- Impulse Buying:

How do "Early Birds" and "Night Owls" Differ? -

- Master Thesis Marketing 2013 -

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"The aim of marketing is to know and understand the customer so well the product or service fits him and sells itself." - Peter Ferdinand Drucker -

Executive Summary

In seeking to extend the theory on impulse buying this study focuses on possible differences between the chronotype groups and their impulse purchases. These different chronotype groups are defined by the difference in alertness peaks during the day. The morning-type (early bird) has a much earlier alertness peak than the evening-type (night owl). These differences can also be observed by temperature peaks and peaks in the level of the hormone cortisol during the day.

Impulse buying is a broad concept within the economic literature. It is defined as buying a product without the intention of purchasing it before entering the store. Due to in-store advertising, promotions, price discounts, or because of feelings/emotions the customer purchases the impulse product.

Building on a theoretical framework, based on literature concerning impulse buying and chronotype, this thesis develops five hypotheses to find out whether the different chronotypes have different impulse buying patterns compared to each other during the day. First of all, the chronotypes are tested to see if there are different patterns in the time of day when these shoppers buy their impulse product. Secondly, this thesis tests whether the chronotypes show different patterns in involvement towards the advertisements. This is followed by looking at, thirdly, the importance of discounts, fourthly, the level of guilt after an impulse purchase, and finally the product involvement when an impulse product is bought. Results provide managerial implications in several directions, namely flexible product placement, advertisement, and marketing strategies.

The sample is partly collected on an online platform in Amazon's Mturk and on my own webpage on Facebook, with a self-made questionnaire that is based upon several scientific articles. A total of 240 participants completed the survey. Through a statistic model and two robustness checks, developed with a *multiple regression*, various significant values occur. These significant values have several managerial implications, namely on the optimal time of day placement of an (impulse) product that has a younger target group, the optimal time of day when discounts are given for (impulse) products which have an older target group, the optimal time during the day for an advertisement directed at a younger target group, and the type of advertisement for (impulse) products during a specific part of the day.

Chapter 1 Introduction

1.1 Introduction

In a time when customers buy their products very selectively and where a new recession is around the corner, retail stores need to optimize the chance that customers buy their products and thus are less dependable on these factors. When studying the phenomena of impulse buying and, in particular, the time of day and consumer behavior, the implementation of the results could be important for the sales of retail stores and online web stores. Therefore, this study concentrates on the "early bird" and "night owl" consumer behavior and specifically on the relationship between time of day and the impulse buying of the customer. The goal of this study is to get more insight into the buying pattern of chronotypes, so that retail stores and online stores can learn from the knowledge and implement the results, in order to maximize the chance that shoppers buy more products on impulse.

1.2 Problem Statement and Research Questions

The purpose of this study is to see whether customers buy impulsively when they are most active during the day, or when they are least active during the day. Furthermore, the thesis aims to shed light on whether there is a significant difference in impulse buying patterns of "early birds" versus "night owls". These dimensions are analyzed in this study.

Problem Statement. To determine how effective the placement of "impulse products" in particular hours of the day is and how in-store stimuli can help retailers gain a higher percentage of impulse purchases in their sales. In order to establish a possible relationship between the two, there needs to be a study about the "early bird" and "night owl" consumer behavior and impulse buying.

Research Questions. In order to solve the problem statement this thesis aims to answer the following research questions. First of all, the relationship between the different chronotypes and impulse buying needs to be investigated. Therefore, do the chronotypes buy impulsively on different times of day compared to each other? Secondly, are the chronotypes differently triggered by promotions, such as discounts and in-store advertisements? Are marketing promotion and in-store advertising more effective during a particular part of the day for one chronotype compared to the other, when these groups buy on impulse? Thirdly, do the different chronotypes purchase high/low involved products at different times during the day? Fourthly, the post-purchase mood of the participants needs to be studied. Do these chronotypes have a different level of guilt after they purchase an impulse product?

1.3 Academic and Managerial Relevance

1.3.1 Academic Relevance

The academic contribution of this thesis is threefold. First of all, this study aims to enhance the literature about advertisement of impulse products. Secondly, this paper contributes to the academic literature on the effect of discounts on impulse products. Thirdly, this study aims to enhance the academic literature on chronotypes in marketing. In order to achieve these three enhancements of the literature, the different post-purchase mood states, the product involvement, the importance of the in-store advertisement, and price discounts are investigated.

Advertising. One of the main subjects in the academic literature that this thesis contributes to is in-store impulse product advertising. First of all, various studies have focused on the emotions, mood states and feelings of the impulse buy (Rook and Hoch, 1985; Gardner and Rook, 1988; Hausman, 2000; Verplanken et al., 2005). They found that several feelings influence the impulse purchase. Such as the feeling of loss of control when buying the impulse product, feeling better after the impulse purchase, and the feeling of guilt when the purchase is bought. Impulse buyers even evaluate themselves as being more emotionalized than shoppers that do not purchase on impulse (Weinberg and Wolfgang, 1982). Academic literature shows that these feelings occur, but they do not investigate if these feelings happen with different groups such as the chronotype groups at particular hours during the day. This study therefore enhances the academic literature by investigating which mood state each different chronotype has, after they buy an impulse product. The focus is on the mood state guilt. Hence, this study investigates the level of guilt when buying an impulse product after the purchase phase (Blackwell et al., 2006).

Secondly, literature shows that in-store advertisement is important if people need to be convinced to buy an (impulse) product (Stern, 1962). Does this type of convincing also occur when shoppers are not in their high arousal states? Hence this thesis investigates the importance of the advertisements for each chronotype in their optimal/ non-optimal times when buying impulse products during the day.

Thirdly, the impulse product involvement and chronotype are investigated. A high or low product involvement has different optimal advertisement strategies (Petty and Cacioppo, 1983). Therefore this study enhances the literature on advertising and especially the literature

of in-store advertising and how these advertisements can be more effective in persuading the customer to purchase the impulse product.

Discounts. This study enhances the academic literature about discounts and the impulse purchase. The relationship between the marketing promotion discounts and the impulse buy has been proven by various studies (Stern, 1962; Abratt and Goodey, 1990). Whereas, these studies show that there is a positive relationship between impulse products that have a discount and the store sales, they do not indicate, however, whether this relationship is the case for different sub groups, such as chronotypes.

Chronotype. Furthermore, this study contributes to the academic literature on the differences between the chronotypes. Academic studies such as Hornik and Miniero (2009) found differences between the chronotypes and their performance in their optimal time/ non optimal time during the day. Also, differences between the chronotypes and variety seeking (Roehm and Roehm, 2004) have been studied. However, there has not been a study that focuses on the impulse buying behavior of these different groups.

1.3.2 Managerial Relevance

A large topic in the literature of the impulse purchase is dedicated to the importance of the impulse buy in retail stores. In the Fifties one of the early researchers that studied the impulse purchase (Clover, 1950) found that there is a relationship between total sales and the impulse purchase in retail stores. Clover (1950) estimated that 21.8% of the total sales were due to the impulse buy of customers. Clover (1950) investigated a wide range of products and estimated how much the percentage was of the impulse purchase of the total sales. For example, Clover (1950) calculated that 14.66% of total book sales covered by the study were due to customers buying on impulse. A year later, West (1951) found that in the four types of stores that were studied (food stores (43.5%), drug stores (26.6%), variety stores (41.5%), and department stores (33.6%)) the average impulse buying percentage in those four types of stores was 36.7% of the total purchases.

Later studies have shown that the impulse purchase is between 27% of all purchases to 62% of all purchases (Bellenger et al., 1978). This study also looked at different product categories and the highest impulse purchase was in the category jewelry (62%) and the lowest percentage of impulse purchase was in the product category women's lingerie (27%). Another study described that 50.5% of all purchases are unplanned (Kollat, 1967). A reason that the percentage of impulse purchases increased over time, according to Rook (1987), is because of

technological innovations such as the credit card and ATM machines. It became relatively easier due to these innovations to have access to cash and credit.

A pattern of impulse buying and time of day could be important for retailers and online stores. Because this phenomenon is responsible for a high part of all purchases in a store, it could be important to get more insight in the people who by impulsively. Therefore it could be relevant to study the buying on impulse and time of day.

Flexible Product Placement. A possible implementation of the results of this study could be, that when it is confirmed that the relationship between time of day and the impulse buy is affected by chronotype, it could be more efficient to place impulse products or "normal" products at different hours of the day at the cash register. According to the theory of the Marketing Mix (McCarthy and Perreault, 1984) "the place" of the product is one of the four factors (price, product, promotion, and place) that is important to establish marketing strategies. Hence, when there is a relationship between time of day and the impulse buy, it could be optimal to change the products during the day, for example near the cash register. In that way the retailer has a higher chance of a possible sale. After this hypothesis is proven, it will be shown that the early birds buy impulse products in the late afternoon and evening, and the night owls buy more often impulse products in the morning and early afternoon. Retail stores and online stores could increase the amount of impulse products that target the younger customers in the morning and early afternoon. Therefore they could accomplish a higher chance that the particular group buys the impulse product. When the target group is relatively older, retail stores and online stores could increase their impulse products that have an older target group in the late afternoon and evening. Older people sleep less than younger people (Klerman and Dijk, 2008). Senior customers are therefore more often categorized as an early bird. Other studies such as Yoon (1997), Yoon et al. (2007) and May et al. (1993) found the same results in their survey sample.

Marketing Promotions and In-store Advertising. Another important dimension in the marketing mix is promotion (McCarthy and Perreault, 1984). The possible results of this study could also have an effect on this dimension for making effective marketing strategies. When the hypotheses are proven, which are described later in this study, retail stores could implement the results to make their promotions (discounts) or in-store advertising for impulse products more effective. It could change the time of day that retailers begin and end their promotions or in-store advertisements.

First of all, this study could have implications on how efficient an in-store advertisement is. When the importance of an in-store advertisement for buying an impulse

product is proven to be influenced by the chronotype, the most effective time of day for having a certain advertisement for an impulse product will be established. The different chronotypes are then more likely to be persuaded in their lower arousal hours. Retailers and internet shops could consider advertising only when their target group has a lower arousal level, because younger people tend to be more frequent the evening-type instead of the morning-type. Older people, on the other hand, tend to be more frequent the morning-type instead of the evening-type (Yoon, 1997; Yoon et al., 2007; May et al., 1993). When the target group of a particular impulse product is best described as young shoppers, the advertisement could be more efficient in the late afternoon or evening. When the target group is relatively older, the advertisement could be more efficient in the morning or early afternoon.

Secondly, this study could have implications for advertisements aimed at lowering the post-purchase guilt. When the post-purchase guilt is proven to be a negatively moderating factor in the relationship between the different chronotypes and the time of day of the impulse purchase, managerial implications could be that retailers can use these advertisements, which are developed to give the buyer a non-guilty feeling, more efficiently. The use of reducing guilt with advertisements already happens today in the retail setting. This study describes the time of day when these advertisements are more effective. Hence, the early bird experiences the guilt more often in the higher arousal level hours, namely the morning and early afternoon. The night owls experience the guilt of buying an impulse product more in the late afternoon and evening. Older people tend to sleep less than younger people (Klerman and Dijk, 2008). The elderly are more often categorized as being an early bird. Therefore, the most effective time to have an advertisement to prevent post-purchase guilt, for a product with a target group that is relatively young would be in the late afternoon or the evening. For a product with a target group that is relatively older, the ideal time to have an advertisement to prevent post-purchase guilt would be in the morning and early afternoon. Once shoppers experience less post-purchase guilt, the reduction could have an effect on whether the customer repeats the purchase, because of the modification of internal standards due to the advertisement (Burnett and Lunsford, 1994).

Thirdly, this study could have implications for types of advertisement the impulse product has. When the product involvement is proven to be a negatively moderating factor for the relationship between the different chronotypes and the impulse purchase, early birds and night owls will then buy more high involved impulse products when these groups are in their high arousal states. Hence, the type of advertisement could be important. When someone

wants to buy a high involved product, strong arguments are important and when someone wants to buy a low involved product a good endorser can persuade the potential buyer (Petty and Cacioppo, 1983). Hence, once it is proven that morning-types buy more high involved impulse products in the morning and early afternoon, than during the rest of the day and for evening-type vice versa. When the target group for the impulse product is relatively young, retailers should advertise with strong argument in the late afternoon and evening. When the target group is relatively older, retailers should consider advertising with strong arguments instead of only an endorser in the morning or early afternoon.

Fourthly, this study could have managerial implications for the time of day when discounts for impulse products can be more efficient. When it is proven that product discounts positively moderates the relationship between the impulse purchase and the chronotype, this effect could have implications for a retail setting but also for an online-shop. When discounts have more effect when the potential buyer is in his or her higher arousal state, morning-types have a higher chance to be persuaded by discounts in the morning and early afternoon and evening-types have a higher chance to be persuaded in the late afternoon and in the evening to purchase an impulse product with a discount.

1.4 Structure of the Thesis

The remainder of the thesis is structured as follows. Chapter two includes a literature review about the impulse buying process and the early bird and night owl consumer behavior. This chapter concludes with the hypotheses development. In chapter three I describe the methods of the study. In the fourth chapter I show the results of the survey and test the hypotheses. In the last chapter I draw conclusions and describe the limitations. This chapter concludes with managerial implications and possible future research. At the end of the thesis I provide the literature list and the appendix.

Chapter 2 Theoretical Framework

2.1 Introduction

Impulse buying is part of the consumer behavior framework and therefore the first part of the theoretical framework focuses on the consumer behavior and especially on the consumer decision making process. After this section, the focus is more on the impulse buying in the consumer behavior and chronotype and time of day. The theoretical framework ends with the formulation of the hypotheses which are tested in this thesis.

2.2 Definitions

2.2.1 Early Bird and Night Owl Consumer Behavior

The early bird and night owl consumer behavior refers to individuals who have different peaks in alertness during the day. The early bird or lark is described to be more active during the early hours of the day and the night owls are described to be more active during the late hours of the day. These two extremes exist because of diurnal variations in the arousal levels of individuals (Hornik, 1988). The two groups have different peaks in the arousal levels at a particular time in a 24-hour day. Hence, early birds have a greater energetic arousal in the morning and early afternoon than night owls. The night owl has a greater energetic arousal state in the late afternoon and evening compared to the early bird (Thayer et al., 1988).

These arousal levels could be explained by body temperature peaks and peaks in the levels of the hormone *cortisol* in the body. Circadian rhythm of body temperature increases parallel to the arousal levels during the day. The lowest body temperature occurs around 4 A.M and the highest body temperature occurs around 8 P.M (Hornik, 1988). The early bird arousal peak is earlier in the day (07:32 P.M) than the arousal peak of a night owl (08:40 P.M) (Horne and Östberg, 1976). Another way to explain the early bird and night owl terms are that the two groups have different peaks in the level of the hormone cortisol during the day. The early bird has an earlier peak during the day in the level of cortisol in the body, than the night owl has during the day (Bailey et al. 2001). These two aspects explain why different individuals belong to a certain group and therefore have a different time of a maximum in alertness and wakefulness in a day. Other terms for the early bird and night owl concept are morningness/ eveningness and chronotype.

