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## Title

Neuro-pricing

The effect of supermarket promotions on Brand  
perception

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# Table of contents

<b>Introduction.....</b>	<b>7</b>
<b>Chapter 1. First steps into Neuromarketing.....</b>	<b>9</b>
1.1 What is neuromarketing.....	10
1.1.1 The role of emotions.....	11
1.1.2 What neuromarketing is useful for.....	14
1.1.3 Neuromarketing areas of study.....	16
1.2 Traditional techniques.....	17
1.3 Implicit methods.....	18
<b>Chapter 2. Review on Consumers' supermarket behaviour to create effective in-store marketing strategies.....</b>	<b>23</b>
2.1 Supermarkets and promotions.....	23
2.1.1 Supermarkets.....	23
2.1.2 Promotions.....	26
2.2 The neuro-pricing concept.....	29
2.3 The psychological effects of colours.....	31
<b>Chapter 3. Research method.....</b>	<b>33</b>
3.1 Psychological theory behind our research: The Stroop effect.....	33
3.2 Research design.....	35
3.2.1 The Extrinsic Affective Simon Task (EAST) .....	35
3.2.2 The Affective priming.....	36
3.3 Research materials.....	37
3.4 Procedure.....	39
3.5 Research data collection.....	41
3.6 Participants.....	41
<b>Chapter 4. Results.....</b>	<b>45</b>
4.1 Description of the research statistical methods.....	45
4.1.1 T-test.....	46
4.1.2 Factor analysis.....	47

4.2	Descriptive statistics results.....	48
4.3	T test analysis results.....	50
4.4	Factor analysis results.....	56
4.4.1	<i>Comparison of brands' scores and main promotions'</i> <i>attributes.....</i>	60
4.5	Emotional differentials analysis results.....	66
4.6	Summary of the results.....	72
4.7	Research limitations.....	74
	<b>Conclusions.....</b>	<b>77</b>
	<b>Appendix A.....</b>	<b>79</b>
	<b>Appendix B.....</b>	<b>85</b>
	<b>Appendix C.....</b>	<b>93</b>
	<b>Appendix D.....</b>	<b>97</b>
	<b>Bibliography.....</b>	<b>103</b>

# Introduction

Nowadays, looking at supermarkets shelves, we can see that there are a lot of promotions running on products every day. This happens because retailers need to run promotions in their supermarkets. For this reason, brands are “forced” to choose which promotions they want to run on their products that are favourable or, at least, less risky. As a consequence, marketers are investing a lot on promotions strategies even if promotions in the long term could damage the brand image and, especially, the perceived quality of products.

How could marketers understand which is the right promotion to use then?

The aim of this research is to understand, with the use of neuromarketing implicit methods, how consumers subconsciously perceive promotions. The focus is to detect the promotions that attract the consumers’ attention and how these promotions influence positively or negatively their buying behaviour. Therefore, this research will help brands to use promotions responsibly to not damage their brand image in the consumers’ mind.

This research has been developed in collaboration with Eamon Fulcher and Geraldine Trufil, directors of the Split Second Research Limited company, a market research company based in the UK, specialized in neuromarketing and implicit researches. Using their tools for implicit reaction times analysis, we created an English survey to analyse the UK market.

In detail, the study analysed six brands: Activia (yoghurt), Philadelphia (soft cheese), Tropicana (fruit juice), Heinz (baked beans), Fairy (laundry), Tresemme (shampoo). These were chosen to reflect different shelf lives. The effect of promotions could be different for these different products. In fact, with this research, we could find out if there are promotions that work well for short term products (like yogurts or soft cheese) and poorly for long term products (like shampoo and detergents) or vice versa.

In the early phases of this research we visited the main UK retailers’ shops to see which are the most used promotions. We selected six promotions to analyse both

price and quantity promotions: *Save £xx, Save 1/3, Strikethrough, Buy 1 get 1 free, Buy 3 for 2, Buy 2 for £xx.*

This thesis is organized in four chapters. In the first chapter we are going to understand what is neuromarketing, how it works and the techniques of this branch of knowledge. The second chapter is a literature review on supermarkets and promotions to understand how they work nowadays. This is going to be our starting point to see the actual marketing strategies and to see how neuromarketing has been used in store so far. Furthermore, in this chapter we will see the new concept of neuro-pricing. In the third chapter we are going to describe the adopted techniques, moreover, we will explain how we collected the data and, finally, we will describe our sample.

The fourth chapter presents the results of the research. As will be explained, we will use three statistical methods to analyse the data, looking at the same data from different perspectives. Combining the results, we will be able to see which promotions are considered good and which ones bad by the consumers' subconscious.

# Chapter 1

## First steps into Neuromarketing

Neuromarketing is an innovative marketing branch. In a few words, it is the combination of Neuro science techniques with marketing ones.

The first definition of neuromarketing comes from Ale Smidts (2002). He used the term neuromarketing for the first time to explain *“the study of the cerebral mechanism to understand the consumer’s behaviour in order to improve the marketing strategies”*.

In reality, the first marketing researches using neuroscience techniques were conducted in 1999 by Gerald Zaltman. He analysed the unconscious activity of the human mind in determining our choices (Krajinović et al, 2012).

Lee et al. (2007) affirmed that *“neuromarketing as a field of study can simply be defined as the application of neuroscientific methods to analyse and understand human behaviour in relation to markets and marketing exchanges”*

The biggest neuromarketing research was conducted by Lindstrom in 2007 (Lindstrom, 2008) involving five different countries (USA, UK, Germany, Japan and China) and analysing 2081 volunteers. He tried to understand how people react to marketing stimuli. He mentioned the fact that 80% of all new products fail in the first 3 months, even if companies spend a lot of money in marketing research before launching the product. Essentially, he understood that what consumers say in traditional surveys does not entirely reflect their true lifestyle. Not because they lie, but simply because they answer consciously. However, looking deeply at this concept, most of our daily decisions are taken subconsciously. This is the reason why new products have this high rate of failure: traditional surveys don’t correctly tell what consumers really want (Lindstrom, 2008). Another key point that he highlighted is that people’s memory rate is declining. Because of the increasing number of stimuli everyone has to deal with every day, only 5% of the

viewers withhold the information of the TV advert just a few minutes after its vision (Gallucci, 2016).

## 1.1 What is neuromarketing

In their research Stephan et al. (2002) pointed out that people, doing habitual actions, act subconsciously most of the time. Moreover, on decision-making processes only 5% is dictated by the conscious level of our brain. The other 95% comes from our inner awareness (Zaltman, 2003).

Because of this increasing interest in subconscious, looking at the *web of science* database, Garcia and Saad (2008) discovered that the use of fMRI enormously increased between 1993 and 2007. In fifteen years the number of studies using this technology passed from six reported studies in the early '90s to 2471 in 2007. Not only psychologists and neuro scientists were interested in subconscious theories but also marketers have come to understand that the use of traditional marketing techniques (e.g. focus groups and surveys) is not enough to really understand what consumers want from a brand. Just to name a few, Gordon (2002) studied the consumers' familiarity with brand names, certifying that brand names are associated with some specific brain regions. Furthermore, it has been demonstrated, using fMRI, that consumers' brand opinions also depend on people's ability to judge. Consumers judge brand personality almost like they judge people (Yoon et al., 2006).

Nowadays, to communicate their personality, brands can use several tools and communication channels. People now have to deal with a huge amount of information every day (Gallucci, 2016).

According to Nielsen (2017), the human brain processes 11.000.000 bits of information every second. The conscious part can handle, per second, only 40 bits; the other 10.999.960 bits are processed unconsciously. It means that our brain selects and processes only 0,00004% of all the received information every single second.

In this context, the most relevant limitation of traditional marketing surveys is that consumers have time to process the questions, therefore researchers are analysing only the conscious part of the consumers' mind. There are also other important criticisms to make regarding traditional surveys. If in some of the questions of the survey the consumers somehow feel a sort of violation of their privacy, they could choose not to answer truthfully, or they could be unwilling to give an answer, biasing the results. As Birks and Malhotra (2007) affirmed, *“participants may be unable to provide accurate answers to questions that tap their subconscious. The values, emotional drivers and motivations residing at the subconscious level are distinguished from the outer world by rationalization and other ego defences”*. The authors provided the example of a man that has bought an expensive new sports car because of his inferiority complex. If questioned, he probably wouldn't ever tell the truth, but he would answer that his old car was falling apart or that he had had a great deal. This is the reason traditional surveys are not enough to really see what is inside a consumer's mind.

Furthermore, everyone sees the world in his own way. Like those pictures that can represent different things at the same time according to different interpretations, the same data, or questionnaire, could be interpreted in a lot of different ways according to consumers' point of view (Zaltman, 2003). As a result, people may interpret the same question in a way much different than the original significance.

With a subconscious analysis, marketers can now better understand their customers' thoughts, what they really want, so to improve their experience with the brands they are considering.

#### 1.1.1 The role of emotions

Emotions act subconsciously, and they play a crucial role in purchase decisions. Gallucci (2016) divided emotions into two big groups: primary emotions and secondary emotions. The first ones are our base emotions, which are anger, sadness, fear, joy, surprise, disgust and acceptance. The secondary emotions are

a combination of the first ones and they come from human interaction like happiness, jealousy, shame and so on. Purchase decision-making is guided by emotions that come from past experiences of a certain product or category of products. In fact, consumers are more attracted to buying products for what they transmit to them than for their physical characteristics (Gallucci, 2016).

Gordon (2002) stated *“Thoughts are never separate from emotions and emotions never separate from thoughts; this is a neuro-scientific fact. Brands are coded in memory on a cognitive (thinking, analytical, considered) and emotional (somatic) basis”*. So, emotions play a crucial role in the buying behaviour. To better understand this, it is important to talk about the consumers’ communication response process. Or, in other words, the steps a consumer goes through before buying.

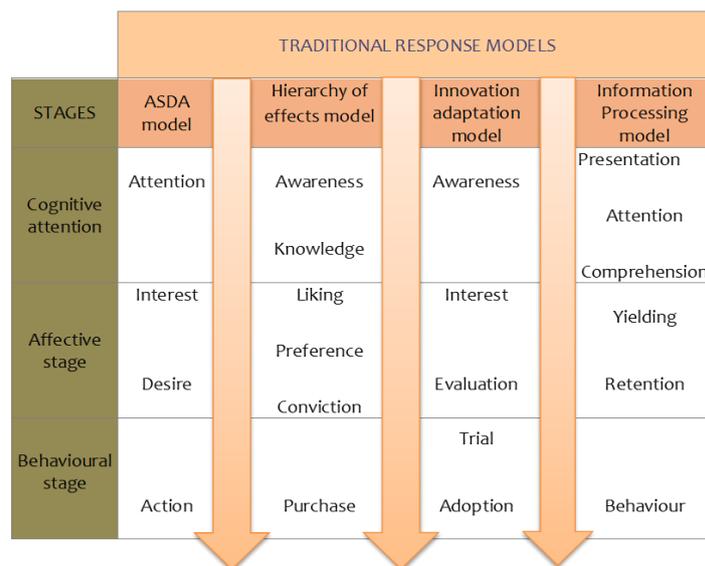


Figure 1.1 Traditional consumers response hierarchy models in a buying process (Belch M. and Belch G., 2016).

Belch M. and Belch G. (2016), described the seven models that explain this process: the four traditional response hierarchy models and the three alternative response hierarchies.

Figure 1.1 explains the various steps consumers pass through according to every traditional model. Each model is composed of three stages: cognitive attention, affective and behavioural.

Cognitive attention is composed by all the first actions a consumer goes through in the early stages of a buying process. In this first phase consumers become aware of the product, or brand, and they start seeking information about it. It is the product or brand presentation, attention, awareness, knowledge and comprehension.

The second step, the affective stage, is the one of our interest. It includes product or brand interest, liking, yielding, desire, preference, evaluation, retention and conviction. It represents, basically, the moment in which consumers start liking the product or the brand or not. They have feelings and emotions about it.

The last step, the behavioural stage, is about actions: purchase, trial, adoption and behaviour.

Figure 1.2, instead, describes the alternative models. As traditional models, the alternatives have three steps consumers pass through before buying. Conceptually they are the same, but in these models, they are called: “learn” (corresponding to the cognitive attention), “feel” (affective stage) and “do” (behavioural stage).

ALTERNATIVE HIERARCHY METHODS		
The Standard Learning Hierarchy	The Dissonance Attribution Hierarchy	The Low Involvement Hierarchy
LEARN	DO	LEARN
↓	↓	↓
FEEL	FEEL	DO
↓	↓	↓
DO	LEARN	FEEL

Figure 1.2 Alternative consumers response models in a buying process (Belch M. and Belch G., 2016).

These models are used to better understand the consumers response process to create more effective communication programs. From our description they could all seem the same. The differences between them concern several reasons like product characteristics, communication channels or consumers' involvement. These, though, are not relevant for the purpose of our research.

What is important to highlight is that in all these models, both traditional and alternative, there is an affective part the consumer passes through. This affective part (called "feel" in alternative hierarchies) are the feelings a consumer experiences for a specific product or a specific brand. The affective part, together with the cognitive one (learn) corresponds to the consciousness and brings consumers to select products based on emotions (Belch M. and Belch G., 2016).

#### 1.1.2 What neuromarketing is useful for

Analysing the new product development process (see figure 1.3) in its various steps we can better understand in which stages neuromarketing is most helpful. A new product development is composed of various steps. The first stage is the product ideation by the brand. Once ideated, the product is fulfilled. A new product needs a plan, if for example it is part of a product line it needs to be consistent with all the others. Basically, it needs to be organised and consistent with the brand image. Once on the market the new product requires a good channel of communication to consumers in order to increase interest and therefore to be sold. The last three steps (the ones in blue in figure 1.3) are completely in the hands of the consumers. When the product is on the market, how is it chosen by consumers? Why is it bought? and, in the end, how they experience it? (Gallucci, 2016).



Figure 1.3 New product development process (Gallucci, 2016).

These top three steps basically represent respectively the problem solving, the buying behaviour and the product usability. When consumers buy a product, they want to satisfy a need or to solve a problem. In marketing, every product is seen as the solution of a problem-solving process by consumers. The level of effort consumers have to deal with before choosing a product is called purchase involvement. Sometimes the consumer's need is clear, so it requires a very small conscious effort and the involvement is very low. Other times the decision-making process includes several problems or needs. In this case consumers need to face a longer and harder decision process on what to buy and their involvement is high. For example, the decision-making process needed to buy a toothpaste is easy and fast, but it is longer and harder to buy a car. Once the consumers have decided what to buy, they experience the product. This experience could be a good one (if the product corresponds to their expectations, or even better) or a bad one (if it doesn't satisfy them) (Mothersbaugh and Hawkins, 2016).

Creating a new product, then, the ideation and fulfilment steps need to be adapted to the last three, the ones up to the consumers. To be successful, a new product has to satisfy new consumers' needs or unknown ones.

A marketing strategy starts analysing consumers' needs, preferences, past experiences, thoughts and everything concerning the product choice, purchase

and usage. Neuromarketing is useful to better understand what is going on in these phases at the subconscious level. This would help in a greater adaptation and communication of the new product (Gallucci, 2016).

### 1.1.3 Neuromarketing areas of study

We could say that neuromarketing explores three big areas: attention, engagement and memory (ainem, 2017).

#### **Attention**

The attention is a scarce cognitive resource that helps us focus only on what our brain thinks it is important for us among all the various stimuli we receive every day. To catch consumers' attention could be a problem for marketing and advertising agencies that nowadays must deal with a huge amount of information. For this reason, it is vital that marketers and advertisers understand what are the keywords that activate consumers' subconscious and, consequently, attract their attention (ainem, 2017).

There are two kinds of attentions: top-down attention and bottom-up attention. The top-down attention occurs when people are looking for something, so they are focused in finding it. The bottom-up, instead, happens when something grabs the attention. In their study about the role of frontal and parietal cortices in the control of attention, Ling et al. (2010) affirm that *'Top-down control regulates the relative signal strength of different information channels based on immediate goals and past experience. Bottom-up control acts automatically to enhance responses to biologically salient stimuli. [...] while bottom-up attention seems reflexive and automatic, top-down attention appears effortful, slow, and dependent on context'*.

#### **Engagement**

The engagement is the second big area that neuromarketing explores. It is a cognitive and emotional state of mind that includes motivations, excitement, attention and interest. This is what brings consumers to buy a certain product or brand. There are three main causes of the engagement: the psychological

characteristics of people, the perceptual characteristics of the stimuli and the environmental conditions in which the interaction between consumers and brands take place (ainem, 2017).

## Memory

If the engagement is high, consumers will memorise the message better (ainem, 2017).

## 1.2 Traditional neuromarketing techniques

There are various neuroscience techniques that can be used for marketing purposes.

The most famous and used ones are the functional Magnetic Resonance Imaging (fMRI), the Electroencephalograms (EEGs) and the eye tracking.

fMRI is the most used technique. With magnetic and radio waves, this technique can create high quality brain images. It measures the blood quantity in localized brain parts. The more neurons that are working in a localised zone, the more oxygen they need, so the more blood will be present. All this is recorded with the MRI scanner<sup>1</sup> (right part of figure 1.4) (Krajinović et al., 2012).

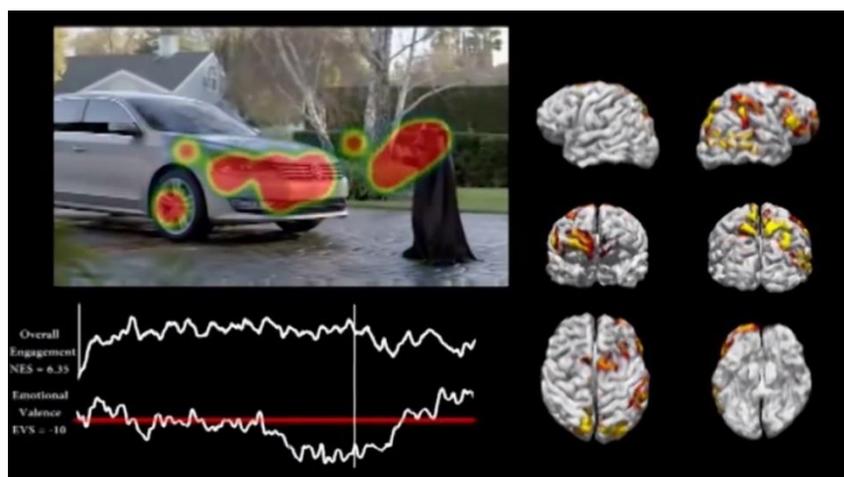


Figure 1.4 fMRI, EEG and eye tracking of Volkswagen spot "the force" (Hannaford, 2013).

