.3271541)	0.9850824** (0.4050667)
DESIGN	-0.6557269* (0.3899281)	0.2350758 (0.4901402)
EASINESS	-0.1703 (0.36684)	0.3949457 (0.4814438)
DISCOUNT	-0.3488096 (0.3378742)	0.4982701 (0.434633)
A BRAND_VARIETY	0.1857795 (0.3942618)	
OWN_QUALITY	-0.9763699** (0.4542199)	-1.181256* (0.616012)
OWN_VARIETY	0.2523233 (0.4367192)	1.028822* (0.573721)
INTERNATIONAL	-0.6390387 (0.7771681)	
ADJUSTED R-SQUARED	0.6603	0.3674
OB-TEST P-VALUE	0.0001	0.0532
WALD TEST P-VALUE		0.0000

* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01

Table 18 - Correlation matrix of Coefficients of Distance regress model 2

E(V)	PRICE	SERVICE	DESIGN	EASINESS	DISCOUNT	FRESH	OWN_Q	OWN_V	CONS
PRICE	1.000								
SERVICE	-0.1600	1.000							
DESIGN	0.1616	-0.3646	1.000						
EASINESS	-0.1747	-0.0266	-0.3275	1.000					
DISCOUNT	-0.3719	-0.0078	0.0109	-0.0944	1.000				
FRESH	0.0213	-0.1692	-0.0658	-0.0513	-0.1276	1.000			
OWN_Q	0.1343	-0.1205	-0.0031	0.0459	-0.0077	-0.0877	1.000		
OWN_V	-0.1303	0.1694	-0.1643	-0.1748	-0.1088	-0.0499	-0.6346	1.000	
CONSTANT	0.3825	-0.1383	-0.2212	-0.1414	-0.3509	-0.1495	-0.2353	0.0461	1.000

Table 19 - Linear regression estimates of the determinants of max. biking distance_AH

VARIABLES	MAX. BIKING DISTANCE_AH		
CONSTANT	5.87731*** (1.192584)	5.769896*** (0.8744272)	5.12383*** (0.6719279)
PREFERENCE	0.143361 (0.6170325)		
SERVICE	0.8376985** (0.333565)	0.8116359** (0.3237736)	0.6431926** (0.2945383)
FRESH_QUALITY	0.7983263** (0.3969533)	0.7879156** (0.3495965)	0.8141792** (0.3453233)
PRICE	0.4185759 (0.3519038)	0.361034 (0.3133495)	0.4665034* (0.2789565)
DESIGN	-0.6089222 (0.4500965)	-0.4909744 (0.3863838)	
EASINESS	0.1129431 (0.3827803)		
DISCOUNT	-0.2726457 (0.3747649)	-0.156745 (0.3370962)	
A BRAND_VARIETY	0.2042041 (0.4069693)		
OWN_QUALITY	-1.075418* (0.5661409)	-1.011453* (0.5474857)	-0.8309818** (0.3363175)
OWN_VARIETY	0.3198332 (0.5657627)	0.357987 (0.5411107)	
INTERNATIONAL	-0.6661212 (0.8312608)		
ADJUSTED R-SQUARED	0.1459	0.1857	0.2006
OV-TEST P-VALUE	0.0900	0.1365	0.0961
WALD TEST P-VALUE			0.0010

* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01

Table 20 - Linear regression estimates of the determinants of max. biking distance_Jumbo

VARIABLES	MAX. BIKING DISTANCE_JUMBO			
CONSTANT	-4.051331 (3.386235)	-7.705966*** (1.613155)	-8.458406*** (1.33364)	-2.473684 (1.761163)
PREFERENCE	2.201371 (1.560901)			2.378421** (1.130119)
SERVICE	1.710148 (1.024126)			
FRESH_QUALITY	-0.2959639 (0.7630262)	-0.1532514 (0.7629009)		
PRICE	-0.6786421 (0.8543181)	-1.409828* (0.8021209)	-1.432627* (0.712015)	
DESIGN	-1.13132 (1.06094)	-0.6198564 (0.782464)		
EASINESS	0.2801533 (1.008514)	1.207675 (0.8763358)	1.209783 (0.7103455)	
DISCOUNT	0.9769932 (0.8320477)	1.338617 (0.8381781)	1.288391* (0.6799847)	
A BRAND_VARIETY	0.5197793 (1.081056)			
OWN_QUALITY	-1.445424 (1.081056)	-0.549118 (0.9960796)		
OWN_VARIETY	0.7751617 (0.9539336)	0.1120008 (0.9358618)		
INTERNATIONAL	0.7406732 (1.92697)			
ADJUSTED R-SQUARED	0.0650	-0.0121	0.1090	0.1116
OV TEST P-VALUE	0.0954	0.3377	0.4925	0.1082
WALD TEST P-VALUE			0.1267	0.0460

* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01

Bibliography

- Baltas, G. (1997). Determinants of store brand choice: a behavioral analysis. *Journal of Product & Brand Management*, 6, 321-324.
- Biswas, A., Pullig, C., Krishnan, B., & Burton, S. (1999). Consumer evaluation of reference price advertisements: effects of other brand's prices and semantic cues. *Journal of Public Policy and Marketing*, 18, 52-65.
- Cadwallader, M. (1975). A Behavioral Model of Consumer Spatial Decision Making. *Economic Geography*, 51, 339-349.
- Dick, A., Jain, A., & Richardson, P. (1995). Correlates of store brand proneness: some empirical observations. *Journal of Product and Brand Management*, 4(4), 15-22.
- Dickson, P. R., & Sawyer, A. G. (1990). The Price Knowledge and Search of Supermarket Shoppers. *Journal of Marketing*, 54, 42-53.
- Dodson, J. A., Tybout, A. M., & Sternthal, B. (1978). Impact of Deals and Deal Retraction on Brand Switching. *Journal of Marketing Research*, 72-81.
- Downs, R. M. (1970). Geohrpahic space perception: Past approaches and future prospects. *Progress in Geogrpahy*, 65-108.
- Dutch News*. (2014, December 30). Retrieved on Dutch News: <http://www.dutchnews.nl/news/archives/2014/12/jumbo-supermarkets-boost-sales-3-5-in-2014/>
- Dutch News*. (2016, January 25). Retrieved on <http://www.dutchnews.nl/news/archives/2016/01/albert-heijn-jumbo-control-over-half-dutch-supermarket-sales/>
- Ehrenberg, A., Hammond, K., & Goodhardt, G. (1994). The After-Effects of Price-Related Consumer Promotions. *Journal of Advertising Research*, 11-21.
- Foxall, G. R., Schrezenmaier, T. C., & Oliveira-Castro, J. M. (2006). Consumer Brand Choice: Individual and Group Analyses of Demand Elasticity. *Journal of the experiemental analysis of behavior*, 85, 147-166.
- GlobalG.A.P.* (2014, September 1). Retrieved on GlobalG.A.P.: http://www.globalgap.org/uk_en/media-events/news/articles/New-Member-Dutch-Retailer-Jumbo-Supermarkets-Builds-on-GLOBALG.A.P./
- Golledge, R. G., Brown, L. A. , & Williamson, F. (1972, 12). Behavioural Approaches in Geography: An overview. *The Australian Geographer*, 59-79.
- Guadagni, P. M., & Little, J. D. (1983). A Logit Model of Brand Choice Calibrated on Scanner Data. *Marketing Science*, 203-208.

-
- Gupta, S. (1988). Impact of Sales Promotions on When, What, and How Much to Buy. *Journal of Marketing Research*, 342-355.
- Halstead, D., Hartman, D., & Schmidt, S. (1994). Multi-source effects on the satisfaction formation process. *Journal of the Academy of Marketing Science*, 22(2), 114-129.
- Hursh, S. R. (1984). Behavioral economics. *Journal of the Experimental Analysis of Behavior*, 42, 435-452.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the econometric society*, 263-291.
- Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1990). Experimental Tests of the Endowment Effect and the Coase Theorem. *Journal of Political Economy*, 1325-1348.
- Kamakura, W. A., & Russell, G. J. (1989). A Probabilistic Choice Model for Market Segmentation and Elasticity Structure. *Journal of Marketing Research*, 379-390.
- Kempf, A., & Ruenzi, S. (2006). Status Quo Bias and the Number of Alternatives: An Empirical Illustration from the Mutual Fund Industry. *Journal of Behavioral Finance*, 7, 204-213.
- Lohmoller, J.-B. (1981). *LVPLS 1.6: Latent Variables Path Analysis with Partial Least Squares Estimation*. Munich: University of the Federal Armed Forces.
- Lozar, C. C. (1974). Application of of behavior setting analysis and undermanning theory to supermarket design. *Man-Environment Interactions: Evaluations and Applications*, 271-279.
- Mela, C. F., Gupta, S., & Lehmann, D. R. (1997). The Long-Term Impact of Promotion and Advertising on Consumer Brand Choice. *Journal of Marketing Research*, XXXIV, 248-261.
- Milliman, R. E. (1982). Using Background Music to Affect the Behavior of Supermarket Shoppers. *Journal of Marketing*, 46, 86-91.
- Richardson, P., Jain, A., & Dick, A. S. (1994). Extrinsic and Intrinsic cue effects on perceptions of store brand quality. *Journal of Marketing*, 58, 957-978.
- Richardson, P., Jain, A., & Dick, A. S. (1996). Household store brand proneness: A framework. *Journal of Retailing*, 72 (2), 159-185.
- Samuelson, W., & Zeckhauser, R. (1988, March). Status Quo Bias in Decision Making. *Journal of Risk and Uncertainty*, 7-59.
- Semeijn, J., van Riel, A. C., & Ambrosini, A. (2004). Consumer evaluations of store brands: effects of store image and product attributes. *Journal of Retailing and Consumer Services*, 11, 247-258.

-
- Sinha, I., & De Sarbo, W. (1998). An integrated approach toward the spatial modeling of perceived customer value. *Journal of Marketing Research*, 35, 236-249.
- Sirohi, N., McLaughlin, E. W., & Wittink, D. R. (1998). A Model of Consumer Perception and Store Loyalty Intentions for a Supermarket Retailer. *Journal of Retailing*, 74 (2), 223-245.
- Sparks, J., & Hunt, S. (1998). Marketing researcher ethical sensitivity: conceptualization, measurement and exploratory investigation. *Journal of Marketing*, 62(2), 92-109.
- Stafford, M. (1998). Advertising sex-typed services: the effect of sex, service type and employee type on customer attitudes. *Journal of Advertising*, 27(2), 92-109.
- Steenkamp, J. B. E., & Dekimpe, M. G. (1997). The Increasing Power of Store Brands: Building Loyalty and Market Share. *Long Range Planning*, 30, 917-930.
- Van Riel, A., Lemmink, J., & Ouwersloot, H. (2001). Consumer evaluations of brand extensions: differences between goods and services. *Journal of Service Research*, 3(3), 220-231.
- Wileman, A., & Jary, M. (1997). *RetailPowerPlays: FromTradingto Brand Leadership, Strategies for Building Retail Brand Value*. New York: New York University Press.