Definition of Early Bird and Night Owl

> *Early bird:* a person that is more active during the early hours of the day and has the arousal peaks in these hours.

> *Night owl*: a person that is more active during the late hours of the day and has the arousal peaks in these hours.

2.2.2 Impulse Buying

Through the 20th Century the definition of impulse buying changed. In the early Fifties impulse buying was described to be only an unplanned purchase (Clover, 1950). Later studies showed that impulse buying is more than only an unplanned purchase (Stern, 1962). Stern (1962) described several types of the impulse buy such as:

- The "*pure impulse buy"*: the purchase of a product that is unplanned and breaks with the normal purchasing pattern.
- The *"reminder impulse bu*y": a type of unplanned buying which concentrates on the idea that the customer remembers, in the store, that a particular product stock at home is low and needs to be refilled. The customer therefore breaks his or her buying pattern and buys this product. Another form of a reminder impulse is when the shopper buys a product he or she did not intend to buy before entering the store. Thus, because the shopper, due to in-store cues or the product itself, thinks of an advertisement of that product, the shopper purchases the product.
- The "*suggestion impulse buy"*: this refers to an unplanned purchase of a product that the customer has no previous knowledge of before seeing it in the store. Because the shopper has a need for the product, the shopper buys the product.
- The "*planned impulse buy"*: this type occurs when a shopper enters the store with the intention of buying a planned product, but also intends to buy other products which are unplanned. These unplanned purchases are influenced by price discounts or other promotional marketing.

So we see that, Stern's (1962) definition of the impulse buy focuses on the base that the impulse buy is an unplanned purchase which is aroused in the store and therefore it changes the shopping patterns of the buyers. These changes in the shopping behavior are due to advertising, promotion and price discounts.

A few years later, a study by Rook and Hoch (1985) showed that impulse buying is much more than unplanned. Rook and Hoch (1985) added several new aspects to the impulse purchase definition, namely that there are sudden and spontaneous desires to buy the impulse product. Customers feel a sudden pressing desire to buy a particular product once they are in a store. Secondly, the impulse purchase can make a buyer briefly feel "out of control". Rook and Hoch (1985) described this purchase as a second feature of their definition of an impulse buy and named this *"the psychological disequilibrium"*. Thirdly, Rook and Hoch (1985) suggested that an impulse purchase comes with internal conflict, the "*psychological conflict and struggle*". The fourth aspect Rook and Hoch (1985) described was that of "*the reduce of cognitive evaluations of the product attributes"*. Thus, the buyer evaluates the attributes of the impulse product as more positive than when the same product was not an impulse product. The last aspect Rook and Hoch (1985) described, is that customers who bought on impulse tend to do this *"without regard to the consequences"*.

To conclude, Rook and Hoch (1985) described the impulse buy as much more than an unplanned purchase: they introduced the aspect that the impulse purchase has a lot to do with psychological aspects, emotions and feelings.

Definition of an Impulse Purchase

An impulse buy: when a product is bought without the intention of buying the product before entering the store. Due to in-store advertisements, promotions, price discounts, or because of feelings/emotions the customer purchases the product.

Impulse Buying Tendency. According to Rook and Fisher (1995), some people have a higher tendency to buy on impulse than others. First of all, Rook and Fisher (1995) described these people to be more *spontaneous* in their buying behavior. They are more open towards changing their normal buying pattern. Secondly, Rook and Fisher (1995) also described that these customers tend to think more *unreflectively*. Thirdly according to Rook and Fisher (1995), shoppers who have a high impulse buying tendency tend to react *immediately* on their buying impulses. Fourthly, Rook and Fisher (1995) described that these shoppers are *kinetically* in their shopping behavior. They experience buying impulses more frequently and stronger than people who are less impulsive.

2.2.3 Online Impulse Buying

A relatively new field in the consumer buying literature is online buying. Online buying is a growing market. The percentage of people in the Netherlands who were asked if they had bought an online purchase in the last three months increased over the last 10 years every year, from 18% in 2003 to 55% in 2012 (Eurostat). With online buying also comes online impulse buying.

In a study by Madhavaram and Laverie (2004), 22% of the surveyed participants made an impulse purchase on the internet. 100% of this portion of the respondents made an impulse purchase in a retail store. Madhavaram and Laverie (2004) found that, similar to the retail impulse buying, there is a relationship between online impulse purchases and exposure towards stimuli other than the product itself. Madhavaram and Laverie (2004) also claim that mood states, positive feelings, and online browsing influence the online impulse buying behavior. Therefore online impulse buying is not that different from the regular impulse buying in retail stores: only the setting is different.

However, there are some differences that present themselves from the results of the survey of Madhavaram and Laverie (2004). First of all, it is difficult to tell the quality of the product online. Secondly, in a retail store people can touch a product or, if it is clothing for example, try it on. Online purchasing is therefore more limited in the experience of the shopper. There are also some other concerns about online shopping such as security, returns, and the delivery (Madhavaram and Laverie, 2004).

Definition of an Impulse Purchase on the Internet

An online impulse buy: when a product is bought without the intention of buying the product before going to the particular website of the online store. This can be due to online-stimuli such as advertisements, promotions, price discounts, or because of feelings/emotions the customer purchases the product.

2.3 Consumer Buying Behavior

The study of consumer behavior focuses on the obtaining, consuming, and disposing of products or services by individuals to fulfill their needs (Blackwell et al., 2006). In order to fulfill the needs that the consumer has, the consumer goes through several decision processes (Blackwell et al., 2006): the consumer decision making process. First of all, the consumers *recognize the need* for a product or the consumer is *aware of a problem.* Secondly, consumers *search for information,* and this information searching can be internal (knowledge

and memory), or external (friends, family and the marketplace) (Blackwell et al., 2006). Thirdly, consumers *evaluate alternatives* (pre-purchase). Consumers can evaluate products on different attributes, such as price and quality. Finally, in the fourth stage *the purchase* takes place. When the first three stages have been successfully negotiated, the consumer buys the product. After buying the product, the consumer consumes the product (*consumption*). The consuming can happen immediately or delayed. The last step in the decision making process of consumers is the *post-consumption evaluation*.

Impulse buying is a limited problem solving decision (Blackwell et al., 2006). Limited problem solving decision means that in the decision making process the search for information and the pre-purchase evaluations are limited. The purchaser only has the information that is provided inside the store and can only evaluate other products inside the store. Also the "need recognition" or problem awareness first appears within the boundaries of the store.

Attributes of an Impulse Product. The impulse product needs to have nine attributes according to Stern (1962) to be optimal for the impulse buy. These attributes are low price, a marginal need for an item, mass distribution, self service, mass advertising, prominent store display, short product life, small size, or light weight, and easy of storage. Stern (1962) also described several conditions that the need to be fulfilled before customers purchases the impulse product. First of all, shoppers need to have the *time* to go to the shop. Secondly, customers need the *money* to buy the product. Thirdly, customers need to have the *physical effort*. Stern (1962) described this physical effort as walking or driving to the place of purchase. Fourthly, the customer needs to have the *mental effort*, explained buy Stern (1962) as scheduling the trip or making a budget for the purchase. When some of these factors are not optimal, the chance that a person buys on impulse decreases.

Shopping Trips and Impulse Products. Bell et al. (2011) focused on trip-level impulse buying and found that the less the planned purchases are identified before the shopping trip, the higher the impulse buying percentage will be. The shopper's trips are categorized into weekly or less than weekly trips (major trips), and daily essentials trips (fill-in trips). Major trips have the most increased unplanned purchases. There is an increase of 60% in impulse purchasing compared to products that are planned purchases of the trip (fill-in trips, 27%). The reason for this is that there are more products needed to be bought in the shopping trip and therefore the impulse buying chance is higher because of in-store stimuli. Kollat et al. (1967) confirm that major trips have a higher percentage in unplanned purchases than fill-in trips. They suggested that this higher percentage is due to the fact that fill-in trips

have a stricter identified need for a product, compared to the major trips, where the customer's needs for products are less identified. Bell et al. (2011) concluded that when shoppers enter a store because of low prices or attractive promotions, the customer spends 12% to 13% more money on impulse products, than entering a store not because of these factors. Another point that Bell et al. (2011) found was that there is a negative effect on the overall impulse purchase when shoppers visit more stores in one trip.

Motivation behind the Impulse Purchase. Normally people do not only shop because they have the time and money to buy a product (Tauber, 1972), but according to Tauber (1972) people could also have several other reasons to shop. The shoppers could have the need for attention, they could have a need to be with peers, the shoppers could want to be with other shoppers who have the same interests, the shoppers could want to exercise, and shoppers may shop because they have free time. When people decide to shop, they spend a high percentage of their total buying on impulse products (Kollat, 1967; Bellenger et al., 1978). There are different motivations behind these impulse purchases.

Impulse Buying and the Pre-purchase Feelings. First of all, customers may buy impulse products because of their own feelings, mood state, and emotional state. Studies show that self-esteem is one aspect that influences the impulse buy. According to Hausman (2000) people who desire a higher level of self-esteem are more likely to buy impulse products, because they get pleasure out of it. Verplanken et al. (2005) showed that impulse buying is driven by feelings of low self-esteem. Because impulse buying leads to short-term pleasure, the shopper gets motivated to buy an impulse product (Hausman, 2000; Verplanken et al., 2005). Rook (1987) and Gardner and Rook (1988) also showed that people feel better after they bought an impulse product. For people who have a negative mood state such as being depressed, frustrated, or bored, the impulse buy may have an effect of getting out of these mood states and making the shopper feel better (Gardner and Rook, 1988).

These moods were further investigated by Tifferet and Herstein (2012). They found that there is a difference between how often the different genders buy on impulse. Women have a higher level of impulse purchases than men. Tifferet and Herstein (2012) investigated *hedonic consumption* and found that women buy more frequent impulse products because women get more pleasure out of buying a product than men. According to Tifferet and Herstein (2012) the reasons for these differences lie in pre-historic gender roles.

One of the aspects that occurs when an impulse product is bought is the lack of control or also known as the, *"psychological disequilibrium"* described by Rook and Hoch (1985). The buyers experience a short, lack of control feeling and need to buy the product. The higher

the lack of control is during the purchase, the higher the possibility that the buyer has a feeling of guilt (Burnett and Lunsford, 1994). The pre-purchase feelings of guilt can influence an impulse buy (Burnett and Lunsford, 1994). People experience this pre-decision guilt, because the buyer thinks that he will have guilty feelings when he does not buy the product. Burnett and Lunsford (1994) call this form of guilt "*antcipantory guilt*".

  Impulse Buying and Post-purchase Feelings. Guilt is a feeling of regret or remorse. People experience guilt when they perceive something as bad and want to change things or do things over (Tagney et al., 1996). Guilt is a negative emotion and it is not in line with the norms or values that the shopper has (Burnett and Lunsford, 1994). The outcome of the emotion guilt is a frequently occurring emotion after the impulse purchase (Gardner and Rook, 1988). Because customers experience guilt, their self-esteem also decreases (Burnett and Lunsford, 1994).

  According to Burnett and Lunsford (1994) there is also post-decision guilt (*reactive guilt*). This form of guilt occurs when the shopper has a guilty feeling after the product is bought. The *anticipatory guilt* experience is more likely to be a *reminder impulse buy* than a *pure impulse buy* (Stern, 1962), whereby the product reminds the customer of an experience outside the store. Burnett and Lunsford (1994) also described that when these shoppers buy an impulse product they can have *financial guilt.* This form of guilt occurs when someone buys a product that they do not need, or the purchaser thinks that the amount of spending was too high. To cope with these feeling of guilt, shoppers use two self-control strategies. The first one is the deduction of desire and the second one is willpower (Hoch and Loewenstein, 1991). The deduction of desire happens in the first stage of the decision making process (Blackwell et al., 2006)

  Impulse Buying and In-store Promotions, Advertising and Cues. Secondly, shoppers may buy impulse products because they get motivated by in-store "convincers". The buying of products on impulse can be influenced by in-store advertising and in-store promotions (Stern, 1962). Shoppers may recognize that they have a need for a product due to the in-store advertising or due to in-store promotions. Abratt and Goodey (1990) confirmed these findings for shoppers in South African supermarkets. In-store stimuli are important in promoting shoppers to buy products impulsively. Examples of in-store stimuli according to Abratt and Goodey (1990) are sampling, price discounts, product positioning on the shelf, displays at the point of purchase of the product, coupons, and demonstrations inside the store. A study in the effect of point of purchase displays of cigarettes and impulse buying confirmed that when there are displays present, the impulse purchases of cigarettes increase for people who have

tried to quit in the last 12 months and people who have quit (Wakefield et al., 2008).

Another "convincer" for buying more impulse products are cues that can be found inside the store. According to Hulten (2012) shoppers stay longer at the point of purchase when there are *visual sensory cues*, such as the design and lighting insight the store and shoppers stay longer at the point of purchase when there are *smell-related sensory cues*. Hulten (2012) concluded that shoppers stay longer at the point of purchase and touch the products more often when these cues are present. Hulten (2012) concluded that because of these two points the chance that the shopper will buy the product will increase and therefore the total sale of the product will increase. Another study by Peck and Childers (2006) explained that shoppers with a high need to touch the product are more likely to buy on impulse than customers that have a low need to touch the product. Therefore when shoppers are invited to touch the product they are more likely to buy this product although they did not have the intention to purchase the product before entering the store, this purchase is thus an unplanned purchase.

A study on in-store cues concluded that a combination of two cues, namely in-store music and smell, are positively related. When these cues are matched, this convinces shoppers to buy on impulse (Mattila and Wirtz, 2001). In that case shoppers evaluate their shopping experience more positively and therefore the likelihood that they buy on impulse increases.

Impulse Buying Tendency and Lack of Control. Another variable which influences these in-store cues is the impulse buying tendency (Youn and Faber, 2000). Customers that have a high impulse buying tendency experience greater impulses in buying products. Therefore they experience more lack of control compared to the customers that have a lower impulse buying tendency (Youn and Faber, 2000). This factor could also influence the cues that involve the likelihood to buy an impulse product. Therefore the higher the impulse buying tendency, the higher the lack of control, and so discount and advertisements should be less important for the shopper to buy the impulse product.

Product Involvement. Bauer et al. (2006) described three major domains with which the shopper's product involvement is measured. These are: the significant value the products have for the shopper; the importance of the product for the shopper; and the pleasure the shopper gets out of the product.

Rook (1987) described that the impulse purchases are more than only low-priced and low-involvement products. According to Rook (1987) impulse products can nowadays also be high-priced and with a high product involvement. According to Bellenger et al. (1978) the category that has the highest percentage of impulse purchases was the category jewelry,

namely 62% of the total purchases. Jewelry should score high on the measurement of Bauer et al. (2006), especially on the significant value and therefore this product should be a high involvment product. However according to Jones et al. (2003), people who are highly involved tend to browse more in the store, because they want to search more for a product and therefore the chance that these shoppers purchase an impulse product will increase.