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<sup>1</sup> MRI (Magnetic Resonance Imaging), is the same scanner used for medical purposes. It captures brain images to see blood changes in the brain. (Morin C, 2011)

The EEG measures the electrical activity of the brain using electrodes positioned on the scalp (down-left part of figure 1.4). It can rapidly capture every short neuronal event. It is useful and interesting to analyse the videos because it is able to capture the reactions associated to each stimulus in every single video frame, even if everything happens so quickly. The only problem is the number of electrodes needed in order to have a good quality vision. The electrical activity of the brain is in various tiny spots throughout the brain and is usually very weak. The more electrodes they use, the more precise is the registered brain activity, but there is no rule which indicates the minimum number of electrodes to be used for good quality results. In fact, there is a debate among scientists regarding this number. Nowadays they tend to consider its quantity on the basis of the research purpose (Gallucci, 2016).

The last classical technique to be mentioned is eye tracking. This technique analyses the pupil movements and the ocular tracking defining the entire eye path (up-left part of figure 1.4). From the eye tracking we can get a series of information like the level of attention in various observation points, the way in which consumers get information about what they are seeing, the page, or advertising, exploration strategies and all the potential problems participants may have in seeing some parts of the analysed object. These methods require very expensive equipment which are difficult to use.

### 1.3 Implicit methods

There are some other neuromarketing techniques, based on social cognition and social psychology, that marketers can use to analyse what happens in the consumers' mind. Compared to the methods explained in par. 1.2, these are cheaper and faster but effective nonetheless. They are called implicit techniques. Marketing techniques like questionnaires or focus groups are based on self-report measures. These are called explicit methods and they ask the consumers directly to talk about their preferences and feelings. The main problem with these methods is the social desirability and the concern of self-presentation (like the

man with a sports car mentioned in par.1.1). Generally, participants want to be seen as good people, so they could answer not with their actual behaviour but with the most social acceptable answer, biasing the results. Implicit methods allow to analyse consumers' feelings and preferences at the subconscious level, without direct questions. This way, the consumers' control on their answers becomes much more limited and marketers can obtain unbiased results (Gawronski and De Houwer, 2014).

Some examples of implicit methods are: Implicit Association Test (IAT), Affect Misattribution Procedures (AMP), Go/Not Go Association Tests (GNAT), The affective priming

### **Implicit Association Test (IAT)**

As Hatfield et al., (2007) told *“The IAT consists of two binary categorization tasks that are combined in a manner that is either compatible or incompatible with the to-be-measured psychological attributes”*. IAT is a computer- based method that measures associations between two targets (E.g. two competing brands like Coca cola and Pepsi) with two attributes (E.g. positive and negative). IAT compares the response time of compatible target/attribute with the non-compatible one in the respondents' mind. Using our examples, the IAT measures the connection strength between the target and the attribute, therefore *“Coca cola - positive”* with *“Pepsi – positive”* or *“Coca cola – negative”* with *“Pepsi – negative”*. Using reaction times, researchers can see which connections are stronger in the consumers' mind (Dimofte, 2010).

A typical IAT survey has a series of 5 blocks. The first one is usually focused on the target. So, for example, respondents have to press the *“s”* key (on the keyboard) when they see Coca cola and *“k”* when they see Pepsi. The second block refers to the attributes. Respondents at this point have to press *“s”* for positive words (e.g. good) and *“k”* for negative words (e.g. bad). The third block ask respondents to press *“s”* for Coca cola or a positive word and *“k”* for Pepsi or a negative word. Then, the other 2 blocks are used to invert the keys (Dimofte, 2010). With the IAT,

researchers can look for variations in psychological attributes (like opinions) that are in consumers' memory, analysing reaction times (De Houwer et al, 2009).

An important concern about this method is that it is a comparative one, it works only when analysing the preferences between two concepts and it is not possible to analyse a single target concept.

### **Affect Misattribution Procedures (AMP)**

AMP is a very popular method. Payne et al., (2005) created this method where *“people are asked to make evaluative judgments in an ambiguous judgment situation”*. In each situation, the researchers show them an object (a prime stimulus) that, according to participants' experience, creates a positive or a negative evaluative reaction. This object is the research focus. After that, they ask them to evaluate an ambiguous target, like an abstract symbol (such as a Chinese ideogram for example). Even if researchers ask them not to think about the previous object, their reactions to it will influence the symbol's evaluation. A symbol people don't know should be neutral to them, it shouldn't transmit anything. Responses about the abstract symbol, then, reflect what people subconsciously think about the object.

### **Go/Not Go Association Tests (GNAT)**

Similarly to the IAT, the go/not go association test analyses connections between a target and a prime (concepts and attributes). Differently from the IAT, the GNAT doesn't have two different keyboard's buttons for two different answers, the distinction is made by the reaction or not using the same response (like for example the space bar), that is why it is called go/not go model. In this case the “go” action is used to describe the conformity between the concept and an evaluative attribute. The “no go” is for the no match between them. *“The extent to which the target category and attribute comprising the signal are associated should determine sensitivity [...]. Thus, differences in sensitivity between pairing conditions (e.g. fruit + good vs. fruit + bad) reflect the association between the*

*concept and evaluation, and association is taken to be a measure of automatic attitude.” (Nosek and Banaji’s, 2001).*

### **The affective priming**

This is the method used for our research. We are going to talk about it further in the next chapters.



# Chapter 2

## Review on Consumers' supermarket behaviour to create effective in-store marketing strategies

### 2.1 Supermarkets and promotions

In the United States supermarkets annually spend \$225 billion in marketing, 45% of it is spent in promotions for Fast Moving Consumers Goods (FMCG) (Centre for Advancing Retail & Technology, 2017). More or less the same result is registered in UK, where the 54% of food items is sold on promotion. The main reason for this high percentage is the immediate and recognizable impact that promotions have on sales volume (Bogomolova et al., 2015). It is critical, then, that retailers and manufacturers understand how to exploit promotions so to invest these moneys to create a good and effective marketing strategy to satisfy consumers' needs. To understand how consumers behave in the supermarket it is important to create effective marketing strategies and to create an experience for consumers. As we are going to say in par. 2.1.1, the in-store decision rate reached 76% in 2012. But, we are living in the digital era, so, why is this rate so high? Retailers and manufacturers need, more than ever, to know which are the pull factors that drive consumers' choices in their in-store buying behaviour (POPAI, 2012).

#### 2.1.1 Supermarkets

##### **Neuromarketing techniques for supermarket analyses**

POPAI study (POPAI, 2012) detected how buying habits inside the supermarket changed from 1965 to 2012. They divided purchases in four categories: [1] specifically planned, [2] generally planned, [3] unplanned, [4] substitutes. According to their study, the in-store decisions are composed by the sum of categories [2][3][4]. They found that in 1965 they were 68,9% of the total buying

decisions, 64.8% in 1977, 66.1% in 1986 and 70% in 1995. In 2012 the in-store decision rate reached 76%.

The main reason for making unplanned purchases is that, once at the supermarket, consumers remember that they need or want a product. The second most claimed cause is that they want to take advantage of a promotion (POPAI, 2012).

Therefore, to create an effective in-store marketing strategy it is important to understand how consumers behave in the supermarket and what they buy.

Nielsen (2011) report talks about three neuromarketing techniques they used to analyse the in-store marketing effectiveness. In these three types of tests the participants experience the supermarket shopping trip in three different ways:

- Mobile ambulatory testing

Using this method, a helmet is put on consumers' head while they are physically at the supermarket. It allows researchers to have the brainwaves and the eye-tracking analysis at the same time, to examine all the aspects of a shopping experience (brands, competitive leverage, product demos, promotions, etc.), in a real shop and in real time.

- Video Realistic Testing (VRT)

This method uses video cameras. Recordings of a real supermarket trip are shown to participants while they are under analysis. It provides a higher level of supervision and a faster turnaround than the previous one. It avoids the contamination of the results by noise and it enhance a better ability to separate external impacts on consumers' behaviour. This method furthermore, includes the participation of more than one shopper.

- 3D virtual reality testing

It is a virtual recreation of the supermarket shopping experience. In this method the supermarket trip is recreated in 3D high resolution. As the VRT consumers see

the developed shopping trip while researchers analyse their neural response. It is the best method to have full control and natural shopping experience at the same time. Being a virtual reality, everything is controlled and manipulated.

These techniques are useful to observe in real time the consumers' subconscious behaviour during the in-store journey.

POPAI (2012), using neuromarketing techniques, analysed the shopper's characteristics according to how they behaved in store. The sample was composed by 75% of women and 25% of men. Results showed that male and female have the same percentage of impulsive buying. The age, instead, is a determining characteristic: people between 35 and 44 years old tend to buy more unplanned products than the other older or younger consumers.

The impulsivity buying behaviour arises also from the attitude of making a shopping list or not. The research discovered that 70% of respondents usually make a list. The remaining 30% never write it or rarely do it. Moreover, how the list is made is important too. 48% make a mental list, 36% a written one, 3% use digital devices and 13% don't do it at all.

They also looked at the relationship between the impulse buying and the aisles they passed through. More than half of the shoppers usually visit only the sections where they planned to go. Only a few shoppers go to each supermarket aisle. They found that there is a linear relationship between the number of products impulsively bought and the number of aisles visited during the supermarket trip.

### **The role of technology in shopping**

Nowadays, it seems that every marketing strategy should focus on media channels to reach consumers. This is true particularly for certain products, especially the services.

But, thinking that all marketing activities should focus on advertising (using internet, radio or TV) is a huge mistake considering supermarkets and FMCG. As the Nielsen Breakthrough Innovation Report affirms, *“Nearly 60% of product decisions are made at the shelf, and 56% of European consumers say in-store discovery is one*

*of their top information sources for new products, compared to 45% for TV ads” (Nielsen, 2016).*

However, even if in-store shopping nowadays is still considered the most reliable by consumers, it needs to be kept in mind that in the past few years online grocery purchases were rapidly expanding. According to Cart (2017), 19% of American people bought groceries online. The rate grew till 23% in 2016 and is estimated to reach the 70% in 2025. Looking at the UK industry sales, 7% is done online. But, the report highlights that online shopping is going to become stronger in the consumers’ life. Traditional supermarkets, though, could use their experience to enter in the digital world and use their knowledge about consumers to build stronger relationships. They know better what consumers prefer than new retailers. They should use this information to sell both in store and online giving to consumers a personalised shopping experience and keeping them loyal at the same time (Cart, 2017).

It is also important to highlight that three technology giants are creating and improving digital intelligences. Google with Google home, Amazon with Alexa and Apple with Siri. These devices are becoming part of consumers’ day life. Using one of them, people can now control technology just talking to it. For example, Amazon is integrating Alexa in a series of cars like BMW and Ford. With this device people can warm up their car just asking to Alexa station from inside the house. There are also some retailers like Whole Foods and Costco that using Google home give to their consumers the possibility to shop by voice. These are still improving technologies, but retailers need to consider the fact that this is what is likely to be the future so, it is possible that they will have a few big customers (Alexa, Google home and Siri) that shop for millions of people (Cart, 2017).

### 2.1.2 Promotions

#### **Definition**

According to Malik (2015) the price promotion definition had an evolution from the 1971 to the 1988. In 1990 Blattberg and Neslin defined price promotion as

*'action- focused marketing event aiming to have a direct impact on the firm's customer behaviour'*. This is an attempt to resume every promotion characteristic that appeared over the years. In fact, this definition highlights that promotions are marketing events aimed at a direct and short-term impact on consumers and intermediaries, using focused actions.

There are different actors on the price promotions system: consumers, retailers and manufactures. Manufacturers sell both to retailers and consumers, retailers instead sell only to consumers. There are so three types of relationships between these players: manufactures-retailers, manufacturers-consumers and retailers-consumers. In the first case promotions are called trade promotions; In the second and third one they are called consumers promotions.

### **Purposes**

Considering price promotions as part of the marketing mix, they are used for different purposes: [1] Induce consumers to brand switching buying the lower price brand, [2] Purchase acceleration, to induce consumers to buy more in quantity or to cut the purchase time down, [3] As support of the expansion of a certain product category and [4] to increase customer loyalty (Malik, 2015). According to Bogomolova et al. (2015) *'Setting price promotions requires two key decisions: (1) the type of deal to use (i.e., how to frame or communicate the deal to consumers), and (2) the depth of the discount'*. They also added that the results of these points influence the efficiency of the entire promotion strategy. But there is not an appropriate documentation about general methods used by industry.

### **Promotions in the UK market**

The Bogomolova et al. (2015) study analysed promotions types in the UK. The research purposes were: give promotions a name, classify them, analyse the discounts used in the UK marketplace and describe their similarities with the USA market. Furthermore, they wanted to see how these analogies between the two markets varies across different product categories, retail chains, time periods and seasons.

The outcome of this research gave the definition of the four promotions types considered the most used: Price off, multi buy, x for y£ and extra fee. They discovered that, in the UK, 30% of the sales are made by promotions. Specifically, 31% in food categories and 28% in non-food. From the same study we can see that different promotions are used with different market penetration. In detail: Price off in 13% of the cases, multi buy for 7%, x for y £ 8% and extra fee only 2%. In the USA the results are almost the same. Multi buy and x for y£ are the exceptions. The multi buy is much more common in the UK (7% compared to 1% in the USA) and the x for y £ is more used in the USA (8% in the UK but 19% in the USA). The study discovered also that in the UK market the discount depth in the various product categories (like crisps, deodorants, cat food, ice cream, etc.) changes according to the deal types and the discount rate. For example, the x for y£ is the 41% in cat food category, but only 1% in the toothpaste.

Furthermore, they found out that, in the UK, promotions are more relevant for national brand than for private labels.

These findings are important because they give an idea of what is the UK promotion situation (Bogomolova et al., 2015).

### **Consumers' promotions perception**

Another important study is Chen et al. (1998). Using online questionnaires, it analysed supermarkets' promotion and how promotions are generally perceived by consumers. The authors highlighted that consumers perceive promotions differently if they are expressed in terms of money or in percentage. For example, let's take in consideration a 20\$ discount. It is perceived in the same way both for a 100\$ jacket and for a 400\$ television. But, the psychophysics-of-price principle says that *'the psychological utility derived by consumers from saving a fixed amount of money is inversely related to the price of the item'* (Grewal and Marmorstein, 1994). So, for most of the people, a 20 minutes travel to spare \$20 is worth for a \$100 Jacket, but not for a \$400 television.

Furthermore, if the same discount is expressed in percentage terms (20% for the jacket and 5% for the television) it is perceived in different ways: the 20% is perceived more convenient (Chen et al., 1998).

### **Psychological Principles**

Larson (2014) collected all the Psychological Pricing Principles in only one paper. Some of them are useful for our research so we report them below.

Azar (2011) *'When comparing prices for substitute products, suggests that shoppers focus more on percentage differences than absolute differences.'*

Sitzia and Zizzo (2012) *'For an individual product, exposing customers to a high price before a low price tends to raise perceived values more than a low-high sequence'.*

Buyukkurt (1986) *'In many circumstances, brands and stores with shallow, noticeable, frequent discounts will be perceived to have lower average prices than brands and stores with deep, infrequent discounts'.*

Chen, Monroe and Lou (1998); Lowry et al. (2005); McKechnie et al. (2012) *'lower-priced products should have discounts described in percentage terms to emphasize the savings, particularly if the discount is large'.*

## **2.2 The neuro-pricing concept**

Neuro-pricing is a recent concept, so there isn't a vast literature about it. According to Kuhn (2015) neuro-pricing is a neuromarketing branch. The general idea is that the process of price determination should consider not only the economic theories around it, but also what is inside consumers' subconscious minds. Analysing what is the perceived fair price could bring an improvement in companies' revenues by increasing sales. Furthermore, different psychological price strategies could attract the consumers' attention therefore influence their buying behaviour.

Some psychological pricing techniques are used from the last century (Schindler and Wiman, 1989).

The most famous is called odd pricing. It consists in setting prices a few cents less than what is the real round price. For example, setting 1,99£ instead of 2£. This technique has been described by Schindler and Wiman (1989). In their research, they studied the consumers' price memory proving that people tend to remember better the left part of the price than the right one. Furthermore, Grasset (2015) affirmed that people at the supermarket are less willing to be bookkeepers. So, to be faster in calculations they usually consider only the first part of the number instead of the total amount. In this way consumers perceive the price lower than what it really is.

Neuro-pricing theories, instead, are focused on what is the perceived right price for consumers. Basically, neuro-pricing techniques exploit the consumers' subconscious analysis to understand which is the right price to set. This could help managers to fix an amount that satisfies every trade participant.

According to Müller (2012), companies should use neuroscience techniques to understand how much consumers are willing to pay for their products, and then decide what is the right price. He analysed Starbucks products. Müller's research showed that consumers are willing to pay more for Starbucks' coffee, even though it already has soaring prices. His study was conducted exploiting the same Starbucks cup of coffee, but using it associated with different prices. Exploiting EEG techniques (see par. 1.2), he understood that when the price associated with the cup of coffee was too high or too low, strong reactions happened in the brain. Using this evidence, he demonstrated that consumers are willing to pay from 30 to 60 cents more compared to how much they currently pay. According to these findings so, the company is not taking advantage of this and it is losing potential revenues (Müller, 2012).

With our research, we are going to focus deeper inside neuro-pricing theories. The purpose of our research is to analyse how consumers subconsciously perceive the various promotions inside the supermarket.

Independently from the economic status, everyone is attracted from the opportunity to save money. Most price offers work on the idea that buying a

product today, on offer, the consumer will save money in the future. So, even if it seems contradictory, consumers are attracted to spend more for unneeded products (Ailawadi et al., 2009). For example, consumers buy product A and not product B, only because one B is at the same price of two As. Or, because A was sold at a higher price and now it has a reduction, so consumers pay less for the same product. However, entering in the supermarket, consumers may not have even been considering buying A or B, but the promotions have caught their interest. In this context, the same promotion, such as *Save £xx*, may work well in a certain product category but may not in another one (e.g. *Save £xx* for yogurts or for detergents). Keeping in mind such kind of information, significant advantages would be provided to retailers and brands (Lam et al., 2001).

Using implicit methods (EAST and affective priming, see par 3.2), the research object is to obtain consumers' evaluation of different supermarket promotions. This will enable to tap subconscious perceptions of a range of several types of offers, since the suspect is that asking explicitly would be likely to produce demand effects<sup>2</sup>. Results may show that consumers do make strong discriminations at the subconscious level. It also may show whether pricing offers work well in some product categories but less in others. We decided to analyse this specific branch of neuro-pricing dividing promotions in two types: the promotions related to quantity and the specific price promotions. The first group is composed by *Buy one get one free*, *Any 3 for 2*, *Any 2 for £xx*. The second one by *Strikethrough*, *Save 1/3* and *Save £xx*.

## 2.3 The psychological effect of colours

Price promotions in the supermarkets are, generally, in red or yellow label. To not dilute the research, it was decided to not analyse the colour of the label and focus only on different kinds of promotions. Nevertheless, it is interesting to see how

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<sup>2</sup> The demand effect is the respondents' tendency to answer what they think could please the researchers instead of the truth. So, in this case they could answer that all promotions are attractive and they see them all positively even if it is not entirely true.

colours are perceived in the consumers' mind according to the psychological and psychophysical literature.

As Shi (2013) affirmed, colours have multiple uses in marketing. First of all, they are essential in brand recognition. Used to attract the attention, they also can affect someone's mood and attitude toward a product. The human body can see colours thanks to photons of light and energy. This energy induces a biological change in the human brain affecting feelings and emotions.

