Consumers' Attitude Toward Generic OTC Drugs:
Examining the Effects of Perceived Risk and Consumer Knowledge

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Abstract

Despite the increased use of OTC drugs, very little is known about consumers' perception of generic OTC drugs. In this study, the role of perceived risk types in the relationship between product category knowledge types and attitude toward generic OTC drugs was investigated. Primary data was obtained with a self-administered survey method. The results of the multiple regression analysis suggest that subjective product category knowledge has (1) a direct positive effect on attitude towards generic OTC drugs, (2) a positive indirect effect by diminishing the perceived financial risk of generic OTC drugs (*complementary mediation*). Furthermore, the results suggest that objective product category knowledge only has a positive indirect effect on attitude toward generic OTC drugs with the perceived financial risk of generic OTC drugs acting as the mediator (*indirect only mediation*). This study highlights the importance of improving health literacy among consumers.

Keywords: OTC drugs, generic drugs, perceived risk, subjective knowledge, objective knowledge

Preface

Writing a thesis can be a challenging task. In my experience, perseverance is the key to achieving a result you can be proud of. At the Erasmus University Rotterdam, I have learned to think about solutions to future economic issues and their social relevance. I feel this thesis emphasizes the social responsibility and the impact of economics on society. This thesis would not be possible without the help and support of others.

First of all, I would like to thank my supervisor for her guidance. Dr. Wendel, dear Sonja, you always took the time to provide extensive feedback. You encouraged me to think more critically and analytically. I have learned a tremendous amount during this process and I am convinced these lessons are helpful to me in my future career. All teachers of the Major Marketing program and Master Marketing program have inspired me in some way to pursue a career in marketing and I am grateful for my education at the Erasmus School of Economics.

Second, I would like to thank the people that shared their expertise with me. I would like to thank Danielle van der Zon and Marten Hummel. Danielle van der Zon of Stichting Pharmacon took the time to go over the process of the druggist examinations and provided material that helped me to construct a vital part of my research. This is much appreciated. Marten Hummel, director at Centraal Bureau Drogisterijbedrijven, welcomed me at their headquarters and provided me with valuable insights from practice. Also, many thanks to drs. M. Fathallah of Medsen Apotheek Kralingen for sharing his knowledge of OTC drugs and Marloes Spanjersberg for her translation work.

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Lastly, I would like to thank my family for their support. Lieve papa, mama, Bindia en Prya, ik draag deze scriptie op aan jullie.

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1. Introduction

The European market for over-the-counter (OTC) drugs continues to expand (Tisman, 2013). OTC drugs are drugs for the purpose of self-medication and are sold to the consumer without the need of a doctor's prescription. The OTC market across all European countries is expanding in value, volume and the range of OTC drugs (Bond, Orru, Leder & Bouvy, 2004). To illustrate the growth: just for Germany, the total value of OTC drug sales is estimated to be risen substantially from €7.8B in 2012 to €8.5B in 2014 (Kretschmer, 2015). At the same time, there is widespread concern about the financial sustainability of health systems in Europe as healthcare costs are rising due to an aging population (Thomson, Thomas & Mossialos, 2009). The European Parliament stated that responsible self-medication should be promoted to reduce health care costs and to encourage people to take responsibility for their health ("European Parliament Resolution", 1996). Consequently, countries in Europe have taken it upon themselves to actively promote self-medication. One of the actions to promote self-medication is to place more drugs in OTC classes and thereby to increase the number of OTC drugs available to consumers (Bond et al., 2004). This increment of switches from prescription-only to OTC availability is regarded as a way to transfer some of the reimbursement costs of prescriptions drugs to consumers (Creyer, Hrsistodoulakis & Cole, 2001). Other potential benefits are an increased access to effective drugs, a greater autonomy of consumers in treating minor illnesses, and fewer visits to physicians (Brass, 2001). An example of a policy reform that had an impact on the accessibility of OTC drugs is the in 2007 introduced *Medicines Act* in the Netherlands (Brabers, Van Dijk, Bouvy & De Jong, 2013). For the first time in the Netherlands retail access channels such as supermarkets and gas stations were allowed to sell OTC drugs alongside established pharmacies. Correspondingly in other European countries, a similar trend is visible, albeit differences in the exact products available and the regulation of OTC drug use, supply, and distribution.

1.1 Drug Brands

The promotion of responsible self-medication in Europe is a way to empower consumers to make decisions about OTC drugs to treat or prevent illness. Generally speaking, consumers can choose between two types of brands of OTC drug: 'brand-name brands' and 'generic brands' (Smith, 2014). Brand-name drugs carry a distinctive proprietary name originating from the pharmaceutical company who first discovered and developed the drug – e.g., Bayer Aspirin. Generics instead have a nonproprietary or established name and are

preceded by a brand-name drug. Generics may only be introduced to the market when the patent of the brand-name drugs has expired. Notwithstanding, that they do require to be of the same quality and performance as brand-name drugs to get approval for the consumer market in Europe, which is called bioequivalence (European Medicines Agency [EMA], 2016). The implication of the bioequivalence requirement of generics is that the generic drug has the same effect on an average consumer as the effect a brand-name drug has on an average consumer. Another key point is that generics are usually lower priced than brand-name drugs (Frank & Salkever, 1997). Generic entry can potentially be beneficial for consumers provided that they result in increased competition and lower prices. To this end, the advancement of generic drug usage has become an integral part of drug policy in European countries. Meanwhile, generic OTC drugs have found their way into European retail outlets and gained in popularity (Buckeldee, 2010).

1.2 Consumer Perceptions of OTC Drug Brands

Most research up to date focused on prescription drugs, which is a market that by far surpasses the OTC market in total revenue. Nonetheless, with global sales of OTC drugs estimated to be over $111B and with sales on the rise ("New Perspectives", 2014), the OTC drug market is clearly not one to be easily overlooked. Halme, Linden and Kääriä (2009) conducted an adaptive conjoint analysis interview in Finland to assess preference structures for generic and brand-name OTC drugs. They found that consumers consider the brand as one of the most important attributes when choosing between a branded and generic OTC drugs. Kohli and Buller (2013) examined the consumers' perceptions in USA – Michigan, to determine factors that influence the choice of an OTC drug brand. In this study, a fair amount of consumers (49%) preferred a brand-name OTC drug over a generic OTC drug. Interestingly most consumers (91%) did believe that generic and brand-name OTC drugs are equally safe and perform the same if they would have the same ingredients. These results are surprising because both types of brands are actually required to have the same active key ingredients. Moreover, a recent study by Bronnenberg, Dubé, Gentzkow and Shapiro (2015) indicates that consumers that are not able to recognize the active ingredient of OTC drugs purchase more often a brand-name OTC drug than consumers that can recognize the active ingredients in OTC drugs. In this study, they estimated the effect of information about active ingredients on the consumers' willingness to pay for brand-name drugs. They found substantial evidence that novice consumers are more willing to pay a price premium for a brand-name OTC drug than expert consumers, such as health professionals. The study

suggests that most consumers might be unaware of the bioequivalence of generics and rely on the appeal of the brand to evaluate the net benefits of an OTC drug.

1.3 Attitude Toward Generic OTC Drugs

Altogether the studies mentioned above indicate that product knowledge is an important determinant for the preferences of OTC drugs. However, none of these studies have specifically focused on the perception of generic OTC drugs and the attitude toward generic OTC drugs. It is striking that uninformed consumers pay considerable amounts of brand premia for brand-name OTC drugs that have the same dosage, directions and active ingredients as generic OTC drugs (Bronnenberg, Dubé, Gentzkow & Shapiro, 2015). As Friedman (2014) elaborates in Business Insider: "Generic drugs are not inferior to brand-name drugs. They are just less expensive ……. Generic and store-brand drugs are just as rigorously tested, well-formulated, and effective as brand names." So why would a consumer not buy generic OTC drugs if they perform the same and are priced lower? A possible explanation is that some consumers perceive generic OTC drug to be less valuable to them than brand-name OTC drugs. Uninformed consumers might not be aware of the similarities and may have different beliefs about generic OTC drugs that are embedded in the attitude they have toward purchasing generic OTC drugs. The type of knowledge that a consumer has and the ability to differentiate between different brands within an OTC drug category seems to be decisive in the forming of this attitude toward generic OTC drugs. This OTC drug category is defined in this current paper as the offering of OTC drugs that share the same general functionality. For example, headache remedies are considered as a product category that includes both generic OTC drugs brands and brand name OTC drugs because they share the same general functionality. In this paper, it is proposed that the product category knowledge is related to the attitude toward a generic OTC brand. An important aspect of this proposition is that this attitude is affected by the perceived risk (i.e., uncertainty of adverse outcomes) of a generic OTC drug. Because consumers are not able to objectively assess the probability of adverse outcomes associated with the purchase of product or brand, they deal with uncertainty (Bauer, 1960). This uncertainty is manifested in this perceived risk. The second proposition of this paper is that consumers with different levels and type of knowledge perceive the risk of generic OTC drugs differently. The purpose of this paper is to find out what the relationship is between consumer product category knowledge, perceived risk of generic OTC drugs and attitude toward generic OTC drugs. This leads to the following main research question:

1.4 Research Question

"What role does perceived risk have in the relationship between product category knowledge and attitude toward generic OTC drugs?"

1.4.1 Sub-questions

1. "How does perceived risk affect attitude toward generic OTC drugs?"
2. "How does product category knowledge affect perceived risk?"
3. "How does product category knowledge affect attitude toward generic OTC drugs?"

1.5 Delimitations of the Study

There are several delimitations. First of all, the subject of this paper is narrowed down to OTC drugs and in specific perceptions of generic OTC drugs. Since the research on OTC drugs needs to be developed and the market of OTC drugs is still expanding there are other issues that could be researched besides consumer perceptions of OTC drugs. For instance, one could think of examining advertising and pricing effects or the effects of retail performance within the context of OTC drugs. Nonetheless, the study of consumer perceptions of generic OTC drugs provides a detailed and valid insight that is fundamental to understand observed behavior in the present market and provides insights for future research. Secondly, the study will be conducted in the Netherlands and is restricted to the Dutch population. Shifts in regulatory policy are apparent for various countries within the European Union. The Netherlands is chosen because of those countries, the Netherlands has recently seen major changes in regulation leading to more access channels of OTC drugs than most other countries. Moreover, there is a wide availability of both brand-name and generic OTC drugs. Third, the product category at interest is limited to analgesics OTC drugs (i.e., painkillers) to get first insights. Other categories are not investigated because of practical reasons. Fourth, in this research, the focus is on attitude and not purchase intent or behavior. Examinations of actual purchase behavior are therefore not within the scope of the study. Fifth, the focus of this paper will be specifically on the two variables consumer product category knowledge, and perceived risk, as factors that predict and influence attitude. Antecedents of product category knowledge are not included to restrict the model. The concept of perceived risk in marketing literature is different from the concept of risk perception in other research fields, although they theoretically share similarities. This current research will mainly restrict itself to conceptualizations found in marketing literature. Sixth, the methodology used in this paper

is confined by financial limitations because this independent research is not funded. Therefore, a non-incentivized survey is used to gather primary data.

1.6 Contribution

1.6.1 Theoretical contribution

In marketing research one of the main goals is to provide a theoretical explanation for consumer behavior (Peter, 1981). One approach is to examine the perceptions that consumers may have of products. At this time little is known about consumers' perceptions of generic OTC drugs (Kohli & Buller, 2013). Despite the increased use of generics, there is limited information available about consumers' attitude toward generic OTC drugs and the underlying decision-making process (Halme, Linden & Kääriä, 2009). Few studies have specifically examined consumers' perceptions of OTC drug brands (Alrasheedy et al., 2014). This current study addresses these calls for more research on consumers' perceptions of generic OTC drugs, by examining consumers' perceived risk and consumers' attitude toward generic OTC drugs. The study of perceived risk in the health domain has theoretical relevance because it allows the researcher to examine individual differences in decision-making (Menon, Raghubir & Agrawal, 2008). Especially for OTC drugs, this perceived risk is important because it helps to understand why generic OTC drugs might be perceived differently by consumers that vary in their expertise (Bronnenberg, Dubé, Gentzkow & Shapiro, 2015). Perceived risk is also identified as one of the three frameworks in health psychology literature appearing in major marketing journals (Stremersch & Van Dyck, 2009). Surprisingly in past research (Agrawal, 1996), the relationship between consumer knowledge and perceived risk within the context of OTC drugs has been formulated, but not empirically investigated. Further, the type of product category knowledge a consumer has seems to affect the quality of consumers' health choices and should be further investigated (Moorman, Diehl, Brinberg & Kidewell, 2004). Therefore, in this current paper, the relationship between knowledge types and perceived risk is examined to create a theoretical understanding of cognitive mechanisms influencing consumer choice of OTC drugs. Moreover, it is indicated that perceived risk influences the attitude toward generic drugs and that more empirical research is required to investigate this relationship (Bearden & Mason, 1978). This current paper extends this investigation by examining the role of perceived risk in the relationship between knowledge types and attitude, within the context of OTC drugs. To the author's knowledge, this will be the first study that specifically examines this relationship from a marketing perspective.

1.6.2 Managerial contribution

Health marketing has become increasingly more important to various stakeholders concerned with consumers, regulation, and firms active in the healthcare industry (Stremersch, 2008). The European healthcare industry is facing changing trends from the OTC market. Across Europe, more OTC drugs are becoming accessible and available to consumers. This development also seems to fulfill the growing need of consumers for better access and convenience. European countries are actively promoting self-medication to consumers to reduce healthcare costs. However, consumers often find decisions that impact their health complex, and disconcerting and healthcare marketers should take consumers' information needs into account (Kay, 2007). Authorities should pay more attention to health illiteracy amongst consumers and shared decision-making (Coulter, Parsons & Askham, 2008). It would be unreasonable, from a consumer point of view, to have the same knowledge as experts have (Ross & Canan, 2009). The regulatory system, therefore, has a major role in not only controlling healthcare costs by promoting self-help but also in providing the right information to consumers to make informed health decisions. Providing health information can be crucial to stimulating generic drug use among less informed consumers. Information effects are suggested to be especially high for healthcare product categories, leading to consumer surplus, and increased retailer profit as more consumers would purchase generic OTC drugs (Bronnenberg, Dubé, Gentzkow & Shapiro, 2015). This current paper provides insights that can be used by policymakers to construct health campaigns to effectively advance the use of generic drugs through influencing the consumer's perceptions of generic OTC drugs. Understanding (risk) perceptions of drugs are quintessential to improving communication to the public (Slovic, 2016).

This paper also has relevance to pharmacies, drugstores, and other retail outlets to customize and structure their marketing activities according to the consumer's perceptions of generic OTC drugs. The greater availability of OTC drugs has generally been supported by the pharmaceutical profession (Bond, Orru, Leder & Bouvy, 2004). However, the developments also brought change to the competitive climate. Traditional pharmacies need to develop their marketing capabilities to ensure their viability (Wieringa, Reber & Leeflang, 2015). For drug stores and other retail outlets, the increasing availability and accessibility of OTC drugs certainly provide opportunities to improve their performance.

1.7 Outline of the Research

The remainder of this work proceeds as follows. The following chapter consists of a literature review. The literature review mainly includes marketing literature and in particular consumer research literature. In chapter three, hypotheses linked to the research questions are discussed. This chapter is concluded with the conceptual model. In chapter four it is explained which research method is used, what measurements are used and how the data is collected. Chapter five consists of the analysis of the results and testing the hypotheses. Chapter six discusses the results. Chapter seven and eight conclude this paper with the managerial implications of the results, the limitations of the research and directions for future research.

2. Literature Review

In this literature review the three concepts attitude, consumer knowledge and perceived risk are discussed. Chapter 2.1 provides an overview of attitude research and how these concepts are linked to the evaluation of OTC drugs. This subchapter also identifies key issues that need further examination in the remaining subchapters of this literature review.

2.1 Attitude

An attitude is considered as a representation of a favorable or unfavorable feeling toward a stimulus object (Fishbein & Ajzen, 1975). The attitude of an individual toward a stimulus object is closely related to the cognitive structures of that person. In consumer research, these cognitive structures can be defined as the way that the knowledge of products is organized and the manner in which associated beliefs have developed over time (Lutz, 1975). It is presumed that the product knowledge is embedded in these cognitive structures as a network of associations and that these structures influence the purchase behavior of consumers (Olson & Reynolds, 1983). The structures are thought not only to contain actual product knowledge but also beliefs and decision rules that together can be activated from memory and be utilized in cognitive processes (Olson, 1978). An implicit assumption is that the attitudes of consumers toward products are formed by these cognitive structures (Howard & Seth, 1969). According to the theory of reasoned action, these attitudes together with subjective norms (i.e., social pressure), determine behavioral intention (Ajzen & Fishbein, 1980). The theory of planned behavior, which is an extension of the theory of reasoned action, has especially been proven useful for the understanding of health behavior (Ajzen & Albarracin, 2007). The behavioral intention may eventually predict the purchase behavior of consumers (Ryan & Bonfield, 1975).

2.1.1 Attitude toward OTC drugs

An important aspect of this intention to purchase consumer goods is the attitude toward the product. In the process of forming beliefs about products, a person acquires an attitude. For example, in the case of a can of soda as an attitude object, consumers form beliefs linked to the attributes of that product. The attitude toward the can of soda then becomes a function of a person's evaluation of the product attributes. Unlike most consumer goods, pharmaceuticals involve high risk and are related to the health of consumers (Pahud de Mortanges, Rietbroek & MacLean Johns, 1997). Accordingly, most consumers consider OTC drugs not as regular consumer goods and rather view them as medical drugs (Taylor, Lo,

Dobson & Suveges, 2008; Wazaify, Shields, Hughes & McElnay, 2005). However, the decision to purchase an OTC drug hinges on a different evaluation than the more, although not entirely, objective evaluation of a third-party prescriber in prescription drug purchasing. Specifically, for prescription drugs, the physician acts as a gatekeeper and makes the final decision on which drug is deemed suitable for the patient (Ding, Eliashberg & Stremersch, 2014). To the contrary, in OTC drugs evaluations, consumers are required to rely more on their own judgment (Wieringa, Reber & Leeflang, 2015). Therefore, the consumer's own ability to evaluate products, and in turn, the formation of an attitude toward OTC drugs has a major role in the purchase behavior of OTC drugs.

2.1.2 Attitude toward generic OTC drugs

A person can have an attitude toward a product, but can also have an attitude toward a more abstract object, such as a brand. In essence, the brand is an extrinsic product attribute that, depending on the buying situation, product, and individual, can have an influence on the attitude toward a product. It seems that consumers that are less informed purchase branded OTC drugs while a bio-equivalent cheaper generic OTC drug is available (Bronnenberg, Dubé, Gentzkow & Shapiro, 2015). It is likely that differences in attitude toward generic brands and brand-name brands determine this behavior. This brand attitude is related to the beliefs a consumer has about the brand and the importance of those beliefs in judgment (Farquhar, 1989). The more favorable and accessible the associations are with a brand, the more positive the brand attitude is, and vice versa (Keller, 1993). Brand attitude reflects the strong brand equity brand-name OTC drugs have. Branded drugs are typically highly advertised compared to generic OTC drugs and have more brand equity. Hence, the attitude toward the product is not the focal point in this paper; rather it is the product in combination with the brand which is the attitude object. To be more specific, the focus will be on the generic brand of OTC drugs.

2.1.2 Evaluation of OTC drugs and attitude formation

The evaluation of product attributes, such as price and quality, eventually shape the attitude toward purchasing a product. It is suggested that consumers have a low price sensitivity for OTC drugs and assign less weight in their evaluations to the price of an OTC drug. A possible reason for this is that consumers make quality inferences that are based on perceived price differences between brands, and because of brand loyalty (Akçura, Gonül & Petrova, 2004). Typically, well-known brands that are priced higher are regarded to be of a

better quality in the consumer's eye. This positive relationship between perceived quality and price is found for various types of products (Rao & Monroe, 1989). Brand loyalty is related to the experience a consumer has. Once a consumer has experience with a certain product, it can be expected that this experience becomes influential in future purchases. Notably, the accumulated usage experience with an OTC drug brand governs brand choice and affects expectations of an OTC brand (Gönül, 1998; Lodorfos, Mulvana & Temperley, 2006). Indeed, OTC drugs are described as 'experience' goods rather than 'search' goods in previous literature (Ling, Berndt & Kyle, 2002). This product experience can be seen as a part of an intuitive process whereby individuals form hypotheses based on prior beliefs and may be motivated to 'update' those beliefs (Hoch & Deighton, 1989). This formation of beliefs may also have an effect on the attitude toward generic OTC drugs. The attitude toward a product is not something static but is very much dynamic in the sense that it can change as consumers gain more experience with products. Overall, product experience is a major factor in the brand choice of OTC drugs given these points.

Moreover, this brand loyalty (i.e., repeated purchases of the same brand) is an example of the influence past usage experience has. This brand loyalty of OTC drugs may reflect consumer's perception of risk but also imperfect information (Ling, Berndt & Kyle, 2002). Consumers are not perfectly informed because of the costs of obtaining information even when impartial sources are available to them (Baeles, Mazis, Salop & Staeling, 1981). Imperfect information may leave consumers vulnerable to exploitation through marketing schemes (Gabaix & Laibson, 2006). Traditionally economists assume that individuals act rational, weight product attributes according to their preferences and search and process information in an optimal way. However theoretical models on which this assumption is based fall short in complex settings. Behavioral economists have shown that systematic bias forms a gap between the beliefs and decisions of individuals and the beliefs and those that are assumed in rational agent models (Kahneman, 2003). In marketing literature, therefore, product quality often is examined from a consumer's perspective by examining their quality perceptions (e.g., Brady & Cronin, 2001, Zeithaml, 1988). This perceived quality is different from the objective quality of products (i.e., technical superiority) and resembles attitude (Zeithaml, 1988). When there are both generic and brand-name drugs available in a purchase situation, it is more likely that the economically optimal decision is to choose the generic product because the objective quality (i.e., benefit) of the product objectively is very similar

to both brands, but the price (i.e., sacrifice) is lower.[1] However, as it is well-established through marketing research, it is now known that it is not the objective quality as such, but the perceived quality that drives preferences in various situations (e.g., Aaker & Jacobson, 1994; Brady & Cronin, 2001; Zeithaml, 1988).

2.1.3 Consumer knowledge and attitude

This perceived quality may be different for consumers that have varying levels of product knowledge. As pointed out before, one way to acquire more product knowledge is to gain more experience with the products. The experience of a consumer may lead to more product knowledge and an updated belief about the product. It can be expected that as consumers gain more experience, they also become more knowledgeable about different types of products and brands within a product category. For consumers, who have little experience with the OTC drug category, this could imply that their lower level of knowledge might limit their ability to differentiate between products. For example, consumers that have little experience with a specific OTC drug category may solely rely on the little prior knowledge they have, such as brands that they might recognize from a commercial. To the contrary, consumers with more experience may have a better ability to differentiate between brand alternatives and consequentially might develop a more positive attitude toward brand products that are less advertised, such as generic OTC drugs. The perceived quality of generic OTC drugs might be more accurate as their beliefs have developed. Nonetheless, it is possible that the beliefs a consumer has about brand alternatives within the product category might not be ‘updated'. Their beliefs about the various products within the product category might not be updated to beliefs that result in are a more accurate representation. The consumer can be overconfident in the own ability to assess the quality of different brands of OTC drugs and thinks he/she gained sufficient experience with the products to come to an informed decision. These consumers are not motivated to obtain knowledge about brand alternatives by information search or information processing. The attitude toward a generic OTC drug brand is possibly affected by these motivational factors that stimulate or inhibit information search

[1] Of course there is the question whether brand-names do influence the performance of OTC drugs, through some placebo effect. These branding effects commonly occur with pharmaceuticals (e.g., Branthwaite & Cooper, 1981). Nonetheless, in this paper it is assumed that if novices were to evaluate the objective quality of products like experts they will be better off in terms of utility.

and information processing. It is, therefore, important to realize that an increase in usage experience with a product does not necessarily imply that a consumer switches to a product brand that offers a better quality for the price, such as generic brands typically offer. Moreover, beside product usage experience there are also other ways to acquire product knowledge. Health professionals, for instance, gain product category knowledge through more formal training. These experts are more likely to have more accurate product category knowledge. Especially with generic OTC drugs it is essential to account for the accuracy of the product knowledge since they are complex products and product knowledge of generic OTC drugs that has diagnostic value (e.g., active ingredients) is difficult to obtain for most consumers. In examining the relationship between product category knowledge and attitude toward generic OTC drugs it is essential not only to measure what people know but also what they might think they know. Chapter 2.2 provides a theoretical background of consumer knowledge. Particular attention is paid to cognitive structures and the expert ability to evaluate products. Findings of consumer research are placed within the context of OTC drugs to create an understanding of the development of consumer's attitude toward generic OTC drugs. Various types of consumer knowledge are discussed in relation to consumer expertise. Chapter 2.2 will conclude with discussing the conceptualizations of knowledge types and their relevance to this paper.

2.1.4 Perceived risk and attitude

A second issue is the risk associated with the purchase of a certain brand within the product category. When consumers make evaluations, they form expectations of the product. The consumer's expectation of loss that might occur after purchasing a product is mainly subjective because typically the consumer is unable to foresee all possible consequences and the probability of their occurrence (Simon, 1959). Consumers are not able to objectively assess the probability of loss with the purchase of products, and therefore they perceive uncertainty surrounding the outcomes (Bauer, 1960). In general, consumers regard well-known brands to be more credible which lowers uncertainty and improves the consumers' perceptions of the well-known brand products (Erdem & Swait, 1998; Keller, 1993). Thus the type and amount of knowledge of a consumer may have an influence on the attitude toward generic OTC drugs as well on the risk he/she perceives with generic OTC drugs. Zikmud and Scott (1974) suggest that overall perceived risk is based on the set of beliefs a consumer has of the risk involved with important product attributes and they link perceived risk to attitude operationally. This theory is similar to the theory on which the attitude paradigm by Fishbein

and Ajzen (1975) is based. Beardon and Mason (1976) in their study of attitude toward generically prescribed drugs, propose that beliefs, on which attitude is based, share similarities to the dimensions of risk. These dimensions are associated with the product attributes and the risk involved with them. Stone and Mason (1995) offer a holistic view of the relationship between attitude and the beliefs underpinning these risk dimensions. They propose that perceived risk is integral to the formation of attitude. In this current paper, this role of perceived risk in attitude formation in relation to knowledge types is further examined. Chapter 2.3 provides a theoretical background of perceived risk. Various conceptualizations and measurements are discussed. At the end of chapter 2.3 the dimensionality of risk will be a point of interest.