Advertising. One study shows that high or low product involvement has its effects on the effectiveness of advertisements (Petty and Cacioppo, 1983). This study showed that when someone wants a product that is low involvement, the person is more likely to follow the *peripheral route*. This route implies that the person can also be persuaded by the endorser of the advertisement. On the other hand, if a shopper wants to buy a high involved product, the buyer seeks more reliability out of the strong arguments the advertisement has (*central route*).

Online Impulse Buying. As described in this chapter, online buying is a growing market. And online impulse buying becomes more important for online stores. Jeffery and Hodge (2007) first found that when the online shoppers spent more money on the internet, they were more likely to purchase a product, which they did not think of purchasing before visiting the website. Secondly, Jeffrey and Hodge (2007) found that when these shoppers buy an impulse product, it is without the cannibalization of other products. Thirdly, when the impulse product is linked with for example a small donation, the sales of the impulse product will increase, due to the shopper having another reason to buy the product (Jeffrey and Hodge, 2007).

2.4 Chronotype

This part of the literature review describes articles about chronotypes in the marketing and consumer research literature. Also relevant articles about the time of day in the marketing and consumer research literature are described.

"Early Bird" vs. "Night Owls". First of all, younger people tend to be more of an evening-type than a morning-type. Older people on the other hand are more frequently a morning-type rather than an evening-type. Various studies draw this conclusion, such as Yoon (1997), Yoon et al. (2007), and May et al. (1993). Secondly, according to Giampietro and Cavallera (2007), people who have their arousal peak later in the day and therefore belong to the night owl group, tend to think more creatively than the people who have their arousal peak earlier (morning birds). Thirdly, a study into morningness and eveningness found that morning-types are more emotionally stable and more agreeable than evening-types (Deyoung et al., 2007). Fourthly, evening-types tend to sleep less during the week compared to the

morning-types and therefore build up a *sleep debt*, which they catch up in the weekend (Taillard et al., 1999).

Advertising. A number of articles focused on time of day and advertising. For example, Hornik (1988) concluded that there is a change in consumer response throughout the day. The immediate memory, recall, and recognition of television commercials decrease throughout the day. Delayed memory recognition improved during the day, and delayed memory recall improved a little comparing later during the day and earlier during the day. Hornik (1988) described that those improvements could be happening because of the circadian rhythm in body temperature, which run parallel with the arousal peaks of the human body. Because body temperatures increase during the day, the maximum arousal is also in a later stadium during the day. The implications of this study are that commercials that are more for immediate purpose should be aired in the morning when the arousal levels are relatively low, and advertising that needs to be retained over a period of time could better be aired later during the day.

Analysis of individual chronotype by Yoon (1997) provides yet another contribution to marketing literature. This study investigates the relationship between the optimal time of day and the inconsistency of message items. Yoon (1997) found that older adults and younger adults use detailed processing strategies when they are at their optimal time of the day. Older adults use a schema-based processing strategy when they are not at their optimal time of day, whereas younger adults still use detailed-processing strategies. The implication of this study is that marketers can give information in advertisements that need to be processed in detail, are more effective to older adults in the morning or early afternoon (Yoon, 1997).

Another study that focused on advertising and time of day is Hornik and Miniero (2009). This study found that the circadian rhythm influences recall and memory. People can recognize and recall ads better when they experience their optimal time of the day and therefore when they experience their arousal peak time. Also people tend to stay longer in a waiting line and evaluate the experienced service as more positive when these shoppers are experiencing their optimal time of day (Hornik and Miniero, 2009; Hornik et al., 2010). This effect could be explained by the fact that morning-types and evening-types underestimate the time of an event when these groups are in their diurnal peak (Hornik et al., 2010).

Variety Seeking. Roehm and Roehm (2004) described that humans vary more in buying products when they have a low arousal level. This study concluded that there is a relationship between time of day and variety seeking behavior of consumers (Roehm and Roehm, 2004). Determining that when the arousal level is low for a consumer, the chance that

a consumer buys more variety in products is higher than when the arousal level is high for a consumer.

2.5 Hypotheses

2.5.1 Time of Day

In the academic literature there are studies, such as Roehm and Roehm (2004) which found that difference in arousal levels leads towards a different buying pattern. As discussed in the previous paragraph, Roehm and Roehm (2004) noticed that humans vary more in buying products when they have a low arousal level. Roehm and Roehm (2004) described that the reason for this characteristic is that when people are in their low diurnal arousal time, they have a bigger need for stimulation. This need for more stimulation is due to the fact that the actual arousal is lower than their optimal stimulation level, or preferred arousal. Variety seeking is an arousing activity according to Roehm and Roehm (2004). Therefore people who are in their high arousal state do not need extra arousal and are more likely to not vary in their product choice. However, people who are in their low arousal state do need to acquire extra arousal and are more likely to seek variety in their products.

When considering this study for chronotypes it should mean that when people are in their low arousal state they are more likely to vary. Therefore the early birds seek more arousing stimulation in the late afternoon and evening and the night owls seek more arousing stimulation in the morning and early afternoon (Thayer et al., 1988).

Variety seeking is just like impulse buying: a low-effort and feeling-based behavior (Sharma et al., 2010). When shoppers experience low arousal levels, they sense a need for stimulation (Roehm and Roehm, 2004). Thus, shoppers want to fill in the need for extra stimulation and so buy more impulse products when their arousal level is not at the maximum.

When implementing this effect for the purchase of impulse products, it indicates that the night owl is more likely to buy an impulse product in the morning and early afternoon and the early bird is more likely to purchase an impulse product in the late afternoon and evening. The reason for this is that these chronotypes have a lower arousal level at different parts of a day (Thayer et al., 1988).

H1: Chronotype has a direct negative impact on the time of day of the impulse buy.

2.5.2 In-store Advertising and Discounts

Youn and Faber (2000) state that advertisements trigger impulse buying. Some studies in academic literature found that difference in arousal levels leads to a different experience

towards the advertisements (Hornik and Miniero, 2009; Hornik et al., 2010). As discussed earlier, according to Hornik (1988) there is a change in consumer response to commercials throughout the day. This change could indicate that marketing promotions, such as commercials that are for immediate purpose, which trigger an impulse buy, are best shown at the moments when the arousal levels are relatively low. Hornik (1988) claimed that a possible reason for these changes in response could be that people who are in their low arousal state tend to minimize *cognitive load* and *effor*t.

Although Hornik (1988) did not prove it, later studies on cognitive performance such as Wright et al. (2002) and Hornik and Miniero (2009) found a relationship between performance and chronotype. According to Wright et al. (2002) when the temperature is elevated and the working memory reaches its peak, the subjective alertness and the visual attention of subjects improve. Therefore they concluded that when people reach their circadian peak in body temperature, their performance, the attention of the subjects, and their alertness increased (Wright et al., 2002). Logically, shoppers minimize their cognitive load and effort when their arousal level is low. They do not focus that much on the advertisement, and therefore the strength of needing to persuade the shopper decreases.

As described by Hornik (1988) and Wright et al. (2002), when people experience their peak in circadian rhythm and their level of arousal reaches the maximum, visual attention also increases. When advertisement involvement is high, people are more involved with the advertisement. Involvement is seen as personal relevance and shoppers are therefore more likely to be persuaded to buy the product because of the advertisement (Petty and Cacioppo, 1981). The reason for being more easily persuaded when personal relevance is high, according to Petty and Cacioppo (1981), is that the arguments that came forth in the advertisement have a larger impact on the attitude of the shopper when the person has a high involvement with the advertisement instead of a low involvement.

Concluding this effect for the advertisement and chronotype, people minimize their effort and cognitive load in their non-optimal hours and advertisement involvement influences the attitude towards the advertisement and therefore its persuasive property. Also, people have a lower visual attention in their non-optimal hours and so the advertisement also loses some persuasive property. The second hypothesis states that the morning-type and evening-type experience high involvement with the advertisement in their optimal arousal peak hours. In their non-optimal hours these two types experience low involvement with the advertisement. Because of this, these shoppers want to minimize their cognitive load and want to minimize their effort to understand the advertisement.

Shoppers have less attention in their non-peak hours for advertisements and are low-involved when they see the advertisement for the impulse product. Hence, the time that shoppers experience their non-peak arousal hour, they experience a low involvement towards the in-store advertisement. This means that the advertisement of the impulse product is not effective in that particular part of the day.

H2: Chronotype positively moderates the relationship between shopper involvement of in-store advertising and the time of the impulse buy.

Discounts are another in-store persuader to buy impulse products (Stern, 1962). Zhou and Wong (2004) investigated the promotional effect, such as discounts and reduction of the prices, on impulse purchases. They described that point of purchase posters that include discounts enhance the likelihood that the shopper buys the impulse product with the promotional effect. Also, Youn and Faber (2000) described that several cues have a higher likelihood to persuade a customer for buying an impulse product. 53.3% of the participated students described that if a product is on sale, they are more likely to buy the product.

Due to that, discounts are just like advertisements, in-store persuaders for buying impulse products, according to Stern (1962). The third hypothesis tests whether promotional effects, like discounts, have different effects on the buying pattern of the different chronotypes. Therefore do discounts have a lower or higher persuasive strength for each chronotype at particular times of day.

The alertness in the hours of higher body temperature is lower than in the hours of lower body temperature during the day (Wright et al., 2002). Therefore people experience a peak in their circadian rhythm. Shoppers who buy impulse products that have a discount do this purchasing because they are convinced in the store that they need the product. A possible reason for this is that the shopper thinks that it is a bargain, or that in the future when they actually need the product it will be more expensive. These thoughts are not typical when someone wants to minimize their cognitive activity. The third hypothesis states that when the shopper is in his or her high alertness state and therefore in the optimal arousal time of day, the shopper thinks more about buying the product and its implications on future buying habits. Therefore, the strength of the discount of an impulse product in persuading the shopper is higher in the optimal arousal hours, and the strength of the discount of an impulse product is lower in the not-optimal arousal hours.

H3: Chronotype positively moderates the relationship between the marketing promotion "discount" and the time of the impulse buy.

2.5.3 Product Involvement

In general, Rook (1987) described that an impulse purchase can be a low involved product purchase but also a high involved product purchase. When shoppers are looking for a high involved product, they tend to search more for information on the product (Beautty and Ferell, 1998). This extra searching could indicate that when someone buys an impulse product and this impulse product has a high product involvement, the arousal level should be higher. The reason for this effect is that when people are in their arousal peak, they are more alert. When the arousal level is at the peak, the buyer buys impulse products that are high involved instead of low involved.

When shoppers experience a lower arousal level and are less alert, shoppers should buy more low involved products than high involved products. Therefore early birds should buy more high involved impulse products in the morning and early afternoon, and night owls should buy more high involved impulse products in the late afternoon and evening. For the low involvement impulse products vice versa.

H4: Chronotype positively moderates the relationship between product-involvement and the time of the impulse buy.

2.5.4 Post-purchase Moods - Guilt

Guilt is a feeling of regret or remorse. People experience levels of guilt or regret when they think that they did something bad and want to change things or do things over (Tagney et al., 1996). When a customer buys an impulse product their mood states changes (Gardner and Rook, 1988). Most people feel better after the impulse purchase than before the impulse purchase. Evaluating their post-purchase mood, the highest scoring moods after the impulse product purchase were positive moods. The purchase was *pleasant* and *enjoyable* and the purchase was *exciting.* People also expressed some negative moods *anxiety/guilt* and *depressed* about the product that they bought. These five moods were responsible for 80% of all the moods that the shopper in the sample experienced (Gardner and Rook, 1988).

Shoppers experience guilt, because the impulse purchase was unexpected and the decision making process was limited. Therefore the purchaser can evaluate the post-purchase as something bad and wants to change things or do things over. Burnett and Lunsford (1994)

described this type of guilt as a *reactive guilt* or post-purchase guilt because the shopper has bought a product and regrets buying it.

Although literature asserts that post-purchase guilt occurs with the impulse purchase (Gardner and Rook, 1988), it does not tell whether the state of alertness or wakefulness has an influence on this post-purchase guilt. When a shopper is more alert, logically the shopper thinks more about buying the product. Thus, the shopper evaluates the product on a higher level, than when the shopper is in a lower state of alertness. This effect reduces the likelihood that the post-purchase *reactive* guilt occurs.

High alertness occurs in the high arousal states during the day. The different chronotypes experience these high arousal states at different times in a particular day. Therefore if the early bird buys impulse products during the morning and early afternoon, that person is less likely to experience the post-purchase guilt, than the night owl in the same part of the day. For the late afternoon and evening the night owl is less likely to experience the post-purchase guilt than the early bird during the same part of the day. Therefore, non-optimal hours in arousal enhance the likelihood that shoppers experience post-purchase guilt when they purchase an impulse product.

H5: Chronotype negatively moderates the relationship between feelings of "guilt" and the time of the impulse buy.

Figure 1. Conceptual Model.
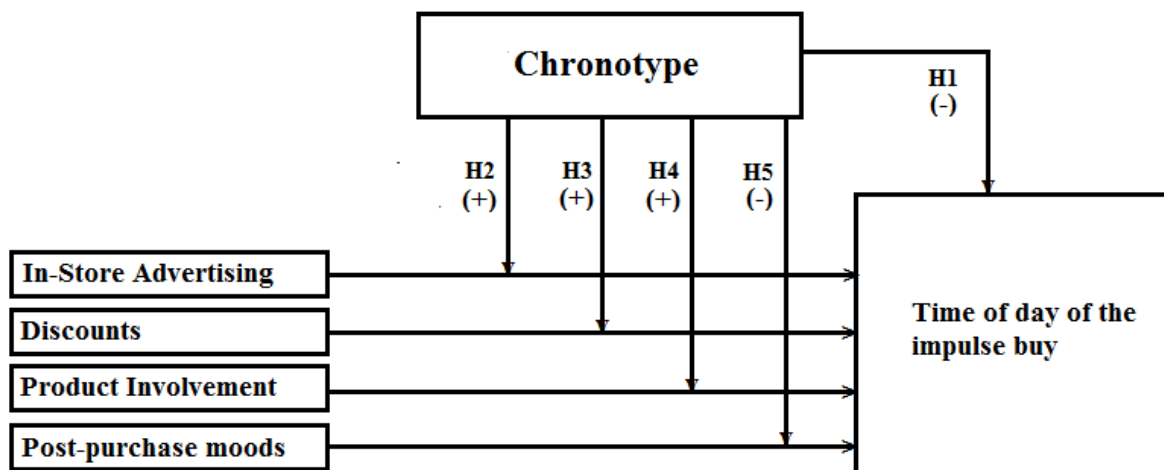
Chapter 3 Methods

3.1 Data Collection

Pretest. Before administering the survey, I pretested the questionnaire with five participants in order to find possible inconsistencies in the survey, get additional feedback, and to measure how long it took for the questionnaire to be completed. Four out of the five participants were moderate English readers and one out of the five respondents was a native English reader. I asked the native reader whether the English in the survey was understandable and correct. I asked the other pretest participants whether they could understand the questions and therefore understand what was being asked. After the pretest I changed the original reverse scale of the bipolar advertisement variable in order to reduce possible mistakes and confusion (Appendix 2).