In nature, colours are communication. Animals use colours to detect from predators, or for reproductive behaviours. In humans, colours are the communication between the eyes and the brain. Not every colour is perceived in the same way. Considering all the spectrum's colours, bright yellow is the most visible one and it is associated with daylight. Dark blue, instead, is associated with night. Cold colours (like blue and green) transmit serenity; warm colours (red and orange) are more energetic and exciting (Tatam, 2010).

Analysing the McDonald's logo, for example, Harrison (2009) explained the effects of red and yellow on people subconscious. Yellow is the colour of the sun, it gives energy and it transmits innovativeness, friendship and happiness. Red is the colour of adrenaline; it is a call to action and it stimulates appetite.

# Chapter 3

## Research method

### 3.1 Psychological theory behind our research: The Stroop effect

In the last 60 years hundreds of experiments demonstrated that mental skills obtained by great practice become automatic (like reading for example).

Taking in analysis the reading action, for example, it becomes impossible for a reader human brain to control the lexical and semantic analyses of single words. In other words, when people see some writings it becomes impossible not to read and understand them. Human brain uses this process to guide actions (both low-level actions and learned ones) when consciousness and intention are not necessary (Besner et al., 1997).

These phenomena have been studied by John Ridley Stroop in 1935.

In his study Stroop (1935) conducted three different experiments:

- “The Effect of Interfering Colour Stimuli Upon Reading Names of Colours Serially”
- “The Effect of Interfering Word Stimuli upon Naming Colours Serially”
- “The Effects of Practice upon Interference”

Experiment	Task 1	Task 2
1	Read colour-word names printed in black ink (41.0s)  Red    Blue    Yellow Blue    Green    Yellow Red    Yellow    Green	Read colour names printed in an incongruous ink colour (43.3s)  Red    Blue    Yellow Blue    Green    Yellow Red    Yellow    Green
2	Name the colour of square patches (63.3s)  	Name the font colour of incongruous colour-words (110.3s)  Red    Blue    Yellow Blue    Green    Yellow Red    Yellow    Green

Figure 3.1 Stroop experiment stimuli (Goodwin, 2010).

As we can see in figure 3.1 the experiment stimuli were composed by black words, colours and colourful words.

In the first experiment he asked participants to read the words without taking in consideration the colour ink. The first stimulus were black ink words, the second one colourful ones.

In the second experiment he asked participants exactly the opposite. They had to say the colour ink of the word without reading them. The first stimulus was composed by coloured cubes and participants were asked to say the colour, the second one was composed by colourful words written with an incongruent ink. The third experiment was a repetition of the various tasks of the first and second experiments to see the memory and practice effects.

The average participants' answer times spent completing the experiment parts depend on the task (see figure 3.1). Extremely interesting is the fact that when the colourful words meaning and the colour inks were incongruent, participants spent much more time to complete the task.

As Besner et Al (1997) affirm *“This Stroop effect (Stroop, 1935) and its many variants have been explored empirically, theoretically, and computationally by cognitive and developmental psychologists, psycholinguists, neuropsychologists, and cognitive scientists in more than 500 papers over the past 60 years”*

YELLOW	GREEN	BROWN	BLACK	RED
ORANGE	RED	BLACK	YELLOW	GREEN
RED	YELLOW	PURPLE	ORANGE	BLUE
BLUE	ORANGE	RED	PURPLE	BROWN
PURPLE	GREEN	BROWN	RED	ORANGE

Figure 3.2 Congruency between words and colours (Yu et al, 2015).

YELLOW	GREEN	BROWN	BLACK	RED
ORANGE	RED	BLACK	YELLOW	GREEN
RED	YELLOW	PURPLE	ORANGE	BLUE
BLUE	ORANGE	RED	PURPLE	BROWN
PURPLE	GREEN	BROWN	RED	ORANGE

Figure 3.3 Discrepancy between words and colours (Yu et al, 2015).

Yu et al. (2015) analysed one variant of the Stroop effect in 2015.

In figures 3.2 and 3.3 are shown Yu et al. (2015) stimuli. Participants were asked to say the words colour inks as quick as possible.

As shown in figure 3.4 they demonstrated that the Reaction times (RTs), in milliseconds, are almost the double when the words and the colour inks were incongruent, compared with the reaction times of the congruent ones.

The same results were registered in the percentage of errors; people tended to make mistakes more frequently when there was incongruency between the word meaning and the word colour ink.

This theory is relevant for our research because it demonstrates that there are some actions (as reading in this case) that people do subconsciously all the time.

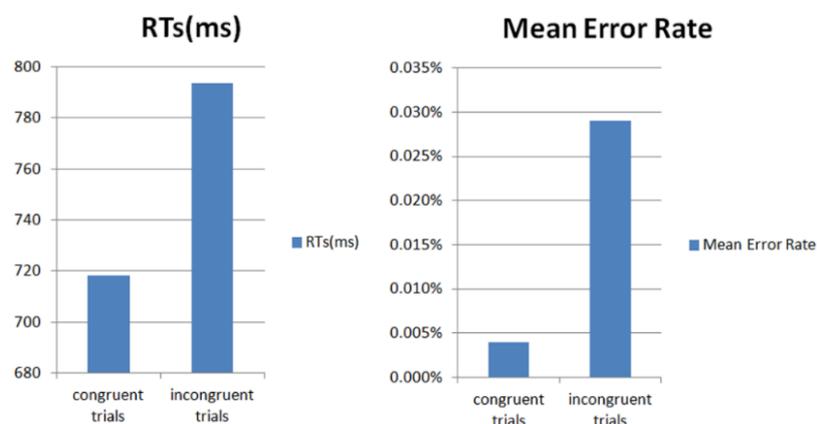


Figure 3.4 Yu et al. (2015) outcomes. Respondents reaction times and error rate when they face congruent or incongruent trials.

## 3.2 Research Design

This research was conducted using two different implicit methods: The Extrinsic Affective Simon Task (EAST) and the Affective priming.

### 3.2.1 The Extrinsic Affective Simon Task (EAST)

The EAST method is a IAT variant (see par. 1.3). This method is used to understand the respondents' semantic discrimination. Some words appear in the middle of the screen. These are either written in white or coloured. In the white option respondents must select if the word has a positive or a negative meaning pressing right or left (see figure 3.5). If the word is coloured the response depends on the colour of the word (e.g. the red colour is related to a negative aspect while green

corresponds to a positive one, the questionnaire could ask for example “if the word is red press right, if green left”) (Teige et al., 2004). According to several studies, answers concerning positive words are faster and more accurate than negative ones (De Houwer, 2003). For this research we used the white words (see figure 3.5).

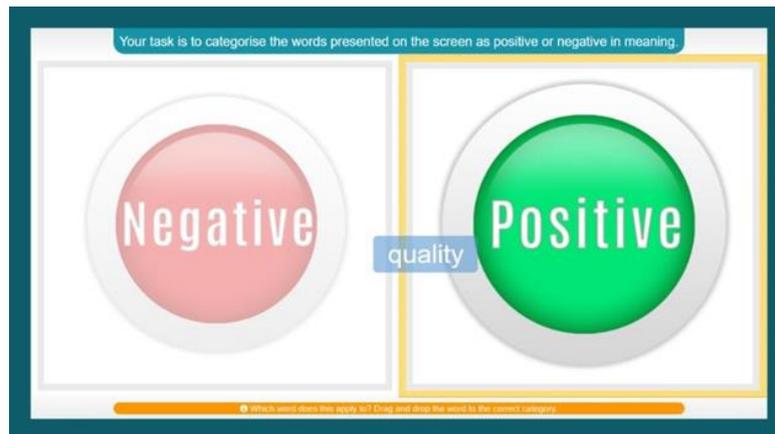


Figure 3.5 Example of the research's EAST.

### 3.2.2 The Affective priming

As mentioned in the first chapter, the affective priming is an implicit computer-based research method, and it is the method used for this research.

According to De Houwer et al. (1998), the affective priming studies the power of one stimulus (the prime) over another one (the target). Fazio et al. (1986) proved that the categorization of a target word with a positive or negative value is simpler and faster when the prime word that foreruns the target word is of the same valence (e.g. healthy life, good). Instead, it is harder and slower when they have opposing valence (e.g. smoke, good). The affective priming works only if the time between the prime and the target is short (around 300 msec) but it doesn't work if it is long (e.g. 1000 msec). This is because it is an automatic process, the respondents should not have the time to analyse and process the prime word (Posner & Snyder, 1975).

In the affective priming, the objective is to identify to which affective category a specific target word belongs. This is analysed through the computer keyboard assigning the targets two different keyboard buttons. The simplest example is using the targets good and bad. Setting up the surveys for example, the key A can have the “good” value, and the L the “bad” one. During the test, the prime is shown followed by the target. Sometimes, the prime is conforming to the target (e.g. healthy life as prime and good as target, or smoke as prime and bad as target). Otherwise, they are opposed (e.g., healthy life as prime and bad as target, or smoke as prime and good as target). As we previously said, the answer is expected to be faster and easier when they comply, slower and harder when they contrast.

This method has been experimented for various purposes and in disparate ways. As, for example, presenting the prime briefly before or simultaneously with the target; using odours or just pronouncing the prime words (De Houwer et al. 1998).

### 3.3 Research Materials

In this research, we analysed 10 positive and 10 negatives words with the EAST method using white words (see table 3.1).

<b>Positive</b>	<b>Negative</b>
Quality	Awful
Authentic	Fake
Popular	Embarrassing
Superior	Inferior
Love	Hate
Amazing	Dreadful
Safe	Harmful
Reliable	Deceitful
Favourite	Worst
First choice	Reject

*Table 3.1 words (or attributes) used as targets in the research.*

These words were chosen because they represent the possible implicit reactions consumers may have towards a sales discount. For example, a price promotion may bring about an implicit reaction that the quality has been reduced. Also, a consumer might believe that the product is being reduced in price because it is not popular. The six brands used in the study were: Activia (yoghurt), Philadelphia (soft cheese), Tropicana (fruit juice), Heinz (baked beans), Fairy (laundry), TRESemme (shampoo). These were chosen to reflect different shelf lives: short, mid and long-term life. It depends on the best before date; short term life products are fresh products like yogurts, mid-term life products have a longer best before date like fruit juice and long-term life are products that never expire like detergents. It could be that the effect of the offers is different for these three different types of products. There are other categories that could have been considered, such as, luxury versus regular, food versus non-food, fast-moving goods versus slow-moving goods, and even highly expensive items, such as cars and property. For the present purposes, the study focuses on shelf life.

The price promotions analysed in this research are:

- *Save £xx*
- *Save 1/3*
- *Strikethrough*

The first two promotions consist of the new promotion price associated with *Save £xx* (xx is the amount of money, it depends on the product price) or *Save 1/3* writings. *Strikethrough*, instead, consist in the old price crossed out plus the new promotion price next to it.

The quantity promotions, instead, are:

- *Buy 1 get 1 free*
- *Any 3 for 2*
- *Any 2 for £xx*

These promotions don't change the products' prices. They change their units number. *Buy 1 get 1 free* means that consumers, buying 1 unit of the product, will have 1 extra unit for free. Almost the same is for *Any 3 for 2*. In this case consumers have to buy 2 units of the product to have a third one for free. The third promotion

is a sort of hybrid between the two categories; it means that if consumers buy 2 units of the same product they will pay less per unit.

All of them are then compared with the product *Original price* and with the going back from the promotion to the original one (we called it *Increased price*).

### 3.4 Procedure

The main task is very easy to do. The participant has to categorise a word as either positive or negative by pressing D for negative and K for positive (and for half of the participants, the other way around, D for positive and K for negative). The first part of the task is a training task, where there are no brands or offers presented. A key point for the construction of the survey is that respondents can identify, understand and therefore discriminate a positive word and a negative one (see figure 3.5). This is a screening part. Respondents need to get 100% correct answers in categorising the words as positive or negative in meaning, otherwise they have to start this part again. They have 3 attempts and if still incorrect after the 3rd attempt they are screened out.

In the present research, the prime were the product images (only one brand among the ones that the respondent selected in the first part of the survey) as well as the price promotion (see figure 3.6). For example, Activia is displayed with the strikethrough promotion “~~£2.00~~ £1.50”. These represent the prime. After that, one of the 20 words appears (see table 3.1) as the target, as shown in figure 3.7. Without analysing the image and without responding to the image, respondents had to focus on the word targets and say if the word is a positive or a negative one by pressing one of two keys on the computer keyboard (e.g., D for positive and K for negative).

In the main set of trials, a trial proceeds as follows: A ‘prime’ is presented in the centre of the screen briefly (for 300 msec, plus or minus a random amount, which is some value between 0 and 50 msec, to be slightly less predictable), followed by the targets. Six tests were created, one test for each brand. Participants qualified

for a test based on their answers to questions about usage (Q 17, see APPENDIX A). If they were regular users, then they qualified for the test. If they qualified for more than one brand, they were allowed to take more than one test (up to a maximum of six). For each test they took they were given an incentive, so if they took six tests they could get six times the chance to win the competition prize. In a single test, the target remains on screen until the participant has pressed the correct key. The product is paired with all of the six price promotion types, the original price, and one increased price ‘promotion’ (eight in all). This means that there were 8 primes in total. Each prime was paired with all of the 20 target words. This means there were a total of 160 pairings. This was repeated over two blocks, so there was a total of 320 trials per test. Each test lasted about 10 minutes. Crucially, the participant’s attitude towards the prime will influence their reaction times to the positive and negative words. For example, when the Activia plus “£2.00 £1.50” is presented as the prime, the participant might think very negatively, such that they might think of low quality, that it is harmful, or fake, or even an embarrassing product to buy. If they think this and then one of these negative words is actually the target, then the participant will be faster to respond because they are already thinking negatively. They may implicitly be expecting a negative word to appear rather than a positive word. If a positive word appears, then their response will be slower because they are currently thinking of a negative word.

Analysis focuses on the time difference between a reaction to a negative word and a reaction to its corresponding positive word.



Figure 3.6 Research prime.



Figure 3.7 Research target.

### 3.5 Research data collection

Once closed the competition, we collected the raw data from the survey system. We obtained several excel files for each analysed brand. Every brand folder was composed by 10 files, one per each survey pair of attributes (e.g. quality-awful file, amazing- dreadful file and so on, see table 3.1). Therefore, every single excel file contained participants' reaction times (RT) about a specific couple of attributes per each promotion of a single brand.

The first steps were to clean and organize the data. First of all, the reaction times has been put all together with the demographics data in order to have a single file for each brand with all the needed information. The output was composed by six excel files, one per each brand. The brand files contained: the participants information about the survey (for example the date they filled in the survey or the device they used), the demographics data and the reaction times. The reaction times regarded the *Original price* and the promotions in relation to the 20 attributes (table 3.1).

In this clean data files, each row, corresponding to each participant, had 8 survey information, 66 demographics information and 160 RTs.

The output of this process was one file per each brand with all the specific information and one overall file.

### 3.6 Participants

After a couple of months the survey was launched online, we collected the results. Paying an English panel provider, we reached 443 respondents from 17 to 75 years of age. The research's most important respondent characteristic was the habit to do their grocery shopping, or at least take part of it. They had to be older than 17 and they needed to be fast enough in answering the affective priming parts. Being a computer based survey, the sample was auto-created by the system.

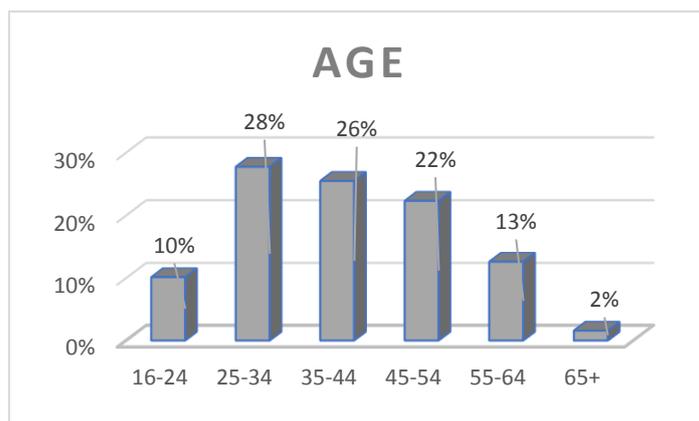


Figure 3.8 Respondents' age (question 3).

Some relevant questions, like question 3 about the age or question 10 about the person in charge for grocery shopping, were respondent selection questions. For example, if a respondent selected “Someone else does the grocery shopping” in question 10 (How do you obtain your groceries?), he/she was screened out from the test.

The sample is composed of 74% of women and 26% of men. As shown in picture 3.8, 76% of respondents were from 25 to 54 years old.

Even if online grocery shopping is spreading, still 76% of respondents prefer to do their shopping at the supermarket (as shown in Table 3.2).

Place of grocery shopping	
Online	24%
Supermarket	76%
Total	100%

Table 3.2 How do you obtain your groceries? (question 10).

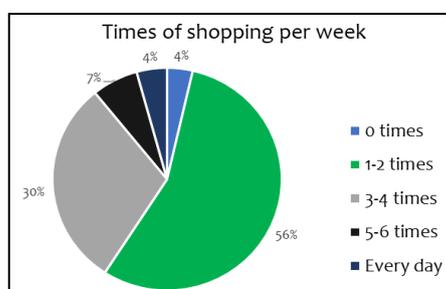


Figure 3.9 How many times do you go to the supermarket in one week? (question 14).

Average time spent at the supermarket	
< 10 minutes	5%
10 to 20 minutes	23%
21 to 30 minutes	38%
31 to 60 minutes	30%
> 1 hour	4%
<b>Total</b>	<b>100%</b>

Table 3.3 When you go to the supermarket, how much time do you spend in it? (question 15).

More than half of the participants do their shopping once or twice a week (see figure 3.9) and 68% of supermarket buyers spend more than 20 minutes to do their grocery shopping at the supermarket (see table 3.3).

When asking if they buy some products in store just because they look attractive or because in that moment they are under promotion, 93% of them answered positively. Surprisingly, the highest percentage of respondents that are not attracted by promotions are the ones with a lower income (see Figure 3.10).

Even if just 7% of respondents affirm to not be affected by promotions, there are several reasons for this result. People with a lower income probably need to be more careful with their spending. They could fix a budget per each week or month dedicated to supermarket spending, so even if they are attracted by promotions, they cannot afford the expenses of buying more products than what they really need.