2.2 Consumer Knowledge

Consumer knowledge is interpreted as information which is stored in memory and is relevant to the obtainment and use of goods and services (Engel, Blackwell & Miniard, 2005). Because of the common assumption that consumer knowledge is directly related to many consumer behaviors, researchers have extensively investigated the effects of knowledge on consumer behavior. Studies in consumer behavior have focused on the relationship between consumer knowledge and information processing (e.g., Bettman & Park, 1980; Sujan 1985), information search (e.g., Brucks, 1985; Johnson & Russo, 1984) and decision-making (e.g., Raju, Lonial & Mangold, 1995). Many of these studies have benefited from research in the field of psychology that are concerned with the organization of knowledge in memory (e.g., Chi, Feltovich & Glaser, 1981; Fiske & Linville, 1980). What a consumer knows, does not know or think he/she knows, has an impact on the way decisions are made and may even determine the final choice (Moorman, Diehl, Brinberg & Kidwell, 2004).

2.2.1 Consumer knowledge in consumer research

A considerable amount of research has examined the role of consumer knowledge in information processing. Much of this focus has been on the cognitive processes that are initiated by stimuli and are followed by a behavioral response. The *Cognitive Revolution* in the 1950s has sparked this interest of researchers, active in various academic disciplines. One of the influential articles from that time with the title "*The Magical Number Seven, Plus or Minus Two*" (Miller, 1956), described the limitations that exist to our information processing capacities and turned out to be one of the most cited papers in psychology today. Work published in the same year with the title "*A study of thinking"* (Bruner, Goodnow & Austin, 1956), proposed that the way we learn from environmental stimuli has an assertive control over our evaluation and judgmental processes. Such environmental stimuli exist of the social, psychological and marketing influences that exert a level of hegemonic influence over the decision processes. Earlier theorization of buyer behavior in the marketing literature by Howard & Sheth (1967, 1969) offer an integration of those concepts into a coherent sequence of information processing. They assume 'bounded rationality' (Simon, 1957): the buyer's behavior is constraint by the limitations of the information available and the buyers' cognitive ability to process that information within a fixed period. They suggest that product knowledge governs attitude toward a product and that this product knowledge is developed by the consumer through information search and usage and purchase experience. This theoretical

construct is partially based on earlier cognitive theory and attitude theory (e.g., Osgood & Tannenbaum, 1955). Other relevant consumer behavior models that propose that consumer behavior is influenced by prior experience and stored information in memory were put forward by Nicosia (1966) and Engel, Kollat and Blackwell (1968). However, a criticism of these two models is that they present the search and evaluation process to be highly rational (Baker, 2001). In this paper, it is assumed that consumers are not always rational and have limits to their information processing abilities. Therefore, in this paper, the theoretical foundation stems from the consumer behavior model by Howard and Seth to explain behavioral outcomes (1967, 1969).

2.2.2 Consumer knowledge and information processing

As these models were established, marketing scholars became increasingly interested in this relationship among consumer knowledge and consumer behavior. Several studies at the latter half of the 1960s explored the relationship amongst consumer knowledge, judgmental processes and meddling constructs such as risk reduction processes (Sheth & Venkatesan, 1968), price cue utilization (Smith & Broome, 1966) and information seeking behavior (Bennett & Mandell, 1969). Right at this critical moment, the focus in the marketing literature largely shifted from choice prediction to understanding the underlying cognitive mechanisms influencing choice. In the 1970s and early 1980s several studies of consumer behavior researched the role of consumer knowledge in the product evaluation processes by examining the effect of consumer knowledge on information processing and information search (e.g. Anderson, Engledow & Becker, 1979; Bettman & Park 1980; Johnson & Russo, 1984; Marks & Olson, 1981; Monroe, 1976; Raju, 1977; Raju & Reilly 1980). These studies differentiate between different levels of consumer knowledge and associated cognitive structures. For example, Marks and Olson (1981) argue that consumers with low levels of consumer knowledge have lesser developed cognitive structures. Those consumers that acquire more knowledge have cognitive structures that are better developed. Bettman and Park (1980) and Johnson & Russo (1984) investigate the effects of prior knowledge on decision-making processes. This prior knowledge is an estimate of the consumer knowledge before the consumer is presented with product options to choose from. Altogether the study by Bettman & Park (1980), and Johnson & Russo (1984) indicate that the amount of prior knowledge has a great influence on how consumers search for information and process information. If these findings of Bettman & Park (1980), and Johnson & Russo (1984), are placed within the context of OTC drugs products, it could be assumed that if consumers have more product

knowledge of OTC drugs they automatically also have a better ability to evaluate OTC drug brands as their information search and processing has developed.

However, there are two main issues with this assumption. The first issues have to do with the operationalization of product knowledge used in these studies. In several studies at the time, product knowledge has been operationalized as the frequency of purchases (Anderson, Engledow & Becker, 1979), use of goods (Johnson & Russo, 1984), and experience, ownership and information search (Bettman & Park, 1980). It makes it difficult to generalize between studies because these studies use different operationalization of consumer knowledge. Most of the studies simply used different measurements for consumer knowledge because an accepted measure of consumer knowledge was not available (Brucks, 1985; Park & Lessig 1981). For instance, in some studies, the purchase and usage experience is used as a measure of the product knowledge. This approach, however, has some conceptual issues (Selnes & Grønhaug, 1986), because: (1) product knowledge does not necessarily depend on just purchase and usage experience, and can be also a result of information search and -use, and (2) the relationship between purchase and usage experience and product knowledge is unique to each individual's interpretation of experience, and in some cases increasing experience may even occur without subsequent increases in product knowledge. Therefore the focus in this paper will be specifically on the knowledge that a consumer has about OTC drug products and not on the experience they might have with the products.

Secondly, consumers may increase the amount of product knowledge, but this does not necessarily imply that their ability to evaluate all products within a product category also automatically increases. For example, a consumer might have acquired a lot of product information about OTC drugs for a specific brand-name but fails to gain information about a generic brand. As a result, this consumer might not be aware of any generic OTC drug alternatives. The study by Bronnenberg, Dubé, Gentzkow and Shapiro (2015) indicates that health experts choose more often a generic OTC drugs over a name- brand OTC drug than novices. An explanation for this behavior is that these experts know the differences and similarities between various products within the product category and can evaluate these difference and similarities in depth. Thus the amount of product knowledge is not a surrogate for expert ability to evaluate OTC drugs; rather it is the diagnostic value of this knowledge and the ability to act on this knowledge. This product expertise reflects the cognitive structure of a consumer as well the mechanisms that are necessary to adequately use product knowledge and beliefs stored in memory (Bearden, Hardestly & Rose, 2001). All things

considered, it is essential in this paper to study cognitive structures of consumers and their expert ability. The next subchapter is included to create an understanding of this relationship by reviewing the literature on expertise.

2.2.3 Experts

Which properties exactly characterize an expert is difficult to define, however, there is a consensus among researchers that experts are more able to make accurate judgments than novices (Chi, Glaser & Farr, 2014). Alba and Hutchinson (1987) provide a review of expertise research in psychology literature and explicate in which way these findings are relevant in consumer situations. They propose that consumer knowledge has two components, namely: (1) familiarity (i.e., the number of accumulated product experiences), and (2) expertise (i.e., performance ability of tasks that are related to the product). The accumulated experience, defined as familiarity, is not limited to purchase or usage experience, but can also include exposure to ads, sales interaction, information search and decision-making. The authors argue that there are five distinct dimensions of expertise, which can be improved by familiarity. These dimensions exist of (1) cognitive effort required for task performance, (2) cognitive structures used to discriminate between product alternatives (3) ability to analyze information, (4) ability to elaborate on information, (5) and the ability to remember information about products. They notice a typical positive relationship between familiarity and expertise but stress that the performance of different expert tasks also demands different types of knowledge. Thus familiarity generally correlates with improved expert ability but the dimensions of expertise are dependent on the type of knowledge that is integrated into consumer's cognitive structure.

In this current paper, the relationship between cognitive structures and the ability to discriminate between products is especially a relevant relationship to investigate. As Alba and Hutchinson (1987) point out: "The principal function of the cognitive structure is to differentiate various products and services in ways that are useful for decision-making." (p. 414). According to Alba and Hutchinson, a higher familiarity leads to the development of the beliefs consumers have about products. Less clear is how these beliefs are build up for different consumers as their familiarity increases, and how this is affected by their cognitive structures.

Category structures. Alba and Hutchinson specifically focus on category structures to discuss the effects of cognitive structures on knowledge accumulation. Experts typically have

a more detailed and complete category structure. This knowledge allows consumers to generalize specific information about products in an efficient and useful manner. Categorization theory (Sujan, 1985) suggests that consumers attempt to match newly acquired information with prior categorized knowledge. Sujan notes that when the new information is congruent with prior category information, experts process information quicker and generate more in-depth associations with the product category. However, when there is a mismatch, experts are also more able than novices to anticipate in piecemeal processing (Fiske & Pavelchak, 1986), and to integrate evaluations of the encountered product attributes (Sujan, 1985). Moreover, findings suggest novices will rely mostly on stereotypical information when provided with ambiguous product attribute information, while experts can use either stereotypical or product attribute information to evaluate brands of products (Maheswaran, 1994). For instance, novices might be guided by common beliefs, such as that higher priced OTC drugs or better-known brands of OTC drugs indicate higher quality. Novices may also rely more on subjective information and recommendations (King & Balasubramanian, 1994), such as recommendations from friends and family, instead of objective information as can be found on renowned health websites. Experts, unlike novices, have a great ability to recognize when their prior beliefs of products do not match with newly acquired information. Experts are also likely to have more accurate representations of the product category (Chi, Feltovich & Glaser, 1982). These representations allow them to encode new information more quickly and completely and thus process product related information in a more efficient way than novices (Johnson & Russo 1984, Punj & Staelin 1983). The cognitive structure mainly determines the ability of consumers to process new information.

The more complete and detailed category structure of experts also helps in problem-solving. When solving problems, experts have a better ability to form useful representations of the problem structure and process information in greater depth (Chase & Simon, 1973, Chi, Feltovich & Glaser, 1981). In a consumer purchase situation, the problem is the need of the consumer, and the product that fulfills that need is the solution. An expert is more analytical in solving this problem. Alba and Hutchinson (1987) illustrate this by using the example of OTC drugs - Novices might not be able to discriminate between a headache and tendonitis (i.e., inflammation of a tendon) and use the one type of brand product they are familiar with for treating both symptoms. While an expert is able to differentiate between these problems and uses different products that appropriately treat each type of pain.

Memory. The cognitive structure also has an effect on memory. Experts are likely to recall more brands when making a decision, while novices are likely to know about protypical brands but not atypical brands (Alba & Hutchinson, 1987). For example, when novices think of analgesics, they are likely to think of brands that are typically associated with pain relief, such as Advil and Nurofen. Experts, to the contrary, might also recall lesser known brands when they think of analgesics. Their recall for brands associated with a product category is much broader. It is also indicated that experts have an advantage due to their extensive brand knowledge to correctly evaluate intrinsic properties when they encounter product attributes (Mitchell & Dacin, 1996). So experts might be able to compare brands with each other on the basis of associated intrinsic properties of the brand products. For example, an expert might be looking for a product to relieve pain and sees Advil in the store, and immediately thinks of Ibuprofen which is the active ingredient of Advil. Because the expert knows this active ingredient, the following action could very well be the search for cheaper alternative brands (i.e., generics) of ibuprofen to relieve pain.

The above findings indicate that as consumers get more familiar with a product category they generally gain knowledge about the various products. Consumers who are more familiar with a product category, therefore, may have different expectations of products (i.e., beliefs) and have developed a different attitude than uninformed consumers might have toward certain brands. These findings also indicate that the cognitive structure of a consumer is decisive in the accumulation of knowledge on which consumers form their beliefs and that it has an influence on the ability to perform product related tasks. It is, in particular, the development of the broadness, accuracy and diagnostic value of category knowledge that has a major influence on the ability to evaluate products and to discriminate between them. It is also key to consider that the intensity in which consumers use various types of information, as indicators of quality, might also be dependent on this product category. For example, in the case of complex goods, it might take a considerable amount of effort to process intrinsic properties even for consumers that are familiar with the product category. Thus consumers may remain biased toward OTC drug brands if their category knowledge as part of their cognitive structure is not well developed. In the next subchapter, it will be discussed how familiar consumers perceive and evaluate products and how this may depend on the type of product. At the end of the next subchapter, it will be discussed what type of product category knowledge is associated with expertise in the context of OTC drugs.

2.2.4 Cue utilization and product knowledge

Products are conceived to comprise a number of cues (e.g., price, brand) that are used in the consumer's product evaluation task (Cox, 1967). A focal issue in marketing research is cue utilization in product perception and evaluations. Cue utilization research involves the study of an arousing configuration of certain details (i.e., cues) that induces attentive behavior of individuals in information processing (Easterbrook, 1959). An important area of research is how individuals use informational cues from a contextual environment in decision processes and the forming of judgments (e.g., Kahneman and Tversky, 1973). Earlier cue utilization studies consist of single cue effects on consumer information processing processes, such as the effect of price cues on consumer product judgments (Leavitt, 1954). Later studies also provided consumers with multi-cue stimuli to study the effect on product quality evaluation (Olson, 1976). Olson and Jacoby (1972) describe how product cues can be classified as either intrinsic cues derived from physical product attributes (e.g., ingredients) or extrinsic cues derived from product related non-physical characteristics (e.g., price, brand name).

This cue utilization in product evaluations has also been found to be related to product category knowledge. Most of the studies examine the dissimilar use of product cues by consumers that have various levels of product category knowledge. Rao and Monroe (1988) propose that consumers with different levels of familiarity use intrinsic and extrinsic cues in different ways to make product quality assessments. They argue that these individuals have differentially developed schemas (i.e., cognitive structures) and thus would utilize different information in product evaluations. The cognitive aspect of attitude is closely related to schemas (Fiske & Linville, 1980). These schemas help to encode new information and to retrieve stored information (Marks & Olson, 1981), and to generate inferences about missing information (Bettman, 1979; Sujan & Bettman, 1989). This concept is somewhat similar to the concept of categorization theory.

Knowledge, bias, and heuristics. Park and Lessig (1981) also investigate in which way consumer knowledge influences decision-making. They investigate the impact of prior knowledge on consumer decisions biases and heuristics. In their experiment, they assign subjects to three groups based on their self-assessed familiarity with the product: low familiar consumers, moderate familiar consumers, and high familiar consumers. The moderate familiar and high familiar consumer were given additional relevant product information to further extend the difference in product knowledge levels between the groups of consumers. They

propose that low familiar consumers will use extrinsic cues with more ease and confidence to evaluate product quality because they are likely to have less product category knowledge and they will rely more on decision rules-based on well-known extrinsic product cues. This is consistent with Tversky and Kahneman's (1973, 1975) availability heuristic, which are mental shortcuts that rely on instant recalled instances or occurrences when performing a product evaluation task. Moderate familiar consumers who have more product category knowledge would be less biased toward intrinsic functional product cues and are able to rely on intrinsic product cues with more ease than low familiar consumers. Mainly because of their higher levels of product category knowledge. High familiar consumers that have product category knowledge would be relying on extrinsic cues because their extensive user experience and knowledge make them more confident to rely on just extrinsic nonfunctional cues. The findings of the study suggest that consumers with high familiarity are more confident in their choice decision and reliance on extrinsic cues than moderate familiar consumers. A possible reason is that high familiar consumers have acquired more knowledge of various products and no longer feel the need to evaluate intrinsic attributes, while a moderate familiar consumer might feel hesitant to rely solely on extrinsic attributes. Interestingly the findings also indicate that the low familiar group are relatively more confident in the use of the extrinsic cue 'brand' than moderate familiar consumers are. The authors reason that overconfidence and the limited ability to process provided product cues perhaps cause low familiar consumers to put more trust in their own ability to assess quality on the basis of evaluating extrinsic cues.

Operationalization of product category knowledge. Park and Lessig (1981) do point out that the generalizability of their study results depends on the operationalization of product category knowledge. Park and Lessig (1981) describe two major measurements that were used prior to their study, which is believed to contribute in different ways to the understanding of cognitive structures: (1) product category knowledge related to the long-term memory, which is the amount of accurate prior information stored in memory (e.g., Staelin, 1878; Jacoby, Chestnut & Fisher, 1978), and (2) self-assessed product category knowledge (e.g., Monroe, 1976; Lichtenstein & Fischhoff, 1977). According to Park and Lessig self-assessed product category knowledge helps to understand decision strategies and individual's systematic biases. That is why Park and Lessig used self-assessed familiarity in their study to understand motivational factors – Thus, when the purpose of any given study is to examine the effects of self-confidence, it is more appropriate to use self-assessed product category knowledge. In contrast to self-assessed knowledge, measuring and operationalizing the amount of accurate

knowledge stored in memory provides more information about the impact of information stored in memory (i.e., actual product knowledge) with respect to evaluation and decision-making. Park and Lessig, suggest that it is possible that measures of self-assessed product knowledge are an indication of both confidence levels as actual knowledge levels depending on the situation. In most cases, however, improved expert ability to make correct evaluations of various brands is more associated with an increase in actual product category knowledge stored in memory. Thus the self-assessed product knowledge may not always be a good proxy for the ability dimensions of expertise because it is a subjective measure of product category knowledge (Alba & Hutchinson, 1987; Park & Lessig, 1981).

The consumer's self-assessed product category knowledge can be a wrongful estimation of the actual product category knowledge. These consumers might be overconfident in their ability to make decisions between various brands. This self-assessed knowledge is typically an indication of familiarity rather than actual product knowledge. Hence, it might not be adequate to merely investigate the link between familiarity and ability to evaluate various product alternatives of different brands. Especially for OTC drugs, it is important to account for the completeness and accuracy of the product category knowledge because the product category of OTC drugs is not very transparent for the typical consumer. Thus for understanding the differences in attitude toward a generic OTC between consumers, it should be examined what a consumer thinks he/she knows, but also what the consumer actually knows. The attitude toward generic OTC drugs is likely to be dependent on both types of knowledge in different ways. For answering the research question in this paper, it is, therefore, necessary to distinguish 'true expertise' from 'false expertise' by examining both the self-assessed product category knowledge as well as the accurate product category knowledge. In the next chapter, the conceptual difference between these two types of knowledge will be discussed.

2.2.5 Objective knowledge and subjective knowledge

One of the first typologies of consumer knowledge was put forward by Brucks (1985). She proposes that consumer product category knowledge has two conceptual distinct but related components: (1) objective knowledge (i.e., the amount of actual information stored in memory), (2) subjective knowledge (i.e., the person's perception of what he or she knows). Similar to self-assessed knowledge as conceptualized by Park & Lessig (1981), the subjective knowledge is associated with confidence. Objective knowledge refers to the actual knowledge

of individuals and is conceptually distinct from subjective knowledge. Brucks and also Park and Lessig suggest that different types of knowledge have differential effects on decision-making. The study by Brucks generated evidence indicating that subjective knowledge and objective knowledge are conceptually distinct. In the study, an experiment was set up to simulate a shopping situation. The objective knowledge was found to be positively related to the evaluation of multiple product attributes by consumers, indicating that this is depth processing is mainly determined by actual information stored in memory. While subjective knowledge was likely to be more an indication of the self-assessed ability to process attributes, rather than the actual level of processing ability. These findings are in line with previous studies (e.g., Park & Lessig, 1981) that suggest that the confidence in one's ability to evaluate products is closely linked to subjective knowledge. The two types of knowledge seem to affect information processing in different ways. There seems to be a consensus among researchers that subjective knowledge and objective knowledge must be seen as conceptually distinct (Alba & Hutchinson, 2000; Hadar, Sood & Fox, 2013; Park, Mothersbaugh & Feick, 1994; Spreng and Olshavsky, 1990).

Besides these conceptual differences, it remains important to consider the type of product when studying differential effects. Differential effects of subjective and objective knowledge on dependent variables are in some cases difficult to separate in empirical investigations (Cowley & Mitchell, 2003). If the two constructs are highly correlated, it becomes more difficult to separate the two in examining their effects, although empirical findings suggest that subjective knowledge is often an inaccurate representation of objective knowledge (Park, Gardner & Thukral, 1988). Flynn and Goldsmith (1999) assert in their meta-analysis that objective and subjective knowledge in previous studies is usually moderately strongly correlated (R =.30 to .60). Carlson, Vincent, Hardestly and Bearden (2008), find in their meta-analysis of empirical research findings regarding the relationship between objective and subjective knowledge, an overall positive relationship (R = .37). They argue that unusual strong correlations or weak correlations can be explained by a strong or weak presence of specific moderators (e.g., type of product, measurement method). In exceptional cases when certain moderators are in effect, subjective knowledge could potentially act as a surrogate for objective knowledge. However, in this paper, it can be expected that there is a moderate correlation between objective and subjective knowledge because OTC drugs can be qualified as experience goods, nondurable products, and utilitarian products. These characteristics limit the range variation of objective knowledge (Carlson,

Vincent, Hardestly & Bearden, 2008). A more narrow range in objective knowledge is associated with a lower correlation between objective knowledge and subjective knowledge. This means that in the case of OTC drugs the involvement with the products might have a small effect on the range variation of objective knowledge. It is, therefore, useful to distinguish both constructs and their effects on attitude in this paper.

In the last subchapter of this literature review, the perceived risk will be discussed. As mentioned before, the types of knowledge may not only have an effect on attitude toward generic OTC drugs but also on perceived risk of generic OTC drugs. Besides the relationship between consumer category knowledge and attitude, it is proposed in this paper that perceived risk also affects attitude toward generic OTC drugs directly. Various conceptualizations and measurements of perceived risk are discussed in the following part of this literature review. The objective is to identify key elements of perceived risk conceptualizations and measurements that are useful for developing the hypotheses within this paper. The next part begins with a brief overview of the subject risk and uncertainty in economic research.

2.3 Perceived Risk

Bauer (1960) is responsible for the introduction of the perceived risk concept to the marketing literature. Since that moment on, perceived risk has remained an important area of research in the social sciences (Campbell & Goodstein, 2001; Mitchell, 1999). Perceived risk is considered to be an important construct in consumers' evaluations of product brands (Dowlin & Staeling, 1994). The concept has recently been applied to research on consumer behavior in a wide range of areas including: store brands (Mieres, Martín & Gutiérrez, 2006), internet banking (Littler & Melanthiou, 2006), genetically modified food (Klerck & Sweeney, 2007) and grocery store perishable (Tsiros & Heilman, 2005). However, the concepts of risk and uncertainty that are associated with perceived risk research have been popular for a long time in the field of economics.

2.3.1 Risk and uncertainty

Risk and uncertainty have been pivotal concepts in the research of human decision-making. Early mentions of the great implications that these two concepts may have on economics theory can be found in the originating work by Menger of the Austrian school of economics. (Menger 1871 [1950]). Menger also emphasized the subjective nature of decision-making by individuals, and thereby deviated from the classical economic view of the decision maker as *homo economicus*. It was Knight's seminal work in 1921 that proposed that there is a sharp distinction to be made between risk and uncertainty (Knight, 1921). Knight theorized that risk is an unknown outcome, susceptible to probability measurement, while uncertainty occurs when there is no information to begin with to set the odds of such an outcome accurately. Although not clearly defined in Knight's work, it can be inferred that if the decision-maker is guided by *a priori* probability (i.e., numerical probability based on general principals) or statistical probability, the situation is classified as risk. In the situation where these probabilities are not possible to establish, and only pure estimates are available, it is called uncertainty. Keynes (1937) states in his *General Theory* that the knowledge upon we form expectations about the future is often inadequate and that only in the situation where we do have unlimited knowledge, the classical theory would be viable. In his formalization of uncertain knowledge, Keynes distinguishes between what is known for certain, what is probable, and matters where there is no scientific basis to form any probability.

Keynes laid the foundation of modern economic macroeconomic theory and dealt with the decision-making of an economy in an integral way. In decision theory in economics, the

focus is more on the reasons behind choices of agents (e.g., consumers, governments etc.). Within this domain, the standard economics model of decision-making under risk is the expected utility model. The expected utility hypothesis is initiated by Bernoulli who introduced the concept of marginal utility in the context of risky ventures and choice (Bernoulli, 1738 [1954]). Risk aversion, for example, can be demonstrated by examining the utility function of an agent (Arrow, 1965; Pratt, 1964). The expected utility model has been applied both as a descriptive model of human behavior as a normative model of rational choice. Neumann and Morgenstern (1944) were the first to reduce the expected utility principle to a system of axioms. Axioms are universally accepted principles with the framework of a theory. The Von Neumann-Morgenstern theorem showed that an individual, who behaves consistent with the axioms from the model, would act so as if he/she is maximizing the expected value of the utility derived from the outcomes, subject to various levels of probability. The model combines utility and objective probability in a function, to value prospects. The model could only be empirically proven however on the assumption that the subjective probability that is assigned by an individual to a set of alternatives is equal to the objective probability. In real-life situations, the subjective probability that is estimated by the decision-maker is not likely to be the same as the objective probability. Interestingly Ramsey (1931) and De Finetti (1937) already proposed that subjective probabilities and expected utility could be measured conjointly. From a behavioral perspective, there was certainly a great interest to quantify the degree of confidence of the decision maker by probability. Therefore, Savage (1954) promoted the subjective expected utility model, building upon the work of Ramsey and De Finetti. In this model objective probabilities are not imposed.