Distribution. I created the questionnaire with the online survey software Qualtrics. I forced the answers to all the questions, so that it was not possible to skip questions. The items that indicate whether the participant noticed any advertisements or whether the impulse product had a discount were redirected when answering the items with "yes", to the importance of the discount variable or the involvement towards the advertisement. When answering "No" these questions were skipped. I administered the survey-link on a platform in Amazon Mturk and through a link on my webpage on Facebook to address my own network. Amazon Mturk has a worldwide pool of people who want to fill in surveys for money.

Having described and evaluated the possibility of the contribution of Amazon Mturk to social sciences, Buhrmester et al. (2011) conclude that the online data collection website Amazon Mturk can be used to obtain high-quality data in an inexpensive and rapidly manner. Buhrmester et al. (2011) draw four conclusions: namely participants are more demographically diverse than other internet samples, taking part is affected by compensation rate and task length, realistic compensation rates do not affect data quality, and the authors conclude that the data that are obtained are at least as reliable as those obtained via traditional methods. Hence, when the compensation is realistic according to the length of the task, Mturk is a reliable method to collect data. These arguments are the reasons why I used this way of data collection. The website also works with a participant rating. Therefore, only serious participants who have proven their quality in their previous surveys can fill in the questionnaire.

3.2 Measurement

For an overview of the types of measurement, the sources, and the constructions of the variables in the questionnaire see table 1.

Chronotype. The first five items in the questionnaire are variables where I measured the chronotype of the participant. These five items were established by using the *Reduced Morningness and Eveningness Questionnaire*, which is formulated in a study by Adan and Almirall (1991). The basis of this questionnaire derives from the *Morningness and Eveningness Questionnaire* by Horne and Östberg, (1976). This original nineteen-item questionnaire was used in several studies in the marketing literature, such as Hornik and Tal (2010), Hornik and Miniero (2009), Yoon et al. (2007), and Yoon (1997). Hornik and Miniero (2009) did not use the entire *Morningness and Eveningness Questionnaire* in their study, but only three questions out of the original questionnaire. According to Hornik and Miniero (2009) these three questions are the most relevant for marketing researchers. In line with Hornik and Miniero (2009), in order to prevent that participants lose interest and become less reliable due to the length of the questionnaire, I opted for the *Reduced Morningness and Eveningness Questionnaire* for the survey. Described in the Adan and Almirall (1991) article, the largest percentage of participants who used this five-item questionnaire belonged to neither group (59.8%). The second largest group belonged to the evening-types (21.8%) and the morning-types were the smallest group (18.4%) (Appendix 1-1). I combined the five items and summed the outcomes. After this step every participant received a number on the morningness/eveningness scale, where participants:

- with 22-25 points belong to the definitely morning-type group,
- with 18-21 points belong to the moderate morning-type group,
- with 12-17 points belong to the neither-type group,
- with 8-11 points belong to the moderate evening-type groups,
- with 4-7 points belong to the definitely evening-type group.

Motivation behind the Impulse Purchase. Another part of the questionnaire focuses on the experience and the motivation that the participant has when he or she buys an impulse product. In order to get relevant information I asked the participants to think of the last impulse purchase that the participant could remember. This purchase could be an online impulse purchase or an impulse purchase in a retail store. Another study that also asked participants to think of their last impulse buy is Gardner and Rook (1988). In this part there

are items that indicate whether the participants bought the impulse product in an online setting or in a retail store, the time of day of the last impulse purchase, the involvement towards the advertising, the importance of discounts and the product involvement with the last impulse purchase.

Advertising. In order to get relevant information, I measured the involvement with the advertisement of the last impulse purchase on a ten item, bipolar adjective scale (Zaichkowsky, 1994). These ten items measure the involvement towards the advertisement and these measurements are constructed by Zaichkowsky (1994). In the original measurement, six out of the ten items were reverse scaled items. These items were transformed in this questionnaire. All the items were placed in a scale, where the high involvement is seven and the low involvement is one. This replacement was done to make the questionnaire easier for the participant and it would help in lowering the chance of mistakes being made. The highest possible score is 70 points. This score indicates that the advertisement is highly involved. The lowest possible score is ten points. This score indicates that the advertisement is low involved.

- Low involved with the advertisement 10-29 points,
- medium involved with the advertisement 30-49 points,
- high involved with the advertisement 50-70 points.

Discounts. I measured the importance of the discount during the last impulse purchase with three items. These items are on a 7 point Likert-scale. On this scale, one is strongly disagree and seven is strongly agree. These items were developed by Lichtenstein et al. (1993). The original measurement was formulated with a six item scale. Not all the questions could be converted to impulse product and therefore three items remained and were applied to the impulse product.

Post-purchase Moods. I measured the post-purchase moods in this survey according to the measurements of Gardner and Rook (1988). The first item indicates if the participant feels better, worse or not different after the purchase of their last impulse buy. The second item indicates how happy the participant was after the impulse purchase and reflects on how positive the participant is. The third item gives an indication of how guilty the participant felt after buying the impulse product and the last question indicates which mood the participant felt the most. In the original article of Gardner and Rook (1988) the authors used thirteen moods that are likely to occur after an impulse purchase. Because 80% of all participants

chose these five moods, these moods are used in this survey. The moods that are used are: pleasure, excitement, anxiety/guilt, enjoyable and depressed.

Product Involvement. I measured the product involvement by twelve statement items. These items are established by Bauer et al. (2006) and they measure product involvement with three subjects. The first measurement is the significant value (four items). The second measurement is the importance of the product (four items), and the last measurement is the pleasure of the product (four items). All these items are on a 7 point Likert-scale where one is strongly disagree and seven is strongly agree.

Control Variables. The questionnaire contained five control variables. These control variables indicate several aspects of the participant. First of all, I measured whether the last impulse purchase of the participant was in an online setting or retail setting. Secondly, I measured whether the last impulse product had a discount. Thirdly, I measured whether the participant drank coffee before buying the impulse product and whether the participant is a regular coffee drinker. Fifthly, I measured whether the participant noticed any advertisements for their last purchased impulse product.

Caffeine and Alertness. All the hypotheses depend on the alertness of the participant and the time of day. One factor that can influence the alertness of the shoppers is caffeine. Coffee is one of the most popular used beverages with the substance caffeine. According to the *Centraal Bureau voor de Statistiek*, Dutch citizens drink 3.2 cups of coffee per day (2006) and therefore coffee is the most consumed beverage in the Netherlands. The country that consumes the most cups of coffee per day in the world is Finland. Citizens of Finland drank on average 5.4 cups of coffee per day in 2006. One cup of coffee is 125 ml and contains 6 grams of pure coffee (www.cbs.nl).

Coffee, and especially the substance caffeine, can have a positive effect on the mental alertness of the participant. Zwyghuisen-Doornebos et al. (1990) found that 250 mg of caffeine increased the sleep latency and therefore improved the alertness of the participants during their experiment. However, regular drinkers of beverages that contain caffeine can develop a tolerance toward caffeine (Zwyghuisen-Doornebos et al., 1990). The more coffee someone drinks on average during the day, the higher the tolerance becomes against the effect of improved alertness, because of the caffeine.

The control variable that indicated whether the participant drank coffee is formulated by reviewing some studies that focus on the improvement of alertness due to caffeine (Zwyghuisen-Doornebos et al., 1990; Wesensten et al., 2005). First of all, an average cup of coffee contains 137 mg. caffeine (Pasquale et al., 2012). In this study they used US cups and

therefore the volume is 237 ml According to the same source, other beverages that contain caffeine have this substance in a lower volume. Tea has 47 mg of caffeine per cup and Coca Cola has 46 mg caffeine per bottle (0,33l). 250 mg of caffeine increases the alertness/ wakefulness of the participants (Zwyghuisen-Doornebos et al., 1990). Therefore, two cups of coffee will increase the alertness of the participant. Achieving the same improvement in alertness will need more volume of the other beverages. The participant needs to drink at least six cups or 1.2 liter of tea or six bottles or almost 2 liters of Coca Cola prior to seeing the impulse product. These consumptions are not likely to happen before seeing the impulse product. Therefore this item only uses the beverage coffee to indicate whether the participant is more alert because of the caffeine. Also, according to Wesensten et al. (2005) the effects of caffeine toward improving the alertness will last for two to four hours. Therefore this item measures whether the participant drank more than two cups (or 474ml.) of coffee in the four hours prior to the impulse purchase.

Another item indicates whether the participant has a higher tolerance for caffeine. The more the participant drinks coffee on a regular basis the higher the tolerance against the effects of caffeine becomes (Zwyghuisen-Doornebos et al., 1990). Therefore, an item in the questionnaire indicates how many cups of coffee the participant drinks on average during the day.

Impulsiveness and Demographics. There are also items which indicate the level of impulsiveness of the particular participant. These items are developed by Ridgway et al. (2008). At the end of the survey a few items indicate the demographics of the sample. Age, gender, working status, regular coffee drinker, and education are the subjects of those last items.

Table 1. Variable Overview of Questionnaire

Number of question	Construct	Measurement	Source
1 to **5**	Five questions which indicate which chronotype groups the participant belongs to	Scale	Adan and Almirall (1991)
6	Control variable, which indicates whether the participant drank coffee prior to the impulse purchase	Nominal	-
7	Variable which indicates the place of purchase (online/store)	Nominal	-
8	Variable which indicates the time of the impulse purchase	Scale	-
9	Control variable, which indicates whether the participant purchased an impulse product that had a discount	Nominal	-
10 ABC	Three questions on a 7 point Likert-scale for estimating the importance of the discount	Scale	Lichtenstein et al. (1993)
11	Control variable which indicates whether the participant noticed any advertising for the impulse product.	Nominal	-
12 A to J	Ten bipolar questions with seven options for estimating the involvement towards the advertisement	Scale	Zaichkowsky (1994)
13	Change in mood after the purchase	Ordinal	Gardner and Rook (1988)
14	Level of happiness after the purchase	Ordinal	
15	Level of guilt after the purchase	Ordinal	
16	Most experienced mood after the purchase	Nominal	
17 A to L	12 statements on a 7 point Likert-scale, which indicate the level of product involvement.	Scale	Bauer et al. (2006)
18 A to D + **19**	5 statements on a 7 point Likert-scale, which indicate the level of impulsiveness.	Scale	Ridgway et al. (2008)
20	Variable which indicates the tolerance against caffeine	Scale	-
21	Variable which indicates the age of the participant.	Scale	-
22	Variable which indicates the gender of the participant.	Nominal	-
23	Variable which indicates the working status of the participant.	Nominal	-
24	Variable which indicates the marital status of the participant.	Nominal	-
25	Variable which indicates the highest obtained level of education of the participant.	Nominal	-

3.3 Data

3.3.1 Sample

A total of 295 people began the survey. 244 participants (82.7%) finished the questionnaire. However, when comparing the IP-addresses several were the same. The data were examined to minimize the chance that a participant filled in the survey more than once. To achieve this, double IP-addresses in combination with corresponding age and gender were excluded. A total of four participants filled in the questionnaire more than once. Hence, only the first response of these participants was used in the analyses.

Out of the 240 different participants, 114 (47.5%) respondents were collected via a platform in Amazon Mturk and 126 (52.5%) were collected by addressing my own network. Participants who were collected via a platform in Amazon Mturk received $1.00 for participating. The participants who were collected via my own network were recruited by a link on my webpage on the social network platform Facebook. The average time respondents needed to fill in the survey was 7 minutes and 14 seconds. However, the two groups show a difference in the average time it took to fill in the questionnaire. The group which was collected through the social network site Facebook has an average time of 10 minutes and 19 seconds and the second group has an average of 4 minutes and 12 seconds. A possible reason for this difference is that respondents who were recruited through Amazon Mturk have more experience in filling in questionnaires and because most of the respondents within this group are from an English speaking country, namely the USA. Consequently, this group might be faster in filling in the questionnaire compared to the respondents who were collected through Facebook, who are mostly from the Netherlands.

After an IP-address check of all the participants, the location where the respondent filled the survey in is collected. The largest group was from the Netherlands (47.5%). The second largest group filled in the questionnaire within the United States of America (45.0%). The remainder of the sample filled in the survey in India (3.8%), Singapore (0.8%), Germany (0.8%), Canada (0.8%), Mexico (0.4%), Honduras (0.4%), and Switzerland (0.4%).

Demographics. First of all, the subjects are between the 14 and 72 years of age ($\bar{x}$ is 34.09 years, standard deviation is 12.996). Each chronotype group has a different average of age. Morning-types are on average 38.98 years, neither-types are on average 34.79 and the evening-types are on average 29.61 years (Appendix 3-5).

Secondly, 119 participants (49.58 %) are male and 121 (50.42%) participants are female. Within the morning-type group, 25 participants are male (51.02%) and 24 participants

female (48.98%). The evening-type has a higher percentage male, namely 56.94% (41 participants) and a lower percentage female, 43.06% (31 participants) (Appendix 3-1).

Thirdly, 139 participants filled in the survey and indicated that their working status is "employed" (57.92%). The second largest group in this variable is "student", 54 participants belong to this group (22.50%). Among the chronotypes there are differences, namely the evening-type group has a much higher percentage of students (38.89%) than the morning-type group (10.20%). The morning-type group nevertheless has a much higher percentage of participants who chose the "employed" option (65.31%) compared to the evening-type group (46.22%) (Appendix 3-2).

Fourthly, within the marital status variable the largest group is "single" (56,3%). The second largest group is "married" (38.75%). Among the evening-type there is a higher percentage that is "single" (69.44%) than among the morning-type (40.82%). Also, the morning-type group has a much higher percentage in the "married" category (53.05%) than the evening-type group (26.39%) (Appendix 3-3).

Fifthly, the largest group in the highest obtained education chooses "high school" (39.2%) as the best option and the second largest group is "undergraduate degree" (29.6%). Among the evening-type there is a much higher percentage that has "high school" as the highest obtained education (42.06%), than among the morning-type (32.65%) (Appendix 3-4).

Impulsiveness Scale. On the impulsiveness scale developed by Ridgway et al. (2008), the sample collected in this thesis scores a mean of 14.35 (standard deviation 5.266) with a minimum of 5 and a maximum of 30. Among the different groups there are some notable differences. For example, the morning-type group has a much lower mean ($\overline{x}$ is 13.73) than the neither-type group ($\overline{x}$ is 14.50) and the evening-type group ($\overline{x}$ is 14.51) (Appendix 3-11).

Coffee. In this sample, 111 participants (46.25%) indicate that they do not drink coffee or less than one cup per day. 57 participants (23.75%) indicate that they drink on average two or three cups per day. 72 participants (30.00%) drink more than three cups per day. Among the chronotype groups there are only slight differences (Appendix 3-12). Four hours prior to the impulse purchase, 60 subjects (25.00%) indicate that they drank more than two cups. (Appendix 3-13).

3.3.2 Chronotype
All the participants were asked to answer several questions that would indicate whether the participant would be a morning-type, an evening-type or neither of these types.

The participants score between the 5 and the 24 on the Chronotype scale ($\bar{x}$ is 14.03, standard deviation is 4.168) (Appendix 3-6).