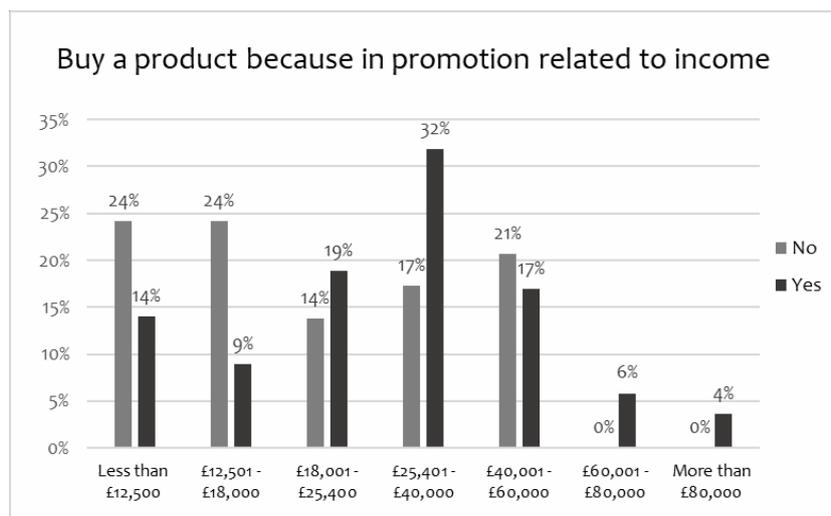


Figure 3.10 When you're in a supermarket do you consider buying products you have never heard of before which look interesting or are on offer? Answers related to respondents' income (question 16 and 12).

Another reason could be that, when answering the question, they saw promotions as something extremely negative. Buying products on promotion could be seen as a demonstration of incapability to afford the entire price, so they could have lied about it in shame.

Taking for granted that people didn't lie answering to this part of the test, this data show that there is a population segment that could not be conditioned by promotions.

See APPENDIX A for all the questions of the demographic part.

# Chapter 4

## Results

### 4.1 Description of the research statistical methods

As explained in chapter three, the goal of the research was to understand if promotions are considered subconsciously by consumers in different ways, depending on products' shelf life. Furthermore, we wanted to see if there are some promotions that work better for a specific kind of products than for other categories of products.

We selected six brands as representative of the shelf life (see par. 3.3). Philadelphia and Activia for the short-term life, Heinz baked beans and Tropicana juices for the mid-term, Fairy and TRESemme for the long-term. The outcome of the research will suggest to the brands which supermarket promotions benefit the most, or at least don't damage, their brand image.

To have a synthesis of the data, we exploited three different statistical methods. We used descriptive statistics, t-test analysis and factor analysis. These were the statistical methods that, in our opinion, could give us an overview of what we were looking for, in an explorative way. Descriptive statistics allowed us to calculate the responses' averages to understand which promotion/attribute combinations were positively perceived and which ones negatively. Furthermore, we used descriptive statistics to analyse the good and poor promotions looking at the emotional differentials (differences between positive and negative values, see 4.4).

Reading this fourth chapter, the results of the three analyses will seem repetitive. This means that different analyses confirm the same characteristic and that we can consider that specific characteristic valid. After a detailed description of the results per each analysis, par. 4.6 will explain the combination of the results.

In the next paragraphs (4.1.1 and 4.1.2) there will be a summary of t-test and factor analysis, to better understand the final results.

Malhotra and Birks (2007) described all these methods in their book.

#### 4.1.1 t-test

To explain what a t-test is, we first need to introduce the concept of Hypothesis test. The hypothesis tests<sup>3</sup> are used to understand if the data collected are enough to say that the results are statistically significant. In other words, they allow researchers to check if the data collected from the sample represent the entire population excluding the possibility of falling into errors. T-test analysis is a kind of Hypothesis test used when the sample has been selected following specific criteria. Thanks to these criteria, the sample has more statistical robustness: it represents better the underlying population. The hypothesis test always needs two hypotheses. The null Hypothesis ( $H_0$ ) represents the possible analysis results that undo the entire research because it proves no relationship between variables<sup>4</sup>. The Alternative Hypothesis ( $H_1$ ) represents all the other possible values that could result from the research. The main objective is to reject the null hypothesis and say that the research data has the “power” to give us the results we want. If the  $H_0$  is neither rejected nor accepted the values are considered valid (all the values are considered valid until researchers are sure they have to accept  $H_0$ ). Once the Hypotheses have been defined, the right distribution has to be selected according to the sample distribution<sup>5</sup>. In this research the t student distribution has been selected (the t-test acts in accordance with the student’s t distribution).

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<sup>3</sup> Differences between them concern the specific characteristics of the sample or of the research purpose.

<sup>4</sup> Statistic variables are all the possible respondents’ characteristics. For example: age, sex, income. Each survey answer is a variable.

<sup>5</sup>The sample distribution is the representation of the way in which all the values of a specific variable are distributed through the statistical units (respondents) that compose the sample.

The outcome of the analysis gives all the p values referred to promotion-attribute relationships. The p value represents, in terms of probability, the risk to reject the null hypothesis while it is true. In other words, the probability to fall into error (type I error<sup>6</sup>).

Researchers at this point have to select a significance level ( $\alpha$ ). This is the tolerable level of risk of making a type I error; it depends on what the costs are of making this kind of error. Usually a level of 0.05 or 0.10 is chosen. It means that researchers are willing to accept the risks of making the type I error no more than 5% or 10% of the cases. For example, if the research is a pharmaceutical research, the level of significance needs to be very low (it could be even 0.01) because making an error in this context could be dangerous to someone's life. Instead, for a marketing research, usually 0.10 is selected to have a vaster overview. In the end, the p values are compared with  $\alpha$ . If the p value is smaller, then  $H_0$  is rejected and the value is statistically significant. If instead it is bigger it means that data are not enough to affirm that  $H_0$  is false and the probability of making this error is higher than the probability researchers are willing to accept.

#### 4.1.2 Factor Analysis

The factor analysis (FA) is used to reduce and to summarize the research data. The most important Factor Analysis characteristic is the interdependence among variables. When the amount of data is large, this technique allows to group variables in descriptive, and more meaningful, categories (the factors) according to the importance and strength of the relationships between them. The FA looks for correlations between the responses and between groups of responses that appear to be correlated with each other.

If in most of the other statistical methods there is a selection of dependant and independent variables, in the Factor analysis all kinds of relationships between

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<sup>6</sup> Type 1 error is the error of considering the null Hypothesis false and Reject it when it is actually true and should be accepted. This means that researchers are using data that should not be used because they don't represent the analysed population.

variables are analysed. This process helps researchers to interpret the data simplifying it and making it easier to read.

For our research, Factor analysis is a way to look at all reaction times during the test to see which attributes appear to be the most discriminating. The FA identifies attributes that are behaving in a similar way. It has been used to understand which attributes are the most statistically important for a particular kind of promotion in the consumer's minds. They are, essentially, the main buying decision factors and are therefore the characteristics, and feelings, consumers perceive looking at a specific offer. For our research the factor analysis was done looking at promotions in general, without focusing on a specific brand. This way, looking at the results coming from all brands for a specific promotion/attribute relationship, we obtained the most important attributes that affect brands running a certain promotion. The attributes coming from the factor analysis could be considered as primary factors in the consumer's mind when choosing to buy the product or not, when they see a particular kind of promotion.

See APPENDIX B for a further and more technical description of t test and factor analysis.

## 4.2 Descriptive statistics results

As said in par. 3.5, the survey results were the participants' reaction times (RTs). As explained in the previous chapters, this method analysed reaction times to see consumers' preferences. When the prime (image of the product with a specific promotion) was shown, at the subconscious level every participant was already thinking about that promotion in a positive or negative way. When the target (attributes words) appeared, their reaction time changed according to what they were already thinking. For example, if the promotion was considered with a positive value, participants were thinking positively, so their reaction time to a positive word was faster than to a negative word and vice versa (Fazio et al., 1986).

Starting from this assumption, the first analysis was about RTs. Being a test where the results are measured in terms of reaction time, the effect of the prime on the target was calculated using time differences. If the prime had no effects on the target in the respondents' brain, then the difference between the reaction times would be 0. Every attribute for each promotion had an *Original price* RT. The *Original price* RT has been used as a benchmark to understand if the respondents answered quickly or slowly. Then, the promotion RT was subtracted to the *Original price* RT. To better explain, we consider what we observed in the first analysis of the Activia brand. Regarding the "Quality- Awful" couple of attributes we got 8 RTs for Quality and 8 for Awful. These 8 RTs were one per each promotion (6), one for the *Original price* and one for the *Increased price*<sup>7</sup>. Subtracting the "Save £xx/Quality" RT to the "Original price/Quality" RT, the result could be positive or negative. If the number is positive, it means that the promotion affects positively the perceived Quality of the product, because the RT was faster than the benchmark. A negative number means that the promotion RT was bigger therefore respondents had a slower reaction.

To not alter the results, the fact that there were some blank answers in the survey has to be taken into consideration. If so, the result has to be blank. If both of them have a value, then the result has to be the *Original price* RT minus the promotion RT.

In our analysis this calculation has been done 62.020 times. This is because 20 attributes x 7 promotions (including the *Increased price*) x 443 respondents = 62.020. Not counting the blank cells, the output was composed by 57.057 results. Each of these tells us how one specific promotion affects one particular attribute in one specific respondent.

Per every promotion/attribute combination the respondents' average has been calculated. From these results we could understand which combinations are perceived positively and which negatively.

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<sup>7</sup> The re-establishment of the original price following a promotion period.

### 4.3 T test analysis results

To see which of the results obtained from the descriptive analysis are significantly different from 0, the t-test analysis was used. If numbers are close to 0, the t-test shows whether these differences are statistically significant or if they are random results.

As explained in APPENDIX B, the first t-test step is to define the null hypothesis and the alternative one. Our research hypotheses were:

H0:  $\pi=0$

H1:  $\pi \neq 0$

where  $\pi$  is the value obtained by the difference in terms of reaction times between the prime and the target. The H0 is a two-tailed Hypothesis (see APPENDIX B). It means that the results could be significantly positive or significantly negative. At this point of the research every option was taken into consideration. This is the reason why the two-tailed test was chosen. Not knowing if the values were extremely positive or extremely negative (essential one-tail test characteristic), the two-tailed test was the best option to consider all the possible outcomes (both positive and negative). Being an explorative research, the level of significance was fixed at 0.10 to have a vaster overview.

Using excel, the p values according to the student's t statistics were calculated.

The results of this first steps are summarized in table 4.1.

	Quality							Awful						
	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased price	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price
Average	-26,5	-21,9	-46,0	2,7	-14,7	2,0	-64,1	-34,5	-31,3	2,0	-22,0	-39,1	-3,1	-27,4
P value	0,255	0,450	0,124	0,389	0,359	0,390	0,031	0,258	0,109	0,220	0,076	0,112	0,040	0,372

Table 4.1 Summarized data: respondent's RT averages and p values regarding the Quality- Awful couple of attributes of Activia brand.

Table 4.1 is just a part of a bigger table, it analyses only the Quality-Awful couple of attributes for Activia brand (the entire table is repeated in APPENDIX C). The

“average” row shows the average values of respondent’s promotion/attribute difference in terms of reaction times between the *Original price* and the promotion (see par. 4.2). The first column, for example, explains how the Quality of Activia is seen in the consumer’s mind when the promotion *Save £xx* is applied. The average is -26.5. This value tells us that when consumers see the Activia product with *Save £xx* promotion the product is not perceived as a Quality product in the consumer’s mind. On the contrary, *Strikethrough* promotion has a positive average (2,7) so with this offer Activia is still seen as a Quality product. In fact, a positive score means that the attribute has been enhanced by the promotion. As explained in par. 4.1.1, not all the data are statistically significant. This is the reason why the p value row is present in the table. The significance level was fixed at 0,10 so, only the combination that has a p value smaller than 0,10 are considered significant for the results.

Table 4.1 shows that, *Increase price* is statistically significant regarding the product Quality; *Save 1/3* and *Strikethrough* promotions are significant concerning the product’s Awfulness. Having all a negative average, the result interpretation is the opposite of the attribute. So, increasing the price again after one promotion, Activia could suffer in terms of perceived product Quality. Instead, using *Save 1/3* or *Strikethrough* promotions, is not seen as an Awful product.

From the brand specific tables like table c.1 in APPENDIX C all the significant results have been extracted and put together in a single brand table, obtaining 6 brand tables (tables 4.2-4.7). Each one is divided into three columns representing the attributes’ valence. According to the EAST words classification (see table 3.1), significant attributes were divided in positive or negative values. If a negative attribute was negatively significant, it was renamed as positive. If a positive attribute was negatively significant it didn’t become negative. According to words’ meaning, saying that a negative word has not a negative value, it means that it is a positive one. Instead, saying that a positive word has not a positive value it’s not the same of saying that it has a negative meaning.

All these values could seem to contradict each other. But, it's important to highlight that only if both the positive and negative values of the same couple of attributes are present, they contradict each other, otherwise they just have different meanings. Another important point is the fact that this is an analysis of feelings; feelings are complicated, they are usually never extremely positive or extremely negative. Most of the time the same event (the same promotion in this case) originates a mixed feeling. The detection of mixed feelings is something that makes implicit reaction time tests especially interesting. In traditional self-report scales, participants often appear to be unified in their views and most likely this happens because they are deliberately trying to be consistent in their responses. We are now going to look in detail the statistically significant attributes per each brand.

## Activia

ACTIVIA	POSITIVE VALUES	NOT POSITIVE NOR NEGATIVE VALUES	NEGATIVE VALUE
Save £XX	First Choice		Reject
Any 3 for 2	Love	Not Reliable	Reject
Any 2 for £XX		Not Superior, Not First Choice	Embarassing
Strikethrough	Popular, Not Awful		Harmful
Buy 1 get 1 free	Authentic	Not Love	
Save 1/3	Safe, Favourite, Not Awful	Not Superior	Embarassing
Increased Price	Not Hate	Not Quality	Inferior

Table 4.2 Activia significant values resulting from the t test.

Looking at table 4.2 we can see Activia results. These first results show us how Activia is seen in the consumers' minds under these promotions. Just *Buy one get one free* doesn't have negative values and it presents Activia as an Authentic brand, even if it is not Loved by consumers. *Save 1/3* is also a good promotion. In fact, even if buying Activia with this promotion they feel Embarrassed and they don't consider it a Superior product, they don't think it is Awful. Furthermore, it is their Favourite also because it's seen as Safe, a vital characteristic for short-term products, such as yogurts. The worst promotion seems to be *Any 2 for £xx*. It doesn't have any positive values. It is considered as not Superior and Embarrassing, so with this promotion Activia is not a consumers' First choice.

## Philadelphia

PHILADELPHIA	POSITIVE VALUES	NOT POSITIVE NOR NEGATIVE VALUES	NEGATIVE VALUE
Save £XX	Reliable	Not Quality, Not Authenticity, Not Favourite	Awful
Any 3 for 2		Not Quality, Not Authenticity, Not Favourite	
Any 2 for £XX	Reliable	Not Quality, Not Authenticity, Not Favourite, Not Amazing	Fake, Hate
Strikethrough	Favourite	Not Love	Fake, Inferior
Buy 1 get 1 free	Safe, reliable	Not Love, Not Authenticity	Inferior, Harmful
Save 1/3		Not Favourite	Fake, Embarassing, Reject
Increased Price		Not Favourite, Not Love	

Table 4.3 Philadelphia significant values resulting from the t test.

Table 4.3 represents Philadelphia results. Looking at these first results it seems that Philadelphia brand image generally suffers with all promotions. The majority of the attributes are in the middle. *Save £xx* is seen as an Awful promotion for Philadelphia, but at the same time it gives Reliability to the brand. A similar result is obtained by *Any 2 for £xx*, but consumers think that it could be a Fake product and they Hate it. Concerning *Buy 1 get one free* promotion, it seems to be the best one in this case because it spreads a feeling of Safety and Reliability. This offer, though, has a contradicting couple of attributes (Safe-Harmful), but Harmful is present a negative statistically significant attribute. At this point we now look at the two attributes p values. Safe has a 0.031 p value, Harmful 0.087. Both are present because the significance level was fixed at 0,1. If  $\alpha$  would have been fixed with a 95% confidence level, only the Safe value would be present. This means that Safe is stronger than its opposite value, so *Buy 1 get 1 free* seems to be the less damaging offer for Philadelphia. Anyway, it would not be recommended.

*Save 1/3* is the worst one. Consumers perceive Philadelphia as a Fake and Embarassing product and, as a result, they Reject it.

## Tropicana

TROPICANA	POSITIVE VALUES	NOT POSITIVE NOR NEGATIVE VALUES	NEGATIVE VALUE
Save £XX	Not Harmful	Not Authentic	Awful, Embarassing, Deceitful
Any 3 for 2	Not Reject, First Choice, Not inferior	Not Quality	Embarassing
Any 2 for £XX		Not Quality, Not Popular	Embarassing, Deceitful
Strikethrough	Favourite		Awful, Fake, Embarassing, Deceitful
Buy 1 get 1 free	Favourite, First Choice, Not Hate	Not Harmful, Not Popular	Embarassing
Save 1/3		Not Popular	Deceitful
Increased Price	Not Reject		

Table 4.4 Tropicana significant values resulting from the t test.

*Buy 1 get 1 free* together with *Any 3 for 2* seem to be the best options for Tropicana brand. The negative value is the Embarrassment of buying it with these promotions, but on the other side both have good positive values. *Buy 1 get 1 free* induces Tropicana to be the First and Favourite choice on the shelf. Even if it is not Popular and Embarrassing, they don't Hate it and it is not seen as Harmful. The other good promotion for Tropicana brand image is *Any 3 for 2*. Consumers still feel Embarrassed, and even if it does not improve the perceived Quality of the product, Tropicana becomes the First choice not being considered as an Inferior product, so they don't Reject it.

The worst two, instead seem to be *Any 2 for £xx* and *Save 1/3*. They don't have positive attributes. They are considered Deceitful and not Popular, furthermore, *Any 2 for £xx* is also Embarrassing and undermines Tropicana perceived Quality.

### Heinz baked beans

HEINZ BEANS	POSITIVE VALUES	NOT POSITIVE NOR NEGATIVE VALUES	NEGATIVE VALUE
Save £XX	Amazing	Not Authentic, Not Safe	Reject
Any 3 for 2	Not Fake, First Choice	Not Reliable	Reject, Embarrassing, Hate
Any 2 for £XX		Not Love, Not Safe	Deceitful, Reject
Strikethrough			Fake, Reject
Buy 1 get 1 free	First Choice	Not Popular	Inferior, Deceitful
Save 1/3	Amazing		Deceitful
Increased Price			Deceitful, Worst

Table 4.5 Heinz Baked Beans significant values resulting from the t test.

Concerning Heinz baked beans, it becomes the First choice when *Buy 1 get 1 free* and *Any 3 for 2* is the running promotion. Consumers consider also *Save 1/3* and *Save £xx* Amazing offers. On the other side, a lot of negative attributes seem to be significant. *Buy 1 get one free*, for example, even if it makes Heinz become the First choice, it is also considered Inferior and Deceitful. *Any 3 for 2* is Rejected, Hated and also Embarrassing. This result could also be because of the physical characteristics of the product itself. Being food in a can, people know that it is not healthy and it does not have the same fresh food quality, but they still love it. This is probably the reason why quantity promotions, even if they have a lot of negative attributes, induces Heinz to be the First shelf choice.

In this case, price promotions affect the brand image less positively. In fact, *Strikethrough* promotion is the worst one. It has only negative attributes: it makes consumers think that it is a Fake product and they Reject it.