The models based on expected utility theory do have flaws. Some anomalies have been identified with the expected utility model. Experimentally the Allais paradox teaches us that observed choices are not always similar to the predicted choices based on expected utility theory (Allais, 1953). From a more philosophical point of view, Simon (1959) describes that the way decision-makers perceive the world does not approximate the real external environment and thus we should take the limitations of the decision-maker into account. Theoretically, perhaps the biggest development in the area of psychology and descriptive modeling of decision-making under uncertainty is prospect theory, which describes that individuals make decisions between probabilistic alternatives by employing heuristics (Kahneman & Tversky, 1979). In their research, the authors demonstrated that individuals

systematically violated the prediction of expected utility. In risk research in marketing, and particularly in the study of consumer behavior, the focus has been primarily on negative consequences when studying risk. This is different than in traditional economics, psychology, and statistical theory, where the focus is both on positive and negative outcomes. Bauer (1960) proposed that consumer behavior could best be understood as an instance of risk taking. In his view, consumers are not able to approximate the objective probability in evaluations of risk because of the limitations they have to their cognitive ability. Therefore, the consumer deals with the uncertainty of negative consequences. This uncertainty is manifested in the perceived risk. Cox and Rich (1964) find the favorable empirical support of perceived risk, shortly after Baur's introduction of perceived risk to the American marketing community. They examine the effects of perceived risk in consumer decision-making by researching the telephone shopping behavior of consumers. Their findings indicate that perceived risk is a major behavioral determinant.

2.3.2 Inherent risk and handled risk

The work by Cox and his associates at Harvard University is appraised but is also criticized for the lack of formalization and for the incomplete definition of the perceived risk components regarding the decision-making process (Nicosia, 1969). Other researchers argue that there should be a precise definition of what perceived risk is and that an improved perceived risk rating scale should be available for any research in the domain to have validity (Spence, Engel & Blackwell, 1970). Bettman (1972, 1973) suggest there are two types of risk, inherent risk and handled risk. Inherent risk is latent risk associated with the product class and handled risk is the amount of arousal a consumer perceives when choosing between brands within the product class. For example, Spence et al. (1970) deal with handled risk by comparing different buying situations without the emphasis on differences between product categories. Bettman argues that inherent risk is related to the importance of loss and handled risk is related to the probability of loss, and that this distinction allows for greater precision in measurement. For instance, a product category such as painkillers can have a great deal of inherent risk compared to other product categories, but a buyer may perceive little risk when the favorite brand of painkillers is purchased. The inherent risk might have little explanatory power when the interest of the study is perceived risk at the brand level (Bettman, 1973). The probability of adverse consequences seems to be an aspect of handled risk and the importance of adverse consequences an aspect of inherent risk (Peter & Ryan, 1976). Inherent risk as proposed by Bettman it is not typically the focal point in examining perceived risk, except in

some studies (e.g., Lutz & Reilly, 1974; Locander & Hermann, 1979). Other research indicates that product category risk (i.e., inherent risk) has little effect on risk reduction processes for product-specific risk when evaluating products within a product class (Dowling & Staelin, 1994). In this current paper, the focus will be theoretically on handled risk by examining perceived risk at the brand level. In the next two subchapters, the literature will be reviewed to understand the differences between various conceptualizations and to offer details of the conceptualization and measurement model that are used in this current paper.

2.3.3 The concept of perceived risk

After the introduction of the concept of perceived risk by Bauer (1960), numerous researchers have utilized the concept to explain consumer behavior and to find empirical evidence for the idea. Kogan and Wallach (1964) suggested that the concept of perceived risk may have an aspect of chance and an aspect that involves the weight of negative consequence. Cunningham (1967) reasoned that objective probabilities of loss are not relevant for the reaction to risk because the decision maker can only react to the perceived risk, which is a subjective interpretation. Cunningham, similar to Kogan and Wallace, proposes that perceived risk consist of two components: (1) uncertainty, (2) and importance or danger. Cox (1967) defines uncertainty as the subjective probability of an outcome and defines the danger component as the amount which is at stake. Spence, Engel and Blackwell (1970) simply use a unidimensional risk measure, by asking respondents to rate on an interval scale how much risk they see in a purchase in as specific buying situations. They refrain from any further conceptualizations of perceived risk. Another stream of research proposes that perceived risk consist of inherent risk and handled risk and reckon that risk reduction behavior and intended behavior is affected by the degree to which handled risk is acceptable to a consumer (e.g., Bettman, 1973; Dowling & Staelin, 1994). Taylor (1974) uses uncertainty as an equivalence of perceived risk in his comprehensive framework of risk in consumer behavior. Peter and Ryan (1976) purposely take another approach. They argue that equating perceived risk with uncertainty adds little in terms meaning specification - If a brand is deemed to be unacceptable, there would be no uncertainty, but paradoxically this would also imply there is no perceived risk to come to such a conclusion. Peter and Ryan define perceived risk at the brand level as the consumers' expectation of losses (i.e., negative utility). Stone and Grønhaug (1993), similar to Peter and Ryan, define perceived risk as the consumers' subjective expectation of a loss. Their conceptualization does differ from the normative expectancy value method often applied in economics and mathematics, in which probability is

multiplied with 'pay off' (Mitchell, 1999). In Stone and Grønhaug's view, consumers make estimates about the probability of adverse consequences that might occur after purchasing a product. The greater the probability of those adverse consequences (i.e., loss) occurring, the greater risk is perceived by a consumer. In this current paper, the conceptualization as proposed by Stone and Grønhaug will be adopted because it offers a clear definition of perceived risk which has been widely adopted by recent literature (e.g. Dholakia, 2001; Laroche, Yang, McDougall & Bergeron, 2005).

2.3.4 Measurement models

Measurements models of perceived risk vary from simple models to complex models. From a psychology point of view, most of these models used in marketing research fall into the category of models that are positioned at a low-level of abstraction (Dowling, 1986). These models share properties of attitude models used extensively in psychology and marketing. Cunningham (1967) introduced a multiplicative model, consisting of two components: uncertainty and importance of danger. Both components were measured using ordinal certainty and danger scales. Cunningham concedes that in an arbitrary way both components were combined to indicate perceived risk. The evidence for this multiplicative relationship is also not found in marketing literature (Peter and Ryan, 1976). However, the multiplicative relationship between the two components has been used throughout the years in a substantial body of literature (Mitchell, 1999). Most researchers use a variation of equation (1) to model perceived risk (Horton, 1976):

$$\textit{Overall perceived risk} = \textit{(probability)} \times \textit{(importance of adverse consequences)} \qquad (1)$$

Peter and Ryan believe this method originates from probability theory. Stone and Grønhaug (1993) doubt whether consumers in real life decisions make these multiplicative calculations. A practical advantage of this simple model is that it is highly adaptable to different research purposes. Spence, Engel and Blackwell (1970) and Perry and Hamm (1969) use an interval rating scale to directly measure adverse consequences of perceived risk. This method is straightforward and practical, but may not be reliable and is likely to have less validity.

Bettman (1973) finds that the additive linear model fits the data better than the multiplicative model. Horton also finds support for this notion. Horton (1976) and Bettman point out that the components used by Cunningham are likely to be correlated and are

therefore not independent. Peter and Tarpey (1975) come up with an equation (2) to accommodate various dimensions of risk:

$$\textit{Overall perceived risk} = \sum_n \textit{(probability} \times \textit{importance of adverse consequences)} \qquad (2)$$
$$n : \textit{dimensions of risk.}$$

Peter and Tarpey compare the perceived risk model with the perceived return model and the net perceived return model. They find that the net perceived return model could explain more variance in brand preference than the other two models. Similar to Bettman (1973), they conclude that future research should include multiple methods measurement methods to examine reliability and validity of the perceived risk method. Ross (1975) stresses that in some research it is not clear whether uncertainty or adverse consequences are measured. Stone and Winter (1985) address these aforementioned issues and operationalize perceived risk as an expectation of loss, supported by earlier findings of Peter and Ryan. They find a strong negative relationship between the operationalized perceived risk and behavioral intentions and attitude. Stone and Grønhaug have taken this measurement model further and study risk with a structural model and define risk as a subjective expectation of loss. They use multiple risk dimensions to estimate overall perceived risk and deviate from the models that treat risk in an expectancy-value way. In this current paper, the measurement model by Stone and Grønhaug will be used to measure perceived risk. This multi-dimensional measurement allows studying the risk dimensions relevant to OTC drugs. The subjective expectation of loss (i.e., the probability of loss) is used to measure perceived risk. This has also the added benefit that it avoids any operational scale issues that are associated with multiplicative functions (Schmidt & Wilson, 1975).

2.3.5 Dimensions of perceived risk

The various dimensions of perceived risk can be included in this measurement model. Bauer (1960) suggested that elements or dimensions of risk should be included in the further research. Cox (1967) specified the danger or amount at stake of perceived risk into a performance and psycho-social risk dimension. Perry and Hamm (1969) focus on the social significance and the economic significance of risk. Roselius (1971) distinguishes between different types of loss associated with methods of risk reduction. He studies the effect of time loss in comparison with money loss, ego loss, and hazard loss. Following Roselius' research of risk reductions strategies, Jacoby and Kaplan (1972) discussed six dimensions of risk that

could explain the perceived risk of unfamiliar brands of various products, such as vitamins and aspirins. These dimensions are financial risk, performance risk, physical risk, psychological risk, social risk and overall perceived risk. Interestingly the first five dimensions of perceived risk could explain the variance of overall perceived risk very well, with R^2 ranging from .63 to .83 across 12 product categories. Furthermore, the findings indicate that these dimensions are conceptually independent. Several researchers agree that perceived risk should be treated as a multidimensional construct and that these dimensions can be unique to the product class under study (e.g., Zikmund & Scott, 1974). Stone and Grønhaug (1993) study the risk dimensions proposed by Jacoby and Kaplan and include time risk as conceptualized by Roselius. In their study of risk dimensions, they find that the proposed risk dimensions explain a significant portion of overall risk and that more than 88% of the variance in overall risk is captured by the dimensions in the structural model. The degree to which these dimensions contribute to overall risk is found to vary significantly. Stone and Grønhaug believe this variation will be dependent on the researched product category. Commonly used dimensions of risk are summarized in Table 2.

Table 1

General Descriptions of Risk Dimensions after Reviewing Relevant Literature

Dimension	Description	Literature
Financial	The risk of losing money on the purchase of the product; the loss of money when the product fails	Jacoby and Kaplan (1972), Roselius (1972), Stone & Grønhaug (1993)
Physical	The risk that the product will cause physical harm or may not be safe	Jacoby and Kaplan (1972), Roselius (1972), Stone and Grønhaug (1993)
Performance	The risk that a product will not perform as expected	Jacoby and Kaplan (1972), Roselius (1972), Stone and Grønhaug (1993)
Time	The risk of time loss when a product fails or requires adjustment time	Jacoby and Kaplan (1972), Roselius (1972), Stone and Grønhaug (1993)
Psychological	The risk that the purchase may cause unwanted anxiety or tension	Jacoby and Kaplan (1972), Roselius (1972), Stone and Grønhaug (1993)
Social	The risk that a product may cause others to think less of the individual or will result in ego loss	Jacoby & Kaplan (1972), Roselius (1972), Stone & Grønhaug (1993)

OTC drugs risk dimensions. Consumers evaluate products on their attributes which can be different for each product category and thus also represent different potential risks. Combining these measures in a single measure of perceived risk is therefore only reasonable if there is a strong belief that these dimensions do not act independently. While this dependence in some cases may be true, it is likely that each risk dimension associated with a product represents a specific type of risk and that these dimensions have differential effects on attitude. The risk dimensions used in research are depended on the purchase situation and is usually determined by the examination of prior studies. It can be expected that specific for OTC drug purchase situations the physical risk dimension is relevant since OTC drugs are

considered as medical drugs by consumers, and the use of those products may entail health risks (Taylor, Lo, Dobson & Suveges, 2008; Wazaify, Shields, Hughes & McElnay, 2005). Moreover, in a recent study, it was found that physical risk has a direct relationship with overall perceived risk of generic drugs (Rozano Suplet, Gómez Suárez & Diaz Marting, 2009). Bearden and Mason (1978) examined the perceived risk and attitudes toward generically prescribed drugs. Their research indicates that financial risk, performance risk, and safety concerns, significantly influence consumer preferences. Social risk scores were generally low which is similar to the findings of the study by Rozano Suplet et al (2009). In this current paper, the focus of perceived risk will therefore be along the physical, financial and performance risk dimensions.

3. Hypothesis Development and Conceptual Model

In the previous chapter, the literature is reviewed. The first subchapter of the Literature Review discussed attitude and how it is theoretically linked to consumer knowledge and perceived risk. The other two subchapters discussed various conceptualizations and measurements of consumer knowledge and perceived risk. In this current chapter, the hypotheses are developed. This chapter is concluded with a summary of hypotheses and the conceptual model.

3.1 Perceived Risk and Attitude

Generic OTC drugs have characteristics that are similar to those of store brands. These store brand products, also called private label brand products, are typically lower priced than similar national brands products of comparable quality (Kumar & Steenkamp, 2007). Often store brands of OTC drugs are generic and are used in research as a classification of generic OTC drugs (e.g., Bronnenberg, Dubé, Gentzkow & Shapiro, 2015). An example is the supermarket brand 'Albert Heijn Ibuprofen', which is a generic of the brand-name OTC drug 'Nurofen Ibuprofen'. In this current paper, store brand OTC drugs are therefore classified as generic OTC drugs. Brand-name drugs generally use national advertising and have higher marketing budgets and are therefore grouped as national brands. The premium a consumer is willing to pay for national brands depends on the perceived risk of the store brands (Sethuraman & Cole, 1999). The higher the perceived risk is of a generic brand, the more likely the consumer is willing to pay a premium for a national brand alternative. Moreover, brand preference is indicated to be negatively correlated with perceived risk (Peter & Ryan, 1976). Bettman (1974) finds in his study of information-processing attitude structures and store brand purchasing, that perceived risk is a key factor that determines unfavorable evaluations of store brands. It is proposed that perceived risk has a major role in the formation of an attitude toward purchasing products (Stone & Mason, 1995). Moreover, the findings by Stone and Winter (1985) indicate that perceived risk has a negative relationship with attitude toward products.

H_1: There is a direct negative relationship between

a) perceived physical risk of generic OTC drugs and attitude toward generic OTC drugs.
b) perceived financial risk of generic OTC drugs and attitude toward generic OTC drugs.
c) perceived performance risk of generic OTC drugs and attitude toward generic OTC drugs.

3.2 Knowledge and Attitude

Product category knowledge can be measured in two ways: (1) subjectively or (2) objectively (e.g., Brucks, 1985; Flynn & Goldsmith, 1999). Objective knowledge is defined as the amount of actual information stored in memory and is usually assessed by an impartial supervisor who uses an objective testing procedure. Subjective knowledge is defined as the person's perception of what he/she knows and is measured using self-assessment. The two types of knowledge correlate but are found to be distinct constructs because of their antecedents (Park, Mothersbaugh & Feick, 1994). Park et al. theorize that when consumers self-assess their knowledge levels, they base their assessment on two types of judgment cues. The first type of cue is the product category knowledge stored in memory. This semantic memory refers to long-term memory that consists of a network of associations, which may include knowledge of brands and product attributes. The second type of cue is the amount of product-related personal experience. Product-related personal experience is easily retrievable to consumers because of the episodic memory basis. This episodic memory is personal and forms a recollection of biographical experiences. The findings of the study indicate that subjective knowledge is stronger positively related to product-related experience than to actual product category knowledge. The authors suggest that this is mainly caused by the greater accessibility of product-related experience. They furthermore notice a gap between subjective knowledge and objective knowledge. Actual product category knowledge was found to be stronger positively related to objective knowledge than subjective knowledge. Thus it seems that subjective knowledge is more determined by easily accessible product experience and objective knowledge is mainly determined by stored product category information in memory.

3.2.1 Subjective knowledge and attitude

Based on the study of Park et al. (1994) it can be expected that as product familiarity increases, the subjective product category knowledge also increases. Familiar consumers are less biased toward the use of intrinsic functional product cues to evaluate products (Park & Lessig, 1981). These effects are likely to vary between product categories as Rao and Monroe (1988) point out in their study of cue utilization. This especially true if product categories differ in the way quality-related characteristics are revealed. For instance, if extrinsic cues are a true indicator of quality for a product class, consumers likely will continue to use these extrinsic cues to evaluate products when they get more familiar with the product class. If intrinsic cues of a product are a more appropriate indicator for quality, it is likely that only

higher familiar consumers will use these intrinsic product cues if these intrinsic cues are difficult to evaluate. Based on these studies, it is likely that in the case of OTC drugs less informed consumer tend to judge OTC drugs on extrinsic product cues such as brand and price. Typically, well-known brands that are priced higher are regarded to be of a better quality in the consumer's eye. This positive relationship between perceived quality and price is found for various types of products (Rao & Monroe, 1989). Richardson, Dick and Jain (1994) find that unfavorable perceptions of store brands are mainly the result of consumers relying on extrinsic cues to evaluate quality. More informed consumers rely more on intrinsic product cues to assess product quality if they think it would lead to a better choice. This is also closely related to the cognitive effort that is required to perform this type of processing (Alba & Hutchinson, 1987). As cognitive structures get more detailed and complete, it enables these consumers to process complex information with less effort than consumers with less-developed cognitive structures. When subjective knowledge increases it is expected that attitude toward generic OTC drugs also positively increases because higher familiarity increases the ability to judge generic OTC drugs on intrinsic properties.

H_2: There is a direct positive relationship between subjective product category knowledge and attitude toward generic OTC drugs.

3.2.2 Objective knowledge and attitude

Objective knowledge is related to accurate information stored in long-term memory (Park, Mothersbaugh & Feick, 1994). It allows consumers to process new information within the domain with more efficiency, and it is associated with the ability to focus on relevant product cues and to filter out irrelevant information (Voss, Vesonder & Spilich, 1980). Some findings suggest that consumers' higher levels of objective knowledge have larger consideration sets and have category knowledge structures that more accurately represent the market conditions (Wirtz & Mattila, 2003). Consumers with high objective knowledge seem to be able to limit their evoke set (i.e., consideration set of comparable brands) and to restrict the number of attributes considered to levels that are relevant for the product evaluation task at hand (Spreng, Devine & Page Jr, 2001). Cordell (1997) finds that consumers with high levels of objective knowledge are more consistent in evaluating product cues compatible with its diagnostic value. This account seems plausible since experts are less likely to rely on irrelevant abstract attributes in the product evaluation task and more on concrete attributes compared to novices (Walker, Celsi & Olson, 1987). The higher level of objective knowledge

is associated with better developed cognitive structures. Better developed cognitive structures allow for expert ability to differentiate between various brands and to accurately evaluate products (Alba & Hutchinson, 1987).

H_3: There is a direct positive relationship between objective product category knowledge and attitude toward generic OTC drugs.

It is possible that as consumers perceive to be more experienced with a product category, the subjective knowledge increases but the objective knowledge increases little in comparison. For example, a consumer who visits the store weekly to obtain OTC drugs to treat pain might assume his/her product category knowledge is very high, but in reality, rarely examines other brands of the same product type. Consequently, this consumer might overestimate his/her ability to make an accurate decision between various brands based on the amount of self-experience. Park and Lessig (1981) argue that subjective knowledge is more related to motivational factors such as confidence and might be a stronger motivational factor for purchase-related behavior. This motivation represents the goals and intensity of learning behavior (Bettman, 1979). Park et al. (1994) therefore expected in their study that self-confidence serves as an antecedent for subjective knowledge, but did not find a significant relationship. However, a later study using new self-confidence measures (Bearden, Hardesty & Rose, 2001) did find a robust correlation between self-confidence and subjective knowledge as hypothesized by Park et al. (1994). This self-confidence might lead to overestimation by consumers of their own ability to evaluate products. In that case, the subjective knowledge would be an inaccurate representation of objective knowledge. Thus, the discrepancy between objective knowledge and subjective knowledge may be attributable to the confidence component in subjective knowledge. Lichtenstein, Fischoff and Philips (1977) demonstrate in their research, that uses a subjective probability paradigm, that people tend to overestimate what they know. Alba and Hutchinson (2000) explain that the correspondence between subjective knowledge and objective knowledge is miscalibrated when confidence does not match accuracy. This means that people are overconfident in their knowledge assessment and don't accurately judge their actual objective knowledge. Alba and Hutchinson find that moderated levels of calibration are typical and indicate a systematic bias. A recent study held in the Netherlands concludes that consumer overconfidence in their OTC drug decisions skills may lead to inappropriate decision-making which might entail health risks (Brabers, Van Dijk, Bouvy & De Jong, 2013). It is quite possible that this overconfidence is also represented in the subjective knowledge of OTC drugs.

Moreover, subjective knowledge is suggested to either inhibit or not affect search behavior at all (Radecki & Jaccard, 1995). The consumers might feel they have acquired enough product knowledge to make accurate decisions and therefore are not motivated to search for information or make more comparisons between various OTC drug brands that are available to them. Subjective knowledge is also associated with lower perceived task difficulty (Duhan, Johnson, Wilcox & Harrell, 1997). Consumers might misjudge the complexity of making a choice between various products to satisfy their needs. The attitude toward a generic OTC drug brand is possibly affected by these motivational factors that stimulate or inhibit information search and information processing. Moorman, Diehl, Brinberg & Kidwell (2004) argue that these effects are caused by the consumer's need to behave consistently with their beliefs formed by subjective knowledge. Subjective knowledge, therefore, represents motivational aspects, and objective knowledge represents more ability (Selnes & Gronhaug, 1986). Thus objective knowledge is more associated with a better ability to accurately evaluate generic OTC drugs than subjective knowledge.

*H*4: There is a stronger positive relationship between objective product category knowledge and attitude toward generic OTC drugs than between subjective product category knowledge and attitude toward generic OTC drugs.

3.3 Knowledge and Perceived Risk

Hypothetically consumers can deal with perceived risk in two ways. In an exploratory study, prior to the research by Cox and Rich (1964), two leading ways were identified to reduce perceived risk (Cox, 1961). One way is to increase the certainty of the predicted outcome, and the other way is to reduce the amount at stake. In both cases, it involves an attempt at reducing uncertainty. In the latter, the only way to effectively reduce risk is to foregoing the purchase entirely because the power of the consumer to lessen the weight of outcomes is usually limited. For instance, when consumers buy products it is not reasonable to think they can change functional characteristics of the product and thereby influencing the performance outcome. Therefore, consumers typically try to reduce uncertainty surrounding an intended purchase instead of trying to influence the purchase outcome. Sheth and Venkatesan (1968) point out there are three major ways to reduce uncertainty: (1) seeking information, (2) deliberation before the purchase, (3) and to rely on brand image. Seeking information is a way to gather more information about the intended purchase and alternatives. The sources of the information can be personal (e.g., word of mouth) or impersonal (e.g.,

ads). Deliberation before the purchase is the time a consumer spends on processing information and to organize mental structures. Brand loyalty (i.e., repeated purchases) is an example of consumers relying on their past experiences to reduce perceived risk (Cunningham, 1967). The three ways to reduce uncertainty depend on the accumulation of product category knowledge through experience.

3.3.1 Subjective knowledge and perceived risk

As consumers get more familiar with OTC drug product category, it can be expected that they perceive less risk with OTC drugs as they have reduced the uncertainty. This familiarity may also lead to a higher expertise regarding the estimation of the risk probability of generic OTC brands. Subjective product category knowledge also increases as consumers get more familiar with a product category (Park, Mothersbaugh & Feick, 1994).

H_5: There is a direct negative relationship between subjective product category knowledge and

a) perceived physical risk of generic OTC drugs.
b) perceived financial risk of generic OTC drugs.
c) perceived performance risk of generic OTC drugs.

3.3.2 Objective knowledge and perceived risk

Similar to hypothesis two and three it can be expected that objective product category knowledge is a better indication of expertise than subjective product category knowledge because of the stronger association with accurate information stored in long-term memory. Consumers that have higher levels of objective product knowledge are expected to be less biased toward generic brands of OTC drugs and have a greater ability to assess the probability of adverse consequences associated with a generic OTC drug purchase.

H_6: There is a direct negative relationship between objective product category knowledge and

a) perceived physical risk of generic OTC drugs.
b) perceived financial risk of generic OTC drugs.
c) perceived performance risk of generic OTC drugs

H_7: Compared to the relationship between subjective product category knowledge and perceived risk of generic OTC drugs, there is a stronger negative relationship between objective knowledge and

a) perceived physical risk of generic OTC drugs.
b) perceived financial risk of generic OTC drugs.
c) perceived performance risk of generic OTC drugs.

3.4 Mediating Role of Perceived Risk

Frequently in consumer research, the perceived risk acts as a mediator between an attitudinal outcome variable and extrinsic product cues (e.g., Agarwal & Teas, 2001; Semeijn, Van Riel & Ambrosini, 2004). Given these studies, the mediating role of perceived risk cannot be neglected and should be tested within the context of OTC drugs. This mediating role of perceived risk is also found by Klerck and Sweeney (2007) in their research of consumer knowledge and adoption of genetically modified food. In their research, they examine different types of product category knowledge. In this current study, it is hypothesized that perceived risk acts a mediator of each knowledge type and attitude toward generic OTC drugs.

H_8: Perceived physical risk is a mediator between

a) subjective knowledge and attitude toward generic OTC drugs.
b) objective knowledge and attitude toward generic OTC drugs.

H_9: Perceived financial risk is a mediator between

a) subjective knowledge and attitude toward generic OTC drugs.
b) objective knowledge and attitude toward generic OTC drugs.

H_{10}: Perceived performance risk is a mediator between

a) subjective knowledge and attitude toward generic OTC drugs.
b) objective knowledge and attitude toward generic OTC drugs.