Six respondents (2.50%) have a score between the 22 and 25 points. The subjects belong to the definitely morning-type group. 43 respondents belong to the moderate morning group (17.92%). The group scores are between the 18-21 points. In total there are 49 respondents in the morning-type group (20.42%). Out of the sample, 119 participants (49.58%) score between the 12-17 points and belong to the neither-type group. This is the largest group in the sample. Participants with 8-11 points belong to the moderate evening-type groups and in this sample there were 59 subjects (24.58%) that belong to this group. Participants with 4-7 points belong to the definitely evening-type group, 13 participants belong to this group (5.42%). In total 74 of the total subjects belong to the evening-type (30.83%). All of these findings are similar and therefore consistent with the study of Adan and Almirall (1991).

3.3.3 Impulse Product

When addressing the impulse product, 89 participants (37.1%) made their last impulse purchase online and 151 participants (62.9%) made their last impulse purchase that they could remember in a retail store (Appendix 3-7). Out of the 240 participants, 134 (55.8%) of the sample bought their last impulse product with a discount (Appendix 3-8) and 51 participants (21.3%) noticed advertisements of the product that they bought during their last impulse buying experience (Appendix 3-9). Among the chronotype groups there are no notable differences.

Time of Day. The largest portion of the sample bought their impulse product between 15:01 and 18:00 (31.25%). The fewest participants bought their impulse product between 06:00 and 09:00 (0.83%). There are some differences between the morning-type group and the evening-type group. The morning-type group has a higher percentage of buying their impulse product in the morning and early afternoon (44.90%) than the evening group (36.11%). However, the evening-type group has a higher percentage of buying their last impulse product in the late afternoon (63.89%) than the morning-type group (55.10%) (Appendix 3-10).

3.3.4 Product Involvement

On average the subject score is 54.38 (standard deviation is 12.462) on the product involvement scale (minimum is 16 and maximum is 83). There are some differences between

the chronotypes. The morning-type score ($\bar{x}$ is 51.90) is lower than the evening-type score ($\bar{x}$ is 55.21) and neither-type score ($\bar{x}$ is 54.91) (Appendix 3-14).

Significant Value. On average the subjects score 15.67 (standard deviation is 5.578) on the significant value scale (minimum is 4.00 and maximum is 27.00) for the impulse product that they bought last. However, there are differences between the chronotype groups. The morning-type scores lower ($\bar{x}$ is 14.19) than the evening-type ($\bar{x}$ is 16.08) and the neither-type ($\bar{x}$ is 16.03) (Appendix 3-15).

Importance. On average the subjects score 19.45 (standard deviation is 5.151) on the importance scale (minimum is 4.00 and maximum is 28.00) of the impulse product that they bought last. There are also almost no differences between the chronotype groups. The evening-type scores slightly lower ($\bar{x}$ is 19.00) than the morning-type ($\bar{x}$ is 19.90) and the neither-type ($\bar{x}$ is 19.53) (Appendix 3-15).

Pleasure. On average the subjects score 19.27 (standard deviation is 4.657) on the pleasure scale (minimum is 4 and maximum is 28.00) for the impulse product that they bought last. However, there are differences between the chronotype groups. The morning-type ($\bar{x}$ is 17.82) scores much lower than the other types: the evening-type ($\bar{x}$ is 20.13) and the neither-type ($\bar{x}$ is 19.35) (Appendix 3-15).

3.3.5 Post-purchase Moods and Feelings

Purchase Feelings. First of all, a large portion of the participants felt better after they bought their impulse product (133 participants, 55.42%). This percentage is lower than in the sample described by Gardner and Rook (1988). They found that 75.00% felt better than before the impulse purchase, 16.00% felt not different and 8.00% felt worse after they bought their last impulse product. There are differences within the chronotype groups. Evening-types feel more often better after they buy an impulse product (61.11%) than morning-types do. Morning-types feel "not different" more frequently (53.05%) compared to the evening-type (33.33%) (Appendix 3-16).

Happiness and Level of Guilt. By far the largest portion of the sample feels no guilt at all after buying an impulse product (49.17%). Also the largest portion of the sample felt happy to extremely happy (65.00%). There are some differences within the chronotype groups. There is a much higher percentage among the evening-type group (54.17%) and neither-type group (50.42%) that does not experience guilt after the impulse purchase, than among the morning-type group (38.78%). The morning-type group also has a higher percentage in the "neither happy nor unhappy" category (40.82%), than the neither-type group

(25.21%) and the evening-type group (26.39%). However, the evening-type group (62.50%) and the neither-type group (63.87%) indicate more frequently that they feel happy after the impulse buy compared to the morning-type group (46.94%) (Appendix 3-17 and 3-18).

Post-purchase Mood. By far the most experienced mood after the respondents bought their impulse product in this sample is "content/relaxed" (42.08%). However, there are some differences between the chronotype groups. The morning-type group shows a higher percentage in the negative moods (12.24%) such as anxiety/guilt and depressed, compared to the neither-type group (8.40%), and the evening-type group (6.94%) (Appendix 3-19).

Chapter 4 Results

The first part of this chapter consists of testing the possible relationship between age and chronotype group. This confirmation is important for the managerial implications of this thesis because these implications also refer to products for a younger target group who are evening-types and products for an older target group who are morning-types. The second part of this chapter contains the analyses of the hypotheses that are constructed in chapter two. All the results were analyzed by using the IMB SPSS program version 21.

4.1 Age versus Chronotype

There are several points that indicate the relationship between chronotype and age in this sample. First of all, only five people (10.20%) out of the morning-type group are a student and 28 participants (38.89%) out of the evening-type are a student (Appendix 3-2). Logically, students tend to be younger than the other "working status-groups". Secondly, more evening-types are single than the morning-type, and there are more participants who indicate that they are married and a morning-type, than married and an evening-type (Appendix 3-3). Thirdly, the percentage of evening-types that have high school as highest obtained level of education is higher than the percentage of morning-types that indicated that high school is their highest obtained level of education (Appendix 3-4). Fourthly, the average age of a morning-type is 38.98 years. This number is much higher than the average age of an evening-type. The mean of the evening-type is namely 29.61 years (Appendix 3-5).

All these findings could be an indication that early birds in this data sample tend to be older than people who belong to the night owl group. However, in order to examine the sample for a relationship between these variables, some statistical tests are conducted.

Analysis. First of all, it needs to be determined whether a parametric or non-paramatric test will be used. The assumptions for a parametric test are that the data are normally distributed and there is homogeneity of the variance (Field, 2009). Hence, a *Kolmogorov-Smirnov* test is conducted to indicate whether the data are normally distributed. When testing for normality with age and morning-type ($D(49) = 0.049$) a p-value of 0.200 occurs, therefore the test shows a non-significance and therefore these variables are normally distributed. For the other two groups there is a p-value of 0.000 for the neither-type ($D(119) = 0.161$) and a p-value of 0.000 for the evening-type. These p-values are highly significant and therefore there is an indication that the data are significantly different to a normal distribution according to the *Kolmogorov-Smirnov* test. To test whether there is homogeneity of variance a

Levene's can be used. The output of this test, F (2,237) = 3.587, p-value is 0.029, shows that the p-value is lower than the critical value (α is 0.05) and therefore it is significant. Hence, the data are significantly different from homogeneity of the variance. Therefore homogeneity cannot be assumed for the age of the three groups.

Comparing the Chronotype Groups. Because the data does not have homogeneity of variance, only non-paramatric tests can be used. First of all, a *Kruskall-Wallis* test is conducted, because the outcome is the continuous variable *age*. The predictor variable is the categorical variable *chronotype group*, because there are more than two categories and each group has different participants. When conducting a *Kruskall-Wallis* test ($H(2) = 14.280$) there is a *Monte Carlo* significant value (p-value is 0.001). The 99% confidence interval is also significant (p-value lower bound is 0.000 and p-value upper bound is 0.002). This gives confidence that the significant value is genuine. Hence, there is a significant difference between these groups. The morning-type group has the highest mean rank (144.71), second highest is the neither-type (124.46), and the evening-type has the lowest rank (97.48). Hence there is a significant rank between the three groups, whereas the morning-type is the oldest and the evening-type the youngest.

Secondly, to compare the different groups, two types of post hoc analyses are conducted. The groups are individually compared to each other with a *Mann-Whitney U* test. This non-parametric test has been chosen because: the outcome is continuous (age); the predictor variable is categorical (chronotype group); there are only two categories; and each group has different participants. When comparing the morning-type group and evening-type group with each other ($U=1071.500$), a significant value occurs (p-value is 0.000). Therefore, people who belong to the morning-type group are significantly different than people who belong to the evening-type group.

The second post hoc test is analyzing the mean ranks of the *Kruskall-wallis test*. The critical difference can be compared to the significant mean rank out of the *Kruskall-Wallis test*. According to Field (2009), the critical difference calculated with the following formula (α is 5%):

$$\left| \overline{R_u} - \overline{R_v} \right| \geq Z_{\alpha/k \, (k-1)} \sqrt{\frac{N(N-1)}{12} \cdot \left(\frac{1}{N_U} + \frac{1}{N_V}\right)}$$

The morning-type compared to the evening-type gives a mean rank difference of 47.23. The critical difference is 30.73. Hence, $47.23 \geq 30.73$ and therefore there is a significant difference between the morning-type group and the evening-type group and their age, whereas the

morning-type is significantly older than the evening-type (Appendix 4-1). Therefore, it can be concluded that within this sample evening-types tend to be significantly more often younger than morning-types, and morning-types tend to be significantly more often older than evening-types. Literature confirms these findings (Yoon, 1997; Yoon et al. 2007 and May et al. 1993).

4.2 Model

In order to investigate the five hypotheses mentioned in the second chapter, a unified model with a *multiple linear regression* is made in which the hypotheses two to five are analyzed by the interaction/moderation effects, and hypothesis one is analyzed with a direct effect. The dependent variable (Y) in the model is the *time of day* when the impulse product was bought. The dependent variable is an interval variable because there is an equal interval between the possible outcomes (Field, 2009). According to Field (2009), an interval variable can be assumed to be categorized as a continuous variable. Therefore a *multiple regression* is made in order to investigate the hypotheses that addresses the variable *time of day* as the dependent variable. This model consists of the variables that measure the hypothesis (model variables) in combination with dummy variables and control variables.

Model Variables. First of all, the variable that indicates the *importance of the discount* is combined with the control variable which states whether the impulse buy had a discount. Hence, a new scale variable is developed that has a minimum of 0 and a maximum of 15, where 0 indicates that there was no discount on the impulse product and 1 to 15 indicate the importance of the discount (1: not important, 15: highly important). Secondly, the same is done for the variable that indicates the *involvement with the advertising*. The new scale variable has a minimum of 0 and a maximum of 61, where 0 indicates that the participant did not notice any advertising for the impulse product they bought, and 1 to 61 indicate the importance of the advertising (1: low involved, 61: highly involved). Thirdly, the variable that indicates the total *product involvement score* is added to the model. Fourthly, the variable that indicates the total *level of guilt* after the impulse purchase is added to the model.

"Early Bird" vs. "Night Owls". In order to investigate the effect that chronotypes have on the dependent variable, three dummy variables are constructed: namely a dummy that indicates whether the participant is a morning-type, a dummy that indicates whether the participant is an evening-type, and a dummy variable that indicates whether the respondent is a neither-type. The creation of these dummy variables is done because the original scale variable *chronotype* is converted to a nominal variable with three categories: morning-type,

neither-type or evening-type. In order to analyze a moderation effect, the variable has to be converted into three dummy variables. However, to avoid *perfect multicollinearity,* the dummy neither-type has been removed from the interaction within the model (Field, 2009). These two variables are also added to the model. To investigate the interaction effect of the variables, the four variables which were described in the previous paragraph are combined with the two dummy variables. Hence, eight new variables are added to the model.

Control Variables. In order to add the control variable *coffee* to the model, the variable that indicates whether the participant drank coffee prior to the impulse purchase and the variable that indicates whether the participant has *tolerance* against caffeine, are combined. The new variable is a scale variable where the following scale of 1-3 is used: 1: the participant drank coffee prior to the impulse purchase and the participant has no tolerance against coffee, 2: the participant drank coffee prior to the impulse purchase and the respondent has tolerance against coffee, and 3: the participant drank no coffee prior to the impulse purchase. The second control variable is the *level of impulsiveness* variable. This is a scale variable and is added to the model.

Model Results. In total the model counts 16 variables (Appendix 6-1) and has a R^2 of 0.070. First of all, the model constant has a significant value of 0.001. Secondly, the variable that shows the total score of the product involvement has a significant value (α is 5%), namely 0.047, this effect counts for 19.7%. Thirdly the dummy variable, indicating whether evening-types show a relationship between the time of day and the impulse product, shows a slightly significant relationship (α is 10%), namely 0.078. Hence, the following model can be made:

$$Y_{time\ of\ day} = \beta_{constant} + \beta_{product\ involvement} * X_{product\ involvement} + \beta_{evening-type} * X_{dummy\atop evening-type}$$

$$Y_{time\ of\ day} = 2.375 + 0.018 * X_{productinvolvement} + 1.540 * X_{dummy\atop evening-type}$$

4.3 Results Hypotheses

Time of Day. After studying the data within the sample, there are findings that could indicate a positive relationship between time of day when the impulse product is bought and the chronotype. Namely, within the sample the percentage of morning-types (44.90%) that buy their impulse product in the morning and early afternoon is higher than the percentage of evening-type (36.11%) during the same hours. Nonetheless, in the late afternoon and evening more evening-types (63.89%) buy an impulse product than morning-types (55.10%)

(Appendix 3-10). Indications that support the hypothesis, developed in chapter two, are the β of the *dummy evening-type* and β of the *dummy morning-type* within the model. These two β's are both positive and the evening-type shows a much higher β than the morning-type (Appendix 6-1). Hence, this finding could indicate that the evening-type purchases the impulse product much later during the day than the morning-type.

However, after analyzing the hypothesis with a *multiple regression,* only the evening-type shows a positive direct significant relationship with the time of day when the impulse product is bought. Hence, evening-types buy their impulse product significantly later during the day than the non-evening-types. Therefore, when the evening-type purchases an impulse product, results show that this is likely to be between the early afternoon and the late afternoon (Figure 2). The non-evening-type (morning-type plus neither-type) are more likely to acquire their impulse product between the late morning and early afternoon. These findings could be an indication that the chronotype is not more likely to purchase an impulse product in the time zone during which they have a lower arousal level and when they are less alert, as proposed in the hypothesis, but the opposite, namely when they are approaching their optimal arousal level and therefore are near their daily alert peak. Therefore Hypothesis 1 is rejected.