## Fairy

FAIRY	POSITIVE VALUES	NOT POSITIVE NOR NEGATIVE VALUES	NEGATIVE VALUE
Save £XX	Not Dreadful, Not Harmful	Not Popular, Not Love	Worst
Any 3 for 2		Not Amazing, Not Favourite	Awful, Fake, Worst
Any 2 for £XX	Amazing	Not Love	Worst
Strikethrough		Not First Choice	Worst
Buy 1 get 1 free	Authentic, Not Harmful, Not Dreadful		Awful, Worst
Save 1/3			Deceitful
Increased Price	Not Dreadful	Not Love, Not Favourite	Hate

Table 4.6 Fairy Laundry significant values resulting from the t test.

These first results for Fairy don't look very positive. The Worst attribute is present in each promotion, an exception is *Save 1/3* that, however, is considered Dreadful and doesn't have any positive value. Looking at these results it seems that Fairy should avoid any type of promotion so as not to damage the brand name. A very bad promotion for this brand is *Strikethrough*. In fact, it doesn't have any positive significant values and, not only does it exclude the product from being a First choice, but it also makes it the Worst. If one of the following promotions should be selected, *Buy one get one free* seems to be the less damaging. In fact, although it is considered Awful and the Worst, on the other side it doesn't affect the product Authenticity and it is not considered Harmful nor Dreadful. Instead, Fairy should absolutely avoid the *Any 3 for 2* formulae. It has no positive values. Furthermore, not only does it make Fairy seem Fake, Awful and the Worst, but it is not considered Amazing nor is it the Favourite. This promotion, according to this first analysis, would seriously damage the brand image in the consumer's mind.

## TRESemme

TRESemme	POSITIVE VALUES	NOT POSITIVE NOR NEGATIVE VALUES	NEGATIVE VALUE
Save £XX	Authentic, Popular, Love, Not Hate, Reliable	Not Amazing	Embarassing
Any 3 for 2	Not Awful, Love, Not Hate, Not Dreadful, Safe, Favourite		Embarassing
Any 2 for £XX	Not Awful, Not Inferior, Love		
Strikethrough	Not Deceitful, Not Worst, Not Reject	Not Amazing	Hate
Buy 1 get 1 free	Authentic, Popular, Superior, Love, Not Harmful	Not Amazing	Embarassing
Save 1/3	Not Awful, Love, Favourite	Not Reliable	Deceitful
Increased Price	Authentic, Popular, Favourite	Not Amazing, Not Reject	Embarassing

Table 4.7 TRESemme significant values resulting from the t test.

This last analysed brand, on the contrary, seems not to be damaged by promotions at all. Almost all the significant values are positive ones, but there are some differences here too. The most liked promotion seems to be *Any 2 for £XX*, because it has no negative values. Another very good promotion is *Any 3 for 2*. It has a lot of good attributes and the only negative one is a bit of embarrassment. Between all of them, *Save 1/3* seems to be the worst one and should be avoided. Not only because it is considered Deceitful, but also because this promotion makes consumers think that it is not a Reliable brand. All the other promotions are considered not Amazing and Embarassing, but having so many positive values, these characteristics are not significant enough to say that one promotion affects the brand image negatively.

## 4.4 Factor analysis results

As previously said in par. 4.1.2, factor analysis in this research has been used to go deeper into the data and to understand the most important attributes in consumer's mind looking at the promotions. This allows us to see, in a more specific way, how brand images are positively or negatively affected by promotions.

The data have been re-organized to have specific sheets on the promotions and to run its factor analysis, without considering the analysed brands. Using MS excel tools, factor analysis has been run to see, per each promotion, which attributes a consumer cares when he looks at promotions. In other words, with this analysis we discovered the attributes considered as the decision factors by a consumer's

mind. To have a broader overview, we selected the rotated varimax table<sup>8</sup>, which considers all the possible relationships between variables. In our research the factor analysis considers correlations between the promotions and the variables. Table 4.8 is the *Save £xx* factor matrix output. As we can see there are three columns. The first column points out the first set of main factors looking at this promotion (Quality, Authentic, Superior and Hate). The second one considers the second group of factors (Embarrassing and inferior) and the third one the third set of main factors (Awful, Fake, Love, Harmful, Reject). Only the first column has been used for our analysis, the first factors are grouped in table 4.9 (See APPENDIX D to see the second and third groups of factors for all the brands).

Save £xx	First factors	Second factors	Third factors
Quality	0,46	0,12	0,04
Awful	-0,08	-0,06	-0,56
Authentic	0,61	0,21	0,14
Fake	0,28	0,18	-0,45
Popular	-0,06	-0,34	-0,05
Embarrassing	0,01	0,66	0,00
Superior	0,55	-0,21	0,13
Inferior	-0,06	-0,41	0,02
Love	0,11	-0,06	0,42
Hate	-0,56	0,18	0,24
Amazing	0,02	-0,34	0,10
Dreadful	-0,25	-0,16	0,24
Safe	0,00	0,16	-0,02
Harmful	0,27	-0,10	0,47
Reliable	-0,20	-0,28	-0,11
Deceitful	-0,01	-0,26	-0,34
Favourite	0,26	-0,30	-0,10
Worst	0,03	0,24	-0,20
First Choice	0,21	-0,37	0,02
Reject	-0,13	0,03	0,42

Table 4.8 *Save £xx* factor matrix (rotated varimax).

The higher the number, the higher is the correlation between the factor and the variable. The correlation coefficient ranges from -1 to 1; a value equal to 0 means

<sup>8</sup> The FA analysis result gives us two matrixes: the unrotated and the rotated varimax. Both show the correlation between the factor and the variable. The first one considering the single correlation, the second one considering also that variables are related to multiple factors.

no correlation at all, -1 means perfect negative correlation, 1 perfect positive correlation (Comrey and Lee, 1992).

Attributes bigger than 0.4 or smaller than -0.4 have been selected. When consumers see *Save £xx* promotion, the perceived Quality, the product Authenticity and Superiority affect their buying behaviour. Looking at the data we can also say that they generally don't Hate this promotion.

Let us now observe how promotions are perceived subconsciously, without considering any specific brand (table 4.9).

Promotions main attributes										
Promotions	Attributes									
Save £xx	Quality	0,46	Authentic	0,61	Superior	0,55	Hate	-0,56		
Any 3 for 2	Quality	0,57	Authentic	0,57	Superior	-0,42	Awful	-0,45		
Any 2 for £XX	Deceitful	-0,59	Favourite	-0,46	Worst	0,56	First Choice	-0,39	Reject	0,39
Strikethrough	Quality	0,41	Superior	0,61	Inferior	0,48	Safe	-0,43	Reliable	0,41
Buy 1 get 1 free	Love	0,43	Hate	0,66	Favourite	-0,56				
Save 1/3	Harmful	-0,40	Deceitful	0,51	Worst	0,59				
Increased price	Quality	0,45	Embarassing	-0,41	Inferior	0,45	Reliable	0,40	First Choice	0,49

Table 4.9 First group of factors per each promotion resulting from the factor analysis.

*Save £xx* is considered a very good promotion; it doesn't give any negative value to consumers.

*Any 3 for 2* has almost the same results. It doesn't damage the product perceived Quality nor Authenticity and even if with this promotion, products are not considered Superior than the others, it is neither perceived as Awful.

*Any 2 for £xx* appears as a very bad promotion. The Deceitful attribute has a negative score, so consumers think it is not a Deceitful offer. But, it affects the Favourite attribute negatively and it will not be the First choice in the consumers' mind. Furthermore, it is considered the Worst and people could Reject it.

*Strikethrough* promotion has conflicting results. Product Quality and Reliability are positively perceived even if Safety has a negative score. It is believed both Superior and Inferior. The Superior attribute has a higher score, so this variable fits the promotion a bit better. This result could be a consequence of the fact that neither a specific brand nor a specific product have been taken into consideration. This result could probably change if looking at a specific product. The promotion

could carry Superiority for a product category and Inferiority for others. We are going to see it in a more thorough manner later in this chapter.

*Buy 1 get 1 free* has conflicting results too, it is Loved or Hated. Generally, it is a bad promotion, it is not a Favourite, and the Hate attribute has a high score.

*Save 1/3* looks to be a bad promotion. The product is not Harmful, but it is perceived as Deceitful and the Worst.

Increasing the price again, after a promotion period, even if could bring some perceived Inferiority of the product, it is not seen negatively. In fact, it doesn't affect Quality, the product is seen as a Reliable one, so it becomes a First choice in the consumers' minds. Furthermore, it is not seen as Embarrassing.

It is interesting, at this point, to compare table 4.9 with the explicit question number 20 of the demographic part of the survey: "Identify how attractive the following promotional offers are." Results of this part are shown in table 4.10.

	<b>Attractive offer</b>	<b>Not sure</b>	<b>Unattractive offer</b>	<b>Total</b>
<b>Save £xx</b>	58%	32%	10%	100%
<b>Any 2 for £xx</b>	63%	31%	6%	100%
<b>Buy 1 get 1 free</b>	90%	6%	3%	100%
<b>Any 3 for 2</b>	63%	25%	11%	100%
<b>Striketrough</b>	80%	16%	4%	100%
<b>Save 1/3</b>	58%	31%	12%	100%

*Table 4.10 Answers to the explicit question about promotions' attractiveness (question 20).*

The question is not structured with attributes like those in the implicit part of the survey, but we can see the general explicit preference about promotions. All promotions are considered attractive by most respondents. The most attractive seems to be *Buy 1 get 1 free* even though looking at these first implicit results, it revealed itself not attractive (although it is an attractive offer in terms of saving money, the general analysis for this promotion reveals that it has negative consequences for the brand's image). The second most attractive promotion

according to explicit data is the *Strikethrough*. Implicit data confirm that even if, as we previously said, it is not attractive in every situation.

Concerning the worst promotions, *Save 1/3* is the one with the higher “unattractive offer” answer percentage in the explicit question. Implicit data confirmed that. The second worst promotion is *Save £xx*. Implicit data, instead, proved exactly the opposite, which according to them seemed to be the best one. This comparison proves that consumers are not always able to really express what they bear in mind while answering explicit questions. They may be unaware of how a promotion affects their feelings towards the brand.

#### 4.4.1 Comparison of brands’ scores and main promotions’ attributes

Once obtained the consumer’s salient attributes (table 4.9), a comparison with the analysed brands has been done. We put table 4.9 together with the respective brand tables (like table C.1 in APPENDIX C). We looked at the brands’ average scores and p values to see how the brand is seen, according to a specific promotion, for important attributes.

The comparison between the brand’s promotion-attribute average and the important attributes scores resulting from the factor analysis, tells us if the brands reflect consumers perception or not. P values, instead, allow us to see if the brand’s average was statistically significant or not.

#### Save £xx

Save £xx	0,46		0,61		0,55		-0,56	
	Quality	p value	Authentic	p value	Superior	p value	Hate	p value
Activia	-26,5	0,25	-33,5	0,43	-27,6	0,34	6,7	0,44
Philadelphia	-57,2	0,01	-66,0	0,03	-51,4	0,36	8,4	0,46
Tropicana	-47,6	0,35	-100,1	0,06	-14,3	0,11	11,1	0,40
Heinz	20,2	0,43	-32,9	0,08	-13,7	0,34	9,8	0,33
Fairy	-19,4	0,28	-112,7	0,18	-28,4	0,30	22,1	0,29
Tresemme	32,2	0,45	50,9	0,04	20,8	0,43	-6,3	0,04

Table 4.11 Comparison between the “Save £xx” main attributes (FA) and the averages (descriptive statistics).

Quality, Authenticity, Superiority and Not Hate were the *Save £xx* main attributes.

According to table 4.11 only TRESemme shampoo is positively affected by *Save £xx* promotion. Each TRESemme result has the same sign of the main attributes. It means that each brand result agrees with consumer's promotion perception.

All the other brands have opposite values. So, for example, Activia product doesn't transmit Quality if *Save £xx* is the running promotion (Activia has a negative Quality average, -26.5). The same result has been registered for Authenticity, Superiority and Hate. This means that, even if *Save £xx* is considered a good promotion in general, it doesn't suit the Activia brand.

The same kind of result has been registered for Philadelphia, Tropicana and Fairy. Heinz baked beans Quality, instead, is not negatively affected by this promotion. The brand image though could be damaged in the same way because all the other positive attributes (Authenticity and Superiority) have a negative sign.

All these results could come from the product's specific characteristics. In Activia's case, for example, it could be possible that this promotion makes a consumer think that something is wrong with the product. Being a yogurt a delicate product, this fact influences their buying behaviour.

### Any 3 for 2

Any 3 for 2	0,57		0,57		-0,42		-0,45	
	Authentic	p value	Quality	p value	Superior	p value	Awful	p value
Activia	-9,4	0,35	-21,9	0,45	-18,8	0,12	-31,3	0,11
Philadelphia	-101,1	0,00	-25,9	0,08	-54,8	0,12	16,6	0,23
Tropicana	-81,5	0,13	-15,5	0,04	-10,8	0,27	35,3	0,10
Heinz	-23,8	0,25	-18,1	0,44	5,9	0,38	-30,3	0,14
Fairy	-48,6	0,11	-2,8	0,22	-18,4	0,47	76,3	0,01
Tresemme	23,1	0,16	-21,4	0,13	45,6	0,41	-69,4	0,03

Table 4.12 Comparison between the Any 3 for 2 main attributes (FA) and the averages (descriptive statistics).

As previously said, Any 3 for 2 doesn't generally damage the brand image (see table 4.9).

The important attributes are: two positive (Authentic and Quality), the negation of a negative one (not Awful) and the negation of a positive one (not Superior). Looking at the brand scores, it seems to work only for TRESemme. We need to

highlight though, that TRESemme perceived Quality seems not to be positively considered by consumers with Any 3 for 2 promotion. But, Awful (the opposite negative value) has a negative statistically significant score. This means that the Quality, in the end, is not perceived as bad. Concerning Authenticity and Superiority, it has a positive value.

Heinz baked beans has something positive too. Even though its Quality and Authenticity seem to be harmed by this promotion, people think it becomes a Superior product and they don't consider it as Awful.

Fairy, Philadelphia and Tropicana have very bad scores in this promotion. People not only think that the product has no Quality, no Authenticity and no Superiority, but they also think that this promotion makes the product Awful. These three brands should avoid this promotion.

Activia has bad values too. This promotion doesn't transmit Quality, Authenticity nor Superiority. But, contrary to the previous brands, people don't think it becomes an Awful product.

### Any 2 for £xx

Any 2 for £XX	-0,59		-0,46		0,56		-0,39		0,39	
	Deceitful	p value	Favourite	p value	Worst	p value	First Choice	p value	Reject	p value
Activia	26,8	0,41	24,9	0,40	0,5	0,12	-1,6	0,06	42,2	0,30
Philadelphia	-33,0	0,29	-35,9	0,04	-19,6	0,40	12,3	0,49	-28,3	0,23
Tropicana	105,9	0,02	-17,6	0,26	-24,9	0,20	17,6	0,18	15,4	0,43
Heinz	28,1	0,04	-48,3	0,42	16,5	0,19	4,3	0,36	18,0	0,02
Fairy	20,0	0,34	9,9	0,26	28,2	0,03	13,6	0,34	-0,9	0,42
Tresemme	-32,8	0,34	34,5	0,23	8,1	0,27	-15,0	0,21	32,1	0,15

Table 4.13 Comparison between the Any 2 for £xx main attributes (FA) and the averages (descriptive statistics).

Considering the Any 2 for £xx promotion, explicitly asking, 63% of respondents affirmed it is an attractive offer. Implicit data tells us that this promotion, generally, is not attractive at all. It is not considered Deceitful, but at the same time it is not the Favourite neither the First choice, furthermore, it is considered the Worst and people tend to Reject it. Looking at the effects that this promotion

has in the analysed brands, we can see that it has both positive and negative influences on products.

Using this promotion Activia is Rejected, it is not the First choice and it is considered Deceitful and the Worst (see table 4.13). It is, however, perceived as the Favourite. It has to be said that only the First-choice negative score is statistically significant, so we can say that this is not a good promotion for the Activia brand.

On the contrary, this seems to be a good promotion for Philadelphia. It is not considered the Worst neither Deceitful and people don't Reject it, the First-choice attribute has a positive score. Although, it is definitely not the Favourite one.

Tropicana is seen as Deceitful associated with this promotion. It is not the Favourite and it is Rejected. Even though it has a positive score in the First-choice attribute and it is not the Worst.

Heinz, even though it has a good score for the First-choice attribute, it is badly affected by Any 2 for £xx. In fact, it is Rejected, being considered both Deceitful, not Favourite and the Worst.

Fairy has almost the same results, even though it is considered the Favourite and the First choice.

TRESemme, that generally has good scores in each promotion, doesn't seem to be so good with this one. In fact, even if it is still the Favourite and it is not considered Deceitful, it is not the First choice and it is Rejected.

## Strikethrough

Strikethrough	0,41		-0,43		0,61		0,48		0,41	
	Quality	p value	Safe	p value	Superior	p value	Inferior	p value	Reliable	p value
Activia	2,7	0,39	19,1	0,35	-37,9	0,39	-7,1	0,37	27,6	0,25
Philadelphia	-37,9	0,28	19,0	0,42	-60,6	0,47	62,6	0,06	32,1	0,43
Tropicana	14,4	0,45	19,8	0,15	-29,5	0,45	-15,7	0,35	-26,3	0,44
Heinz	7,2	0,17	27,9	0,28	-25,9	0,37	30,9	0,32	-53,9	0,16
Fairy	-11,9	0,46	-49,3	0,17	-43,1	0,13	-45,7	0,44	-49,6	0,36
Tresemme	36,2	0,38	-8,4	0,22	42,3	0,43	-29,1	0,33	-13,5	0,37

Table 4.14 Comparison between the Strikethrough main attributes (FA) and the averages (descriptive statistics).

As we previously said, *Strikethrough* promotion has a couple of opposite values. It probably depends on the product (see table 4.14).

Quality is a general positive *Strikethrough* attribute. In fact, this promotion transmits Quality to Activia, Tropicana, Heinz and TRESemme. But, it doesn't work for Fairy and Philadelphia.

Product Safety is in doubt. *Strikethrough* seems to not work so well with long term products, like Fairy and TRESemme. Generally looking at promotions this is considered a negative attribute, in fact it has bad scores for these two brands, and positive scores for all the others.

Reliability has almost the same results. With this promotion short terms products are seen as Reliable ones, but not all the others.

Concerning Superiority and Inferiority the three brands have opposed values: Heinz and Philadelphia become Inferior. TRESemme, instead, is considered Superior. Activia, Tropicana and Fairy are not Superior neither Inferior.

### Buy 1 get 1 free

Buy 1 get 1 free	0,43		0,66		-0,56	
	Love	p value	Hate	p value	Favourite	p value
Activia	-7,6	0,07	9,6	0,44	29,4	0,45
Philadelphia	-47,7	0,05	-1,1	0,37	0,4	0,32
Tropicana	-43,3	0,33	-3,1	0,03	28,8	0,06
Heinz	18,2	0,48	-3,4	0,16	-34,7	0,49
Fairy	-28,0	0,18	-13,8	0,47	-10,8	0,29
Tresemme	50,6	0,09	17,3	0,48	38,8	0,25

Table 4.15 Comparison between the Buy 1 get 1 free main attributes (FA) and the averages (descriptive statistics).