3.5 Summary of Hypotheses

Table 2

Summary of Hypotheses

Hypothesis	Formulation
H_1	There is a direct negative relationship between a) perceived physical risk of generic OTC drugs and attitude toward generic OTC drugs. b) perceived financial risk of generic OTC drugs and attitude toward generic OTC drugs. c) Perceived performance risk of generic OTC drugs and attitude toward generic OTC drugs.
H_2	There is a direct positive relationship between subjective product category knowledge and attitude toward generic OTC drugs.
H_3	There is a direct positive relationship between objective product category knowledge and attitude toward generic OTC drugs.
H_4	There is a stronger positive relationship between objective product category knowledge and attitude toward generic OTC drugs than between subjective product category knowledge and attitude toward generic OTC drugs.
H_5	There is a direct negative relationship between subjective product category knowledge and a) perceived physical risk of generic OTC drugs. b) perceived financial risk of generic OTC drugs. c) perceived performance risk of generic OTC drugs.

H_6 There is a direct negative relationship between objective product category knowledge and

a) perceived physical risk of generic OTC drugs.
b) perceived financial risk of generic OTC drugs.
c) perceived performance risk of generic OTC drugs

H_7 Compared to the relationship between subjective product category knowledge and perceived risk of generic OTC drugs, there is a stronger negative relationship between objective knowledge and

a) perceived physical risk of generic OTC drugs.
b) perceived financial risk of generic OTC drugs.
c) perceived performance risk of generic OTC drugs.

H_8 Perceived physical risk is a mediator between

a) subjective knowledge and attitude toward generic OTC drugs.
b) objective knowledge and attitude toward generic OTC drugs.

H_9 Perceived financial risk is a mediator between

a) subjective knowledge and attitude toward generic OTC drugs.
b) objective knowledge and attitude toward generic OTC drugs.

H_{10} Perceived performance risk is a mediator between

a) subjective knowledge and attitude toward generic OTC drugs.
b) objective knowledge and attitude toward generic OTC drugs.

3.6 Conceptual Model

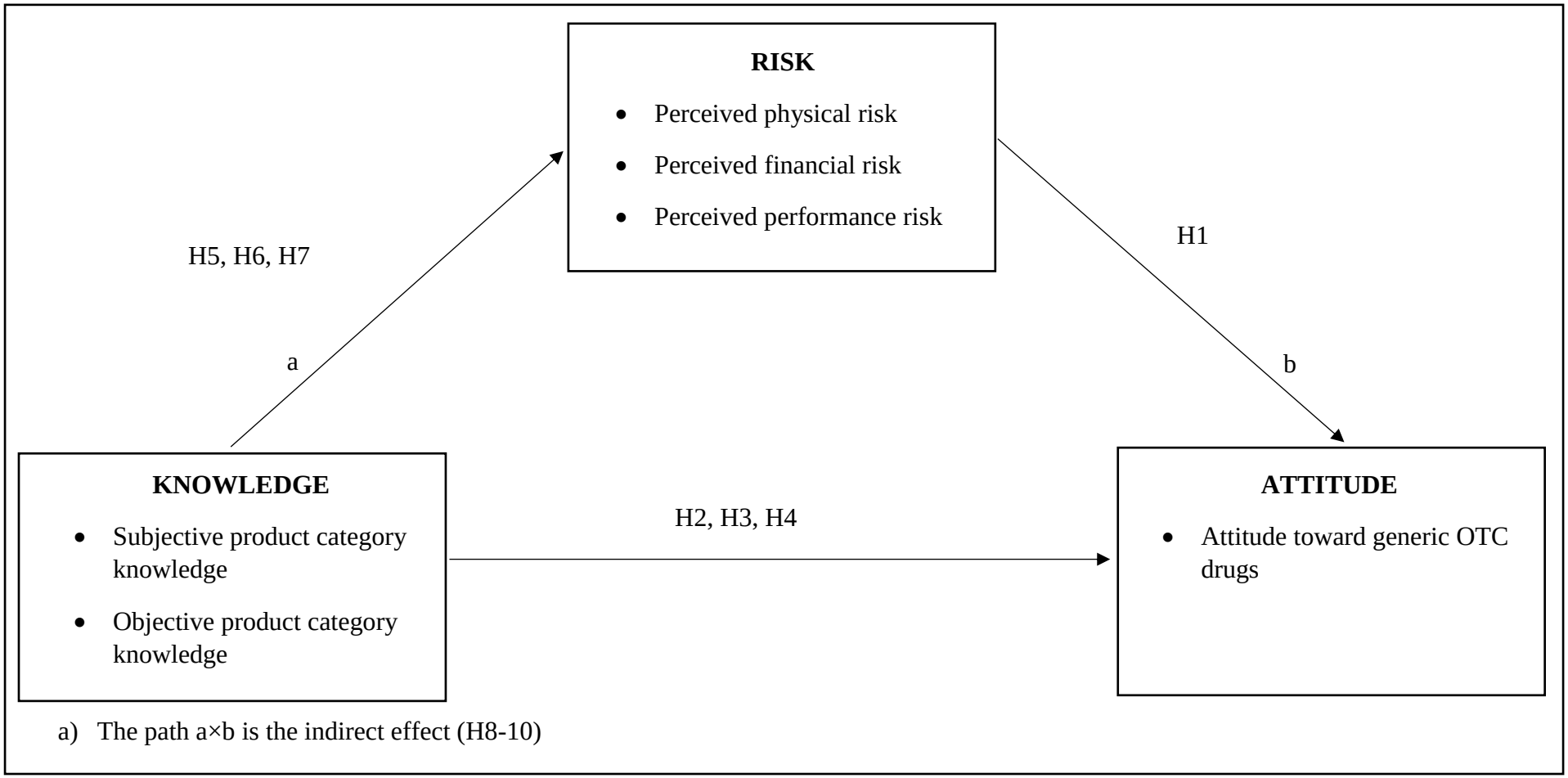

Figure 1: Illustration of the conceptual model

4. Method

The main objective of this empirical study is to examine the consumers' perception of generic OTC drugs. The qualitative part of this study consists of desk research. Qualitative information is analyzed to develop a conceptual model and to streamline the research by identifying the crux of the research problem. This method chapter describes the method that is used to conduct a quantitative research. First, the research design is discussed that introduces the procedural plan of the research. Second, the sampling method is discussed. Third, the instrumentation plan is presented. This method chapter will conclude with a discussion of the survey structure and development, and the method to test the hypotheses. The goal is to conduct a study that provides valuable insights for answering the research questions.

4.1 Research Design

The research design describes the procedural plan that is used by the author to collect and analyze data in an efficient and effective manner to meet the research objective (Kumar, 2012). The quantitative part of this research makes use of a cross-sectional design and revolves around observational data at one point in time. The nature of this research is deductive by testing the hypotheses and conceptual model as formulated in the previous chapters. It is conclusive and descriptive which means that data is collected that describes the characteristics of groups of people (Parasaruman, Grewal & Krishnan, 2006). Primary data is collected through a survey by performing field research. This data collection method is chosen because surveys are especially useful to collect factual information of a large group of people (Denscombe, 2010). The self-administered survey is made available both online and offline. The surveys will be in Dutch and English. The online version is developed with Google Forms, which automatically saves the responses and has the option to export the responses to a Microsoft Excel file. The offline responses from the paper survey are put in an Excel file by the author manually. The Microsoft Excel file will serve as the data input for IBM SPSS version 20. SPSS is the statistical program that is used to perform statistical analysis. Coding of the data will also be done with SPSS.

4.2.1 The Dutch OTC market

Out of practical reasons, the hypotheses are only tested for the Dutch population. OTC drugs have three classifications in the Netherlands which differ in the restriction of their availability as determined by the Dutch law (Van Dijk, Van der Maat, Salimans & Bouvy, 2010). The first class of OTC drugs is drugs that are only available at pharmacies. These drugs require monitoring and consulting of educated pharmacists. The second class of OTC drugs is drugs which can be sold at both pharmacies and drug stores. These drugstores typically sell other types of product such as food and cosmetic goods but are not allowed to sell prescription drugs. The drug stores need to have a certified druggist employed who oversees the responsible sale of OTC drugs. The last class of OTC drugs consists of drugs that are generally sold. These drugs are deemed relatively safe and can also be sold at retail access channels such as supermarkets and gas stations. Before the *Medicines Act* introduced in 2007, this class was non-existent and retailers other than drug stores and pharmacies were not allowed to sell OTC drugs (Brabers, Van Dijk, Bouvv & De Jong, 2013).

The Netherlands is the only country, among the major countries in the EU, in which OTC drugs are made accessible for sale at four different kinds of access channels, which include pharmacies, drug stores, supermarkets and online stores (“Marktcijfers”, 2016a). The variety of access points increases the accessibility of OTC drugs that are generally sold. The total sales of OTC drug products were in total 719 million euro in the Netherlands with over 75% of revenue from drug stores (“Marktcijfers”, 2016b). Drugs for the upper respiratory and painkillers are the two product categories of OTC drugs that are sold the most in the Netherlands and represent 40% of the OTC drug revenue (Appendix A). In total 2,360 drug stores, 1,983 pharmacies and 3,460 supermarkets were allowed to sell OTC drugs in 2016 (“Marktcijfers”, 2016a). In the Netherlands, drugstores are typically in close proximity to consumers in all regions (“Dossier Drogisterijen”, 2013). In the Netherlands, the ratio pharmacy per number of inhabitants is one to 8.407 (“Marktcijfers”, 2016a). Pharmacies are generally easily accessible.

4.2.2 OTC store brand painkillers

The product class that is examined in this study is OTC painkillers. OTC painkillers are used to treat pain. These drugs are available at the drugstore, gas station, supermarket, and pharmacy. In a study that examined the use of OTC drugs in the Netherlands (Van Dijk et al., 2010), 87% of the respondents (N = 783) indicated to have used OTC drugs in the last five years. About 82% of those consumers purchased painkillers. There are also store brand

variations of OTC painkillers. Examples of store brand painkillers are the Kruidvat Paracetamol which is a drug store brand. An example of a national brand painkiller is Advil. Store brands of painkillers are widely available in the Netherlands. Respondents are asked about their perception of store brands of OTC painkillers and their knowledge about OTC drug painkillers. The benefit of choosing store brand painkillers as the subject of the survey is that these are recognizable and identifiable to most consumers. The term 'generic' might not be well-known to most consumers. Asking about generic drugs might be confusing to respondents and otherwise, demand a thorough explanation that gives away too much information about the property of generic drugs. This might harm the research since the purpose is to investigate whether knowledgeable consumers might have different perceptions and attitudes towards generic OTC drugs. For this reason, the knowledge about generic drugs properties is instead tested in the objective knowledge test, without providing any specific information about them in the survey.

4.3 Sampling

The purpose of sampling is to collect accurate and representative findings without examining the whole population (Denscombe, 2014). The researcher can make inferences about the populations by studying the sample. The Netherlands has a total resident population of approximately 16,979,120 million in 2016 of which 13,562,539 were 18 years of age or older (CBS statline, 2017). The total population element for this study is determined by the number of consumers who are 18 years of age or older in the Netherlands. Approximately 13,562,539 people qualify for this requirement, although the sampling frame is smaller. To estimate the sample size, that is required for accurate results, the following equation can be used to calculate the sample size for a finite population (Krejcie & Morgan, 1970).

$$s = \frac{X^2 NP(1-P)}{d^2\,(N-1) + X^2 P(1-P)}$$

s = required sample size

X = z-value

N = population size

P = population proportion

d = degree of accuracy (margin of error)

This method, to determine sampling sizes, is comparable to the sample size formula of Cochran (1977). Cochran defines the margin of error as the acceptable risk that is acceptable for the researcher. This margin of error is typically .05 in social studies. The Z value in the

formula correspondents with the significance level (i.e., alpha level). The significance level indicates the risk of a type I error and is set by the researcher. Typically, this is set at .10 or lower. The population proportion is usually set at .50. When the significance level is set at .10 the required sample size is 271, for a significance level of .05 a sample size of 385 is required. Ideally, the researcher wants to improve the statistical power by increasing the sample size to reduce the chance of a type II error. The appropriate sample size is also dependent on the statistical analysis that is performed. In practice, social studies frequently have a pragmatic approach and use non-probability sampling (Dendscombe, 2014). In this study, non-probabilistic purposive sampling will be applied which means that the researcher sets the parameters that determine which members of the population will be included. This method of sampling is subjective. This method is chosen because recourses are limited and this paper is a part of a graduate program.

4.4 Instrumentation

In this part, the measurement items will be presented. Also, the validity and reliability are discussed. An overview of the survey items that are used to measure the variables attitude, perceived risk and subjective knowledge can be found in table 4 at the end of this subchapter.

4.4.1 Attitude

Burton, Lichtenstein, Netemeyer and Garretson (1998) developed a scale for measuring attitude toward store brand products. The scale consists of a multi-item psychometric measure of store brand attitude. Items are selected on their predictive value and consist of statements that link to the relationships between store brand attitude and latent constructs such as consumer price perceptions and other marketing constructs (e.g. brand loyalty). Items are rated by respondents on a 7-point Likert-type scale that ranges from 1 (strongly disagree) to 7 (strongly agree). Six items were tested in the study after pretesting. The internal consistency was found to be supportive of the scale with a coefficient α (Cronbach alpha) of .87. The scale seems to be valid for explaining store brand purchase behavior, assuming pre-purchase attitude is equal to post-purchase attitude. The scale is used in this current research because it has been proven valid and is specifically designed to measure store brand attitude. A detailed overview of the items that are adopted from Burton et al. (1998) is presented in table A1, Appendix A.

4.4.2 Perceived risk

Stone and Grønhaug (1993) measured perceived risk with the use of three items for each risk dimension. Items are measured on a 7-point Likert-type scale that ranges from 1 (‘strongly’ disagree) to 7 (‘strongly’ agree). Because of the context-specific nature of perceived risk, all six dimensions used by Stone and Grønhaug may not have a significant influence in the case of OTC drugs. The dimensions that are utilized to measure perceived risk in this study are the physical, financial and performance risk dimensions. Adaptations to the items developed by Stone and Grønhaug (1993) will be according to two store brand OTC drugs related studies that have used the measurement as presented by Stone and Grønhaug (1993) with slight changes in the formulation of words. The first study by González Mieres, María Díaz Martín and Trespalacios Gutiérrez (2006) investigated perceived risk for store brands. The second study by Rozano Suplet, Gómez Suárez and Diaz Marting (2009) examined the perceived risk of generic drugs. Items used in this current study are presented in detail in table A3, Appendix A.

4.4.3 Subjective knowledge

The measure of subjective knowledge used in this current study is based on the measure developed by Flynn and Goldsmith (1999). Their study resulted in the development of a scale consisting of five items. Reliability of the scale was assessed and coefficient α ranged .87 to .94 across various product categories, indicating a high internal consistency. The final scale was proven to be valid by using multiple statistical methods to assess the validity. Factor analysis showed that a large portion of the variance was explained by these five items. Items are rated by respondents on a Likert-type 7-point scale that ranges from 1 (strongly disagree) to 7 (strongly agree). A detailed overview of the items that are adopted from Flynn and Goldsmith (1999) are presented in Table A2 of Appendix A.

4.4.4 Objective knowledge

The procedure of developing the objective product category knowledge test in this current study is consistent with the method used in previous research (c.f., Raju, Lional & Mangold, 1995; Park, Mothersbaugh & Feick, 1994). The objective knowledge test measures the general knowledge about OTC drugs and specific knowledge about the OTC drug product category such as knowledge about active ingredients of brand-name drugs within that category. Questions are partially adopted from the druggist exams that are usually taken to meet the requirements set by the government to ensure the responsible provision of care to customers. Access to these questions are gained through collaboration with the branch

association of drug stores (CBD) and are made available by the exam institute Pharmacon. The remainder of the questions is developed with the use of information about OTC drugs that is freely accessible on the website of the branch association of pharmacists (KNMP). The final ten items are judged on accuracy and relevance by a local pharmacist (MSc.). The questions are multiple choice with a maximum score of ten questions answered correctly. The number of correct answers forms an objective knowledge index score. The final ten items can be found in figure A1, Appendix A.

4.4.5 Validity and reliability

Validity. In quantitative research, the construct validity is fundamental to conducting a valid research. The purpose of the construct is to describe or explain a naturally occurring phenomenon. The validation of these constructs is concerned with the generalizability of results across studies (Cronbach & Meehl, 1955), and the correspondence between the measurements of these constructs (Peter, 1981). To ensure the validity of the constructs, the focus in this paper is the degree to which the instrument measures what it intends to measure. The theoretical part of this current paper provides the necessary theoretical concepts and their relevance for the purpose of ensuring the construct validity. The instruments that are used in this research are adopted from prominent articles and are found to be valid and consistent in recent research. The validity is also tested using an exploratory factor analysis. Exploratory factor analysis is especially useful in the case of latent variables. These variables might not be directly measured, for example with the use of a single item, and require a measurement of various aspects of the variable. The exploratory factor analysis is discussed in the Analysis Chapter.

Reliability. The reliability of an instrument is defined as the degree in which it is accurate and consistent (Peter, 1979). To ensure the reliability, the survey questions are clear and unambiguous so that they cannot be interpreted differently by various respondents. The completion time is kept around five minutes to avoid fatigue as an external source of variation. The internal consistency is warranted when multiple items of a test measure relate to a single concept. The internal consistency is tested by using the Cronbach alpha (Cronbach, 1951). The internal consistency analysis is further discussed in the Analysis Chapter. An overview of the items used in this current study can be found in table 4. Objective knowledge is not presented in this table because it is basically a test score of the objective knowledge test in the survey.

Table 4

An Overview of the Survey Items

Variable	Measurement
Attitude	In general, store brand OTC painkillers are poor-quality products.*
	I love it when store brands of OTC painkillers are available.
	The best buy is usually the store brand of OTC painkillers.
	Buying store brands of OTC painkillers make me feel good.
	Considering value for money, I prefer store brand OTC painkillers to national brand OTC painkillers.
	When I buy a store brand OTC painkiller, I always feel that I am getting a good deal.
Perceived performance risk	Purchasing a store brand OTC painkiller causes me to be concerned about the performance of the drug.
	I think that if I were to purchase a store brand OTC painkiller, it will not really work as well as it is supposed to.
	The thought of purchasing a store brand OTC painkiller causes me to worry about the trustworthiness of the drug.
Perceived physical risk	I worry that if I would purchase a store brand OTC painkiller, it may cause me some physical harm.
	One concern I have about purchasing store brands OTC painkillers is that it may not be safe for me or my family.
	I am afraid that if I were to purchase a store brand OTC painkiller, it may endanger my health.
Perceived financial risk	I think purchasing a store brand OTC painkiller is not a wise way of spending money.
	I think purchasing a store brand of an OTC painkiller is a waste of money.
	Purchasing a store brand OTC painkiller causes me to worry that the product won't be worth the money.
Subjective knowledge	Compared to most other people, I know less about OTC painkillers.*
	I know pretty much about OTC painkillers.
	I do not feel very knowledgeable about OTC painkillers.*
	Among my circle of friends, I am one of the "experts" on OTC painkillers.
	When it comes to OTC painkillers, I really don't know a lot.*

* = reverse scored

Note. All items are rated on a 7-point scale that ranges from 1 (strongly disagree) to 7 (strongly agree).

4.5 Survey Development and Structure

4.5.1 Translation

The questions in English are translated into Dutch by the author. The back translation is carried out by a Dutch resident who has lived in England for several years, received a high level of education and has a high proficiency in English. For the final step, the back translated questions are compared with the original English questions, to see if any meaning was lost in the process. Minor changes were made to the wording of some questions to avoid ambiguous meaning.

4.5.2 Pretest

A pretest was conducted to eliminate any inconsistencies in the survey and to optimize the survey for the purpose of the research. Pretesting is a pilot study that is used to evaluate the survey on how well it functions (Churchill, 1979). There are three methods for administering the pretest survey (Hunt, Sparkman & Wilcox, 1982): (1) personal interviews, (2) telephone interviews, and (3) mail self-reports. The best method is suggested to be personal interviews because the researcher can observe respondents' reaction and attitude (Boyd, Westfall & Stasch, 1977). A debriefing method, therefore, was conducted: Respondents were asked to fill in the survey and the survey was concluded with a short personal interview. Interviews were held by the author. The number of respondents that is recommended for pretesting is about 20 but is not fixed and ultimately relies on the complexity of the instruments (Hunt, Sparkman & Wilcox, 1982). In total 21 respondents completed a paper survey which is deemed sufficient by the author to gain valuable insights.

The surveys were conducted in the train in the afternoon near Rotterdam within 15 minutes of travel time intervals. The subject of the survey was communicated verbally in advance and key points such as anonymity were explained to the potential respondents. The response rate was around 80%. Respondents reacted positively to the fact that no medical information was asked in the survey despite the health-related subject. Another observation was the positive reaction towards the estimated completion time of the survey. Several respondents stated that they wanted to fill in the survey because of the affiliated university and out of interest to participate in a study. Respondents generally finished within ten minutes, with an estimated average completion time of five minutes. The average right questions answered of the objective knowledge test was 5.48 / 10 with a standard deviation of 1.57 which is acceptable. On the last page, respondents could indicate if the survey was clear

to them. 80% of the respondents thought the survey was completely clear to them (1 non-response excluded).

One respondent stated that he felt deceived by the subject of the survey. The respondent felt that the questions were too cryptic. This respondent did complete the survey but halfway through the survey did not have any motivation to answer the questions in a serious manner which resulted in extreme responding. Two respondents wished the introduction about OTC drugs was a bit more comprehensive to communicate the purpose of the survey and the subject matter. Two respondents thought that their answer would not have any added value because they had no experience with OTC drugs. One respondent found some of the possible answers to the objective knowledge test discouraging because the words were too complicated.

As a result of the pretest, several unnecessarily complicated words in the objective knowledge test were replaced. A short introduction to the objective knowledge test was added to explain that the questions might be complex. The introduction of the survey was also made more comprehensive. A better explanation of the research subject may lead to higher trust, reliability, and lower perception of deception. Some questions were slightly reworded to avoid questions to be cryptic. Respondents without any experience with OTC drugs are directly addressed in the introduction by stating that experience is not a requirement to complete the survey. This pretest was especially of value because of the gained insights about the clarity of the questions and to understand how the survey could be made more user-friendly.

4.5.3 Structure

The structure of the survey is as follows: First, the purpose of the research and the research field is communicated. This part also indicates that the purpose of the research is scientific and filling in the survey is of value because it helps a graduate student with research. Second, key elements of the survey are summed up, which include the estimated completion time, the confidentiality and anonymity of the responses, and that no medical information will be asked. This way the respondent knows what to expect. Third, an introduction to the specific topic of the survey is given to make sure all respondents know what the definition of a brand store OTC drug is. Fourth, a complete 7-point scale is made visible so that the respondent is aware of the meaning of the numbers when they give answers on the scale. Fifth, items about consumers' perceptions are followed by an objective

knowledge test. This test is introduced by a short text to indicate that the questions might be complex and that it is not out of the ordinary that a respondent does not know all the answers. This way respondents are encouraged to complete the test anyway. Also, this test is at the end of the survey to avoid response bias. The survey is concluded with demographic questions. These questions are put at the very end of the survey because they might be sensitive. Finally, a comment box is provided in the survey for feedback.

4.6 Direct Effects

The purpose of the survey questions is to establish a measurement of the variables in the conceptual model. The first step is to perform a factor analysis on the dataset that the survey generated. The factor analysis reveals the components in the dataset. The results are used to reduce the data to a set of variables. The direct effect is the effect of one variable to another. To examine these relationships, a preliminary analysis is carried out by examining the Pearson correlation coefficients. The Pearson correlation coefficient is calculated by the covariance of two variables divided by the product of their standard deviations. Two variables are correlated when there is a linear coherence between the two.

An Ordinary Least Squares (OLS) multiple regression analysis is then performed to predict the outcome variable from the predictor variables. During the analysis, additional assumptions are checked. The theoretical model is represented by equations (2-5). In these equations β_0 is the intercept, β_1- β_5 are the standardized coefficients of the predictor variables, and ε is the error term. It is unrealistic to assume that predictor variables are uncorrelated with external variables, hence this influence in captured by the error term (ε). Any omitted variables are represented by this term. The sign of the coefficients is used to interpret the effect (positive or negative). In equation (2) the outcome variable is the attitude toward generic OTC drugs and in equation (3-5) the outcome variables are the types of perceived risk toward generic OTC drugs. The standardized regression coefficients allow for making comparisons between effect sizes.

H_1- H_4:

(2)

$$attitude = \beta_0 + \beta_1 \times perceived\ performance\ risk + \beta_2 \times perceived\ financial\ risk + \beta_3 \times perceived\ physical\ risk + \beta_4 \times subjective\ knowledge + \beta_5 \times objective\ knowledge + \varepsilon$$

H_{5}- H_{7}:

(3)

$$Perceived\ physical\ risk = \beta_0 + \beta_1 \times subjective\ knowledge + \beta_2 \times objective\ knowledge + \varepsilon$$

(4)

$$perceived\ financial\ risk = \beta_0 + \beta_1 \times subjective\ knowledge + \beta_2 \times objective\ knowledge + \varepsilon$$

(5)

$$perceived\ performance\ risk = \beta_0 + \beta_1 \times subjective\ knowledge + \beta_2 \times objective\ knowledge + \varepsilon$$

Equations (2-5) examine the direct effects on an outcome variable. To test for mediation, the indirect effects are required to be examined. This next subchapter briefly discusses the theory behind mediation and techniques used to examine mediation. This is followed by the method used in this current study to test the indirect effects.

4.7 Mediation Effects

In social studies, there is an often made distinction between two types of effects that clarify the ways in which third variables may account for differences in behavior (Baron & Kenny, 1986): (1) moderation, and (2) mediation. Moderation is the effect of a variable that alters the strength and/or direction of a relationship between a predictor and an outcome variable. For example, customer characteristics such as income may have a moderating effect on the relationship between customer satisfaction and repurchase intention (Seiders, Voss, Grewal & Godfrey, 2005). Simplified, this means that the relationship between satisfaction and repurchase intention is different for consumers that have different income profiles. Thus, a moderator indicates when these effects occur, without clarifying why these effects occur. To the contrary, mediation explains the underlying mechanism that influences the relationship between a predictor variable and an outcome variable through a mediator variable. An example of a mediating variable is the attitude towards advertising as a mediator of the relationship between brand cognition and intention to try the brand (MacKenzie, Lutz & Belch, 1986). The mediator in this example explains why the strength and/or direction of the relationship between brand cognition and intention to try the brand is altered through

mediation. Typically, a distinction between a total and a direct effect is made to examine the mediation effects.