Figure 2. Evening-type and Time of Day

$$Y_{time\ of\ day} = 2.375 + 1.540 * X_{dummy\ evening-type}$$

$$Evening - type_{time\ of\ day} = 2.375 + 1.540 * 1 = 3.915$$

$$Non - Evening - type_{time\ of\ day} = 2.375 + 1.668 * 0 = 2.375$$

In-store Advertising. After investigating the sample, several findings support Hypothesis 2. Namely, within the sample the highest mean of the involvement towards the advertisement of the evening-type is in the early evening, and the highest mean of the involvement towards the advertising of the morning-type is in the late morning. The lowest mean of the evening-type is in the late morning and the lowest mean morning-type is in the early afternoon (Appendix 5-3). These findings could be an indication that morning-types are more involved with the advertisement of the impulse product in the early hours of the day, and that the evening-type is more involved into the advertisement of an impulse product in the late hours during the day. However, according to the statistical model, the result shows no

significant moderating relationship between the chronotype and the involvement with the advertisement during the day. Nonetheless, the *regression model* does show a positive (non-significant) moderating relationship between the interaction "*dummy evening-type* and *the involvement with the advertisement variable*" and the time of day when the impulse product is bought. The interaction variable (between the *dummy morning-type* and *the involvement with the advertisement variable)* shows a non-significant negative relationship with the time of day when the impulse product is purchased. These effects are formulated within Hypothesis 2. However, since these values are not significant Hypothesis 2 is rejected.

Discounts. When investigating the sample, a notable difference was found between each chronotype. The morning-type has an overall higher average of importance of the discount than the evening-type. However, the evening-types have their highest score in the late evening and the morning-types have the highest score in the late morning. Also, for the morning-type there are no cases in the two extreme times (Appendix 5-1). These findings could indicate that morning-types find the discount for an impulse product more important in the early hours. This is because they are in their arousal peak or high alertness peak. Evening-types find the discount more important in the late hours, because they have their higher alertness in the late hours. These findings confirm the third hypothesis developed in the second chapter.

However, after conducting a *multiple regression,* the evening-type shows a negative non-significant effect between the interaction "*dummy evening-type* and the *importance of the discount"* and the time of day when the impulse product is purchased. The morning-type shows a positive non-significant effect between the interaction *"dummy morning-type* and the *importance of the discount"* and the time of day when the impulse product is bought (Appendix 6-1). These findings indicate that there might be a negative moderate relationship between the importance of the discount for a chronotype and the time when the impulse product is bought. These effects are contradicting the third hypothesis described in chapter two.

Nonetheless, after constructing the model, no significant values are found. Hence, there is no indication that the different chronotypes have significant different patterns compared to each other when addressing the importance of the discount during the impulse purchase and the time of day when the product is bought. This implies that Hypothesis 3 is rejected.

Product Involvement. There are several indications that support the fourth hypothesis. According to the table in Appendix 5-5, which shows the means of the product involvement

per time zone, a remarkable point is found, namely that in total the evening-types score higher than the morning-types. Also after aggregating the variable *time of day* into two categories (morning/early afternoon and late afternoon/evening), morning-types score a lower average on the product involvement scale during the late afternoon and evening (51.11) than during the morning and early afternoon (52.86). Evening-types show the opposite: this group scores higher on the product involvement scale during the late afternoon and evening (56.37), than during the morning and early afternoon (53.15) (Appendix 5-6). These findings could indicate that when the chronotype is near its arousal peak, the chronotype is more involved with the impulse product than when the chronotype is in the non-optimal arousal time. These findings are consistent with the fourth hypothesis that is constructed in chapter two.

However, after analyzing the data with a *multiple regression,* there are no indications that chronotype has a positive significant moderate relationship between the product involvement and the time of day. Even the β's of both the variables are negative. Hence, there is a non-significant indication that morning-types purchase high involvement impulse products earlier during the day than low involved impulse products. This finding supports Hypothesis 4. However, the negative β between the interaction of the "*product involvement and the dummy evening-type"* is also negative. Therefore, there is a non-significant indication that evening-types purchase high involvement impulse products earlier during the day compared to lower involved impulse products. This note shows the opposite result of the Hypothesis 4. Nonetheless, the data do show a significant positive direct relationship between time of day and level of involvement with the impulse product.

Post-purchase Guilt. As discussed in chapter three, there are different indications that the chronotypes have different patterns when buying impulse products and the post-purchase moods they experience. There is a much higher percentage among the evening-type group (54.17%) and neither-type group (50.42%) that do not experience guilt after the impulse purchase, than among the morning-type group (38.78%). The morning-type group has a higher percentage in the "neither happy nor unhappy" category (40.82%), than the neither-type group (25.21%), and the evening-type group (26.39%). The evening-type group (62.50%) and the neither-type group (63.87%) indicate more times that they feel happy after the impulse buy compared to the morning-type group (46.94%). When addressing the model made with a *multiple regression,* several findings support the fifth hypothesis. First of all, the β of the interaction between the *dummy evening-type* and the *level of guilt* variable shows a negative relationship. This relationship indicates that an evening-type feels more guilt earlier during the day than later during the day. Secondly, the β of the interaction between the

dummy morning-type and the *level of guilt* variable show a positive relationship. This relationship indicates that a morning-type feels more guilt later during the day than earlier during the day. These two findings support Hypothesis 5.

However, these findings are non-significant (α is 10%) and therefore there are no indications that there is a difference between the chronotypes and the post-purchase guilt that these groups experience after they purchase an impulse product. Hence, Hypothesis 5 is rejected.

4.4 Robustness Analysis

I conducted several additional analyses in order to check the robustness of the findings in the previous paragraph. First of all, I used the chronotype variable as a continuous variable instead of the two dummy variables of each chronotype. However, the results were inconclusive and all the hypotheses were rejected. Secondly, the two different recruitment types were run separately from each other. This test is conducted because there might be a difference in homogeneity between the two subsamples. Thirdly, only the participants who filled in the survey in their optimal time zone were analyzed. This test is conducted, according to Hornik (1988), for the reason that it could make the results more reliable, because people can remember events better at their arousal peeks during the day.

Facebook and Amazon Mturk. After running the original model for each subsample, different results occur. The R^2 of the *regression model* with only the participants collected via Facebook is 13% and the R^2 of the *regression model* with only the respondents collected via Amazon Mturk is 18%

Within the Amazon Mturk sample there are two major differences compared to the original regression model (Appendix 6-2). First of all, the new model shows a significant negative moderating relationship of the involvement with the in-store advertisement of the morning-type and the time during the day when the impulse product is bought (α is 5%). Secondly, the model shows a slightly significant negative moderate relationship between time of day when the impulse product is bought, and the product involvement with the impulse product of the evening-type (α is 10%).

After filtering the data, for only the participants who were collected with a link on Facebook two major differences occur compared to the original regression model (Appendix 6-3). First of all, the new model shows a significant negative moderating effect between the importance of the discount for evening-types and the time of day when they bought the impulse product (α is 5%). Secondly, the model shows a slightly negative moderating

relationship between the product involvement of the morning-type and the time during the day when they bought the impulse product (α is 10%)

Optimal Time of Day. In order to execute a robustness check for the optimal time during the day, two new variables are created, namely a dummy variable that indicates whether the participant is a morning-type and filled in the questionnaire in the optimal morning-type time, and a dummy variable that indicates whether the participant is an evening-type and filled in the survey in the optimal evening-type time. Hence, only participants who are a morning-type and filled in the questionnaire between 06:00 and 12:00 (local time) were used in this model and the evening-types that did the survey between 15:30 and 21:30 (local time) are used. These indications of time are applied because according to Hornik and Miniero (2009) the optimal time for a morning-type in alertness and performance is 09:00 and for an evening-type 18:30. However, only a few of the respondents began exactly at these two moments in time. Hence, a range of three hours is added. In order to find the local time when the participants began filling in the questionnaire, all the IP-addresses were checked to establish the location where the participant did the survey. When the location was found, the time when the participant began the survey is converted to the local time. Hence, 24 participants who are a morning-type filled in the survey in the morning and 25 participants are an evening-type and did the survey in the late afternoon or early evening. However, the results show no indication that any of the hypotheses are partly or completely supported (Appendix 6-4).

Chapter 5 Conclusion and Discussion

5.1 Conclusion

After developing the hypotheses, collecting the data, and analyzing the sample, several conclusions can be made.

First of all, after analyzing the sample and conducting a *multiple regression* there seems to be an indication that the chronotype is more likely to purchase an impulse product when they are closer to their optimal peak of alertness. However, this behavior is statistically proven for the evening-types (α is 10%) but not for the morning-types.

Secondly, the sample also shows indications that the chronotype is more involved with the advertisement of an impulse product when the chronotype is near its alertness peak. These indications cannot be statistically proven with the original model. However, after the robustness check for the Amazon Mturk sample, it can be concluded that the morning-types are more highly involved with the advertisement of an impulse product when they are closer to their alertness peak.

Thirdly, the data show that the opposite might be happening for Hypothesis 3. Hypothesis 3 describes that the chronotype finds the discount of an impulse product more important when the chronotype is near its alertness peak. There is no statistical confirmation of Hypothesis 3 within the original model. However, after conducting several robustness checks, the Facebook sample shows that when the evening-types get closer to their alertness peak the discount becomes less important in convincing them to purchase the product.

Fourthly, there is an indication that the chronotype purchases higher involved impulse products when the chronotype is near its alertness peak. There is no statistical proof that this behavior occurs for these two groups within the total sample. However, after the robustness checks, evening-types seem to be more highly involved with the impulse product when they come closer towards their non-optimal time during the day within the Amzon Mturk´s sample. Morning-types seem to be more highly involved with the impulse product when they come closer towards their optimal time during the day within the Facebook sample.

Fifthly, after analyzing the data, the post-purchase level of guilt seems to be lower when the chronotypes are near the time of their alertness peak. This is consistent with the fifth hypothesis. However there is no statistical proof that the level of guilt is lower for the chronotypes when they reach their alertness peak.

5.2 Managerial Implications

Although none of the hypotheses are proven, the results which are explained in chapter four could have managerial implications for online and/or offline retail shops and the way of addressing impulse products in their business.

Flexible Product Placement. According to the results, there is a positive significant interaction effect between the variable for *time of day* during which the impulse product is bought, and the dummy variable *evening-type*. This conclusion can have managerial implications. When the target group of a particular impulse product is relatively younger, the retailer could place the product between the early afternoon and late afternoon to get a higher chance that an evening-type buys the impulse product. When a target group is older and therefore there is a higher chance that the target group consists out of more morning-types, the retailer could place the product between the late morning and early afternoon to get a higher chance that the target group purchases the impulse product. For the online retailer these implications could also be of use. For example, an online retailer can present a variety of products much easier to the shopper than a store retailer can. Hence, when the retailer has defined the product's target group, the retailer could advertise for these target groups at the different times.

Marketing Promotions, In-store Advertising and Discounts. As discussed in the first chapter, this thesis could shed light on several managerial implications on various subjects such as general in-store advertising, advertisement for reducing guilt, type of advertisement (high involved/low involved), and the effectiveness of discounts. Due to the fact that there are no significant values in the original regression model, it can be concluded that the morning-type has no significant different pattern when this group purchases an impulse product compared to the evening-type when addressing the importance of a discount, importance of in-store advertising, the product involvement, and the level of guilt after an impulse purchase.

However, follow-up testing does show some significant indications that a morning-type or an evening-type does have a different pattern compared to a non evening-type/morning-type. These conclusions have three managerial implications:

Advertisement. The early birds are more highly involved with the advertisement when they get near their optimal time during the day. Hence, retail and online stores should only advertise when the shopper is more highly involved with the advertisement. Therefore when the target group of a particular impulse product is older, the advertisement should be near the

optimal alertness time of the target group and therefore retailers should advertise in the morning or early afternoon.

Discounts. The night owl finds the discount more important when this chronotype gets near its non-optimal time during the day. Hence, when a retailer wants to give a product a discount and this product has a relatively younger target group, the retailer can give the product the discount in the morning or early afternoon, for a more optimal result.

Product Involvement. Described by Petty and Cacioppo (1983), the type of advertisement is important for convincing potential buyers to purchase a product. When someone wants to buy a high involved product, strong arguments are important, and when someone wants to buy a low involved product, a good endorser can persuade the potential buyer. Incorporating these findings with the conclusion described in the beginning of this chapter, managerial implications could be that both chronotypes are more highly involved with the product in the morning and therefore when addressing these groups, the retailer should advertise with strong arguments instead of an endorser in the morning, and the opposite for later during the day.

5.3 Limitations and Future Research Directions

5.3.1 Limitations

After analyzing the results none of the hypotheses developed in chapter two are proven with the sample collected in this thesis. These rejections could be due to the following limitations:

Chronotype. First of all, in order to draw better conclusions one could only use participants who are young and an evening-type and participants who are older and a morning-type. For example in the study of Yoon (1997), only participants who are between 18 and 22 years of age, who are evening-types were compared to participants who were between 65 and 79 years of age and belonged to the morning-type group. This was not possible in this thesis because there were too few respondents who belonged to those different age groups.

Secondly, when investigating the chronotypes it is not optimal if there is a high percentage that belongs to the neither-type. Hence, the reduced scale of the Morningness and Eveningness Questionnaire (Adan and Almirall, 1991) gives a higher percentage of participants who are the neither-type (Appendix 1-1) than the original Morningness and Eveningness Questionnaire developed by Horne and Östberg (1976). Therefore, it could be better to use the original 19-item questionnaire to determine whether the participants are a

morning-type or an evening-type. However, the survey with a 19-item Morningness and Eveningness Questionnaire would be substantially longer than the survey with the 5-item reduced questionnaire.

Thirdly, when investigating the chronotype groups, a survey is not optimal. Thus, the largest part of the sample cannot be identified and therefore belongs to the neither-type group. In order to indentify early birds and night owls one should analyze the body temperature or cortisol level of the participant during one day. In the article of Bailey et al. (2001), the authors describe that the morning-type, compared to the evening-type, has a different pattern in their cortisol and temperature rhythm during the day.

Impulse Product. First of all, this study looks at impulse products in general. However, in order to get better specific results one has to study different types or categories between the impulse buying products. Secondly, the alertness of the participant could also be higher or lower due to the price of the impulse product. For example, when a shopper buys an expensive impulse product, the shopper could be more alert, because there is more money involved in the purchase. Therefore this study could have focused on the low-priced impulse products instead of all the impulse products. Thirdly, asking participants for them to think of their last impulse purchase and then asking several questions about it could be confusing for the respondents, when the particular purchase happened a long time ago. Hence, it could not be optimal for the results.

5.3.2 Future Research Directions

Although the hypotheses are rejected, there are indications that chronotypes do show different behavior among each other when they purchase an impulse product during the day. For example, on the following subjects: the involvement with the advertisement, the importance of the discount, and the level of post-purchase guilt compared to the time of day of the impulse purchase. However, in order to find significant differences in behavior between the chronotypes, future research could choose to address the hypotheses with a field study instead of a survey. When asking the participants about their impulse purchase, it would be optimal if it is done shortly after they made the purchase. For example, researchers could interview the participants in a retail store. Another addition for a following research would be to measure the chronotype in an impulse purchase study, not by a survey, but by measuring body temperature peaks and/or cortisol level peaks during the day. In order to increase the chance of finding the specific chronotype groups.

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Appendix 1
-(r)MEQ-

Score list of the Morningness and Eveningness Questionnaire, by Horne and Östberg (1976) and Score list of the Reduced Morningness and Eveningness Questionnaire, by Adan and Almirall (1991).