Among the main attributes of *Buy 1 get 1 free*, a couple of opposed attributes are present: the Love and Hate couple of attributes (see table 4.15).

In this case, except from Fairy, all the other brands have either opposed values (Love positive and Hate negative or vice versa) or a statistically significant p value. This allows us to understand which one is the strongest in consumers' mind looking at the analysed brands. If the two values confirm each other, we know

which one prevails in the consumers' mind. If the two attributes have the same average sign, then the attribute with a statistically significant p value, per definition, represents better the respondents' opinion since the percentage of falling in error is lower.

Activia has opposite values. People don't Love Buy 1 get 1 free for Activia. In fact, Hate attribute has a positive value. However, it is still considered the Favourite one.

Consumers' consideration of Philadelphia with this promotion is in doubt. Hate has a negative value, but Love has a negative statistically significant value, so this is not a good promotion for Philadelphia.

Tropicana is the Favourite with Buy 1 get 1 free, in fact people don't Hate it. But, it has to be highlighted that Love has a bad score.

This seems to be a good promotion for Heinz baked beans, people Love it so the Hate attribute has a negative score. However, it is not their Favourite.

Generally, it is not a good promotion for Fairy. The Favourite attribute has a negative score. Consumers don't Hate it but it is not Loved either.

Finally, TRESemme is Loved with Buy 1 get 1 free promotion (it has a statistically significant p value) and TRESemme is the consumers' Favourite with this promotion.

### Save 1/3

Save 1/3	-0,40		0,51		0,59	
	Harmful	p value	Deceitful	p value	Worst	p value
Activia	16,6	0,35	60,8	0,30	-8,8	0,34
Philadelphia	-17,6	0,42	29,2	0,45	2,0	0,21
Tropicana	-11,1	0,43	52,9	0,07	-14,7	0,18
Heinz	-4,4	0,19	48,9	0,09	-10,9	0,45
Fairy	-13,7	0,21	31,1	0,06	29,7	0,18
Tresemme	29,9	0,33	26,8	0,08	11,8	0,39

Table 4.16 Comparison between the "Save 1 /3" main attributes (FA) and the averages (descriptive statistics).

*Save 1/3* is not considered a good promotion (see table 4.16). In fact, Deceitful and Worst are the main attributes describing this promotion, even if it is not considered Harmful.

Looking at the analysed brands, TRESemme seems to be the most damaged by this promotion. It is considered Harmful, Deceitful and the Worst associated with *Save 1/3*.

Philadelphia and Fairy reflect the general findings of this promotion. They are considered Deceitful and the Worst, but not Harmful.

Tropicana and Heinz baked beans look Deceitful, but not the Worst nor Harmful compared with the other competitors. In fact, they seem to be the less damaged by this promotion.

Activia becomes Deceitful and Harmful but not the Worst.

## 4.5 Emotional differentials analysis results

Once analysed which attributes are the brands' statistically significant ones (t-test results) and which are the most important promotion attributes considered by consumers (FA analysis), we now discuss on good or bad promotions for brands using the differences between the attributes (Emotional Differentials, ED).

Since the survey construction, all the attributes were paired in positive and negative couples (see table 3.1). Participants, during the test, saw all the promotions associated to brands and to all attributes. As mentioned in the previous paragraph, sometimes the results are a mix of feelings and both negative and positive values are present. To understand the good or bad promotions for the analysed brands, the difference between positive and negative values has been calculated (tables 4.17- 4.22).

Using the averages from table c.1, each value was obtained as:

Positive attribute average – negative attribute average.

For example, in the first column of table 4.17, the first cell in the first row is the result of: *Save £xx Quality average* – *Save £xx Awful average* for Activia brand.

The results show us which is the strongest in a specific couple of attributes. So, if the resulting number is positive, in that specific couple of attributes, the positive one is stronger. Otherwise the negative prevails.

To say that the positive or the negative overcome the other, the difference between the two needs to be big enough. Only differences bigger than +30 or smaller than -30 have been highlighted. A bad score for an offer, doesn't necessarily mean that consumers don't like the offer, it only means that they feel less positive about the brand. As a consequence, both brand image and brand loyalty are affected in the long term.

## Activia

Activia	Quality awful	Authentic Fake	Popular Embarassing	Superior Inferior	Love Hate	Amazing Dreadful	Safe Harmful	Reliable Deceitful	Favourite Worst	First Choice Relect
Save £XX	8	-60	-48	-74	-9	15	-76	-51	28	-65
Any 3 for 2	9	-42	-6	-30	18	-18	-100	-74	22	-83
Any 2 for £XX	-48	33	-20	-35	39	-9	-78	-98	24	-44
strikethrough	25	-74	10	-31	19	9	-29	-26	89	-87
Buy 1 get 1 free	24	4	-13	-11	-17	23	-27	-73	34	-36
Save 1/3	5	-36	-16	-60	-36	-12	13	-72	14	-24

Table 4.17 Activia good and bad promotions (Emotional differentials analysis).

As we can see in table 4.17 the brand is negatively impacted by offers, probably because it has a short best-before life.

First choice, Reliability, Safety, Superiority and Authenticity are the most undermined characteristics affected by promotions. Amazing and Favourite are untouched by any offer. We can say that what might be called the Brand preference is unaffected.

However, being a short-term life product, Quality, Safety and Reliability could be the most important attributes to look at. In this case, Quality is affected only by Any 2 for £xx, Safety is undermined by Save £xx, Any 3 for 2 and Any 2 for £xx. Reliability is impacted by all promotions except the Strikethrough.

Summarizing, the brand’s best strategies would be to follow a *Buy 1 get 1 free* promotion because it is the overall less damaging promotion. The *Strikethrough* seems to be a good promotion too because it is the only one that doesn’t affect the three most important attributes for this specific type of product.

Its worst strategies are the *Save £xx* (because it is the one that affects the higher number of characteristics) and *Any 2 for £xx* (because it is the one that negatively affects Quality, Safety and Reliability).

### Philadelphia

Philadelphia	Quality awful	Authentic Fake	Popular Embarassing	Superior Inferior	Love Hate	Amazing Dreadful	Safe Harmful	Reliable Deceitful	Favourite Worst	First Choice Rehect
Save £XX	-75	-98	-33	-129	0	-69	22	29	-60	2
Any 3 for 2	-43	-148	-36	-85	-35	-26	51	51	-36	-11
Any 2 for £XX	-115	-161	-40	-55	1	-82	-47	94	-16	41
strikethrough	-47	-76	25	-123	-37	-84	27	25	8	-9
Buy 1 get 1 free	-60	-118	-39	-75	-47	-79	59	93	-27	10
Save 1/3	-84	-99	-63	-67	-13	-44	31	15	-60	-6

Table 4.18 Philadelphia good and bad promotions (Emotional differentials analysis).

As Activia, Philadelphia is a short-term life product. Among the analysed brands, it is the most negatively affected by promotions (see table 4.18). This demonstrates that promotions negatively affect the brand image, even if Safety and Reliability are undamaged. Looking for a strategy, all the analysed promotions should be avoided because all of them badly affect the perceived Quality of the product. In this case it may be worth following other paths or analyse other promotion types like competitions or coupons.

### Heinz baked beans

Heinz baked beans	Quality awful	Authentic Fake	Popular Embarassing	Superior Inferior	Love Hate	Amazing Dreadful	Safe Harmful	Reliable Deceitful	Favourite Worst	First Choice Rehect
Save £XX	49	-33	21	-75	-29	13	-19	-67	-10	-10
Any 3 for 2	12	-6	-34	-37	-10	21	-45	-134	2	8
Any 2 for £XX	52	-24	-24	-37	-70	-19	-53	-66	-65	-14
strikethrough	11	-33	-46	-57	-27	25	39	-84	-62	-10
Buy 1 get 1 free	-16	-29	-30	-66	22	0	-7	-65	-26	44
Save 1/3	27	-40	-25	-75	-60	26	54	-101	-4	-22

Table 4.19 Heinz baked beans good and bad promotions (Emotional differentials analysis).

This is a different type of product compared to the previous ones. Its shelf life is longer. In this case the product remains Amazing and of good Quality with all promotion types (see table 4.19). This brings us to think that the brand is perceived as high Quality and that people have good feelings about it. Though, Superiority and Reliability are the most suffering attributes. They are undermined by all promotion types. Looking at the various promotions, *Any 2 for £ xx* and the *Strikethrough* offers are the worst because they touch negatively five brand attributes. Instead, the less damaging offers are *Buy 1 get 1 free* and *Save £ xx*; not only do they affect the less number of attributes negatively, but they respectively affect the First choice and the Quality positively.

## Tropicana

Tropicana	Quality awful	Authentic Fake	Popular Embarrassing	Superior Inferior	Love Hate	Amazing Dreadful	Safe Harmful	Reliable Deceitful	Favourite Worst	First Choice Relect
Save £XX	-101	-150	-90	-24	-24	-29	140	-56	5	6
Any 3 for 2	-51	-84	-93	15	-58	-31	7	-73	39	75
Any 2 for £XX	-62	-16	-90	-12	0	-44	35	-122	7	2
strikethrough	-45	-47	-101	-14	-23	-20	64	-108	19	-9
Buy 1 get 1 free	-36	-16	-126	-56	-40	1	127	-68	9	21
Save 1/3	-11	-41	-27	53	-62	-15	42	-118	1	-14

Table 4.20 Tropicana good and bad promotions (Emotional differentials analysis).

Tropicana seems to be badly affected by all kinds of promotions as it was for Philadelphia. There are some points to highlight though. The Favourite, Safe and First choice attributes are never affected by promotions. It means that, even if people don't appreciate promotions on this product, they still maintain good feelings about it and they keep the purchase intention in the short term. However, Quality, Popularity and Reliability are the most suffering attributes. In this case, the less damaging offer for table 4.20 seems to be *Save 1/3* that is the only one that doesn't affect Quality, Popularity, Amazingness, Favourite and First choice attributes; Furthermore, it positively affects Superiority and Safety. Nevertheless, looking at table 4.4 about Tropicana statistically significant attributes, we can see that between all of them only Deceitful and not Popular are statistically

significant. This means that, even if from table 4.20 it looks like a good promotion, the strongest attributes are all negative. I wouldn't recommend this offer in a promotion strategy.

Any 3 for 2 has a similar fate: according to table 4.20 the product seems to be the Worst. This promotion affects Quality, Authenticity, Popularity, Love, Amazing and Reliability negatively, even if it affects Favourite and First choice positively. But, looking at table 4.4 it looks like a very good promotion to use.

So, resulting from this comparison, Tropicana doesn't really have good or bad promotions. Save 1/3 seems to be a good promotion because it doesn't have too many negative values. However, it has been pointed out that the only statistical significant values are bad ones. The exact opposite is for Any 3 for 2, where the few positive values are those significant. Therefore, just looking at the significant values it seems to be a really good promotion but, instead, it affects negatively all the other attributes.

The only promotion where the two analyses show almost the same results is Any 2 per £xx that is a promotion to avoid.

## Fairy Laundry

Fairy Laundry	Quality awful	Authentic Fake	Popular Embarassing	Superior Inferior	Love Hate	Amazing Dreadful	Safe Harmful	Reliable Deceitful	Favourite Worst	First Choice Relect
Save £XX	-34	-126	-16	-53	-57	-12	65	-33	-32	0
Any 3 for 2	-79	-70	9	6	-73	-52	57	-40	-34	5
Any 2 for £XX	31	-27	-28	-20	-56	9	-27	-6	-18	15
strikethrough	-32	-38	25	3	-38	-61	-44	-82	-38	7
Buy 1 get 1 free	-54	11	30	9	-14	-4	-15	-16	-57	-53
Save 1/3	-28	-9	26	-39	-56	-10	11	-51	-32	30

Table 4.21 Fairy Laundry good and bad promotions (Emotional differentials analysis).

Fairy Laundry product image has almost the same results as Tropicana. It suffers in almost all kinds of promotions (see table 4.21). It seems to suffer more on Quality, Love, Reliability and Favourite. The unaffected attributes are Popularity and Safety. Talking about a strategy, the most favourable promotion is Any 2 for £xx, which is the one that negatively affects only the Love attribute.

The worst one, instead, is the *Strikethrough* pricing offer that doesn't affect any attribute positively. Instead, it affects Quality, Authenticity, Love, Amazing, Safety, Reliability, Favourite negatively.

## TRESemme

TRESemme	Quality awful	Authentic Fake	Popular Embarassing	Superior Inferior	Love Hate	Amazing Dreadful	Safe Harmful	Reliable Deceitful	Favourite Worst	First Choice Rehect
Save £XX	87	70	-32	73	59	-17	-51	61	10	22
Any 3 for 2	48	38	-99	40	18	20	62	15	123	-14
Any 2 for £XX	64	26	-3	68	4	9	-12	70	26	-47
Strikethrough	67	70	-29	71	-13	-82	-24	13	18	69
Buy 1 get 1 free	-19	42	-8	-7	33	-80	86	-17	31	-31
Save 1/3	14	23	-21	-18	27	-58	32	-49	5	-60

Table 4.22 TRESemme good and bad promotions (Emotional differentials analysis).

As opposite to all the other studied brands, TRESemme not only is not damaged by promotions, but it actually benefits from them (see table 4.22).

The attributes that seems to be affected the most are First choice and Amazing. Though, Quality, Authenticity and Superiority are positively affected by almost all kinds of promotions.

Even though it doesn't suffer because of promotions, there still are some promotions that work better than others. The worst offer is *Save 1/3*. The best ones instead are: *Save £XX*, *Any 3 for 2* and *Strikethrough*.

Trying to understand why this product reached such positive results, a few reasons came up.

The first reason is its long shelf life, it is less probable that consumers may think about something wrong with the product and its functionality. (i.e., Quality and Safety). Though, for the same reason Fairy should have the same results.

A Second reason is its positioning in consumers' mind. TRESemme is seen as a very good product and a very good brand. Loyal consumers see promotions as a sort of prize for their loyalty instead of wondering about product characteristics.

The problem is that, using promotions frequently, brand Popularity falls, and the brand seems to become weaker in the market.

Concluding this discussion, we have now looked at all the attributes compared to see in each kind of promotion which attributes are negatively or positively affected to ponder which promotions should be used or not.

All the data has been analysed according to three different perspectives (t- test, factor analysis and emotional differentials). Combining the results of the three analyses we can see that the results are consistent. In fact, with these three analyses we looked at the data according to three different points of view highlighting several important aspects every time. Firstly, the brands' statistically significant attributes (t-test results). Secondly, the most important promotions' attributes considered by consumers (FA analysis), adapted then to brands' scores. Thirdly, the prevalence of positive or negative values in each promotion per each brand.

## 4.6 Summary of the results

The three used methods looked at the same data according to three different perspectives, as mentioned in the previous paragraph.

Combining the results, we can say with a high level of certainty, which promotions are good or bad for the analysed brands.

*Buy 1 get 1 free* resulted the best Activia option, confirmed by all three tests (t test, factor analysis and emotional differentials analysis). Factor analysis and emotional differentials analysis showed us that also *Strikethrough* is a good promotion for this brand.

On the other side, *Any 2 for £xx* was confirmed by all the results a bad promotion for Activia. Furthermore, the FA and ED analysis added *Save £xx* as bad promotion. Philadelphia didn't have positive results. The only exception seemed to be *Any 2 for £xx* according to the FA, but the t-test contradicted this result. Looking at all the other cases, Philadelphia had bad scores in all promotions in all the tests.

Tropicana had a series of contradicting results. *Save 1/3* resulted good in the FA and in the ED analysis, but bad in the t-test. *Any 3 for 2*, instead, the exact opposite: good for the t-test and bad for the FA and ED analysis. This could happen because,

looking from different perspectives, data can show something that is not easily visible with just one analysis. When we find two positive results in 2 different analyses, we say that the promotion is a good one, even if in the third analysis it is not mentioned as a positive offer. When, instead, there is one analysis that shows the opposite, then we can't consider that promotion a good one. The t test showed us that for these two promotions what FA and ED analysis pointed out was wrong. In all the other cases, instead, if the third analysis didn't point out anything particularly positive nor particularly negative, the other results were taken as valid.

We can say that both the t test and the FA saw the *Buy 1 get 1 free* as a good promotion for Tropicana. Instead *Any 2 for £xx* as a bad one.

Looking at Heinz baked beans, all the analyses confirmed that *Buy 1 get 1 free* and *Save £xx* are good promotions for this brand. Factor and differences analyses, instead, pointed out that *Any 2 for £xx* and *Strikethrough* are bad promotions for Heinz baked beans.

Fairy didn't have good results. The only good promotion, shown by the FA and ED analysis, is *Any 2 for £xx*. *Buy 1 get 1 free* seemed to be a good promotion according to the t test, instead the factors analysis contradicted the result. All three-analyses indicated that *Strikethrough* is a bad promotion for the brand image. Furthermore, t test and FA presented *Save 1/3* and *Any 3 for 2* as a bad promotion too.

TRESemme, as we saw, had a lot of positive responses. The best one is *Any 3 for 2*, confirmed as a good promotion by all the analyses. *Any 2 for £xx* is a good promotion looking at the t test and the FA. Moreover, *Strikethrough* and *Save £xx* are good promotions according to both FA and ED analysis.

The only bad promotion that TRESemme should avoid is *Save 1/3*, confirmed as a bad promotion by the FA and the ED analysis.

Reflecting the shelf life, results pointed out that *Buy 1 get 1 free* is a very good promotion for short and middle shelf life products, but it is not good for long term

products. On the contrary, *Any 2 for £xx* had very bad scores with short and middle term life products, but it seems to be the best option for long life products.

Regarding all the other promotion types, they work better or worse according to specific products, not for categories of products. An example is *Strikethrough* that resulted good for TRESemme but very bad for Fairy.

One possible explanation of the product specific differences in promotion perception could come from the consumers' loyalty for the brand. Even if we considered the brands from the same product category all the same because of the expiration date characteristic, we didn't consider the power of the brand on the products. Different brands, even if belonging to the same product category, could be seen in different ways in the consumers' minds. This fact takes consumers to perceive the same product (like yogurts) differently from one brand to another (Kapferer, 2015). As consequence, the product shelf life is not enough to explain the differences on how promotions are perceived by consumers. A clear example is TRESemme. We saw that all promotions seem to work well with this product and we tried to explain that with the specific characteristics of the product: loyal consumers consider it a very good brand, so promotions do not have the power to damage the brand image, instead, it could be seen as a sort of prize.

## 4.7 Research limitations

This research has a couple of main limitations.