4.6.1 Causal steps approach

Baron and Kenny (1986) further explain the difference between both effects in their article. They proceed by describing the conditions that must be met for mediation to occur and the *causal step approach* to test if a variable acts as a mediator. The relationship between a predictor variable X and an outcome variable Y is called the total effect c of X on Y (see fig. 2). The direct effect c' is the effect of X on Y when controlled for the mediator M. The paths between the variables are investigated to test for the mediating function of a variable.

The following conditions must be met for full mediation: (I) X significantly predicts variations in Y (i.e., path $c \neq 0$), (II) X significantly predicts variations in M (i.e., path $a \neq 0$), (III) M significantly predicts variations in Y (i.e., path $b \neq 0$), when controlling for X, (IV) the relationship between X and Y is no longer significant, when controlling for M ($c' = 0$).

The total effect (c) is equal to the direct effect of X on Y (c') and the indirect effect (a×b) equation (4). Path c' equals zero in the case of full mediation and c becomes equal to a×b. In partial mediation the effect of X on *Y* is still significant but is reduced significantly.

$$c = c' + a \times b \qquad (4)$$

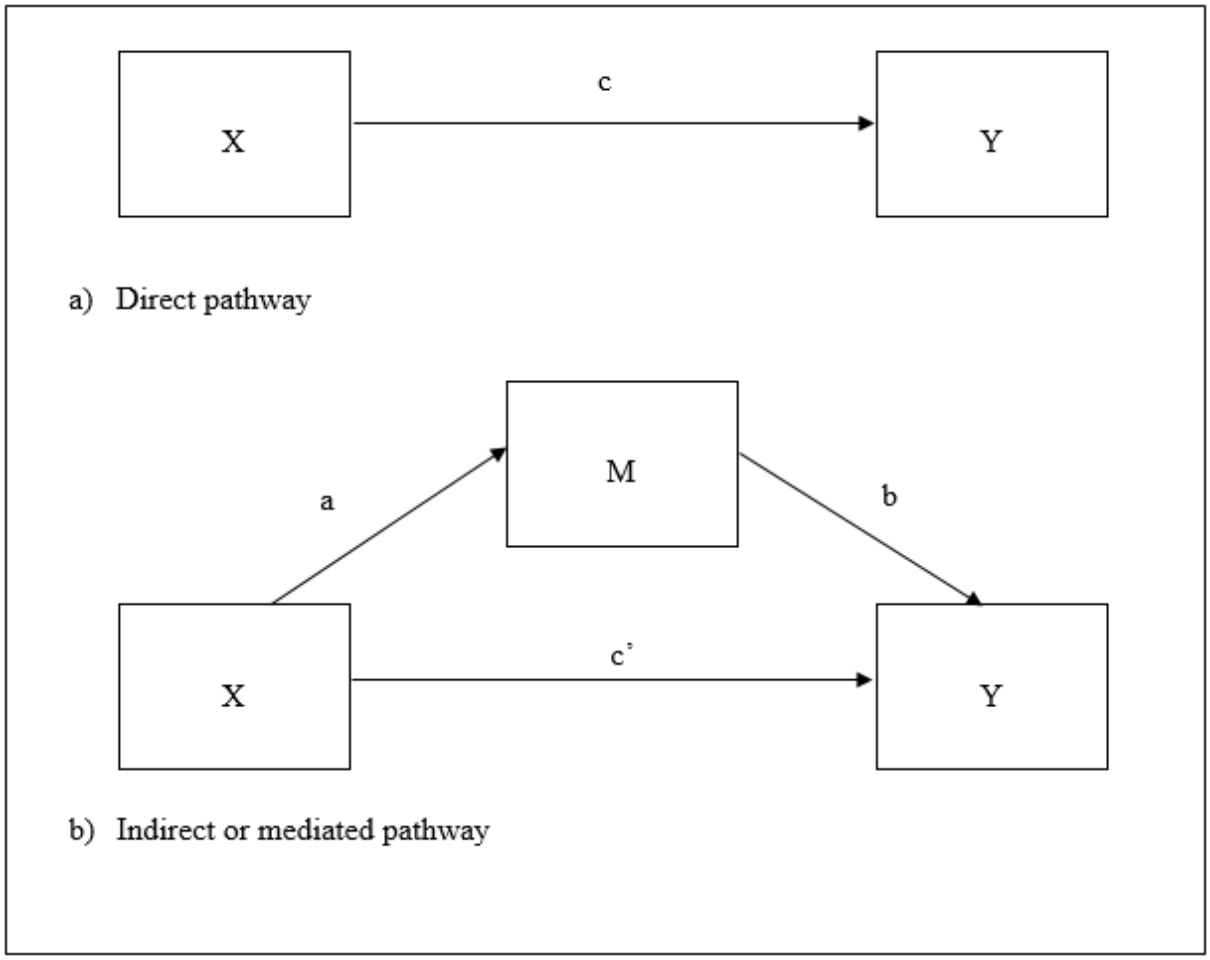

Figure 2: Illustration showing the simple mediation model.

Baron and Kenny propose three regressions to test for the individual paths, resulting in equation (5) -(7).

$$Y = i_1 + cX + \varepsilon_1 \quad (5)$$

$$Y = i_2 + aX + \varepsilon_2 \quad (6)$$

$$Y = i_3 + c'X + bM + e_3 \quad (7)$$

In these equations, *i* represents the intercept coefficient and ε is the error term. Equation (7) is the multiple regression model with the mediator as a second independent variable. The second part of the mediation analysis concerns the analysis of the indirect effect. They suggest a variation of the Sobel z-test for testing the significance of the indirect effect.

In this equation (8), the denominator represents the pooled standard error of a×b and the nominator the indirect effect.

$$z = \frac{a \times b}{\sqrt{b^2 s_a^2 + a^2 s_b^2}} \qquad (8)$$

4.6.2 Perceived risk as mediator

In this current study, it is investigated if perceived risk acts as a mediator in the relationship between consumer product category knowledge and attitude towards generic OTC drugs. The method of testing the mediation effect is different from the causal steps approach. Baron & Kenny (1986) state that there would only be a strong mediation when there is not a significant direct effect when controlling for a and b, (c'= 0). The main criticism with this interpretation is that mediation should be measured by the strength of the indirect effect and not by the absence of the direct (c') effect (Zhao, Lynch and Chen, 2010). Only a significant indirect effect (a×b) should be a requirement of establishing mediation. A significant total effect is also not a prerequisite for mediation to take place (Shrout & Bolger, 2002). Instead, the significance of indirect effect determines mediation and the significance of the direct effects define the type of mediation.

For testing this indirect effect, Baron and Kenny recommend the aforementioned Sobel test. The main problem with this test is that the distribution of the indirect effect is often not normal distributed because it is a product of the two parameters and the Sobel test assumes the distribution of the product to be normal. The Sobel test often requires a large sample to have adequate statistical power (MacKinnon, Lockwood & Williams, 2004). Thus, the Sobel test is conservative because it is based on the presumption of a normal and symmetric distribution of the indirect effect, and this is one of the reasons it is now commonly replaced by bootstrapping (Kenny, 2016). Preacher and Hayes (2004) also argue that the Sobel test is often not sufficient and emphasize the greater power of the bootstrap test. Zhao et al. (2010) support the use of this test. Bootstrapping allows for an empirical investigation of the distribution of a×b that relies on random sampling (with replacement). In this method, a new sample distribution is built by repeatedly drawing random 'bootstrap' samples from the original sample that has *N* cases. The coefficient can be calculated for each bootstrap sample (Field, 2009). Thus for each bootstrap sample, a coefficient of a×b is estimated, leading to *k* estimates, where *k* is the number of bootstrap samples. For example, *k* = 5000 bootstrap samples lead to 5000 estimations of a×b. These *k* estimates are then ordered from small to

large and according to the set confidence interval (typically 95%) an upper and lower limit can be established (Hayes, 2009). The standard error is then an estimation of the standard deviation derived from the sample distribution. One problem with this percentile-based bootstrap confidence interval is that it can be biased when the interval is not centered on the true a×b value. This is possible because of the tendency to underestimate the error rates, thus not accounting for the extreme values in the original sample. This can be corrected by creating a bias corrected bootstrap interval (Efron, 1987). The benefit is that it increases the power of the significance test for a×b. A disadvantage that should be noted is that it increases the Type I error rate (Hayes & Scharkow, 2013). Thus, the bootstrap method with the bias-corrected intervals offers greater power (improvement type II error) at the cost of an increase of the type I error.

Bootstrapping is a relatively simple and straightforward method that offers many benefits for assessing the indirect effect. Moreover, it does not require the data to be normally distributed. Bootstrapping as a method for testing mediation is used recently in articles appearing in *The Journal of Marketing* and *The Journal of Marketing Research* (Müller-Stewens, Schlager, Häubl & Herrmann, 2017; Naylor, Lamberton & West, 2012; Zhang, Wedel & Pieters, 2009).

In this current paper, a bias corrected bootstrap method is applied using the PROCESS (Hayes, 2012) plugin for SPSS[2].

The following steps are followed in this current paper:

1. Determining if the a-path and b-path are significant
2. Determining if the a×b effect is significant, using a bootstrap method
3. Identifying the type of mediation based on the direct effects

The following types of mediation and non-mediation can be identified using the output (Zhao, Lynch & Chen, 2010):

I. *Indirect only mediation*: when a×b is significant, but c' is not.
II. *Complementary mediation*: when a×b and c' are significant, and have the same direction.
III. *Competitive mediation*: when a×b and c' are significant, and have the opposite direction.

[2] The PROCESS macro for SPSS is available at: http://www.processmacro.org/index.html

IV. *Direct only nonmediation*: when a×b is not significant, but c’ is.

V. *Noneffect nonmediation*: when neither a×b and c’ are significant.

The discussion of this method concludes this chapter. The validity and reliability of the instrumentation are discussed and the steps for testing the hypotheses are presented. The next step is to conduct the analysis. The following chapter will discuss the implementation of the method and the analysis of the data. The main objective of this next chapter is to assess the hypotheses based on the analysis of the data.

5. Analysis

5.1 Sample

In total 164 respondents participated in the online and offline survey. Of those respondents, 101 respondents participated in the online survey and 63 respondents participated in the offline survey. Three offline surveys are considered to be incomplete for further analysis. These three surveys have missing data for items that are used to analyze the research model. One offline survey is discarded because the respondent is under 18 years. In the end, a total of 160 cases is used for the analysis of the research model ($N = 160$). Missing answers to the demographic questions are left in the data and are treated as missing values in SPSS. The surveys were taken during a time period of five weeks in May and June 2017. The paper survey is spread in the train and in a local neighborhood in Leiden, The Netherlands at daytime.

This part is a summary of the basic features and provides information about the sample (see tables B1-B6, Appendix B). Of the 160 respondents 56% is female and thus the sample is almost equally divided between genders. There are more young people represented in the sample, with a total of 76% respondents falling in the age category of 55 years and younger. A possible explanation is that older people are, according to the author, more difficult to reach in public places for the paper survey and might have difficulties to complete an online survey. Also, the online survey is mainly spread amongst friends and acquaintances that fall into younger age categories. Likewise, the respondents with a scientific educational background might be overrepresented with 38%. The number of respondents employed in a health-related field is also possibly higher than average. This, however, does not necessarily forms a problem for the analysis of the research model because it causes higher variation in the sample since these respondents are expected to have better health knowledge. It does, however, cause some concern for the representativeness of the sample. An independent *t*-test shows that there is a significant difference in the objective knowledge index scores for respondents not employed in a healthcare related field ($M = 6.09$, $SD = 1.79$) and respondents that are employed in that field ($M = 7.08$, $SD = 2.15$), conditions; $t(158) = 2.49$, $p < .05$. Thus health professionals scored on average almost one point higher on the objective knowledge test.

In figure 4 the locations are displayed in which the respondents most frequently shop at for OTC drug painkillers. Answers of eight respondents are not included because they

either did not fill in their answer or chose more than one location as their answer. Noteworthy, the drug store is clearly the location at which most respondents chose to purchase OTC drug painkillers with 62%. This is followed by the supermarket (17%) and the pharmacy (12%). A possible explanation is that drug stores and supermarkets offer convenience and especially drug stores might be more associated with OTC drug painkillers.

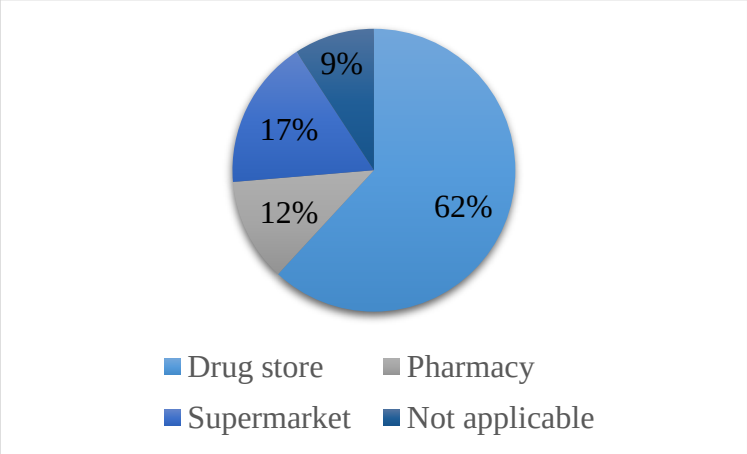

Figure 4. The percentage respondents that most frequently shop at the corresponding location. (*N* = 152)

Finally, 81% of 160 respondents stated to have purchased a store brand OTC painkiller in the past year and 84% stated to have used a store brand OTC painkiller. This is much higher than for national brand OTC painkillers with 44% and 52% respectively. This is an indication that overall attitude towards generic OTC painkillers may be positive.

5.3 Exploratory Factor Analysis

An exploratory factor analysis is conducted to ensure the validity. Strictly speaking, Likert-type scale items are qualified as items that produce an ordinal scale variable and are therefore not always reliable in factor analysis (Field, 2009). Nonetheless, in this research, the exploratory factor analysis is applied to explore the data. It is assumed that the intervals appear equally. In the preparatory data analysis, a descriptive analysis is performed on the standardized item values. No univariate outliers were identified with a cut-off z-score of +3.29/ -3.29, which means that no data points are found with a *p*-value less than .001 (see table B7, Appendix B).

5.3.1 Sample adequacy

The sample size is generally recommended to be at least containing 100 observations for each item or at least five times as many observations for each item variable. Based on this rule of thumb, the sample size of 160 would suffice. However, the usefulness of this rule of thumb might not be great (MacCallum, Widaman, Zhang & Hong, 1999). Therefore, special interest is paid to the communalities of the items. Prior to the factor analysis, Pearson correlation is used to determine if the items, theorized to measure a single latent variable, correlate with each other. The objective knowledge item is not included because it represents the number of correct answers given in the objective knowledge test and serves as a direct measure of objective category knowledge. This item will be used in the actual factor extraction analysis to get a complete idea of the dataset. The correlation matrices (see tables B8 –B12, appendix B) show that items intended to measure a not directly measured (latent) variable are significantly correlated. All correlations are above .30 and indicate that it is useful to proceed with the factor analysis (Janssens, Wijnen, Pelsmacker & Van Kenhove, 2008). One exception can be found in the correlation matrix of items measuring attitude in which one item (ATT1) does not have correlations with other items below .30 (see table B8, appendix B). This indicates that this item may need to be removed after reviewing the first exploratory factor analysis.

Initially, 21 items are examined. These items are theorized to measure the latent variables: attitude, subjective knowledge, objective knowledge and perceived risk. The input of the factor analysis will be the correlation matrix. After examining the correlation matrix, the next step is the analysis of Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity. These criteria provide further insights into the correlation between item variables. Ideally, there is a sufficient level of correlation between item variables present. The Bartlett's test of sphericity has a null hypothesis that states that the item variables are uncorrelated. The Bartlett's test of sphericity is significant (χ^2 (210) = 2818.61, $p < .001$). This means there is significant evidence to reject the null hypothesis and there is some degree of correlation between the item variables. The KMO statistic summarizes partial correlations compared to the zero-order correlation. The KMO measure gives a value of .90 which is a great value (Field, 2009). The KMO values for individual item variables are produced on the diagonal of the anti-image correlation matrix (Table B13, Appendix B). The anti-image correlation matrix shows that the diagonals are above .80, which is well above the acceptable limit of .50 (Field, 2009). The off-diagonal values are low, which is also considered good.

5.3.2 Principal component analysis

Altogether the KMO shows the sample is adequate and predicts good factorability. The next step is the extraction of factors. The method that is applied is the principal component analysis (PCA). Contrary to the statement before, this applied method is theoretically different from the factor analysis (FA), although there are many similarities. The main difference is that factor analysis is a mathematical way of estimating the underlying factors that maximize shared variance, while PCA estimates what components in the data consists with respect to a linear combination of variables. In short, the main purpose of PCA is to reduce the data to a number of orthogonal components. This method lends itself well to psychometric research and is ideal for basic analysis.

The first step in PCA is the examination of the eigenvalue. This step helps to identify the linear components in the data. The eigenvalue gives an idea of the variation within the data that can be explained by an individual component. There are 21 components because there are 21 item variables. In SPSS, the factors are by default retained with the use of the Kaiser's criterion (1960). The top three components have eigenvalues greater than Kaiser's criterion of 1. This rule is somewhat arbitrary (Fabrigar, Wegener, MacCallum & Strahan, 1999) and the author chose a fixed number of six factors to extract, based on the theoretical support presented in this paper. The first six components explain 80% of the total variance (see Table B14, appendix B). To evaluate the extraction of factors the communalities are examined to see the proportionality of common variance and show how much variance can be explained by the factors after extraction. The communalities are all above .5 (see Table B15, Appendix B). The average of communalities is above .8 and this is considered acceptable (Field, 2009).

Rotation. A technique to establish how well variables load onto a factor is a rotation. Rotation is used to obtain factors that are easy to interpret. The loading of a variable onto a factor tells how important that variable is to that factor. There are in general two types of rotation (Field, 2009). The first type is an orthogonal rotation. In the orthogonal rotation, the factors are rotated in such a way that they remain uncorrelated. The second type is an oblique rotation. In the oblique rotation, the factors are permitted to correlate after rotation. Typically, this type of rotation is used when the factors theoretically are assumed to correlate. In this PCA, the oblique rotation is applied because the factors are expected to correlate. The chosen method is Oblimin rotation with Kaiser normalization. The pattern matrix with all 21 items included shows that the items clearly cluster together on six components as expected (see

table B16, appendix B), with the exception of one item (ATT1). This item loads on a different component than expected. A possible explanation is that this is the only item intended to measure attitude that is reverse scored. The question that belongs to this item is negatively worded. Also, that question might be misunderstood since it was the first question of the survey. ATT 1 is eliminated and the PCA is repeated. Oblimin rotation with Kaiser normalization produces a new pattern matrix. Items that cluster together suggest that

- component one represents perceived physical risk of store brand OTC painkillers (PR_PHYS)
- component two represents the subjective knowledge of OTC painkillers (SK)
- component three represents the attitude toward store brand OTC painkillers (ATT)
- component four represents the perceived performance risk of store brand OTC painkillers (PR_PERF)
- component five represents the perceived financial risk of store brand OTC painkillers (PR_FIN)
- component six represent the objective knowledge of OTC painkillers (OK)

Together these six components explain 81% of the total variance (without ATT1). The components and corresponding items are consistent with the expected number of components. The results are summarized in table 3.

5.3.2 Reliability

The PCA suggest that there are six components based on the dataset with the objective knowledge index excluded. A reliability analysis is run to measure the consistency of the survey. Cronbach's alpha (α) is used to examine the reliability. This coefficient takes a value between 0 and 1. A value of .6 and more indicates a satisfactory internal consistency reliability (Malhotra, 2004).

Attitude towards store brand OTC painkillers has an overall α of .85, perceived performance risk of store brand OTC painkillers an overall α of .91, perceived physical risk of store brand OTC painkillers an overall α of .96, perceived financial risk of store brand OTC painkillers an overall α of .93 and subjective knowledge of OTC painkillers an overall α of .90 (see tables B17-21, appendix B). When one of the attitude items is deleted (ATT1), the overall α improves to .87. These values are considered good to superb (Field, 2009). Based on the resulted reports above this item (ATT1) is eliminated for further analysis. A summary of the PCA and reliability analysis can be found in table 3.

Table 3

Summary of the Exploratory Factor analysis

	Component					
Item question	PR_ PHYS	SK	ATT	PR_ PERF	PR_ FIN	OK
I love it when store brands of OTC painkillers are available.			.65			
The best buy is usually the store brand of OTC painkillers.			.80			
Buying store brands of OTC painkillers make me feel good.			.80			
Considering value for money, I prefer store brand OTC painkillers to national brand OTC painkillers.			.79			
When I buy a store brand OTC painkiller, I always feel that I am getting a good deal.			.85			
Purchasing a store brand OTC painkiller causes me to be concerned about the performance of the drug.				.83		
I think that if I were to purchase a store brand OTC painkiller, it will not really work as well as it is supposed to.				.82		
The thought of purchasing a store brand OTC painkiller causes me to worry about the trustworthiness of the drug.				.84		
Compared to most other people, I know less about OTC painkillers.*		.79				
I know pretty much about OTC painkillers.		.73				
I do not feel very knowledgeable about OTC painkillers.*		.89				
Among my circle of friends, I am one of the “experts” on OTC painkillers.		.66				
When it comes to OTC painkillers, I really don’t know a lot.*		.91				
I worry that if I would purchase a store brand OTC painkiller, it may cause me some physical harm.	.72					
One concern I have about purchasing store brands OTC painkillers is that it may not be safe for me or my family.	.69					
I am afraid that if I were to purchase a store brand OTC painkiller, it may endanger my health.	.68					
I think purchasing a store brand OTC painkiller is not a wise way of spending money.					.94	
I think purchasing a store brand of an OTC painkiller is a waste of money.					.94	
Purchasing a store brand OTC painkiller causes me to worry that the product won’t be worth the money.					.62	
Objective knowledge item						.78
Eigenvalues	4.4	4.9	4.7	5.4	6.0	1.8
% of variance	44	15	10	5	4	3
α	.96	.90	.87	.91	.93	—

Note. The pattern matrix shows the factor loadings after extraction with PCA and rotation with Oblimin and Kaiser normalization. Small coefficients with absolute values < 0.45 are suppressed. * = reverse scored.

5.4 Preliminary Analysis

A principal component analysis is run to identify the components in the dataset. After the factor analysis, the data is reduced to a set of variables by computing the average of the items that load onto one component. Perceived performance risk (PR_PERF), perceived financial risk (PR_FIN), perceived physical risk of store brand OTC painkillers (PR_PHYS), subjective knowledge of OTC painkillers (SK) and attitude towards store brand OTC painkillers (ATT) are the variables that are computed. The objective knowledge index (OK) measures the objective knowledge of OTC painkillers. Before testing the hypotheses, it is important to examine the properties of these variables.

5.4.1 Descriptive statistics

OK has the most variance with a standard deviation of 1.88. Most respondents had 7 out of 10 questions correct. ATT is negatively skewed. The average of 4.58 suggests that on average the respondents have a positive attitude towards store brand OTC painkillers. The variables ATT, PR, and SK and OK are assumed to be continuous. Strictly speaking, they are at least at the ordinal level. The author assumes them to be at the interval level. The shape of the histogram of frequencies indicates that ATT, SK, and OK are normally distributed and PR_PERF, PR_FIN, and PR_PHYS are not normally distributed (see figures C1-C6, Appendix C). A descriptive analysis is done to analyze the kurtosis (the tailedness of the distribution) and the skewness (see table 4). PR_PERF, PR_FIN, and PR_PHYS are positively skewed, $p < .001$. PR_FIN, and PR_PHYS display significant kurtosis, $p < .05$. No univariate outliers were identified with a cut-off z-score of +3.29/ -3.29, which means that no data points are found with a p-value less than .001 (see table B22, Appendix B). Table 4 provides a summary of the descriptive properties.

Table 4

Descriptive Statistics

						Assumptions	
	M	*SD*	Mode	$Z_{skewness}$	$Z_{kurtosis}$	Scale level	Distribution
ATT	4.58	1.29	4.00	-1.89	0.26	interval	normal
OK	6.25	1.88	7.00	-0.48	-0.94	interval	normal
SK	3.94	1.54	4.00	0.56	-1.77	interval	normal
PR_PERF	2.51	1.51	1.00	4.72	-0.36	interval	not normal
PR_FIN	2.40	1.57	1.00	6.36	2.20	interval	not normal
PR_PHYS	2.36	1.42	1.00	6.68	3.96	interval	not normal

Note. *N* = 160. OK= objective knowledge of OTC painkillers, SK = Subjective knowledge of OTC painkillers, ATT = attitude towards store brand OTC painkillers, PR_PERF = perceived performance risk of store brand OTC painkillers, PR_FIN = perceived financial risk of store brand OTC painkillers, PR_PHYS = perceived physical risk of store brand OTC painkillers

5.4.2 Correlations

A Pearson correlation analysis is run to examine the bivariate correlations prior to the hypotheses testing. A summary of the bivariate Pearson correlation coefficients is displayed in table 5. All correlations are significant, $p < 0.01$ (1-tailed). The knowledge types are negatively correlated with the risk types and positively correlated with ATT. The perceived risk types have negative correlations with ATT. These correlations are consistent with the expected associations based on the theory. Notably, OK and SK show a strong significant correlation. This relationship is moderately high compared to previous empirical research findings (cf., Carlson, Vincent, Hardestly & Bearden, 2008). As expected the risk types are also highly correlated. Based on the theory, these variables are treated as distinctive constructs because they are expected to have differential effects on ATT.