1. MEQ versus rMEQ

	MEQ* (N)		rMEQ (N)	
Definitely evening-type			19	(2.1%)
Moderate evening-type	20	(41.7%)	148	(16.3%)
Neither-type	10	(20.8%)	543	(59.8%)
Moderate morning-type			182	(20.0%)
Definitely morning-type	18	(35.7%)	16	(1.8%)
Total	48	(100.0%)	908	(100.0%)

*the original MEQ by Horne and Östberg (1976) has three divisions, namely; evening-type, neither-type, and morning-type.

Appendix 2
-Survey-

This survey is part of my Master thesis at the Erasmus University Rotterdam. The purpose of this survey is to find different shopping patterns during the day. There are no right or wrong answers and the answers you give are confidential. I appreciate it if you would fill in this short questionnaire. This survey should take about five to ten minutes of your time.

When answering the first five questions please think of a typical day with what you consider to be a normal day and night routine.

1. What time do you normally get up when you do not have anything to do during the day?

1. 05:00AM – 06:30AM
2. 06:30AM – 07:45AM
3. 07:45AM – 09:45AM
4. 09:45AM – 11:00AM
5. 11:00AM – 12:00
6. 12:00   – 05:00AM

2. After you wake up, how do you normally feel in the first half hour?

1. Very Tired
2. Tired
3. Awake
4. Very Awake

3. At what time in the evening do you normally feel tired and do you need sleep?

1. 08:00PM – 09:00PM
2. 09:00PM – 10:15PM
3. 10:15PM – 12:45AM
4. 12:45AM – 02:00AM
5. 02:00AM – 03:00AM

4. At what time of day do you normally feel your best?

1. 05:00AM – 08:00AM
2. 08:00AM – 12:00
3. 12:00   – 05:00PM
4. 05:00PM – 10:00PM
5. 10:00PM – 05:00AM

5. Which type do you think you are?

1. Definitely a morning type
2. More a morning type than an evening type
3. More an evening type than a morning type
4. Definitely an evening type

For the following questions please remember the **last impulse purchase** that you can remember. Your last impulse product can be an online or a retail store purchase. An impulse purchase is the purchase of a product without the intention of buying the product before entering the store or before visiting the website.

Please think of the last impulse product you bought.

6.	In the four hours prior to the impulse purchase, did you drink more than 2 cups (or 474ml) of coffee **with caffeine**?

    1.   Yes
    2.   No

7.	Please indicate if your last impulse product was an online or a retail store purchase

    1.   Online
    2.   Retail store

8.	At what time of day did you buy the impulse product?

    1.   Early morning   (06:01 – 09:00)
    2.   Late morning   (09:01 – 12:00)
    3.   Early afternoon   (12:01 – 15:00)
    4.   Late afternoon   (15:01 – 18:00)
    5.   Early evening   (18:01 – 21:00)
    6.   Late evening   (21:01 – 24:00)

9.	Did the impulse product have a discount?

    1.   Yes
    2.   No (please proceed with question 10)

10. Please indicate how much you agree/disagree with the following statements. These questions are about the aspects of your last impulse product that you bought.

1=Strongly disagree 2=disagree 3= somewhat disagree 4=neither disagree nor agree 5= somewhat agree 6=agree 7=strongly agree

	1	2	3	4	5	6	7
A. One of the reasons that I bought the impulse product was because it was on sale							
B. I felt that I was getting a good deal							
C. I have favorite brands, but during the purchase of my last impulse product, I bought the brand that was on sale.							

11. Did you notice any in-store/online advertising for the product, before you bought the impulse product?
    1. Yes
    2. No (please proceed with question 12)

12. Please indicate for the following scales the level in which the in-store/ online advertisement convinced you to buy the impulse product

To me the **in-store/ online advertisement** of my last impulse purchase was;

	1	2	3	4	5	6	7	
A. Important								unimportant
B. Boring								Interesting
C. Relevant								irrelevant
D. Exciting								Unexciting
E. means nothing to me								means a lot to me
F. appealing								Unappealing
G. fascinating								ordinary
H. worthless								Valuable
I. involving								Uninvolving
J. not necessary								Necessary

13. Please indicate whether your mood changed after the impulse purchase
    1. I felt better
    2. I felt no different
    3. I felt worse

14. How happy were you after your last impulse purchase?
    1. Extremely unhappy
    2. unhappy
    3. neither happy nor unhappy
    4. happy
    5. extremely happy

15. How guilty did you feel after buying your last impulse product?

    1. Not guilty at all
    2. I felt a little guilty
    3. I felt somewhat guilty
    4. I felt very guilty
    5. I felt extremely guilty

16. Which mood did you experience the most after your last impulse purchase?

    1. Pleasure
    2. Excitement
    3. Content/relaxed
    4. Anxiety/Guilt
    5. Depressed

17. Please indicate how much you agree/disagree with the following statements. These questions are about the aspects of your last impulse product that you bought.

1=Strongly disagree 2= disagree 3= somewhat disagree 4=neither disagree nor agree 5= somewhat agree 6= agree 7=strongly agree

	1	2	3	4	5	6	7
A. This product tells other people something about me							
B. This product helps me express my personality							
C. This product does not reflect my personality							
D. This product is part of my self-image							
E. This product is not relevant to me							
F. This product does not matter to me							
G. This product is of no concern to me							
H. This product is important to me							
I. This product is fun							
J. I find this product fascinating							
K. I find this product exciting							
L. I am interested in this product							

18. Please indicate how often you experience the following statements.

1= Never, 2=rarely 3=sometimes 4=occasionally, 5=often, 6=usually 7=always

	1	2	3	4	5	6	7
A. I buy products that I do not need							
B. I buy products that I did not plan to buy							
C. I buy products without thinking							
D. I am a bit irresponsible about what I buy							

19. Please indicate how much you agree/disagree with the following statement.

1=Strongly disagree 2=disagree 3=somewhat disagree 4=neither disagree nor agree 5=somewhat agree 6=agree 7=strongly agree

	1	2	3	4	5	6	7
A. I consider myself an impulse buyer							

20. How many cups of coffee (237ml, **with caffeine**) do you drink on an average daily basis?
   1. I do not drink coffee or less than 1 cup per day
   2. 1 or 2 cups per day
   3. 3 or 4 cups per day
   4. 5 or 6 cups per day
   5. 7 or more than 7 cups per day

21. Please indicate your age.

22. Please indicate your gender
   1. Male
   2. Female

23. What is your main working status?
   1. Student
   2. Employed
   3. Unemployed
   4. Retired
   5. Other

24. Please indicate your marital status
   1. Single
   2. Married
   3. Divorced
   4. Widowed

25. Please indicate your highest obtained level of education

    1. High school
    2. Associate degree
    3. Undergraduate degree (Bachelor)
    4. Graduate (Master)
    5. Doctoral

Thank you for participating!

Appendix 3
-Sample Properties-

1. Frequency table: Gender versus Chronotype Groups

Gender	Morning-type	Neither-type	Evening-type	Total
Male	25 (51.02%)	53 (44.54%)	41 (56.94%)	119 (49.58%)
Female	24 (48.98%)	66 (55.46%)	31 (43.06%)	121 (50.42%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

2. Frequency table: Working Status versus Chronotype Groups

Working status	Morning-type	Neither-type	Evening-type	Total
Student	5 (10.20%)	21 (17.65%)	28 (38.89%)	54 (22.50%)
Employed	32 (65.31%)	73 (61.34%)	34 (47.22%)	139 (57.92%)
Unemployed	5 (10.20%)	11 (9.24%)	4 (5.56%)	20 (8.33%)
Retired	4 (8.16%)	6 (5.04%)	2 (2.78%)	12 (5.00%)
Other	3 (6.12%)	8 (6.72%)	4 (5.56%)	15 (6.25%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

3. Frequency table: Marital Status versus Chronotype Groups

Marital status	Morning-type	Neither-type	Evening-type	Total
Single	20 (40.82%)	65 (54.62%)	50 (69.44%)	135 (56.25%)
Married	26 (53.05%)	48 (40.34%)	19 (26.39%)	93 (38.75%)
Divorced	2 (4.08%)	6 (5.04%)	3 (4.17%)	11 (4.58%)
Widowed	1 (2.04%)	-	-	1 (0.42%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

4. Frequency table: Education versus Chronotype Groups

Education	Morning-type	Neither-type	Evening-type	Total
High school	16 (32.65%)	47 (34.50%)	31 (43.06%)	94 (39.17%)
Associate degree	7 (14.29%)	16 (13.44%)	11 (15.28%)	34 (14.17%)
Undergraduate degree	18 (36.73%)	33 (27.73%)	20 (27.78%)	71 (29.58%)
Graduate degree	6 (12.24%)	20 (16.81%)	10 (13.89%)	36 (15.00%)
Doctoral	2 (4.08%)	3 (2.52%)	-	5 (2.08%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

5. Age versus Chronotype Groups

Education	Morning-type	Neither-type	Evening-type	Total
N	49	119	72	240
Mean	38.98	34.79	29.61	34.09
Standard deviation	13.889	13.012	10.913	12.996

6. Sample Chronotype

Type	Frequency	Percentage
Definitely morning-type score: 22-25	6	2.5%
Moderate morning-type score: 18-21	43	17.9%
Neither-type score: 12-17	119	49.6%
Moderate Evening-type score: 8-11	59	24.6%
Definitely evening-type score 4-7	13	5.4%
Total	240	100%

7. Frequency table: Place of Purchase of the Impulse Product versus Chronotype Groups

Place of purchase	Morning-type	Neither-type	Evening-type	Total
Online store	17 (34.69%)	47 (39.50%)	25 (34.72%)	89 (37.08%)
Retail store	32 (65.31%)	72 (60.50%)	47 (65.28%)	151 (62.92%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

8. Frequency table: Noticed a Discount versus Chronotype Groups

Noticed a discount	Morning-type	Neither-type	Evening-type	Total
Discount	26 (53.06%)	70 (58.82%)	38 (52.78%)	134 (55.83%)
No discount	23 (46.94%)	49 (41.18%)	34 (47.22%)	106 (44.17%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

9. Frequency table: Noticed an Advertisement versus Chronotype Groups

Noticed an advertisement	Morning-type	Neither-type	Evening-type	Total
Advertisement	11 (22.45%)	26 (21.85%)	14 (19.44%)	51 (21.25%)
No advertisement	38 (77.55%)	93 (78.15%)	58 (80.56%)	189 (78.75%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

10. Frequency table: Time of Day versus Chronotype Groups

Time of day	Morning-type	Neither-type	Evening-type	Total
06:00-09:00	1 (2.04%)	1 (0.84%)	-	2 (0.83%)
09:01-12:00	5 (10.20%)	22 (18.49%)	5 (6.94%)	32 (13.33%)
12:01-15:00	16 (32.65%)	25 (21.01%)	21 (29.17%)	62 (25.83%)
15:01-18:00	10 (20.40%)	41 (34.45%)	22 (30.56%)	75 (31.25%)
18:01-21:00	17 (34.69%)	21 (17.65%)	14 (19.44%)	52 (21.67%)
21:01-24:00	-	6 (5.04%)	10 (13.89%)	17 (7.08%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

11. Impulsiveness Scale versus Chronotype Groups

Impulsiveness scale	Morning-type	Neither-type	Evening-type	Total
N	49	119	72	240
Minimum	5	5	6	5
Maximum	28	30	29	30
Mean	13.73	14.50	14.51	14.35
standard deviation	4.982	5.072	5.787	5.266

12. Frequency table: Coffee versus Chronotype Groups

Coffee frequency	Morning-type	Neither-type	Evening-type	Total
One cup or less than one Cup	23 (46.94%)	52 (43.70%)	36 (50.00%)	111 (46.25%)
2-3 cups per day	15 (30.61%)	28 (23.53%)	14 (19.44%)	57 (23.75%)
4-5 cups per day	6 (12.24%)	19 (15.97%)	10 (13.89%)	35 (14.58%)
6-7 cups per day	4 (8.16%)	13 (10.92%)	10 (13.89%)	27 (11.25%)
More than 7 cups per day	1 (2.04%)	7 (5.88%)	2 (2.78%)	10 (4.17%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

13. Frequency table: Coffee before Impulse Purchase versus Chronotype Groups

Coffee	Morning-type	Neither-type	Evening-type	Total
More than 2 cups of coffee 4 hours prior to the purchase	11 (22.45%)	32 (26.89%)	17 (23.61%)	60 (25.00%)
Less than 2 cups or no cups of coffee 4 hours prior to the purchase	38 (77.55%)	87 (73.11%)	55 (76.39%)	180 (75.00%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

14. Product Involvement Scale versus Chronotype Groups

Product involvement scale	Morning-type	Neither-type	Evening-type	Total
N	49	119	72	240
Minimum	21	16	26	16
Maximum	75	81	83	83
Mean	51.90	54.91	55.21	54.38
standard deviation	12.280	11.713	13.688	12.462

15. Product Involvement Scales versus Chronotype Groups

	Significant value			Importance			Pleasure		
	Morning-Type	Neither-Type	Evening-type	Morning-Type	Neither-type	Evening-Type	Morning-type	Neither-type	Evening-type
N	49	119	72	49	119	72	49	199	72
Minimum	4	4	5	10	7	4	5	4	8
Maximum	24	27	27	28	28	28	26	28	28
Mean	14.18	16.03	16.08	19.90	19.53	19.00	17.82	19.35	20.13
standard deviation	5.426	5.310	6.004	4.547	4.829	6.019	5.345	4.344	4.485

16. Frequency table: Post-Purchase Feelings versus Chronotype Groups

Post-purchase feelings	Morning-type	Neither-type	Evening-type	Total
Felt better	22 (44.90%)	67 (56.30%)	44 (61.11%)	133 (55.42%)
Not different	26 (53.06%)	43 (36.13%)	24 (33.33%)	93 (38.75%)
Felt worse	1 (2.04%)	9 (7.56%)	4 (5.56%)	14 (5.83%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

17. Frequency table: Post-Purchase Happiness versus Chronotype Groups

Happy state	Morning-type	Neither-type	Evening-type	Total
Extremely unhappy	1 (2.04%)	1 (0.84%)	-	2 (0.83%)
Unhappy	2 (4.08%)	7 (5.88%)	4 (5.56%)	13 (5.42%)
Neither happy nor unhappy	20 (40.82%)	30 (25.21%)	19 (26.39%)	69 (28.75%)
Happy	23 (46.94%)	76 (63.87%)	45 (62.50%)	144 (60.00%)
Extremely unhappy	3 (6.12%)	5 (4.20%)	4 (5.56%)	12 (5.00%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

18. Frequency table: Post-Purchase Level of Guilt versus Chronotype Groups

Level of guilt	Morning-type	Neither-type	Evening-type	Total
Not guilty at all	19 (38.78%)	60 (50.42%)	39 (54.17%)	118 (49.17%)
Felt a little guilty	18 (36.73%)	42 (35.29%)	24 (33.33%)	84 (35.00%)
Felt somewhat guilty	10 (20.41%)	13 (10.92%)	6 (8.33%)	29 (12.08%)
Felt very guilty	2 (4.08%)	2 (1.68%)	3 (4.17%)	7 (2.92%)
Felt extremely guilty	-	2 (1.68%)	-	2 (0.83%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