The first limitation regards the language. The structure of this method requires a fast response. Data are composed by reaction times collected when respondents choose if the prime word is positive or negative. This requires a very good language knowledge that only native speakers own. As we explained in chapter three a fast response coincides to a conformity between the target and the prime. Instead, a slower response is a dissonance between the two. Non-native speakers could answer slower not because they subconsciously think there is dissonance between the prime and the target, but because they need more time to think

about the word meaning. This is a limitation because it excludes from the survey English inhabitants that are not English native speakers.

The second limitation regards the reaction times. Being a computer-based survey, people didn't have any researcher that could clearly explain to them how to take the test. For this reason, if they didn't understand how it worked there was no one that could explain it to them. The main problem of this limitation is the inclination to consciously analyse both the target (the promotion images in this case), and the prime, even if it was explicitly clarified that they didn't have to do that. The result of this mechanism was that they took too much time to answer when the prime appeared. The time available to answer (around 300 msec), per definition, wasn't enough to analyse both the target and the prime, otherwise it would have compromised the results. If respondents take too much time they are screened out from the test.

Lots of people have been screened out for this reason, possibly people that could have given us useful data to analyse.



## Conclusions

This research tried to answer to one question: which promotions at the supermarket don't damage the brand image in the consumers' mind?

To answer, we used neuromarketing implicit methods that work on respondents' reaction times. Behind these methods there are psychological theories that have been supported by many experiments in the past (like the Stroop effect).

To analyse reaction times, we created the survey using a special software built from the 'Split Second Research limited' company. The software can be used for multiple implicit methods according to the research purposes. In our case we used it for the Extrinsic Affective Simon Task (EAST) and The Affective priming, analysing reaction times, with a (payed) English panel provider, reaching 443 respondents. Analysing the data according to three different perspectives (t test, factor analysis and emotional differentials), we found out that there is not a clear promotion diversification with respect to the product shelf life.

However, even if we cannot talk about shelf life to explain how promotions are perceived differently, this research demonstrated that there are profound distinctions on how consumers subconsciously perceive promotions. There are not promotions that always work well or always work bad, each of them are perceived as good or bad according to the product and to the brand.

Furthermore, with this research we demonstrated that marketers need to be very careful in choosing promotions because there are some kinds of promotions that could really damage the brand image.

Recommendations for future research could be to find a common characteristic that differentiate products and see if it influences distinctively how promotions are perceived.

For example, we found that the shelf life doesn't create a clear difference between offers, but the frequency of purchase or the range of price could influence how promotions are perceived by consumers. It could be that more expensive products, even if they are the most suffering in terms of brand image,

are more likely to be bought on promotion, but which kind of promotion should they use to not damage the brand?

The same could be looking at the frequency of purchase. Grouping products according to how frequently consumers buy that product could show us that some promotions work better for products consumers buy every week instead of for products that they buy once a month.

Other connected researches are the promotions concerning other types of products. Are there common promotions between a supermarket and a clothes shop? If yes, do they work in the same way?

All these researches will help brands to use more effective promotions to create a stronger and more aware in-store marketing strategy.

## APPENDIX A

As we explained in chapter 3, the survey was composed by several parts: the demographic part, the EAST part and the affective priming part. The EAST and the affective priming are interactive, so it is not possible to transcribe them here (see par. 3.4). We want to transcribe, though, the demographic part.

Q1: Welcome and thank you for taking part. This survey should last no more than 10 minutes and is divided into 2 parts. Part 1 – general questions about you, your shopping habits and the products you purchase. Part 2 – How fast your reaction times are. Are you ready to proceed? Yes or no answer.

Q2: Please select your gender

Q3: Please indicate your age

Q4: Do you or any member of your immediate family (spouse, children or parent) work in any of the following industries? (Please select all that apply)

- Radio or television (including pay TV)
- Market Research
- Advertising
- Entertainment industry
- Banking and Finance
- Construction
- Tourism and Leisure
- Telecommunication
- Information Technology
- None of the above
- Other (please specify)

Q5: Which one of the following best describes your main occupation?

- Senior managerial, senior administrative or senior professional
- Intermediate managerial, intermediate administrative or intermediate professional
- Supervisory or clerical, junior managerial, junior administrative or junior professional
- Skilled manual worker

- Semi and unskilled manual worker
- State pensioner or widow, casual or lowest grade worker
- Student
- Unemployed

Q6: Are you?

- Single
- In a relationship
- Married
- Divorced
- Widowed

Q7: Who do you live with?

- by myself
- with my immediate family
- with my extended family
- with my boyfriend/girlfriend
- with friends
- Other (please specify)

Q8: How many children do you have?

Q9: Please specify the languages you can speak and the level of fluency of each

	First language	Fluent but not first language	Good knowledge	Tourist knowledge	Very little to None
English					
French					
German					
Spanish					
Polish					
Urdu					
Chinese					
Portuguese					
Punjabi					
Bengali					
Arabic					

Q10: How do you obtain your groceries?

- Mostly by buying them online
- Mostly by visiting a supermarket
- Someone else does the grocery shopping

Q11: Who usually does the shopping at your home? (please specify, e.g. me, my husband, I go with my mother, etc)

Q12: What is the total gross income in your household per year?

- Less than £12,500 per year
- Between £12,500 and £18,000
- Between £18,001 and £25,400
- Between £25,401 and £40,000
- Between £40,001 and £60,000
- Between £60,001 and £80,000
- More than £80,000

Q13: Which of the following supermarkets have you shopped in within the last six months?

- Sainsbury
- Tesco
- Co-op
- Waitrose
- Asda
- M&S
- Lidl
- Aldi
- Other (Please specify)

Q14: How many times do you go to the supermarket in one week?

Q15: When you go to the supermarket, how much time do you spend in it?

Q16: When you're in a supermarket do you consider buying products you have never heard of before which look interesting or are on offer? Yes or no answer.

Q17: Which of the following products or brands do you purchase from supermarket?

- 
- 
- 
- 
- 
- 
- None of the above

Q 18: Do you make a shopping list when planning your visit to the supermarket?

	Always	Sometimes	Rarely	Never
I make a written shopping list of what I need				
I make a mental list of what I need				
I make a digital shopping list on my mobile phone				

Q19: While you are in the supermarket, do you look for the various promotions and offers going on at that moment? Yes or no answer

Q20: Identify how attractive the following promotional offers are.

	Attractive	Not sure	Unattractive
Save £3 on a product that was £10			
Any 3 for the price of 2			
Any 2 for £3			
<del>£4.99</del> £2.90			
Buy 1 get 1 free			
Save 1/3			
New increased price			

Q21: Is there a product that you only buy when it's on offer? Yes or no answer, if the answer was yes, they had to specify which product.

Q22: Do you collect and use coupons or vouchers when you shop at the supermarket? Yes or no answer

Q23: Do you prefer to use a computer mouse with your left or right hand?



## APPENDIX B

In Appendix B we are going to explain in a more exhaustive way how t-test and factor analysis work.

Information of this appendix comes from: Malhotra and Birks (2007), Lane et al. (2007), Bowles (2013), Yong and Pearce (2013) and lessons material from the *Quantitative tools for marketing* course taught by prof. Gerolimetto at Ca' Foscari University.

### **T test**

T-test analysis is a Hypothesis test, called also association analysis. It is used to understand the strength of associations between variables.

Before explaining what it is, we need to briefly introduce the different kinds of scales that can be used during a survey creation.

There are several scales of measurement that can be used creating a questionnaire: the nominal scale, the ordinal scale, the interval scale and the ratio scale. Each of them uses numbers in different ways.

In the first case numbers are used as labels to identify and classify objects. In the ordinal scale numbers are used to rank objects and to explain the degree of extension of a certain characteristic. In the interval scale equal distances from 0 represent equal values for the same characteristic. The ratio scale has all the previous scales features plus an absolute zero. Each scale has properties that allow researchers to use different statistical methods. Using ratio scale, researchers can take advantage of every statistical method. The other scales, for their definition, are more restrictive and researchers cannot use every method.

A hypothesis test could be categorised as parametric or non-parametric test.

The parametric test is used when the analysed data come from an interval or ratio scale. The non-parametric test, instead, is used with nominal or ordinal scales.

T test uses quantitative data so, it is a parametric test. This test is made on one sample that has been selected following specific parameters (or criteria) to better represent the analysed population.

This test uses a student's t statistic. Using this type of statistic, we assume that “the variable is normally distributed<sup>9</sup> and the mean is known (or assumed to be known) and the population variance<sup>10</sup> is estimated from the sample” (Malhotra and Birks, 2007).

To run a hypothesis testing 6 steps have to be followed:

Step 1: Define which are the null Hypothesis (H<sub>0</sub>) and the alternative one (H<sub>1</sub>). The null hypothesis is the worst scenario. It is the value that undo the entire research, basically it means that there is no relationship between variables. The alternative hypothesis (H<sub>1</sub>) are all the other values that could result from the research. When the null hypothesis is equal to 0, it means that researchers are using a two-tailed test; otherwise it is a one tail test.

The one tailed test is chosen when researchers want to analyse results in only one direction (only positive or only negative results, see figure B.1).

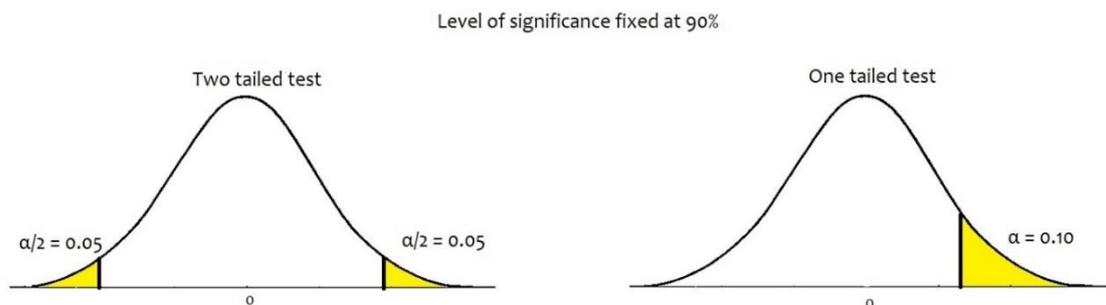


Figure B.1 Graphical representation of the one tailed and two tailed Hypothesis testing (Bowles, 2013).

Otherwise, to have an overview of the results, the two-tailed test is chosen because it analyses both directions (positive and negative). In our research we chose the two-tailed test because we wanted to find out not only the attributes

<sup>9</sup> That follow the normal (or Gaussian) distribution.

<sup>10</sup> Variance: It is the expected variation of a specific measurement (in this case the analysed population). If the measurements from the various respondents are extremely different from each other, the variation is high. If instead the measurements are similar through individuals, the variance is small.

that promotions transmit positively, but also the ones that promotions transmit in a negative way.

Step 2: Choose the right statistical formula. The hypothesis test usually follows a well-known distribution function. The t-test acts in accordance with the student's t distribution. This distribution is similar to the Gaussian distribution, but its slope is less steep so the smallest values are farther from the centre.

The student's t statistic is:

$$t = \frac{\bar{X} - \mu}{\sqrt{s^2 / n}}$$

where  $\bar{X}$  is the sample mean,  $\mu$  is the mean of the random variable,  $s^2$  is the sample's variance and  $n$  is the sample's number.

The result is the t value. It represents the standard deviation of the analysed variable considering both the sample and the variable mean.

Step 3: Select  $\alpha$  (the significance level), to test  $H_0$ . The level of significance is the probability that the null hypothesis is rejected when instead it is actually true. This is called also type 1 error. This step is needed to choose a tolerable level of risk of making a type 1 error. It depends on what are the costs of making this kind of error. Usually  $\alpha$  is fixed at 0.05 or 0.10. In the case of a two-tailed test  $\alpha$  is then divided in half. For our research we chose a 90% level of significance, so  $\alpha=0.10$ .

Step 4: Using the sampling distribution, define the probability of a true null hypothesis using the t distribution statistical table or a statistical software (like Excel). For this step the level of freedom has to be chosen. The t student provides for a  $n-1$  levels of freedom. Using the t value, the levels of freedom and the significance level, the p value is calculated through the t distribution statistical table or a statistical software. The p value represents the probability of achieving

a sample statistic different from the null hypothesis criterion, so to reject the null Hypothesis and consider the result statistically significant (according to the level of significance researchers decided to use). In other words, it is the probability that, sampling more than once from the same population, all the t values result equal or higher than the value resulted from our t test (higher than the t value or smaller than the negative t value if we are considering a two-tailed test). It is easier to explain it with a graph (see figure B.2).

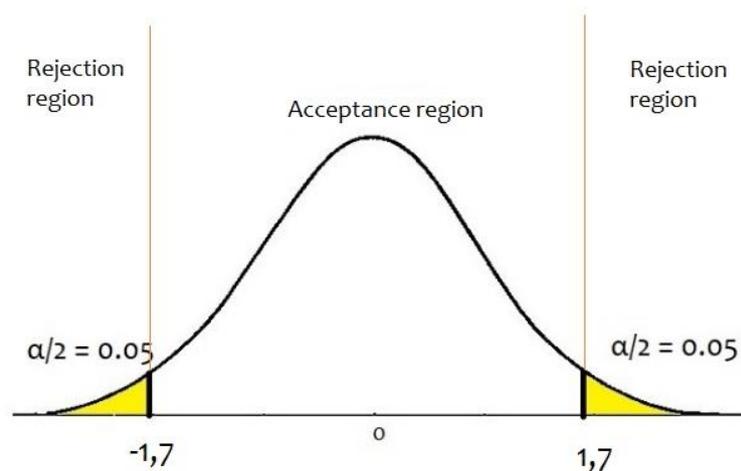


Figure B.2 Explanation of p value and t value in a two-tailed test (Bowles, 2013).

If we obtain a t value equal to 1,7 in a two-tailed test, the values that allow us to reject the null hypothesis are the values greater than 1,7 or smaller than -1,7. The p value is the probability of obtaining these values repeating the test on another sample from the same population.

Step 5: Compare the p values with the level of significance. If the p value is smaller than the selected  $\alpha$ ,  $H_0$  is rejected and the combination is statistically significant. If the p value is bigger,  $H_0$  could be accepted. Basically, it means that the data are not enough to affirm that  $H_0$  is false and the probability of making the type I error is higher than the probability researchers are willing to accept.

In this test we are assessing whether the data is significantly different from 0 (either significantly above or below 0). The t test in our research has been done

140 times per each brand. In this way we got the p value per each promotion - attribute combination, per each brand. Each p value tells us the probability of achieving values that allow us to reject the null hypothesis for that specific combination.

## Factor Analysis

As previously said in par. 4.1.2, the factor analysis is a class of procedures used to reduce and to summarize research data.

The most important Factor Analysis characteristic is the interdependence among variables.

If in most of the other statistical methods there is a selection of dependant and independent variables, in the factor analysis all kinds of relationships between variables are analysed. FA looks for correlations between the responses, and especially for groups of responses, that appear to be correlated with each other. The FA is used to detect *communality* that is the extent of variance of one variable in common with the other variables.

The factor model formula is:

$$X_i = A_{i1}F_1 + A_{i2}F_2 + A_{i3}F_3 + \dots + A_{im}F_m + V_iU_i$$

$X_i = i^{th}$  standardised variable represented by latent factors

$A_{ij}$  = factor loading<sup>11</sup> of variable i

F (1,2,3... m) = common factor

$V_i$  = standardised regression coefficient<sup>12</sup> of variable i on unique factor i

$U_i$  = the unique factor for variable i

m = common factors

---

<sup>11</sup> The factor loading tells us the contribution of a variable into the factor. It represents the strength of correlation. If it is high, the variable contributes highly to the factor.

<sup>12</sup> Standardized units coming from a regression analysis.

The steps to perform Factor analysis are the following:

Step 1: Problem formulation. The first step is understanding how to set up the analysis. Identify the analysis goal and the variables to use.

Step 2: Correlation matrix construction. This is an important step. To be meaningful, variables need to be correlated. This matrix shows us the correlations between paired variables. For example, table B.1 is the correlation matrix resulting from *Save £xx* Factor analysis.

Save £xx	Quality	Awful	Authentic	Fake	Popular	mbarassin	Superior	Inferior	Love	Hate	Amazing	Dreadful	Safe	Harmful	Reliable	Deceitful	Favourite	Worst	First Choice	Reject
Quality	1,00	-0,13	0,20	0,04	-0,03	0,10	0,14	0,03	0,04	0,00	0,02	-0,06	0,01	-0,05	-0,06	0,08	0,09	-0,03	0,01	-0,10
Awful	-0,13	1,00	-0,04	0,07	-0,10	-0,05	0,08	-0,08	-0,13	0,02	0,05	-0,05	0,00	-0,06	0,12	0,11	-0,01	0,07	-0,04	-0,15
Authentic	0,20	-0,04	1,00	0,04	-0,01	0,05	0,12	-0,09	0,05	-0,19	-0,07	-0,07	0,09	0,12	-0,06	-0,06	-0,01	0,03	0,09	0,00
Fake	0,04	0,07	0,04	1,00	-0,02	0,02	0,06	0,02	-0,07	-0,15	-0,06	-0,12	0,02	-0,07	-0,05	0,01	-0,05	0,14	-0,01	-0,04
Popular	-0,03	-0,10	-0,01	-0,02	1,00	-0,10	-0,09	0,05	0,13	-0,10	0,01	0,01	0,04	-0,12	0,05	0,09	0,03	-0,12	0,01	-0,07
Embarassing	0,10	-0,05	0,05	0,02	-0,10	1,00	-0,13	-0,17	0,03	0,02	-0,12	-0,05	0,08	-0,06	-0,02	-0,08	-0,02	0,08	-0,15	-0,03
Superior	0,14	0,08	0,12	0,06	-0,09	-0,13	1,00	-0,08	0,05	-0,13	0,14	-0,06	0,01	0,21	0,00	-0,02	0,07	-0,05	0,08	0,04
Inferior	0,03	-0,08	-0,09	0,02	0,05	-0,17	-0,08	1,00	0,05	-0,02	0,03	-0,06	-0,01	0,02	0,08	-0,02	0,09	-0,02	0,06	0,00
Love	0,04	-0,13	0,05	-0,07	0,13	0,03	0,05	0,05	1,00	0,03	0,02	-0,01	-0,02	0,10	0,00	-0,04	0,06	0,01	-0,04	0,03
Hate	0,00	0,02	-0,19	-0,15	-0,10	0,02	-0,13	-0,02	0,03	1,00	-0,05	0,06	0,05	-0,07	0,05	-0,02	-0,16	-0,04	-0,07	0,14
Amazing	0,02	0,05	-0,07	-0,06	0,01	-0,12	0,14	0,03	0,02	-0,05	1,00	0,10	0,01	0,04	0,00	0,03	-0,02	-0,05	-0,03	0,01
Dreadful	-0,06	-0,05	-0,07	-0,12	0,01	-0,05	-0,06	-0,06	-0,01	0,06	0,10	1,00	0,01	0,06	0,04	0,01	-0,01	0,10	0,06	0,04
Safe	0,01	0,00	0,09	0,02	0,04	0,08	0,01	-0,01	-0,02	0,05	0,01	0,01	1,00	-0,07	0,00	0,01	-0,06	-0,09	-0,03	-0,02
Harmful	-0,05	-0,06	0,12	-0,07	-0,12	-0,06	0,21	0,02	0,10	-0,07	0,04	0,06	-0,07	1,00	0,02	-0,06	-0,05	-0,05	0,00	0,03
Reliable	-0,06	0,12	-0,06	-0,05	0,05	-0,02	0,00	0,08	0,00	0,05	0,00	0,04	0,00	0,02	1,00	0,02	0,00	-0,05	0,05	-0,06
Deceitful	0,08	0,11	-0,06	0,01	0,09	-0,08	-0,02	-0,02	-0,04	-0,02	0,03	0,01	0,01	-0,06	0,02	1,00	0,10	0,00	0,01	-0,01
Favourite	0,09	-0,01	-0,01	-0,05	0,03	-0,02	0,07	0,09	0,06	-0,16	-0,02	-0,01	-0,06	-0,05	0,00	0,10	1,00	0,05	0,11	0,03
Worst	-0,03	0,07	0,03	0,14	-0,12	0,08	-0,05	-0,02	0,01	-0,04	-0,05	0,10	-0,09	-0,05	-0,05	0,00	0,05	1,00	-0,01	0,04
First Choice	0,01	-0,04	0,09	-0,01	0,01	-0,15	0,08	0,06	-0,04	-0,07	-0,03	0,06	-0,03	0,00	0,05	0,01	0,11	-0,01	1,00	0,02
Reject	-0,10	-0,15	0,00	-0,04	-0,07	-0,03	0,04	0,00	0,03	0,14	0,01	0,04	-0,02	0,03	-0,06	-0,01	0,03	0,04	0,02	1,00

Table B.1 Save £xx correlation matrix from the Save £xx FA.