The scatterplots (see figure C7-C17, Appendix C) suggest that there is a negative linear relationship between the perceived risk types and ATT, and a positive relationship between the knowledge types and ATT. They also suggest that there is a negative linear relationship between the knowledge types and the risk types. To establish if the variables actually have significant predictive power within the model, multiple regressions are performed. The next subchapter tests if there is sufficient support for the hypotheses.

Table 5

Pearson Correlation

Measure	ATT	PR_PERF	PR_FIN	PR_PHYS	SK	OK
ATT	—					
PR_PERF	-.40**	—				
PR_FIN	-.45**	.70**	—			
PR_PHYS	-.38**	.71**	.75**	—		
SK	.39**	-.30**	-.37**	-.28**	—	
OK	.30**	-.31**	-.40**	-.37**	.57**	—

Note. $N = 160$
**$p < .01$ (1-tailed).

5.5 Hypothesis Testing

The correlation analysis is followed by a regression analysis. Regression analysis is used to examine the direct relationships and to predict the outcome variable from the predictor variables. Four separate multiple OLS regressions are performed to test the direct effects. A forced entry method is applied in SPSS. At the end, the significance of the indirect effects is examined with a method using bootstrapping.

5.5.1 Direct effects on attitude

A multiple linear regression is calculated to predict the attitude toward store brand OTC drugs, based on the objective and subjective knowledge of OTC painkillers and the various types of perceived risk of store brand OTC painkillers. The results are analyzed to make assumptions about H_1- H_4. The outcome variable is assumed to be a continuous variable. To test for multicollinearity, a variance inflation factor (VIF) test is performed. Multicollinearity is a problem when two or more predictor variables have a high correlation. For this model, the VIF values are not greater than 2.8 and the tolerance levels are greater than .20. Based on these values it can be concluded that there is no multicollinearity (Field, 2009). Visual analysis indicates that the errors are normally distributed (see figures C18-19, Appendix C). The Durbin-Watson test calculated a value close to 2.0. This is satisfactory and indicates that the errors are independent (Field, 2009). One assumption of linear regression is homoscedasticity, which means that the residuals have equal variance and do not depend on the predictor variable values. Visual analysis of the standardized residuals indicates that heteroscedasticity is not present (see figure C20, Appendix C). Table 6 displays the output based on the following equation:

(1)

$$ATT = \beta_0 + \beta_1 \times PR\_PERF + \beta_2 \times PR\_FIN + \beta_3 \times PR\_PHYS + \beta_4 \times SK + \beta_5 \times OK + \varepsilon$$

Table 6

Predictors of Attitude toward Store Brand OTC drugs

	B	*SE*	*β*	*p*	95% CI
Constant	4.62	0.45		0.00	[3.73, 5.51]
Perceived performance of store brand OTC painkillers	-0.12	0.09	-.14	.179	[-0.30, 0.06]
Perceived financial risk of store brand OTC painkillers	-0.23	0.10	-.25*	.029	[-0.43, -0.02]
Perceived physical risk of store brand OTC painkillers	-0.01	0.09	-.02	.880	[-0.20, 0.17]
Subjective knowledge of OTC painkillers	0.20	0.07	.24**	.005	[0.06, 0.34]
Objective knowledge of OTC painkillers	0.01	0.06	.01	.935	[-0.11, 0.12]
R^2	.27				
Adj R^2	.25				
F	11.54				

Note. N = 160. CI = confidence interval.
*p < .05. **p < .01.

A significant regression equation is found $F(5, 154) = 11.54$, $p < .001$, and explains a significant proportion of the variance, $R^2 = .27$. In this model PR_FIN significantly predicts ATT, $\beta = -.25$ $t(154) = -2.21$, $p < .05$. PR_FIN has a significant negative direct effect on ATT and therefore supports H_{1b}. PR_PERF and PR_PHYS do not significantly predict ATT and thus H_{1a} and H_{1c} are not supported. Their estimates are negative as expected and PR_PERF seems to have a stronger relationship with ATT than PR_PHYS, but both variables are not significant predictors of ATT within this model based on their *p*-value (.18 and .88).

SK significantly predicts ATT, $\beta = .24$ $t(154) = 2.84$, $p < .01$. SK has a significant positive effect on ATT and this supports H_2. OK does not have a significant positive direct effect on ATT, and therefore H_3 is not supported. According to the standardized effects and the significance of the effects, H_4 is also not supported. OK does not have a significantly positive stronger effect on ATT. This leads to the following model with the standardized coefficients, based on the findings.

$$ATT = -.25 \times PR\_FIN + .24 \times SK + \varepsilon \qquad (2)$$

5.5.2 Direct effects on perceived physical risk

A multiple linear regression is calculated to predict the perceived physical risk of store brand OTC painkillers (PR_PHYS) by the predictor variables objective and subjective knowledge of OTC painkillers. The VIF values are lower than 1.5 and the tolerance levels are greater than 0.2. This is an indication that multicollinearity is not an issue (Field, 2009). Visual analysis indicates that the errors are fairly normally distributed (see figures C21-22, Appendix C). The Durbin-Watson test value is close to 2.0. This is satisfactory and indicates that the errors are independent (Field, 2009). Visual analysis of the standardized residuals indicates that heteroscedasticity is present (see figure C23, Appendix C). The Koenker test for heteroscedasticity is significant and homoscedasticity is rejected, $p < .05$. This is a limitation to the validity the regression analysis. Table 7 displays the output based on the following equation:

$$PR\_PHYS = \beta_0 + \beta_1 \times SK + \beta_2 \times OK + \varepsilon \qquad (3)$$

Table 7

Predictors of Perceived Physical Risk of Store Brand OTC painkillers

	B	*SE*	*β*	*p*	95% CI
Constant	4.45	0.41		.000	[3.63, 5.26]
Subjective knowledge of OTC painkillers	-0.10	0.09	-.10	.256	[-0.28, 0.08]
Objective knowledge of OTC painkillers	-0.26	0.08	-.31**	.001	[-0.41, -0.11]
R^2		.15			
F		13.33			

Note. $N = 160$. CI = confidence interval.
*p < .05. **$p < .01$.

A significant regression equation is found $F(2, 157) = 13.33$, $p < .001$, and explains a significant proportion of the variance, $R^2 = .15$. SK does not significantly predict PR_PHYS and therefore H_{5a} is not supported. The estimate of SK does seem to suggest a negative relationship with PR_PHYS but the *p*-value (.26) definitely indicates that the effect is insignificant within this model.

OK significantly predicts PR, $\beta = -.31$ $t(157) = -3.49$, $p < .01$. This significant negative effect of OK on PR_PHYS supports H_{6a}. Based on the significance of the effects and the standardized coefficients, H_{7a} is supported. The effect of OK on PR_PHYS is negatively stronger. The model with the standardized coefficients is as follows:

$$PR\_PHYS = -.31 \times OK + \varepsilon \qquad (4)$$

5.5.3 Direct effects on perceived financial risk

A multiple linear regression is calculated to predict the perceived financial risk of store brand OTC painkillers (PR_FIN) by the predictor variables objective and subjective knowledge of OTC painkillers. The VIF values are lower than 1.5 and the tolerance levels are greater than 0.2. This is an indication that multicollinearity is not an issue (Field, 2009). Visual analysis indicates that the errors are fairly normally distributed (see figures C24-25, Appendix C). The Durbin-Watson test value is close to 2.0. This is satisfactory and indicates that the errors are independent (Field, 2009). Visual analysis of the standardized residuals indicates that heteroscedasticity is present (see figure C26, Appendix C). The Koenker test for

heteroscedasticity is significant and homoscedasticity is rejected, $p < .05$. This is a limitation to the validity of the regression analysis. Table 8 displays the output based on the following equation:

$$PR\_FIN = \beta_0 + \beta_1 \times SK + \beta_2 \times OK + \varepsilon \quad (5)$$

Table 8

Predictors of Perceived Financial Risk of Store Brand OTC painkillers

	B	*SE*	*β*	*p*	95% CI
Constant	4.42	0.36		.000	[3.70, 5.14]
Subjective knowledge of OTC painkillers	-0.19	0.08	-.21*	.020	[-0.35, -0.03]
Objective knowledge of OTC painkillers	-0.21	0.07	-.28**	.002	[-0.34, -0.08]
R^2	.19				
F	17.96				

Note. $N = 160$. CI = confidence interval.
*p < .05. **$p < .01$.

A significant regression equation is found $F(2, 157) = 17.96$, $p < .001$, and explains a significant proportion of the variance, $R^2 = .15$.

SK does significantly predict PR_FIN, $\beta = -.21$ $t(157) = -2.34$, $p < .05$. SK is significantly negative related to PR_FIN and H_{5b} is supported.

OK significantly predicts PR_FIN, $\beta = -.28$ $t(157) = -3.19$, $p < .01$. This significant negative effect of OK on PR_PHYS supports H_{6b}. The effect of OK on PR_FIN is negatively stronger, based on the significance of the relationships and the standardized coefficients. H_{7b} is therefore also supported. The model with the standardized coefficients is as follows:

$$PR\_FIN = -.21 \times SK - .28 \times OK + \varepsilon \quad (6)$$

5.5.3 Direct effects on perceived performance risk

A multiple linear regression is calculated to predict the perceived financial risk of store brand OTC painkillers (PR_PERF) by the predictor variables objective and subjective knowledge of OTC painkillers. The VIF values are lower than 1.5 and the tolerance levels are greater than 0.2. This is an indication that multicollinearity is not an issue (Field, 2009).

Visual analysis indicates that the errors are fairly normally distributed (see figures C27-28, Appendix C). The Durbin-Watson test value is close to 2.0. This is satisfactory and indicates that the errors are independent (Field, 2009). Visual analysis of the standardized residuals indicates that heteroscedasticity is present (see figure C29, Appendix C). This is not supported by the Koenker test and homoscedasticity is not rejected, $p = .06$. Table 9 displays the output based on the following equation:

$$PR\_PERF = \beta_0 + \beta_1 \times SK + \beta_2 \times OK + \varepsilon \quad (7)$$

Table 9

Predictors of Perceived Performance Risk of Store Brand OTC painkillers

	B	*SE*	*β*	*p*	95% CI
Constant	4.26	0.40		.000	[3.46, 5.05]
Subjective knowledge of OTC painkillers	-0.18	0.09	-.19*	.042	[-0.36, -0.07]
Objective knowledge of OTC painkillers	-0.16	0.07	-.21*	.026	[-0.31, -0.02]
R^2		.12			
F		10.78			

Note. $N = 160$. CI = confidence interval.
*p < .05.

A significant regression equation is found $F(2, 157) = 10.78$, $p < .001$, and explains a significant proportion of the variance, $R^2 = .12$.

SK does significantly predict PR_PERF, $\beta = -.18$ $t(157) = -2.05$, $p < .05$. SK is significantly negative related to PR_ PERF and therefore H_{5c} is supported.

OK significantly predicts PR_PERF, $\beta = -.21$ $t(157) = -2.25$, $p < .05$. This significant negative effect of OK on PR_PERF supports H_{6c}. After evaluating the standardized coefficients, it can be assumed that the effect of OK on PR_PERF is negatively stronger. H_{7c} is therefore supported. The model with the standardized coefficients is as follows:

$$PR\_PERF = -.19 \times SK - .21 \times OK + \varepsilon \quad (8)$$

5.5.3 Total and indirect effects

In the previous parts, the direct effects are examined. The results of these multiple regressions are used to determine if there is a significant direct effect. In this part, the total and indirect effects are examined.

Total effects. Table 10 shows the results of the multiple regression based on the following model, that is required to identify the total effects of the predictor variables (without the mediators) on the outcome variable ATT.

$$ATT = \beta_0 + \beta_1 \times SK + \beta_2 \times OK + \varepsilon \qquad (9)$$

Table 10

Predictors of Attitude toward Store Brand OTC painkillers (without proposed mediators)

	B	*SE*	*β*	*p*	95% CI
Constant	3.05	0.34		.000	[2.38, 3.71]
Subjective knowledge of OTC painkillers	.27	0.07	.32**	.000	[0.12, 0.42]
Objective knowledge of OTC painkillers	.08	0.06	.11	.214	[-0.04, 0.20]
R^2		.16			
Adj R^2		.15			
F		14.69			

Note. *N* = 160. CI = confidence interval.
**p < .01.

A significant regression equation is found $F(2, 157) = 14.69$, $p < .001$, and explains a significant proportion of the variance, $R^2 = .16$. OK does not have a significant total effect on ATT. SK significantly predicts ATT, $\beta = .32$ $t(157) = 3.62$, $p < .01$. SK has a positive significant total effect on ATT. The adjusted R^2 (.15) for his model is lower than the adjusted R^2 (.25) with the mediators included (see table 6). This indicates that the model with the mediators included has more explanatory power and the model fits the data better.

Indirect effects. To test the significance of the indirect effect, a bootstrap method is applied in SPSS. The indirect effect is tested with 5000 bootstrap samples and a 95% bias-corrected confidence interval as recommended in the literature (Hayes, 2009). The use of

5000 samples is conservative compared to parameters used in recent marketing research (c.f. Zhang, Wedel & Pieters, 2012). The indirect effect is significant at the $p = .05$ level when the 95% confidence interval excludes zero. The Hayes (2012) script PROCESS generates an output that contains all the unstandardized coefficients of the direct, total and indirect effects based on OLS multiple regressions and contains the calculated confidence intervals (see figure D1-2, Appendix D). The total and direct effects can also be found in table 6-10. In the next parts, the unstandardized estimates (*b*) are discussed.

First, the indirect effects are examined between SK and ATT (see figure D1 and table D1, Appendix D). The bootstrap method tested an insignificant indirect (a×b) effect for PR_PHYS as mediator, $b = 0.00$, CI = -0.02 to 0.05, $p > .05$. PR_PHYS does not act as a mediator in the relationship between SK and ATT, and H_{8a} is not supported. The bootstrap method tested an insignificant indirect (a×b) effect for PR_PERF as mediator, $b = 0.02$, CI = -0.01 to 0.09, $p > .05$. PR_PERF does not act as a mediator in the relationship between SK and ATT, and H_{10a} is not supported. The bootstrap method tested a significant indirect (a×b) effect for PR_FIN as mediator, $b = 0.04$, CI = 0.006 to 0.10, $p > .05$. PR_FIN acts as a mediator between SK and ATT and H_{9a} is supported. The indirect (a×b) effect is significantly positive. The direct effect (c') of SK on ATT was previously found to be significant, $b = 0.20$, $p < .01$. The type of mediation is thus *complementary mediation* (Zhao, Lynch and Chen, 2010). The indirect and direct of SK on ATT are both significantly positive. The effect is mediated by PR_FIN. One-unit increase of SK leads to an increase of 0.24 (0.20 + 0.04) in ATT, based on the significance of the found relationships. Thus, SK has a positive direct effect and a positive indirect effect on ATT. The total (c) effect of was also found to be significantly positive, $b = 0.27$, $p < .01$. The difference in effect between the total effect of SK on ATT, and the indirect effect combined with the indirect effect through PR_FIN, is likely to be caused by the presence of other 'mediators', although the indirect effect through these mediators is not significant. All effects for this particular model are summarized in table D1 of Appendix D.

Second, the indirect effects are examined between OK and ATT (see figure D2 and table D2, Appendix D). The bootstrap method tested an insignificant indirect (a×b) effect for PR_PHYS as mediator, $b = 0.00$, CI = -0.05 to 0.07, $p > .05$. PR_PHYS does not act as a mediator in the relationship between OK and ATT, and H_{8b} is not supported. The bootstrap method tested also an insignificant indirect (a×b) effect for PR_PERF as mediator, $b = 0.02$, CI = -0.01 to 0.08, $p > .05$. PR_PERF does not act as a mediator in the relationship between OK and ATT, and H_{10b} is not supported. The bootstrap method tested a significant indirect

(a×b) effect for PR_FIN as mediator, $b = 0.05$, CI = 0.004 to 0.140, $p > .05$. PR_FIN acts as a mediator between OK and ATT and H_{9b} is supported. The indirect (a×b) effect is significantly positive. The direct effect (c') of OK on ATT was previously found to be insignificant, $b = 0.00$, $p = .93$. The type of mediation is thus *indirect only mediation* (Zhao, Lynch and Chen, 2010). The effect of OK on ATT is fully mediated by PR_FIN based on the significance of the results. A significant total effect was not found, $b = 0.08$, $p = 0.214$. Both the direct and total effect of SK on ATT are not significant. The results suggest that the direct effect ($b = 0.00$) is smaller than the total effect ($b = 0.08$) because of the presence of other perceived risk 'mediators'. It is important to note that this is not certain since the insignificance of the total effect and insignificance of some of the indirect effects preclude conclusive statements. Also the presence of SK as a covariate of OK should be considered. Since both knowledge types have similarities and are correlated, it is possible that the effect of OK on ATT is less clear. All effects for this particular model are summarized in table D2 of Appendix D.

This concludes the analysis part of this paper. All significant findings are shown in figure 5. The results of the hypothesis testing are summarized in table 11.

5.9 Model and summary of results

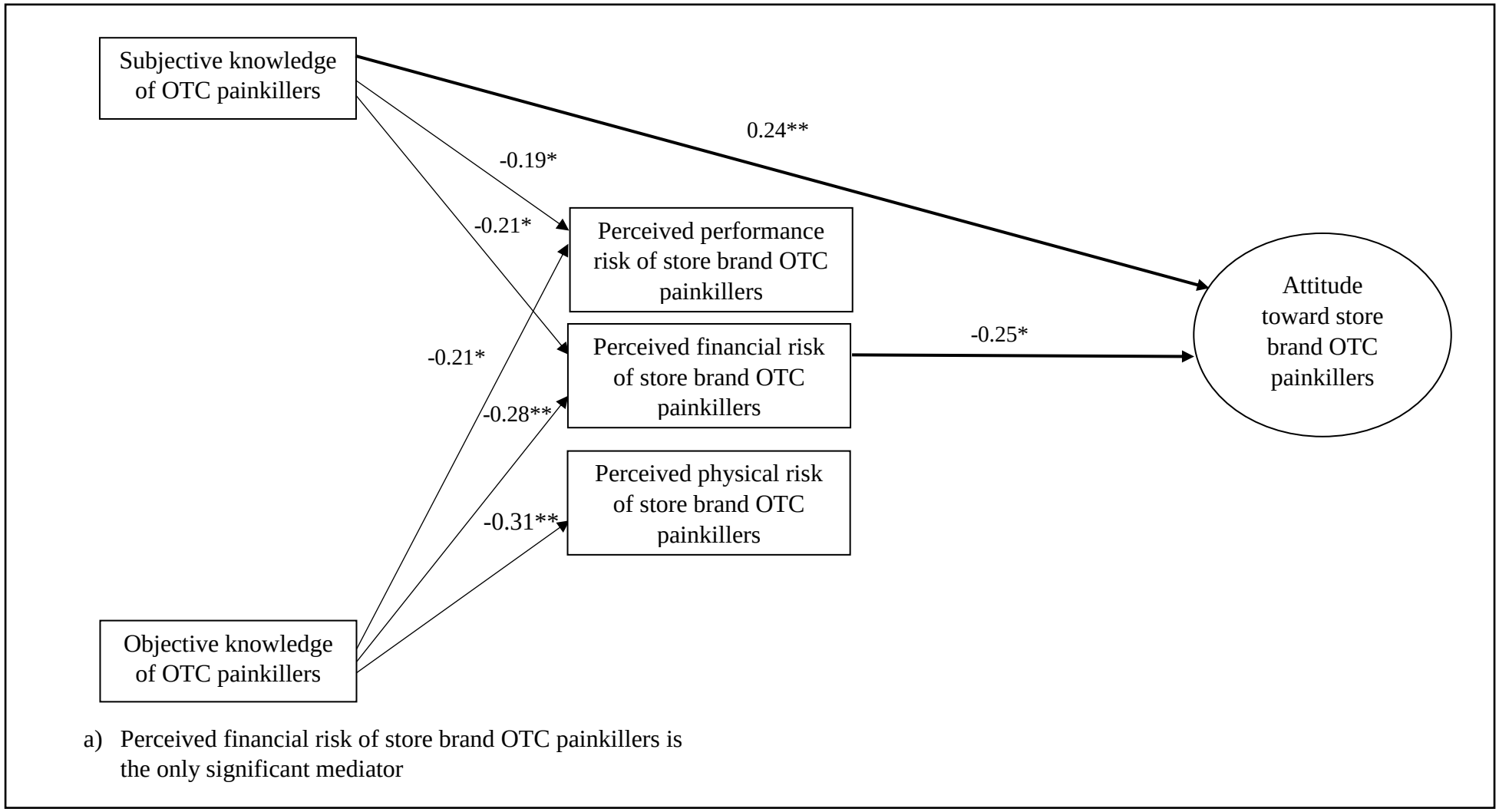

Figure 5. Revised model based on the results (standardized coefficients).

*p < .05. **p < .01.

Table 11

Summary of findings.

Hypothesis	Formulation	
H_1	There is a direct negative relationship between	
	a) perceived psychical risk of generic OTC drugs and attitude toward generic OTC drugs.	not supported
	b) perceived financial risk of generic OTC drugs and attitude toward generic OTC drugs.	supported
	c) perceived performance risk of generic OTC drugs and attitude toward generic OTC drugs.	not supported
H_2	There is a direct positive relationship between subjective product category knowledge and attitude toward generic OTC drugs.	supported
H_3	There is a direct positive relationship between objective product category knowledge and attitude toward generic OTC drugs.	not supported
H_4	There is a stronger positive relationship between objective product category knowledge and attitude toward generic OTC drugs than between subjective product category knowledge and attitude toward generic OTC drugs.	not supported
H_5	There is a direct negative relationship between subjective product category knowledge and	
	a) perceived physical risk of generic OTC drugs.	not supported
	b) Perceived financial risk of generic OTC drugs.	supported
	c) perceived performance risk of generic OTC drugs.	supported

H_6	There is a direct negative relationship between objective product category knowledge and	supported
	a) perceived physical risk of generic OTC drugs.	supported
	b) Perceived financial risk of generic OTC drugs.	supported
	c) perceived performance risk of generic OTC drugs	
H_7	Compared to the relationship between subjective product category knowledge and perceived risk of generic OTC drugs, there is a stronger negative relationship between objective knowledge and	
	a) perceived physical risk of generic OTC drugs.	supported
	b) Perceived financial risk of generic OTC drugs.	supported
	c) perceived performance risk of generic OTC drugs.	supported
H_8	Perceived physical risk is a mediator between	
	a) subjective knowledge and attitude toward generic OTC drugs.	not supported
	b) objective knowledge and attitude toward generic OTC drugs.	not supported
H_9	Perceived financial risk is a mediator between	
	a) subjective knowledge and attitude toward generic OTC drugs.	supported
	b) objective knowledge and attitude toward generic OTC drugs.	supported
H_{10}	Perceived performance risk is a mediator between	
	a) subjective knowledge and attitude toward generic OTC drugs.	not supported
	b) objective knowledge and attitude toward generic OTC drugs.	not supported

6. Discussion

The primary data obtained with the use of a survey method is analyzed in the previous chapter. This survey is constructed to examine the consumers' perception of generic OTC drugs. The product class that is examined in this study is OTC painkillers. Dutch residents were asked about their perception of the store brand (i.e. generic) variant of OTC painkillers and their knowledge about OTC painkillers in general. The results are supportive of several hypotheses (see table 11). In this chapter, the results are further discussed and the research questions are answered based on these results. First, the three subquestions are answered. Lastly, the main research question is answered.

"How does perceived risk affect attitude toward generic OTC drugs?"

Three types of perceived risk of store brand OTC painkillers are examined. Two of the perceived risk types, perceived performance risk and perceived physical risk, are not significant predictors of attitude toward store brand OTC painkillers. The Pearson correlation coefficients and the coefficients estimates in the regression analysis do not completely rule out the possibility of a negative association between these two risk types and attitude toward generic OTC drugs. However, based on the significance of the regression estimates, a negative direct relationship is overall not supported. These findings do not confirm the expectations based on the theory. The results contradict the hypotheses statements and put forward that the consumers' attitude toward generic OTC drugs is not influenced by the causes to feel worried about how well the product performs or the negative effects it may have on their health. This is somewhat surprising because especially for OTC drugs one could think that the perceived physical risk would have a major effect on the attitude toward an OTC drug brand. A possible explanation is that the relative weight consumers attach to perceived physical risk type is low for OTC painkillers. This is consistent with previous findings in the literature that indicate consumers underestimate the risks of analgesics (Van Dijk, Vervloet, Plas, Breuning & van den Ende, 2005; Wilcox, Cryer, & Triadafilopoulos, 2005). Another possibility is that higher perceived physical and performance risk are more a reflection of inherent risk, the latent risk of the product category. This inherent risk is different than handled risk, the risk a consumer would perceive when choosing a brand within that product category (Bettman, 1973).

Perceived financial risk, to the contrary, is found to be a significant predictor of attitude toward store brand OTC painkillers. A significant direct negative relationship is found. This implies that when consumers worry more about the value for money of store brand OTC painkillers, they also are expected to have a less positive attitude toward these store brand OTC painkillers. This effect supports the hypothesis, stating that perceived financial risk is directly negatively related to the attitude toward generic OTC. Consumers that perceive high financial risk with generic OTC drugs might be biased since generic OTC drugs actually do provide better value for money because they are not only cheaper but also bioequivalent to brand-name OTC drugs. This confirms previous findings in the literature that point out consumers are not price sensitive across OTC drug brands (Akçura, Gonül & Petrova, 2004). In economics, this means that brand preference is not influenced by relative price changes of the brand alternative. Thus, price promotions and lower pricing of generics might not easily persuade the consumer to purchase a generic brand if they favor a brand-name. Moreover, it is possible that consumers regard higher priced brands to be of a higher quality (Rao & Monroe, 1989). In the study, 44 % of the respondents stated to have purchased a national brand (i.e., brand-name) OTC painkiller in the past year. For these consumers the level of perceived financial risk of generic OTC painkillers might be unacceptable, leading them to prefer the national brand). Lower priced drugs might be perceived as riskier especially for less knowledgeable consumers that are unsure about the properties of OTC drugs. The next sub-question is formulated to investigate this relationship between the product category knowledge and perceived risk.