19. Frequency table: Post-Purchase Mood versus Chronotype Groups

Post-purchase mood	Morning-type	Neither-type	Evening-type	Total
Pleasure	4 (8.16%)	23 (19.33%)	19 (26.39%)	46 (19.17%)
Excitement	14 (28.57%)	34 (28.57%)	24 (33.33%)	72 (30.00%)
Content/relaxed	25 (51.02%)	52 (43.70%)	24 (33.33%)	101 (42.08%)
Anxiety/Guilt	4 (8.16%)	9 (7.56%)	5 (6.94%)	18 (7.50%)
Depressed	2 (4.08%)	1 (0.84%)	-	3 (1.25%)
Total	49 (100.00%)	119 (100.00%)	72 (100.00%)	240 (100.00%)

Appendix 4

-Chronotype versus Age-

1. Morning-type versus evening-type and age (Field, 2009)

$\overline{R_m}$ = mean rank morning-type = 144.71

$\overline{R_n}$ = mean rank neither-type = 124.46

$\overline{R_e}$ = mean rank evening-type = 97.48

$$\left| \overline{R_m} - \overline{R_e} \right| \geq Z_{\alpha/k \, (k-1)} \sqrt{\frac{N(N+1)}{12} \cdot \left(\frac{1}{N_m} + \frac{1}{N_e} \right)}$$

$$\left| 144.71 - 97.48 \right| \geq Z_{0.05/3 \, (3-1)} \sqrt{\frac{240(240+1)}{12} \cdot \left(\frac{1}{49} + \frac{1}{72} \right)}$$

$$Z = 2.39$$

$$47.43 > 30.73$$

$\overline{R_m}$ = mean rank morning-type

$\overline{R_e}$ = mean rank evening-type

K = groups

N_m = participants who are a morning-type

N_e = participants who are an evening-type

Appendix 5

-Chronotype versus Time of Day-

1. Importance of Discount versus Chronotype and Time of Day

Importance of discount	Morning-type	Neither-type	Evening-type	Total
06:00-09:00 (N)	-	1	-	**1**
Mean	-	16.00	-	16.00
Standard deviation	-	-	-	-
09:01-12:00 (N)	3	11	3	**17**
Mean	18,00	17.64	16.00	17.41
Standard deviation	4.359	2.541	3,464	2.895
12:01-15:00 (N)	8	12	12	**32**
Mean	15.25	16.50	14.92	15.60
Standard deviation	3.882	1.679	2.503	2.674
15:01-18:00 (N)	6	30	11	**47**
Mean	15.50	15,07	14,27	14.94
Standard deviation	2.881	2.664	4.452	3.137
18:01-21:00 (N)	9	14	8	**31**
Mean	17.11	15,07	15.75	15.84
Standard deviation	3.140	4.269	2.915	3.643
21:01-24:00 (N)	-	2	4	**5**
Mean	-	17,50	17.25	17.33
Standard deviation	-	0.707	2.986	2.338
Total (N)	**26**/49	**70**/119	**38**/72	**134**/240
Mean	16.27	15.80	15.24	15.73
Standard deviation	3.412	2.976	3.324	3.160

2. Aggregating: Importance of Discounts versus Chronotype and Time of Day

Importance of discount	Morning-type	Neither-type	Evening-type	Total
06:00-15:00 (N)	11	24	15	**50**
Mean	16.00	17.00	15.13	16.22
Standard deviation	4.000	2.126	2.615	2.831
15:01-24:00 (N)	15	46	23	**88**
Mean	16.47	15.17	15.30	15.44
Standard deviation	3.044	3.178	3.771	3.323

3. Advertisement Involvement versus Chronotype and Time of Day

Advertisement involvement	Morning-type	Neither-type	Evening-type	Total
06:00-09:00 (N)	1	-	-	**1**
Mean	32.00	-	-	32.00
Standard deviation	-	-	-	0
09:01-12:00 (N)	2	4	1	**7**
Mean	33.50	23.25	12.00	24.57
Standard deviation	0.707	8.421	-	9.467
12:01-15:00 (N)	2	5	3	**10**
Mean	23.50	30.80	31.33	29.50
Standard deviation	9.192	4.087	9.713	6.916
15:01-18:00 (N)	-	10	3	**13**
Mean	-	37.70	22.33	31.85
Standard deviation	-	8.420	4.509	9.272
18:01-21:00 (N)	6	3	5	**14**
Mean	30.67	23.33	33.80	30.21
Standard deviation	7.941	3.055	9.365	8.285
21:01-24:00 (N)	-	4	2	**6**
Mean	-	3475	32.00	33,83
Standard deviation	-	9.811	5.657	8.134
Total (N)	**11**/49	**26**/119	**14**/72	**51**/237
Mean	30.00	30.88	29.00	30.18
Standard deviation	7.183	8.567	9.543	8.447

4. Aggregating: Advertisement Involvement versus Chronotype and Time of Day

Advertisement involvement	Morning-type	Neither-type	Evening-type	Total
06:00-15:00 (N)	5	9	4	**18**
Mean	29.20	27.44	26.50	27.72
Standard deviation	6.979	7.126	12.503	7.999
15:01-24:00 (N)	6	17	10	**33**
Mean	30.67	32.71	30.00	31.52
Standard deviation	7.941	8.894	8.692	8.500

5. Product Involvement versus Chronotype and Time of Day

Product involvement	Morning-type	Neither-type	Evening-type	Total
06:00-09:00 (N)	1	1	-	**2**
Mean	48.00	27.00	-	37.50
Standard deviation	-	-	-	14.849
09:01-12:00 (N)	5	22	5	**32**
Mean	46.40	53.36	60.20	53.34
Standard deviation	15.437	9.604	11.692	11.235
12:01-15:00 (N)	16	25	21	**62**
Mean	55.19	53.40	51.48	53.21
Standard deviation	14.321	13,276	12.683	13.213
15:01-18:00 (N)	10	43	22	**75**
Mean	49.80	54.93	58.32	55.24
Standard deviation	11.698	12.597	13.847	12.961
18:01-21:00 (N)	17	21	14	**52**
Mean	51.88	57.67	53.79	54.73
Standard deviation	9.980	9.265	13.951	11.001
21:01-24:00 (N)	-	7	10	**17**
Mean	-	60.71	55.70	57.76
Standard deviation	-	7.718	16.056	13.184
Total (N)	**49**	**119**	**72**	**240**
Mean	51.90	54,91	55.21	54,38
Standard deviation	12.280	11.713	13.688	12,462

6. Aggregating: Product Involvement versus Chronotype and Time of Day

Product involvement	Morning-type	Neither-type	Evening-type	Total
06:00-15:00 (N)	22	48	26	**96**
Mean	52.86	52.83	53.15	52.93
Standard deviation	14.390	12.071	12.761	12.678
15:01-24:00 (N)	27	71	46	**144**
Mean	51.11	56.31	56.37	55,35
Standard deviation	10.475	11.336	14.188	12,263

7. Level of Guilt versus Chronotype and Time of Day

Level of guilt	Morning-type	Neither-type	Evening-type	Total
06:00-09:00 (N)	1	1	-	**2**
Mean	2.00	2.00	-	2.00
Standard deviation	-	-	-	-
09:01-12:00 (N)	5	22	5	**32**
Mean	1.60	1.91	1.60	1.81
Standard deviation	0.894	0.921	0.548	0.859
12:01-15:00 (N)	16	25	21	**62**
Mean	2.13	1.48	1.71	1.73
Standard deviation	0.885	1.005	0.902	0.961
15:01-18:00 (N)	10	43	22	**75**
Mean	1.30	1.65	1.68	1.61
Standard deviation	0.675	0.870	0.995	0.884
18:01-21:00 (N)	17	21	14	**52**
Mean	2.12	1.71	1.36	1.75
Standard deviation	0.857	0.717	0.497	0.764
21:01-24:00 (N)	-	7	10	**17**
Mean	-	1.86	1.70	1.76
Standard deviation	-	0.378	0.675	0.562
Total (N)	**49**	**119**	**72**	**240**
Mean	1.90	1,69	1.63	1.71
Standard deviation	0.872	0,861	0.813	0,851

8. Aggregating: Level of Guilt versus Chronotype and Time of Day

Level of guilt	Morning-type	Neither-type	Evening-type	Total
06:00-15:00 (N)	22	48	26	**96**
Mean	2.00	1.69	1.69	1.76
Standard deviation	0.873	0.971	0.838	0.915
15:01-24:00 (N)	27	71	46	**144**
Mean	1.81	1.69	1.59	1.68
Standard deviation	0.879	0.785	0.805	0.808

Appendix 6

-Multiple Regression-

1. Multiple Regression Model: Main model

Model variables	Unstandardized coefficients		Standardized coefficients	t.	Sig.
	B	Std.Error	Beta		
(Constant)	2.375	0.688		3.453	0.001
In-store advertising	0.018	0.011	0.144	1.583	0.115
Importance discount	-0.008	0.015	-0.050	-0.527	0.599
Product involvement	0.018	0.009	0.197	1.999	0.047**
Level of Guilt	0.031	0.127	0.023	0.242	0.809
Dummy evening-type	1.540	0.870	0.612	1.772	0.078*
Dummy morning-type	0.816	0.976	0.285	0.837	0.404
Interaction evening-type and in-store advertising	0.009	0.019	0.042	0.491	0.624
Interaction morning-type and in-store advertising	-0.019	0.021	-0.077	-0.901	0.369
Interaction dummy evening-type and importance of discount	-0.006	0.025	-0.027	-0.252	0.801
Interaction dummy morning-type and importance of discount	0.018	0.027	0.070	0.644	0.520
Interaction dummy evening-type and Product involvement	-0.017	0.014	-0.399	-1.283	0.201
Interaction dummy morning-type and Product involvement	-0.017	0.017	-0.325	-1.034	0.302
Interaction dummy evening-type and level of guilt	-0.136	0.212	-0.102	-0.642	0.522
Interaction dummy morning-type and level of guilt	0.073	0.233	0.054	0.313	0.755
Use of Coffee and tolerance	0.142	0.128	0.074	1.114	0.266
Level of impulsiveness	-0.010	0.015	-0.044	-0.650	0.516

*   =significant value under α is 0.10
**   =significant value under α is 0.05

2. Multiple Regression Model: subsample Amzon Mturk

Model variables	Unstandardized coefficients		Standardized coefficients	t.	Sig.
	B	Std.Error	Beta		
(Constant)	1.266	1.188		1.066	0.289
In-store advertising	0.042	0.018	0.287	2.295	0.024**
Importance discount	-0.039	0.023	-0.228	-1.670	0.098*
Product involvement	0.029	0.015	0.278	1.977	0.051*
Level of Guilt	0.224	0.206	0.150	1.088	0.279
Dummy evening-type	3.586	1.577	1.201	2.274	0.025**
Dummy morning-type	0.632	1.567	0.214	0.403	0.688
Interaction evening-type and in-store advertising	0.010	0.038	0.032	0.260	0.795
Interaction morning-type and in-store advertising	-0.072	0.036	-0.246	-1.995	0.049**
Interaction dummy evening-type and importance of discount	0.044	0.043	0.189	1.015	0.313
Interaction dummy morning-type and importance of discount	0.050	0.040	0.212	1.261	0.210
Interaction dummy evening-type and Product involvement	-0.046	0.023	-0.918	-1.974	0.051*
Interaction dummy morning-type and Product involvement	-0.005	0.028	-0.101	-0.193	0.848
Interaction dummy evening-type and level of guilt	-0.501	0.373	-0.339	-1.343	0.183
Interaction dummy morning-type and level of guilt	-0.209	0.356	-0.156	-0.588	0.558
Use of Coffee and tolerance	0.224	0.206	0.150	1.088	0.279
Level of impulsiveness	-0.007	0.028	-0.025	-0.245	0.807

* =significant value under α is 0.10
** =significant value under α is 0.05

3. Multiple Regression Model: subsample Facebook

Model variables	Unstandardized coefficients		Standardized coefficients	t.	Sig.
	B	Std.Error	Beta		
(Constant)	2.956	0.827		3.575	0.001**
In-store advertising	-0.004	0.013	-0.038	-0.285	0.776
Importance discount	0.028	0.020	0.185	1.421	0.158
Product involvement	0.015	0.012	0.187	1.312	0.192
Level of Guilt	-0.240	0.157	-0.196	-1.525	0.130
Dummy evening-type	0.862	1.021	0.411	0.845	0.400
Dummy morning-type	1.816	1.350	0.653	1.345	0.181
Interaction evening-type and in-store advertising	0.034	0.022	0.204	1.563	0.121
Interaction morning-type and in-store advertising	0.025	0.025	0.118	0.986	0.326
Interaction dummy evening-type and importance of discount	-0.081	0.034	-0.358	-2.416	0.017**
Interaction dummy morning-type and importance of discount	-0.009	0.040	-0.031	-0.231	0.818
Interaction dummy evening-type and Product involvement	-0.010	0.016	-0.257	-0.591	0.556
Interaction dummy morning-type and Product involvement	-0.041	0.022	-0.738	-1.858	0.066*
Interaction dummy evening-type and level of guilt	0.174	0.251	0.149	0.695	0.488
Interaction dummy morning-type and level of guilt	0.164	0.330	0.120	0.496	0.621
Use of Coffee and tolerance	0.037	0.181	0.020	0.206	0.837
Level of impulsiveness	-0.003	0.016	-0.018	-0.196	0.845

* =significant value under α is 0.10
** =significant value under α is 0.05

4. Multiple Regression Model: Optimal Time of Day

Model variables	Unstandardized coefficients		Standardized coefficients	t.	Sig.
	β	Std.Error	Beta		
(Constant)	3.050	0.576		5.297	0.000**
In-store advertising	0.015	0.009	0.123	1.601	0.111
Importance discount	0.001	0.012	0.008	0.106	0.916
Product involvement	0.008	0.007	0.087	1.186	0.237
Level of Guilt	-0.052	0.103	-0.038	-0.502	0.616
Dummy optimal time evening-type	-1.199	1.330	-0.318	-0.901	0.368
Dummy optimal time morning-type	0.882	1.181	0.229	0.747	0.456
Interaction evening-type and in-store advertising	-0.012	0.024	0.040	0.505	0.614
Interaction morning-type and in-store advertising	-0.011	0.026	-0.034	-0.425	0.672
Interaction dummy evening-type and importance of discount	-0.061	0.038	-0.153	-1.602	0.111
Interaction dummy morning-type and importance of discount	-0.030	0.033	-0.092	-0.918	0.360
Interaction dummy evening-type and Product involvement	0.021	0.021	0.323	1.010	0.314
Interaction dummy morning-type and Product involvement	-0.010	0.023	-0.146	-0.460	0.646
Interaction dummy evening-type and level of guilt	0.268	0.291	0.126	0.922	0.358
Interaction dummy morning-type and level of guilt	0.144	0.289	0.083	0.499	0.618
Use of Coffee and tolerance	0.139	0.128	0.072	1.088	0.278
Level of impulsiveness	-0.005	0.015	-0.025	-0.375	0.708

*   =significant value under α is 0.10
**   =significant value under α is 0.05