Each combination of table B.1 is calculated using the correlation coefficient ( $\rho_{XY}$ ) formula:

$$\rho_{XY} = \frac{Cov(X, Y)}{\sigma_X \sigma_Y}$$

where  $\sigma_X$  is the variance of x and  $\sigma_Y$  is the variance of y.  $Cov(X, Y)$  is the covariance<sup>13</sup> between the variables X and Y and it is expressed as:

<sup>13</sup> Covariance: Index that tells us if the two variables are correlated and the correlation tendency

Covariance = 0 means no correlation,

Covariance > 0 means positive correlation,

Covariance < 0 means negative correlation.

Calculating the correlation coefficient, we understand the strength of the correlation.

$$Cov(X, Y) = \frac{\sum_i^n (x_i - \bar{x})(y_i - \bar{y})}{n}$$

where  $x_i$  and  $y_i$  are the values  $i$  of the variable  $X$  and the variable  $Y$ .  $\bar{x}$  and  $\bar{y}$  are the averages of the variables  $X$  and  $Y$  respectively.  $n$  is the sample number.

Step 3: As we previously said, FA is a class of procedures. So, at this point of the analysis, researchers need to select the method they want to use. The two most used methods are the principal components analysis and common factors analysis. The principal components analysis is used to develop a multiple regression with the results. The goal is to detect the minimum number of factors that bring the maximum variables variance. The principal components are the factors resulting from this method. This first method considers the total variance in the data.

The common factors analysis aims to detect the hidden factors and to identify the common variance between two variables. This method uses only the common variance between two variables.

In our research, the common factors analysis has been chosen. The calculations have been done using MS excel.

Step 4: number of factors decision. The focus of this analysis is to summarize the results. Researchers need to choose how many factors are important for their research since this analysis can be done as long as there are available variables. There are various selection methods; for example, using the percentage of variance or using the significance test. For our research we selected three factors using the a priori determination.

Step 5: The most important FA output is the factor matrix. Its values are the correlation coefficients between the considered factors and variables. The bigger the absolute value, the stronger the correlation between the two. The factor

matrix shows only the single correlation between the factor and the variable. The main problem is that the variables are correlated with multiple factors. So, in this 5<sup>th</sup> step researchers need to rotate the factors so to have a single matrix that take into consideration every variable relationship (table 4.8).

For details we refer to Malhotra and Birks (2007) and Yong and Pearce (2013).

Step 6: Factors interpretation (see par. 4.4).

## APPENDIX C

In par. 4.3, table 4.1 mentioned the Activia's t test results. In this appendix the entire table with all the results is shown divided into 10 parts, one per each couple of attributes (table c.1).

In this appendix the Activia table is shown to better explain how this analysis has been done. The results of all the other brands are summarized in par 4.3. In this table we see all the averages and p values of every single combination. All the statistically significant p values have been highlighted following a 0.10 level of significance. To read this table we need to be careful. First of all, all the attributes have a positive or a negative meaning (for example, Quality is positive and awful is negative). Furthermore, all the highlighted p values can refer to a positive or a negative score. If the significant value refers to a positive average of a positive attribute, it means that the promotion is perceived positively. If the positive score refers to a negative attribute, it means that the promotion is considered a bad offer. If the significant p value is associated to a negative average, it means “not positivity” for positive attributes and “not negativity” for negative attributes.

To better understand, looking at table 1, we see that, for example, *Increase price* affects negatively the Activia Quality. In a similar way *Strikethrough* and *Save 1/3* don't make Activia an Awful product. *Buy 1 get 1 free* affects positively the product Authenticity. While *Any 2 for £xx*, instead, is Embarrassing.

	Quality							Awful						
	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased price	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price
Average	-26,5	-21,9	-46,0	2,7	-14,7	2,0	-64,1	-34,5	-31,3	2,0	-22,0	-39,1	-3,1	-27,4
P value	0,255	0,450	0,124	0,389	0,359	0,390	0,031	0,258	0,109	0,220	0,076	0,112	0,040	0,372

	Authentic							Fake						
	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price
Average	-33,5	-9,4	40,9	-29,5	33,3	7,8	-14,8	26,4	32,1	7,4	44,5	29,4	43,8	75,2
P value	0,430	0,345	0,177	0,319	0,050	0,150	0,390	0,483	0,395	0,187	0,304	0,368	0,213	0,121

	Popular							Embarassing						
	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price
Average	-10,3	-25,1	23,0	16,0	11,9	54,3	19,7	37,4	-18,7	43,2	5,8	25,0	69,9	-37,8
P value	0,217	0,288	0,102	0,090	0,427	0,103	0,394	0,220	0,141	0,091	0,388	0,104	0,025	0,392

	Superior							Inferior						
	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price
Average	-27,6	-18,8	-35,9	-37,9	-7,1	-51,6	-46,7	46,3	11,5	-0,6	-7,1	4,2	8,8	33,7
P value	0,344	0,120	0,079	0,388	0,244	0,019	0,205	0,223	0,202	0,209	0,366	0,132	0,460	0,037

	Love							Hate						
	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price
Average	-2,4	9,5	35,0	49,9	-7,6	-0,6	30,6	6,7	-8,7	-3,6	31,2	9,6	35,8	-25,8
P value	0,378	0,075	0,299	0,413	0,072	0,208	0,375	0,440	0,360	0,241	0,341	0,441	0,100	0,034

	Amazing							Dreadful						
	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price
Average	13,6	25,4	15,6	41,9	39,5	30,3	44,8	-1,1	43,1	24,8	33,2	16,5	42,6	43,0
P value	0,180	0,497	0,203	0,183	0,316	0,457	0,135	0,363	0,175	0,467	0,219	0,229	0,334	0,233

	Safe							Harmful						
	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price
Average	-30,2	-64,1	-64,2	19,1	17,2	29,2	-18,6	46,3	36,3	13,4	48,1	44,2	16,6	-2,7
P value	0,463	0,243	0,415	0,346	0,444	0,074	0,422	0,346	0,105	0,456	0,013	0,176	0,353	0,441

	Reliable							Deceitful						
	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price
Average	-32,5	-36,2	-71,3	27,6	-68,1	-11,5	-16,5	18,5	37,9	26,8	53,6	4,4	60,8	12,5
P value	0,249	0,074	0,227	0,252	0,111	0,192	0,483	0,361	0,495	0,415	0,254	0,349	0,300	0,430

	Favourite							Worst						
	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price
Average	9,6	12,7	24,9	36,5	29,4	5,3	31,8	-18,1	-9,3	0,5	-52,4	-4,8	-8,8	-24,6
P value	0,248	0,256	0,402	0,308	0,448	0,099	0,375	0,373	0,136	0,118	0,118	0,393	0,341	0,411

	First Choice							Reject						
	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price	Save £XX	Any 3 for 2	Any 2 for £XX	strikethrough	Buy 1 get 1 free	Save 1/3	Increased Price
Average	24,0	-6,8	-1,6	-23,3	4,5	7,6	-32,4	89,2	76,6	42,2	63,7	40,4	31,2	86,1
P value	0,016	0,124	0,064	0,414	0,112	0,202	0,247	0,035	0,049	0,305	0,231	0,167	0,229	0,103

Table c.1 Activia RT averages and t test analysis results.

All the results have been put together in a more readable table to simplify their interpretation.

Table c.2 represents all the Table c.1 data divided in positive, negative or not positive nor negative values for the brand image.

ACTIVIA	POSITIVE VALUES	NOT POSITIVE NOR NEGATIVE VALUES	NEGATIVE VALUE
Save £XX	First Choice		Reject
Any 3 for 2	Love	Not Reliable	Reject
Any 2 for £XX		Not Superior, Not First Choice	Embarassing
Strikethrough	Popular, Not Awful		Harmful
Buy 1 get 1 free	Authentic	Not Love	
Save 1/3	Safe, Favourite, Not Awful	Not Superior	Embarassing
Increased Price	Not Hate	Not Quality	Inferior

Table c.2 Summarize of the data from table c.1.

The summarization output can be seen in table c.2. To describe the t test results, we created brand specific tables as table c.2 (see par. 4.3).



## APPENDIX D

In this appendix we are going to show all the important factors per each promotion, including the second and third groups of factors. In our analysis, in par. 4.4, we took into consideration only the first ones to simplify the interpretation and to work with a smaller number of data. But there are some other important attributes that consumers consider, even if they are not the most important.

### Save £xx

Save £xx	First factors	Second factors	Third factors
Quality	0,46	0,12	0,04
Awful	-0,08	-0,06	-0,56
Authentic	0,61	0,21	0,14
Fake	0,28	0,18	-0,45
Popular	-0,06	-0,34	-0,05
Embarassing	0,01	0,66	0,00
Superior	0,55	-0,21	0,13
Inferior	-0,06	-0,41	0,02
Love	0,11	-0,06	0,42
Hate	-0,56	0,18	0,24
Amazing	0,02	-0,34	0,10
Dreadful	-0,25	-0,16	0,24
Safe	0,00	0,16	-0,02
Harmful	0,27	-0,10	0,47
Reliable	-0,20	-0,28	-0,11
Deceitful	-0,01	-0,26	-0,34
Favourite	0,26	-0,30	-0,10
Worst	0,03	0,24	-0,20
First Choice	0,21	-0,37	0,02
Reject	-0,13	0,03	0,42

Table D.1 Save £xx factor matrix (rotated varimax).

We described *Save £xx* as a very good promotion because the first considered factors were all positive. Second and third factors confirm that. In fact, Inferiority Awfulness and Fake have bad scores. Furthermore, Love is considered as third important factor. We need to highlight that there are some negative ones too.

Embarrassment is one of the second factors, Harmful and Reject appear as third factors.

### Buy 1 get 1 free

Buy 1 get 1 free	First factors	Second factors	Third factors
Quality	0,17	-0,01	0,10
Awful	0,07	0,19	-0,38
Authentic	0,13	0,50	-0,03
Fake	0,28	0,33	-0,12
Popular	0,21	0,21	0,48
Embarassing	-0,12	0,43	0,04
Superior	0,12	0,02	-0,19
Inferior	-0,29	-0,40	-0,06
Love	0,43	-0,49	0,03
Hate	0,66	-0,14	-0,11
Amazing	-0,30	-0,01	0,57
Dreadful	0,18	-0,43	0,19
Safe	0,22	0,10	-0,03
Harmful	-0,16	-0,04	0,07
Reliable	0,01	0,18	0,06
Deceitful	-0,15	-0,02	-0,52
Favourite	-0,56	0,00	-0,22
Worst	0,16	0,39	-0,02
First Choice	0,05	-0,06	0,09
Reject	-0,03	0,13	0,53

Table D.2 Buy 1 get 1 free factor matrix (rotated varimax).

Looking at the deepened data from the Buy 1 get 1 free FA analysis (see table D.2), we see that even if it doesn't look too positive with the first factors, second and third groups of factors demonstrate that it is not a bad promotion after all. Love is negatively perceived as second attribute so, looking at the first ones the attribute Hate is stronger, there is a bit of Embarrassment and people could Reject the product. But, Authenticity, Popularity and Amazingness are positively perceived. Furthermore, the product becomes not Inferior, not Dreadful and not Deceitful.

So, even if looking only at the first factors this promotion seems not so good, from this deeper analysis it is easy to see that there are lots of positive attributes consumers perceive looking at this promotion.

### Any 3 for 2

Any 3 for 2	First factors	Second factors	Third factors
Quality	0,57	0,16	-0,24
Awful	-0,45	0,04	0,13
Authentic	0,57	0,29	-0,01
Fake	0,13	0,04	0,55
Popular	0,23	-0,12	-0,03
Embarassing	-0,16	-0,17	0,35
Superior	-0,42	0,25	-0,19
Inferior	0,19	0,43	-0,04
Love	-0,22	0,06	0,45
Hate	0,19	-0,42	0,25
Amazing	-0,17	0,07	-0,50
Dreadful	-0,03	-0,19	0,07
Safe	0,14	0,08	0,51
Harmful	-0,17	0,35	0,05
Reliable	0,38	0,02	0,16
Deceitful	-0,37	0,08	-0,09
Favourite	-0,22	0,66	0,02
Worst	-0,01	0,13	-0,17
First Choice	0,04	0,01	-0,07
Reject	0,08	0,51	0,29

Table D.3 Any 2 for 3 factor matrix (rotated varimax).

Any 3 for 2 has both positive and negative important attributes. It probably depends on the product. Quality and Authenticity are seen positively, it is not Awful but not Superior. Second and third set of factors show us that this promotion is also considered Inferior, Fake, not Amazing and it could bring consumers to Reject the product. On the other side, Love, Safety and Favourite are seen positively by consumers.

The FA pointed out that this promotion is a good promotion for consumers, it has in fact more positive than negative attributes.

## Any 2 for £xx

Any 2 for £xx	First factors	Second factors	Third factors
Quality	0,13	-0,37	0,03
Awful	-0,37	0,27	-0,09
Authentic	-0,04	-0,10	0,56
Fake	-0,01	-0,09	0,02
Popular	0,19	-0,42	-0,11
Embarassing	0,04	0,48	-0,06
Superior	-0,06	-0,31	-0,48
Inferior	-0,06	-0,33	0,07
Love	0,23	0,05	-0,21
Hate	0,00	-0,09	0,60
Amazing	-0,19	-0,09	-0,10
Dreadful	-0,06	-0,04	-0,51
Safe	0,25	-0,19	0,24
Harmful	-0,03	-0,27	0,02
Reliable	-0,12	-0,45	-0,12
Deceitful	-0,59	0,26	0,04
Favourite	-0,46	-0,07	-0,14
Worst	0,56	0,05	-0,14
First Choice	-0,39	-0,37	-0,09
Reject	0,39	0,21	-0,25

Table D.4 Any 2 for £xx factor matrix (rotated varimax).

Looking at the FA results Any 2 for £xx is a very bad promotion. Even just looking at the first factors we can see that it is not positively perceived. In fact, it is not Deceitful, nor the Worst, nor the First choice, nor the Favourite and the product is Rejected. Second and third factors confirm that. They tell us that this promotion is also Embarrassing, not Popular, not Reliable, not Superior and they Hate it. The only positive characteristics are the untouched Authenticity of the product and the non-Dreadful attribute.

However, as we discussed in par. 4.6, combining the results of all our analyses, we figured out that this is a very bad promotion for short and mid-term products, but it works very well with long-term products.

## Strikethrough

Strikethrough	First factors	Second factors	Third factors
Quality	0,41	0,15	-0,41
Awful	0,02	-0,06	0,57
Authentic	0,11	-0,20	-0,31
Fake	-0,07	0,39	0,22
Popular	-0,07	0,53	-0,14
Embarassing	-0,31	0,14	0,12
Superior	0,61	-0,28	0,16
Inferior	0,48	0,09	0,07
Love	-0,04	-0,31	0,00
Hate	-0,12	-0,07	-0,56
Amazing	0,35	0,22	0,43
Dreadful	0,11	0,17	-0,01
Safe	-0,43	0,13	0,18
Harmful	0,05	0,48	-0,07
Reliable	0,41	0,16	0,00
Deceitful	0,12	-0,39	0,03
Favourite	-0,19	-0,25	0,32
Worst	0,03	-0,21	0,00
First Choice	0,17	0,15	-0,29
Reject	0,10	0,40	0,15

Table D.5 Strikethrough factor matrix (rotated varimax).

As Any 3 for 2, Strikethrough promotion gives rise to conflicting feelings. The most reasonable explanation, as per all the other promotions, is the fact that it depends on the products characteristics. Looking deeper in this FA result we see that the values referring to a single couple of attributes confirm each other because they are opposed. Quality is positively perceived as a good factor looking at the first column. The third set of factors, though, undo it. In the third column, in fact, Quality is negative and Awful is positive. Almost the same is for Safe- Harmful and Reliable- Deceitful couples, the second main attributes (Harmful and Deceitful) confirm the first ones (Safe and Reliable). Furthermore, even if this promotion could be Rejected, it is seen as Amazing, Popular and it is not Hated.

## Save 1/3

Save 1/3	First factors	Second factors	Third factors
Quality	-0,01	-0,26	-0,01
Awful	0,33	0,29	0,38
Authentic	-0,31	-0,05	-0,30
Fake	-0,23	0,29	-0,12
Popular	-0,28	-0,14	0,27
Embarassing	-0,04	0,26	-0,37
Superior	-0,02	0,03	0,43
Inferior	0,00	0,12	0,00
Love	-0,36	-0,14	0,03
Hate	0,01	-0,61	-0,01
Amazing	-0,11	0,07	0,62
Dreadful	0,17	0,37	-0,08
Safe	-0,36	0,17	-0,21
Harmful	-0,40	-0,05	-0,04
Reliable	-0,04	0,10	0,19
Deceitful	0,51	-0,15	0,01
Favourite	-0,08	0,68	0,28
Worst	0,59	0,00	-0,16
First Choice	0,03	-0,30	0,47
Reject	-0,36	0,04	0,15

Table D.6 Save 1/3 factor matrix (rotated varimax).

Considering only the first set of main attributes, this promotion seems to be a very bad promotion: the main attributes are all negative (Even if not Harmful, it is considered Deceitful and the Worst). Surprisingly, these FA results show us that second and third groups of factors, instead, are all positive. Second considered factors are Favourite and not Hate. Third ones are Superior, Amazing and First choice. So, at first glance it seems to be a bad promotion but, instead, it could bring some positive results too.

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