"How does product category knowledge affect perceived risk?"

The study results indicate that there is a significant direct negative relationship between objective knowledge of OTC painkillers and the perceived risk types of store brand OTC painkillers. These relationships are also found for subjective knowledge of OTC painkillers, with the exception of the perceived physical risk of OTC painkillers. This exception is discussed in the second paragraph. Altogether, the results do suggest that in general there is a negative direct relationship between the types of product category knowledge and perceived risk of generic OTC drugs. This means that as consumers get more knowledgeable, or perceive to be more knowledgeable, they also perceive less risk with generic OTC drugs. This is consistent with the expectations based on the theory. This is also

in line with the proposition that better-developed knowledge structures increase expertise (Alba & Hutchinson, 1987). Consumers that are experts have an improved ability to accurately estimate the risk that is associated with the generally less advertised and less well-known generic brands. Consumers that have low product category knowledge may not have that ability and evaluate products by employing simple heuristics without diagnostic value (Park & Lessig, 1981). Consequently, these consumers possibly misjudge the risk probability of generic OTC drugs and perceive more risk.

One inconsistency is found in the relationship between subjective knowledge of OTC painkillers and perceived physical risk of store brand OTC painkillers. As aforementioned, this relationship was found to be insignificant. This is quite the opposite of the relationship between objective knowledge of OTC painkillers and perceived physical risk of store brand OTC painkillers, that was found to be the strongest among risk types and product category knowledge types. These results suggest that higher subjective knowledge does not lead to a significant reduction of perceived physical risk of generics but higher objective knowledge does. This difference may be caused by the antecedents of the knowledge types. Subjective knowledge is self-assessed and is not only judged on actual knowledge but also on product-related experience (Park, Mothersbaugh & Feick, 1994). Consumers with high objective knowledge are more aware of intrinsic properties of OTC drugs, such as ingredients. This information is quite complex and higher levels of subjective knowledge might not indicate higher awareness of these characteristics. Consequently, consumers with higher subjective knowledge might still experience a degree of uncertainty about the difference in the ingredients and associated health risks of generic brands and national brands. This difference is in reality very small to nonexistent because both brand types are required to be equally safe. Consumers with high objective knowledge seem to recognize this.

Another finding of the study is that that increases in subjective knowledge of OTC painkillers have overall a smaller negative effect on perceived risk of store brand OTC drugs than increases in objective knowledge of OTC painkillers. The consumer may overestimate their actual knowledge on the basis of their knowledge from recalled experiences (Alba & Hutchinson, 2000). This overestimation is closely related to self-confidence. Self-confidence is positively correlated to subjective knowledge but differs from the expertise and actual product knowledge (Bearden, Hardesty & Rose, 2001). The study findings together with the theoretical support presented in this paper suggest that consumers may overestimate their knowledge of OTC drugs, possibly caused by over-confidence. This systematic bias may

adversely affect precise probability estimations of adverse consequences (i.e. perceived risk) of generic OTC drugs.

Taking everything into account, it can be concluded, that as consumers become more informed they generally perceive less risk with generic OTC drugs. The findings related to the first sub-question suggest that perceived financial risk is directly negatively related to the attitude toward generic OTC drugs. The answer to the following and last sub-question clarifies if there is also a direct relationship found between the knowledge types and the attitude toward generic OTC drugs.

"How does product category knowledge affect attitude toward generic OTC drugs?"

A significant positive direct relationship is found between subjective knowledge of OTC painkillers and attitude toward store brand OTC painkillers. This suggests that higher subjective product category knowledge predicts a higher attitude toward generic drugs. Consumers with low subjective category knowledge may have favorable and accessible associations with the well-known brand-name OTC drugs but not with generic OTC drugs. This likely changes as consumers get more familiar with the product category, hence the positive effect. A significant direct relationship between objective knowledge of OTC painkillers and attitude toward store brand OTC painkillers was not proven. This suggests that objective product category knowledge does not directly affect attitude toward generic OTC drugs in a positive way. The results do indicate that objective knowledge of OTC painkillers is positively correlated with attitude toward store brand OTC painkillers. In previous literature, this positive correlation of knowledge about active ingredients and brand preference is pointed out (Bronnenberg, Dubé, Gentzkow & Shapiro, 2015). Surprisingly, the findings in this current study do contradict the assumption that better knowledge of intrinsic OTC drug properties directly leads to more a positive attitude toward the generic brand.

Prior to the study, it was expected that objective category knowledge has a stronger positive direct relationship with attitude than subjective category knowledge. This hypothesis is not supported. A possible explanation is that the self-confidence aspect in subjective knowledge strongly relates to affective reactions, such as attitude towards products (Cole, Gaeth, Chakraborty & Levin, 1992). A consumer who has a high level of subjective knowledge is likely to have more product experience (Park, Mothersbaugh & Feick, 1994).

For a consumer who has a high objective knowledge, this might not always be the case because the level of objective knowledge is also related to the expertise and processing abilities. Objective knowledge is stronger related to cognitive ability, which also explains why objective knowledge is stronger negatively related to perceived risk, which reflects the ability to estimate the risk probability. Subjective knowledge is closely associated with the motivational aspects of product knowledge (Selnes & Grønhaug, 1986). For example, studies examining organic food consumption show that subjective knowledge is stronger directly related to both attitude and purchase-related behavior than objective knowledge is (e.g. Aertsens, Mondelaers, Verbeke, Buysse & Van Huylenbroeck, 2011). Unfortunately, very few studies have examined these effects in the context of OTC drugs. This makes it difficult to compare the findings of this current study with previous findings in the literature.

"What role does perceived risk have in the relationship between product category knowledge and attitude toward generic OTC drugs?"

The difference in objective and subjective knowledge is perhaps more apparent in the way the two types of knowledge affect attitude towards generic OTC painkillers in the study. Subjective product category knowledge (1) directly has a positive effect on attitude toward generic OTC drugs, and (2) indirectly affects the attitude toward generic OTC drugs in a positive direction by diminishing the perceived financial risk of generic OTC drugs (*complementary mediation*). The findings suggest that objective product category knowledge has only a positive indirect effect on attitude toward generic OTC drugs with perceived financial risk of generic OTC drugs acting as a mediator (*indirect only mediation*). The indirect effect of objective knowledge of OTC drugs on attitude toward generic OTC drugs is marginally stronger than the indirect effect of subjective knowledge on attitude toward generic OTC drugs. However, based on the results, the total effect of subjective knowledge on attitude toward generic OTC drugs is considerably stronger. This is most likely caused by the motivational and confidence aspects of subjective knowledge. In this study, objective and subjective product category knowledge have differential effects on the attitude. This confirms that they are conceptually distinct constructs.

Furthermore, the results indicate that the perceived performance risk and perceived physical risk do not act as a mediator and are not directly related to attitude toward generic OTC drugs. They do have significant negative correlations with both the knowledge types and

the attitude toward store brand OTC painkillers. Perceived financial risk does mediate the relationship between the objective knowledge types and attitude toward OTC painkillers and is directly negative related to attitude toward store brand OTC painkillers. This finding, together with the results listed above, demonstrate the importance of investigating perceived risk in a multidimensional way. Also, variations in attitude cannot be completely understood by the level of perceived risk. The significant direct relationship of subjective knowledge with attitude suggests that not only risk perceptions are important in the formation of attitude. The beliefs on which attitude and perceived risk are formed might be similar in a certain respect. However, the beliefs on which perceived risk is formed are primarily loss-based whereas the beliefs on which attitude is formed can be both loss- and gain-oriented (Stone & Mason, 1995). Thus, the fear of not spending money wisely on generic OTC drugs certainly has an effect on attitude toward generic OTC drugs, but the levels in perceived financial risk do not completely explain levels in attitude toward generic OTC drugs. Altogether, the results of this study present the knowledge types, perceived risk types, and attitude, as conceptually distinct and demonstrate the importance of combining these constructs in researching the consumers' perception of OTC drugs.

7. Managerial Implications

The results point out that differences in perceived risk at the brand level for generic OTC drugs are an indication of how well consumers are informed. Marketing research indicates that novices fail to understand the diagnosticity and relevance of intrinsic OTC drug properties (Catlin, Pechman & Brass, 2015). This is in line with the findings of this current study. The misinformation may even be attributed to deceptive advertising (Bronnenberg, Dubé, Gentzkow & Shapiro, 2015). For example, certain aspects of OTC drugs packages, such as color and brand name, are suggested to influence consumers' brand choice more than intrinsic properties (Kauppinen-Räisänen, Owusu & Abeeku Bamfo, 2012). This current study emphasizes that authorities should be aware of the misinformation amongst consumers and the possible deceptiveness of advertising and promotion.

Insufficient knowledge of intrinsic drug properties is an indication of limited health literacy. The results of this current study also demonstrate that subjective knowledge has a direct positive effect on attitude toward generic OTC drugs. This subjective knowledge may reflect motivational and self-confidence aspects. Health literacy also concerns self-confidence. This is also acknowledged by Jany Rademakers, head of the research department of Netherlands Institute for Health Services Research: "Health literacy is about more than just a person's ability to read and understand health information. It also concerns motivation, self-confidence, and discernment." ("Health Literacy on the European Agenda", 2015). Limited health literacy is especially prevalent amongst people with low socioeconomic status (Van der Heide et al., 2016). Based on the study results presented in this paper, it can be expected that this group has less category knowledge and hold a more negative attitude towards generic OTC drugs. This is distressing because relative cost-savings from brand-name to generic brand purchase switches are expected to be the highest for this group. In general, lower health literacy leads to more negative health outcomes.

In fact, more European countries are recognizing limited health literacy as a problem but fail to develop national policies to reduce health illiteracy ("Health Literacy on the European Agenda", 2015). Health literacy among consumers becomes even more important as European countries are promoting self-medication to reduce healthcare costs. This current study stresses the importance of health knowledge and how it may positively affect the perception of generic drugs. Health education is vital to the stimulation and promotion of healthy behavior. Consumers can benefit from initiatives to improve health literacy. Therefore, health education should be an integrative part of national educational systems. This

paper illustrates that providing information and stimulating involvement are essential elements in changing consumer perceptions.

In addition, the results also suggest that the OTC drugs market is not transparent for all consumers. As the availability and accessibility of OTC drugs increases, the responsibility of guiding consumers to making informed choices becomes more important. This is also recognized by Marten Hummel, director of the branch association of drug stores (CBD). In a personal interview with the author, he expressed his concerns about the recent developments. He supports the increasing availability and accessibility but is convinced this should be accompanied with professional oversight and advice. Hummels experiences that in practice consumers are not well-informed even if they think they are. He is convinced that drug stores have the capability to provide the right information to consumers and can improve the responsible care. His organization is an advocate of certifying drug stores to warrant the level of expertise at drug stores. It is important to realize that asking advice is also regarded as a strategy of the consumer to reduce perceived risk (Mitchell & McGoldrick, 1996). The level of expertise in these consults have a major impact on consumer's purchase decisions of OTC drugs (Nichol, McCombs, Johnson, Spacapan & Sclar, 1992), and may lead to an increase in switches from brand-name to generic OTC drugs (Sclar, Robinson & Skaer,

Altogether, this current study confirms the importance of providing information to consumers and giving consumers the confidence to make informed choices. Effective policy requires the engagement of all stakeholders involved. Governments can reduce their costs with the promotion of responsible self-medication and consumers become more autonomous. A benefit for retailers is that actively providing information and giving advice create the opportunity to promote store brands. Generic drugs typically sold under the retailer's private label (i.e., store brand) can be of keen interest because private labels may have higher retail margins (Ailawadi & Harlem, 2004) and potentially increase store loyalty (Ailiwadi, Pauwels & Steenkamp, 2008). For pharmacies, this current study emphasizes the importance of their high expertise. To remain competitive and to provide responsible care related to OTC drugs it is vital to signal their expertise (Wieringa, Reber, & Leeflang, 2015). The results presented in this paper suggest that the confidence consumers have in their own knowledge and their decision skills impact the attitude toward OTC drugs. Pharmacies can advance the confidence of consumers by maintaining a trusted environment in which consumers can choose products without perceiving risk.

8. Limitations and Future Research

This study should be considered as a step toward a holistic view of consumer behavior in the context of OTC drugs. The findings that are presented in this study provide a basis for understanding consumers' perceptions of generic OTC drugs. The results obtained with the multiple regression analysis identify subjective knowledge of OTC painkillers and perceived financial risk of store brand OTC painkillers as significant predictors of attitude toward store brand OTC painkillers. All research suffers from limitations. In this chapter, the limitations to this research are discussed and directions for future research are given.

First, in this study, a purposive sampling method is applied that limits the generalizability of these results. This method is chosen due to budgetary constraints. A smaller sample size is achieved than the statistically determined appropriate sample size. The statistical power of the regression analysis is dependent on the sample size and the external validity is affected by the representativeness of the sample. Nonetheless, the sample composition does not give the immediate impression that the results cannot be generalized to the Dutch population. In future research, the inclusion of other individual characteristic variables, such as demographics, might gain insights of differences within the population. For example, variations of the health belief model (HBM) developed to predict health behavior often incorporate these modifying variables. It would also be interesting to investigate if the conclusions based on the results hold for populations of other European countries as the results might be subject to cultural differences, national policy, and regulation.

Second, the lack of prior research on the topic limits the comparability of the results. There is a possibility that the influence of the perceived risk dimensions changes across OTC drug categories. Perceived performance and physical risk are both significantly negatively correlated to attitude toward store brand OTC painkillers but are according to the regression analysis, not significant predictors. This might change for other OTC drug categories. OTC drug categories are for instance different in the availability of brands, the frequency of repeated purchases, typical routes of drug administration and the severity of associated illness. Another direction for future research is to examine the level of acceptable perceived risk in brand choice and to include more risk dimensions to obtain a complete picture.

Third, it is found that subjective category knowledge has a significant direct effect on attitude toward store brand OTC painkillers. Objective category knowledge did not have a

direct effect. One possibility is the operationalization of the objective knowledge test. This test is newly developed for this specific research. However, several precautions are taken to avoid an unreliable measurement. Experts are consulted in the development process and the method is similar to those applied in previous research. Another possibility is the confidence aspect of subjective category knowledge. In this current study, this is not directly measured. Future research of OTC drugs should focus on the self-confidence of consumers and how this is influenced by involvement and situational aspects. A good starting point would be to investigate the relationship between self-confidence and information needs and acquisition. Another point of interest is how store characteristics and service in a retail environment may influence the knowledge levels, confidence and buying decision of consumers.

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Appendix A

Instrumentation tables

Table A1

Measurement scale of attitude towards generic (i.e., store brand) OTC painkillers

Measurement	Literature
Buying store brands of OTC painkillers make me feel good.	Burton, Lichtenstein, Netemeyer and Garretson (1998)
I love it when store brands of OTC painkillers are available.	
The best buy is usually the store brand of OTC painkillers.	
*In general, store brand OTC painkillers are poor-quality products.	
Considering value for money, I prefer store brand OTC painkillers to national brand OTC painkillers.	
When I buy a store brand OTC painkiller, I always feel that I am getting a good deal.	

a: * = reverse scored
b: All items are rated on a 7-point scale that ranges from 1 (strongly disagree) to 7 (strongly agree).

Table A2

Measurement scale of subjective category knowledge

Measurement	Literature
I know pretty much about OTC painkillers.	Flynn and Goldsmith (1999)
*I do not feel very knowledgeable about OTC painkillers.	
Among my circle of friends, I am one of the "experts" on OTC painkillers.	
*Compare to most other people, I know less about OTC painkillers.	
*When it comes to OTC painkillers, I really don't know a lot.	

a: * = reverse scored
b: All items are rated on a 7-point scale that ranges from 1 (strongly disagree) to 7 (strongly agree).

Table A3

Measurement scale of perceived risk of generic (i.e., store brand) OTC painkillers

Risk dimension	Measurement	Literature
Physical	One concern I have about purchasing store brands OTC painkillers is that it may not be safe for me or my family.	González Mieres, María Díaz Martín and Trespalacios Gutiérrez (2006)
	I worry that if I would purchase a store brand OTC painkiller, it may cause me some physical harm.	Rozano Suplet, Gómez Suárez and Diaz Marting (2009)
	I am afraid that that if I were to purchase a store brand OTC painkiller, it may endanger my health.	Stone and Grønhaug (1993)
Performance	The thought of purchasing a store brand OTC painkiller causes me to be worry about the reliability of the drug.	
	I think that if I were to purchase a store brand OTC painkiller, it will not really work as well as it is supposed to.	
	Purchasing a store brand OTC painkiller causes me to be concerned about the performance of the drug.	
Financial	Purchasing a store brand OTC painkiller causes me to worry that the product won't be worth the money.	
	I think purchasing a store brand of an OTC painkiller is a waste of money.	
	I think purchasing a store brand OTC painkiller is not a wise way of spending money.	

a: All items are rated on a 7-point scale that ranges from 1 (strongly disagree) to 7 (strongly agree).

Figure A1 : Objective category knowledge questions

1) Side effects of a drug
   a) are negative effects that always occur
   b) are undesirable side effects through usage
   c) always reduce the effectiveness of the drug

2) The more, often and prolonged use of paracetamol may lead to
   a) persistent headaches
   b) stomach complaints
   c) suppression of inflammatory symptoms

3) The following drug has a predominantly analgesic effect
   a) amoxicillin
   b) paracetamol
   c) omeprazole

4) Generic painkillers in the Netherlands
   a) are only available at the pharmacy
   b) are generally less reliable
   c) have the same active ingredient as brand-name drugs

5) The active ingredient of Nurofen tablets is
   a) aspirin
   b) ibuprofen
   c) paracetamol

6) The active ingredient of Advil tablets is
   a) naproxen
   b) paracetamol
   c) ibuprofen

7) The active ingredient of Aleve tablets is
   a) naproxen
   b) aspirin
   c) ibuprofen

8) The active ingredient of Voltaren tablets is
   a) naproxen
   b) aspirin
   c) diclofenac

9) Diclofenac
   a) has stomach- and gastrointestinal complaints as possible side effects
   b) does not work anti-inflammatory
   c) has little interactions with other medicines

10) Generic painkillers in the Netherlands
    a) are not allowed to be sold at supermarkets
    b) are required to be bio-equivalent to the original
    c) are required to be just as safe and expensive as brand-name drugs

Note: Correct answers are in bold.

OTC Market in the Netherlands

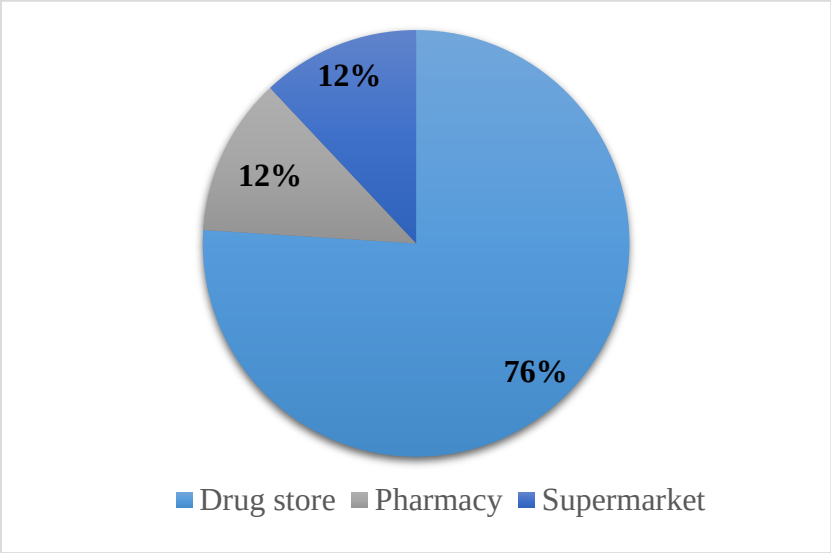

Figure A1. Revenue Share in Dutch OTC Market 2016. This figure illustrates the percentage of total revenue of OTC drugs for each type of access point. Gas stations represent a small percentage of sales and are therefore not included in this figure. Source: ("Marktcijfers", 2016b).

Table A4:

Sales of OTC drugs in the Netherlands.

	Revenue in million euros	Revenue of total sales
Upper respiratory	152	21%
Analgesics	139	19%
Vitamins/Minerals	131	18%
Other	297	41%

a: Source: ("Marktcijfers", 2016b).

Self-Care Survey

Thank you for participating in this research. I study Economics at the Erasmus University Rotterdam and my research is focused on consumer behavior.

This self-care study is about OTC (over-the-counter) painkillers and is part of my graduate thesis for the degree of Master of Science in Marketing. OTC painkillers are painkillers that are available without the need of a doctor's prescription. An example is paracetamol.

- **Your responses to this survey will be kept confidential and anonymous**
- **You won't be asked about your medical information.**
- **The completion time of this survey is about 5 minutes.**

A short introduction follows below.

Store brand painkillers

OTC painkillers are used to treat pain. These drugs are available at the drugstore, gas station supermarket and pharmacy without the need of a doctor's prescription.

The first questions are about store brand OTC painkillers.

A store brand product has the name of the store where it is sold rather than the name of the company that made it. Typically less money is spent on advertising of store brands. Therefore store brands are usually cheaper than national brands. For example, the peanut butter from the Jumbo supermarket is a store brand and the Calvé peanut butter is a national brand.

There are also store brand variations of OTC painkillers. Examples of store brand painkillers are the Albert Heijn Ibuprofen and Kruidvat Paracetamol. An example of a national brand painkiller is Advil.

You are not required to have any purchase or usage experience with these drugs for answering the questions. However, it is important to complete the entire survey.

Please read the questions/statements carefully and select your answer. The numbers correspond with the following answers.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

-START-

Part 1/7 ***please circle your answer***

	Strongly disagree						Strongly agree
In general, store brand OTC painkillers are poor-quality products.	1	2	3	4	5	6	7
I love it when store brands of OTC painkillers are available.	1	2	3	4	5	6	7
The best buy is usually the store brand of OTC painkillers.	1	2	3	4	5	6	7
Buying store brands of OTC painkillers make me feel good.	1	2	3	4	5	6	7
Considering value for money, I prefer store brand OTC painkillers to national brand OTC painkillers.	1	2	3	4	5	6	7
When I buy a store brand OTC painkiller, I always feel that I am getting a good deal.	1	2	3	4	5	6	7

Part 2/7 ***please circle your answer***

	Strongly disagree						Strongly agree
Purchasing a store brand OTC painkiller causes me to be concerned about the performance of the drug.	1	2	3	4	5	6	7
I think that if I were to purchase a store brand OTC painkiller, it will not really work as well as it is supposed to.	1	2	3	4	5	6	7
The thought of purchasing a store brand OTC painkiller causes me to worry about the trustworthiness of the drug.	1	2	3	4	5	6	7

Part 3/7 ***please circle your answer***

	Strongly disagree						Strongly agree
Compared to most other people, I know less about OTC painkillers.	1	2	3	4	5	6	7
I know pretty much about OTC painkillers.	1	2	3	4	5	6	7
I do not feel very knowledgeable about OTC painkillers.	1	2	3	4	5	6	7
Among my circle of friends, I am one of the “experts” on OTC painkillers.	1	2	3	4	5	6	7
When it comes to OTC painkillers, I really don’t know a lot.	1	2	3	4	5	6	7

Part 4/7 ***please circle your answer***

	Strongly disagree						Strongly agree
I worry that if I would purchase a store brand OTC painkiller, it may cause me some physical harm.	1	2	3	4	5	6	7
One concern I have about purchasing store brands OTC painkillers is that it may not be safe for me or my family.	1	2	3	4	5	6	7
I am afraid that that if I were to purchase a store brand OTC painkiller, it may endanger my health.	1	2	3	4	5	6	7

Part 5/7 ***please circle your answer***

	Strongly disagree						Strongly agree
I think purchasing a store brand OTC painkiller is not a wise way of spending money.	1	2	3	4	5	6	7
I think purchasing a store brand of an OTC painkiller is a waste of money.	1	2	3	4	5	6	7
Purchasing a store brand OTC painkiller causes me to worry that the product won’t be worth the money.	1	2	3	4	5	6	7

The next 10 questions are about OTC drugs in general. There is a good possibility that you won’t always know the correct answer. In that case, please choose the answer that you think is the correct one. Please do not consult others while answering the questions.

Part 6/7 ***please circle your answer***

1. Side effects of a drug a) are negative effects that always occur b) are undesirable side effects through usage c) always reduce the effectiveness of the drug	a	b	c
2. The more, often and prolonged use of paracetamol may lead to a) persistent headaches b) stomach complaints c) suppression of inflammatory symptoms	a	b	c
3. The following drug has a predominantly analgesic effect a) Amoxicillin b) Paracetamol c) Omeprazole	a	b	c
4. Generic painkillers in the Netherlands a) are only available at the pharmacy b) are generally less reliable c) have the same active ingredient as brand-name drugs	a	b	c
5. The active ingredient of Nurofen tablets is a) aspirin b) ibuprofen c) paracetamol	a	b	c
6. The active ingredient of Advil tablets is a) naproxen b) paracetamol c) ibuprofen	a	b	c
7. The active ingredient of Aleve tablets is a) naproxen b) aspirin c) ibuprofen	a	b	c
8. The active ingredient of Voltaren tablets is a) naproxen b) aspirin c) diclofenac	a	b	c
9. Diclofenac a) has stomach- and gastrointestinal complaints as possible side effects b) does not work anti-inflammatory c) has little interactions with other medicines	a	b	c
10. Generic painkillers in the Netherlands a) are not allowed to be sold at supermarkets b) are required to be bio-equivalent to the original a) are required to be just as safe and expensive as brand-name drugs	a	b	c

Part 7/7

You have almost arrived at the end of this survey. Please answer some general questions about yourself.

What is your gender?

- Male ○
- Female ○

What age group do you belong to?

- Under 18 ○
- 18-25 ○
- 26-34 ○
- 35-54 ○
- 55-64 ○
- 65 and older ○

What is the highest level of education you have completed?

- None ○
- Primary school ○
- High school ○
- Lower vocational education ○
- Higher vocational eduction ○
- Scientific education ○
- Other ○

Are you currently employed in a health care related field?

- No ○
- Yes ○

I usually purchase OTC drugs from

- the drug store ○
- the pharmacy ○
- the supermarket ○
- the gas station ○
- not applicable ○

Please continue on the next page.

Store brand: Have you purchased store brand OTC painkillers in the past year?

No ○
Yes ○

Store brand: Have you used store brand OTC painkillers in the past year?

No ○
Yes ○

National brand: Have you purchased national brand OTC painkillers in the past year?

No ○
Yes ○

National brand: Have you used national brand OTC painkillers in the past year?

No ○
Yes ○

Do you have any comments? Please fill them in below.

-END-

Do you have questions? Please contact me by sending an email to 316224aj@student.eur.nl.

Thank you for your time!

Appendix B

Table B1

Percentage male/ female

Gender	Frequency	Percentage
Female	90	56.3%
Male	70	43.8%
Total	160	100.0%

Table B2

Age group

Age	Frequency	Percentage
18-25	32	20.0%
26-34	43	26.9%
35-54	47	29.4%
55-64	30	18.8%
65 and older	8	5.0%
Total	160	100.0%

Note. This table shows the age groups and the percentage of respondents falling into a category. The circled values suggest that younger subjects might be overrepresented.

Table B3

Completed education

Education level	Frequency	Percentage
Primary school	2	1.3%
High school	15	9.4%
Lower vocational education	33	20.6%
Higher vocational education	46	28.8%
Scientific education	61	38.1%
Other	3	1.9%
Total	160	100.0%

Note. This table displays the education level of respondents. The circled value shows that respondents with a higher educational level is high.

Table B4

Employed in a health care related field

	Frequency	Percentage	Mean OK_INDEX	*SD*	*t*-test*
no	134	83.8%	6.09	1.79	2.49
yes	26	16.3%	7.01	2.15	
Total	160	100.0%			

***p* < .05 (2-tailed)

Note. M = Mean, *SD* = Standard Deviation. Independent t-test is performed to analyze the differences in OK_INDEX scores between respondents that are employed and not employed in health care related fields.

Table B5

Location of most frequent purchases of OTC drug painkillers

Location of most frequent purchases	Frequency	Percentage	Percentage with excluded missing values
drug store	94	58.8%	61.8%
pharmacy	18	11.3%	11.8%
supermarket	26	16.3%	17.1%
not applicable	14	8.8%	9.2%
missing value	8	5.0%	.
Total	160	100.0%	100.0%

Note. The circled value shows that the drug store is the location of the most frequent purchases.

Table B6

Store brand/ national brand OTC painkillers purchase and usage

	percentage
Purchased a store brand	81.3%
Used a store brand	84.4%
Purchased a national brand	44.4%
Used a national brand	52.5%

Note. This table shows the usage and purchasing of store brand- and national brands OTC painkillers of the past year as stated by the respondents. The results suggest that on average for each respondent the chance that they used and purchased a store brand painkiller is higher than for national brands.

Table B7

Minimum/ maximum values of standardized item values to detect univariate outliers

Standardized items	Minimum	Maximum
Zscore(ATT1)	-3.02	1.01
Zscore(ATT2)	-2.49	1.32
Zscore(ATT3)	-2.24	1.82
Zscore(ATT4)	-2.08	1.90
Zscore(ATT5)	-2.18	1.16
Zscore(ATT6)	-2.41	1.60
Zscore(PR_PERF1)	-0.99	2.59
Zscore(PR_PERF2)	-0.92	2.81
Zscore(PR_PERF3)	-0.87	2.87
Zscore(SK1)	-1.96	1.41
Zscore(SK2)	-1.64	1.74
Zscore(SK3)	-1.74	1.43
Zscore(SK4)	-0.94	2.33
Zscore(SK5)	-1.72	1.44
Zscore(PR_PHYS1)	-0.91	2.62
Zscore(PR_PHYS2)	-0.84	2.89
Zscore(PR_PHYS3)	-0.84	2.98
Zscore(PR_FIN1)	-0.94	2.94
Zscore(PR_FIN2)	-0.86	3.28
Zscore(PR_FIN3)	-0.88	3.00
Zscore(OK_INDEX)	-2.79	1.99

Note.N = 160. This table is a display of the minimum and maximum values of all item variables. No outliers are detected. The OK_INDEX is a directly measured composition of objective knowledge item scores and thus will not be used in the exploratory factor analysis.

Table B8

Correlation of attitude items

	ATT1 In general, store brand OTC painkillers are poor-quality products	ATT2 I love it when store brands of OTC painkillers are available.	ATT3 The best buy is usually the store brand of OTC painkillers.	ATT4 Buying store brands of OTC painkillers make me feel good.	ATT5 Considering value for money, I prefer store brand OTC painkillers to national brand OTC painkillers.	ATT6 When I buy a store brand OTC painkiller, I always feel that I am getting a good deal.
ATT1 In general, store brand OTC painkillers are poor-quality products	—					
ATT2 I love it when store brands of OTC painkillers are available.	.18*	—				
ATT3 The best buy is usually the store brand of OTC painkillers.	.21**	.50**	—			
ATT4 Buying store brands of OTC painkillers make me feel good.	.22**	.53**	.58**	—		
ATT5 Considering value for money, I prefer store brand OTC painkillers to national brand OTC painkillers.	.30**	.48**	.59**	.60**	—	
ATT6 When I buy a store brand OTC painkiller, I always feel that I am getting a good deal.	.35**	.55**	.60**	.68**	.76**	—

Note. N =160. This table shows the correlations between items that intend to measure attitude. The circled values are values that fall below 0.30 and suggest that factorability is moderate to low for this item.

*p < .05. **p < .01

Table B9
Correlation of Perceived Physical Risk Items

	PR_PHYS1 I worry that if I would purchase a store brand OTC painkiller. it may cause me some physical harm.	PR_PHYS2 One concern I have about purchasing store brands OTC painkillers is that it may not be safe for me or my family.	PR_PHYS3 I am afraid that that if I were to purchase a store brand OTC painkiller. it may endanger my health.
PR_PHYS1 I worry that if I would purchase a store brand OTC painkiller. it may cause me some physical harm.	—		
PR_PHYS2 One concern I have about purchasing store brands OTC painkillers is that it may not be safe for me or my family.	.90**	—	
PR_PHYS3 I am afraid that that if I were to purchase a store brand OTC painkiller. it may endanger my health.	.87**	.92**	—

Note. N=160. This table shows the correlations between items that intend to measure perceived physical risk.
**$p < .01$

Table B10
Correlation of perceived physical risk items

	PR_PERF1 Purchasing a store brand OTC painkiller causes me to be concerned about the performance of the drug	PR_PERF2 I think that if I were to purchase a store brand OTC painkiller. it will not really work as well as it is supposed to	PR_PERF3 The thought of purchasing a store brand OTC painkiller causes me to worry about the trustworthiness of the drug.
PR_PERF1 Purchasing a store brand OTC painkiller causes me to be concerned about the performance of the drug	—		
PR_PERF2 I think that if I were to purchase a store brand OTC painkiller. it will not really work as well as it is supposed to	.76**	—	
PR_PERF3 The thought of purchasing a store brand OTC painkiller causes me to worry about the trustworthiness of the drug.	.78**	.80**	—

Note. N =160. This table shows the correlations between items that intend to perceived performance risk.
**$p < .01$

Table B11
Correlation of perceived physical risk items

	PR_FIN1 I think purchasing a store brand OTC painkiller is not a wise way of spending money.	PR_FIN2 I think purchasing a store brand of an OTC painkiller is a waste of money.	PR_FIN3 Purchasing a store brand OTC painkiller causes me to worry that the product won't be worth the money.
PR_FIN1 I think purchasing a store brand OTC painkiller is not a wise way of spending money.	—		
PR_FIN2 I think purchasing a store brand of an OTC painkiller is a waste of money.	.85**	—	
PR_FIN3 Purchasing a store brand OTC painkiller causes me to worry that the product won't be worth the money.	.79**	.82**	—

Note. N =160. This table shows the correlations between items that intend to measure perceived financial risk.
**$p < .01$

Table B12

Correlation of subjective knowledge items

	SK1 Compared to most other people, I know less about OTC painkillers.	SK2 I know pretty much about OTC painkillers.	SK3 I do not feel very knowledgeable about OTC painkillers.	SK4 Among my circle of friends, I am one of the "experts" on OTC painkillers.	SK5 When it comes to OTC painkillers, I really don't know a lot.
SK1 Compared to most other people, I know less about OTC painkillers.	—				
SK2 I know pretty much about OTC painkillers.	.72**	—			
SK3 I do not feel very knowledgeable about OTC painkillers.	.68**	.62**	—		
SK4 Among my circle of friends, I am one of the "experts" on OTC painkillers.	.51**	.60**	.61**	—	
SK5 When it comes to OTC painkillers, I really don't know a lot.	.69**	.64**	.75**	.51**	—

Note. N =160. This table shows the correlations between items that intend to measure subjective knowledge.

**$p < .01$

Table B13

Anti-image correlation matrix

Item	ATT1	ATT2	ATT3	ATT4	ATT5	ATT6	PR_PERF1	PR_PERF2	PR_PERF3	SK1	SK2	SK3	SK4	SK5	PR_PHYS1	PR_PHYS2	PR_PHYS3	PR_FIN1	PR_FIN2	PR_FIN3	OK
ATT1	**0.96**																				
ATT2	0.09	**0.89**																			
ATT3	-0.01	-0.23	**0.87**																		
ATT4	0.05	-0.22	-0.14	**0.91**																	
ATT5	0.04	0.01	-0.20	-0.07	**0.88**																
ATT6	-0.09	-0.14	-0.14	-0.33	-0.53	**0.87**															
PR_PERF1	0.13	-0.19	0.18	0.09	-0.04	0.06	**0.91**														
PR_PERF2	0.21	0.04	-0.16	-0.03	0.00	0.05	-0.31	**0.91**													
PR_PERF3	0.06	0.06	0.02	-0.04	0.15	-0.10	-0.31	-0.37	**0.93**												
SK1	0.01	0.17	-0.23	-0.10	0.06	0.11	-0.08	0.16	-0.01	**0.89**											
SK2	-0.08	-0.06	-0.06	0.02	0.01	-0.07	-0.04	-0.02	-0.11	-0.40	**0.88**										
SK3	-0.10	-0.15	0.11	-0.08	-0.01	0.03	-0.05	0.05	0.07	-0.20	0.01	**0.86**									
SK4	-0.01	0.03	0.08	0.00	0.01	-0.05	0.04	-0.05	0.03	-0.01	-0.25	-0.35	**0.84**								
SK5	0.08	0.03	-0.01	0.01	-0.07	0.05	0.16	-0.17	0.00	-0.20	-0.22	-0.48	0.05	**0.87**							
PR_PHYS1	0.04	-0.07	0.02	0.07	-0.14	0.17	0.00	-0.01	0.01	-0.02	-0.06	0.05	-0.01	-0.03	**0.94**						
PR_PHYS2	-0.01	0.17	0.11	-0.09	-0.02	-0.01	0.14	-0.25	-0.04	-0.04	0.12	-0.12	0.05	0.04	-0.42	**0.89**					
PR_PHYS3	0.04	-0.01	-0.21	-0.01	0.05	-0.03	-0.14	0.14	-0.02	0.14	-0.17	-0.02	-0.09	0.10	-0.27	-0.57	**0.9**				
PR_FIN1	0.12	0.03	0.14	-0.08	-0.02	-0.02	0.14	-0.11	0.06	-0.13	-0.04	-0.12	0.19	0.16	-0.11	0.12	-0.09	**0.89**			
PR_FIN2	0.06	-0.04	-0.06	0.13	0.20	-0.15	0.00	0.07	0.02	-0.02	0.06	0.28	-0.24	-0.16	0.08	-0.09	-0.05	-0.56	**0.88**		
PR_FIN3	-0.12	0.06	-0.11	-0.03	-0.07	0.13	-0.30	0.06	-0.18	0.13	0.03	-0.08	-0.01	-0.04	0.01	-0.16	0.05	-0.25	-0.35	**0.93**	
OK	-0.07	0.04	-0.03	0.05	-0.04	0.02	0.08	-0.06	-0.10	-0.09	-0.18	-0.03	-0.18	0.04	0.13	-0.02	0.00	0.03	-0.02	0.08	**0.95**

Note. $N = 160$. This table shows the MSA in bold.

Table B14

Total Variance explained

	Initial Eigenvalues			Extraction Sums of Squared loadings			Rotation sums of squared loadings
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	9.23	44	44	9.23	44	44	4.47
2	3.11	15	59	3.11	15	59	4.92
3	2.12	10	69	2.12	10	69	4.77
4	0.95	5	73	0.95	5	73	6.09
5	0.74	4	77	0.74	4	77	6.31
6	0.68	3	80	0.68	3	80	2.03
7	0.59	3	83				
8	0.50	2	85				
9	0.47	2	88				
10	0.41	2	90				
11	0.39	2	91				
12	0.36	2	93				
13	0.27	1	94				
14	0.21	1	95				
15	0.20	1	96				
16	0.20	1	97				
17	0.17	1	98				
18	0.13	1	99				
19	0.12	1	99				
20	0.10	0	100				
21	0.06	0	100				

Note. This table shows the Eigenvalues of the components. Method of extraction is PCA. The circled values indicate that a number of six components with Eigenvalues above 0.68 are extracted and explain 80% of the total variance.

Table B15

Communalities after extraction

	Extraction
ATT1	0.65
ATT2	0.71
ATT3	0.67
ATT4	0.71
ATT5	0.76
ATT6	0.82
PR_PERF1	0.83
PR_PERF2	0.84
PR_PERF3	0.84
SK1	0.76
SK2	0.76
SK3	0.82
SK4	0.64
SK5	0.80
PR_PHYS1	0.89
PR_PHYS2	0.94
PR_PHYS3	0.90
PR_FIN1	0.90
PR_FIN2	0.93
PR_FIN3	0.85
OK	0.85

Note. Method of extraction is PCA. The circled value is the lowest.

Table B16

Pattern Matrix with all 21 Items Included

	Component					
Item question	1	2	3	4	5	6
In general, store brand OTC painkillers are poor-quality products.*				.64		
I love it when store brands of OTC painkillers are available.			.67			
The best buy is usually the store brand of OTC painkillers.			.80			
Buying store brands of OTC painkillers make me feel good.			.79			
Considering value for money, I prefer store brand OTC painkillers to national brand OTC painkillers.			.79			
When I buy a store brand OTC painkiller, I always feel that I am getting a good deal.			.85			
Purchasing a store brand OTC painkiller causes me to be concerned about the performance of the drug.				-.82		
I think that if I were to purchase a store brand OTC painkiller, it will not really work as well as it is supposed to.				-.84		
The thought of purchasing a store brand OTC painkiller causes me to worry about the trustworthiness of the drug.				-.83		
Compared to most other people, I know less about OTC painkillers.*		.79				
I know pretty much about OTC painkillers.		.71				
I do not feel very knowledgeable about OTC painkillers.*		.88				
Among my circle of friends, I am one of the “experts” on OTC painkillers.		.63				
When it comes to OTC painkillers, I really don’t know a lot.*		.92				
I worry that if I would purchase a store brand OTC painkiller, it may cause me some physical harm.	.71					
One concern I have about purchasing store brands OTC painkillers is that it may not be safe for me or my family.	.69					
I am afraid that that if I were to purchase a store brand OTC painkiller, it may endanger my health.	.68					
I think purchasing a store brand OTC painkiller is not a wise way of spending money.					.93	
I think purchasing a store brand of an OTC painkiller is a waste of money.					.94	
Purchasing a store brand OTC painkiller causes me to worry that the product won’t be worth the money.					.61	
OK item						.78

a: * = reverse scored

Note. The pattern matrix shows the factor loadings after extraction with PCA and rotation with Oblimin and Kaiser normalization. Small coefficients with absolute values < 0.45 are suppressed.

Table B17

Reliability of items measuring attitude toward store brand OTC painkillers

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ATT1	0.31	0.87
ATT2	0.58	0.83
ATT3	0.66	0.81
ATT4	0.70	0.81
ATT5	0.73	0.80
ATT6	0.81	0.78

Note. Overall α = .85. The circled value points out that α improves when item is deleted.

Table B18

Reliability of items measuring perceived performance risk of store brand OTC painkillers

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PR_PERF1	0.81	0.89
PR_PERF2	0.83	0.88
PR_PERF3	0.84	0.86

Note. Overall α = .91.

Table B19

Reliability of items measuring perceived physical risk of store brand OTC painkillers

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PR_PHYS1	0.90	0.96
PR_PHYS2	0.94	0.93
PR_PHYS3	0.92	0.94

Note. Overall α = .96.

Table B20

Reliability of items measuring perceived financial risk of store brand OTC painkillers

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PR_FIN1	0.86	0.90
PR_FIN2	0.89	0.88
PR_FIN3	0.84	0.92

Note. Overall α = .93.

Table B21

Reliability of items measuring subjective knowledge of OTC painkillers

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SK1	0.77	0.87
SK2	0.76	0.87
SK3	0.79	0.86
SK4	0.64	0.90
SK5	0.77	0.87

Note. Overall α = .90.

Table B22

Minimum/ maximum values of standardized item values to detect univariate outliers

Standardized items	Minimum	Maximum
Zscore(ATT)	-2.63	1.88
Zscore(PR_PERF)	-1.00	2.98
Zscore(PR_PHYS)	-0.90	2.93
Zscore(PR_FIN)	-0.95	3.27
Zscore(OK)	-2.79	1.99
Zscore(SK)	-1.90	1.99
Zscore(PR_PERF)	-1.00	2.98

Note. N = 160.This table is a display of the minimum and maximum values of all item variables.

Appendix C

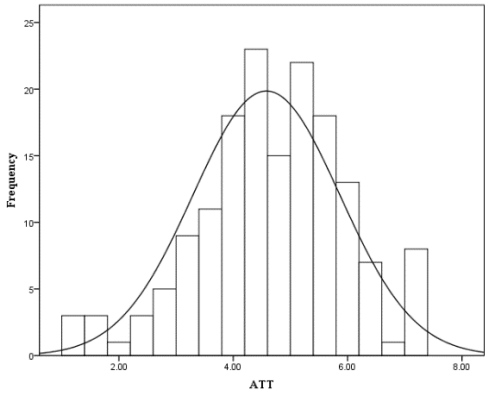

Figure C1: *N* = 160. The histogram of frequencies of attitude towards store brand OTC painkillers suggests that the data is normally distributed.

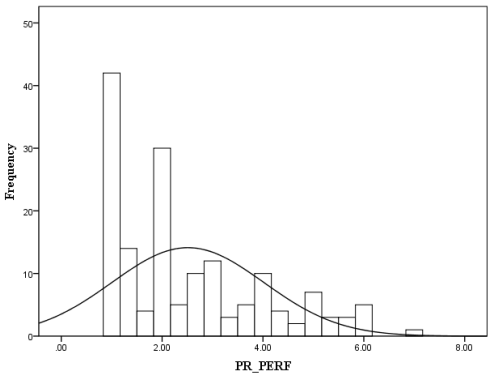

Figure C2: N = 160 The histogram of frequencies of perceived performance risk of OTC painkillers suggests that the data is not normally distributed.

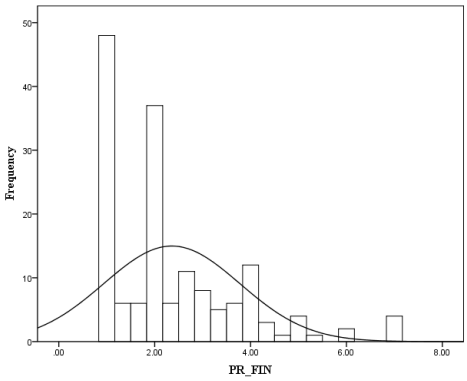

Figure C3: N = 160 The histogram of frequencies of perceived financial risk of OTC painkillers suggests that the data is not normally distributed.

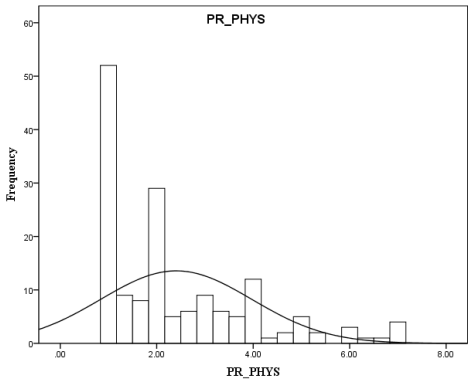

Figure C4: N = 160.The histogram of frequencies of perceived physical risk of OTC painkillers suggests that the data is not normally distributed.

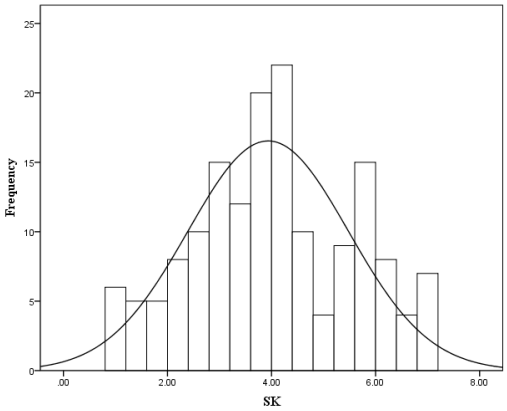

Figure C5: *N* = 160. The histogram of frequencies of attitude towards store brand OTC painkillers suggests that the data is normally distributed.

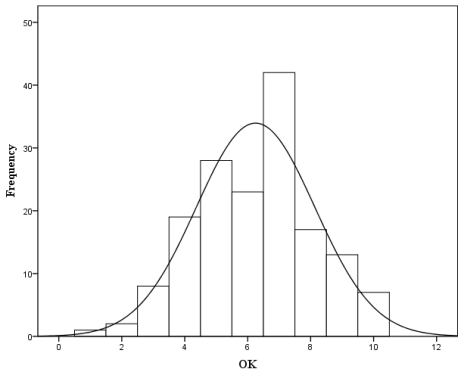

Figure C6: *N* = 160. The histogram of frequencies of attitude towards store brand OTC painkillers suggests that the data is normally distributed.

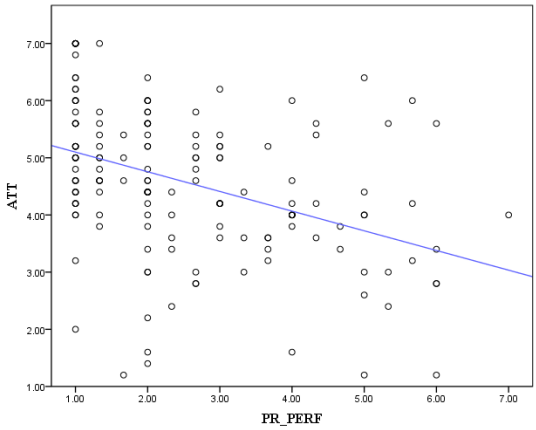

Figure C7: Scatter plot of the variables attitude towards store brand OTC painkillers (Y-axis) and perceived performance risk of store brand OTC painkillers (X-axis).

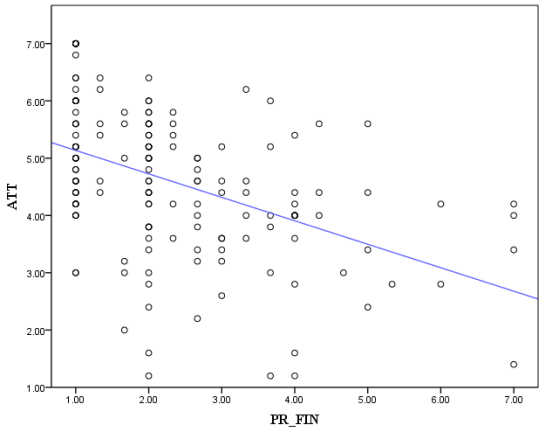

Figure C8: Scatter plot of the variables attitude towards store brand OTC painkillers (Y-axis) and perceived financial risk of store brand OTC painkillers (X-axis).

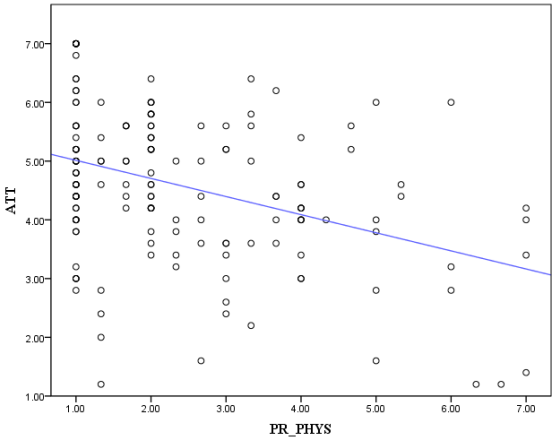

Figure C9: Scatter plot of the variables attitude towards store brand OTC painkillers (Y-axis) and perceived physical risk of store brand OTC painkillers (X-axis).

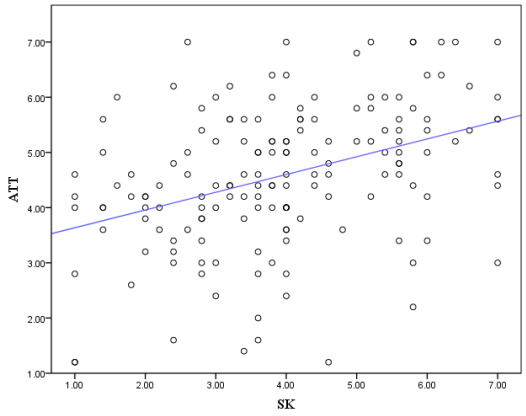

Figure C10: Scatter plot of the variables attitude towards store brand OTC painkillers (Y-axis) and subjective knowledge of OTC painkillers (X-axis).

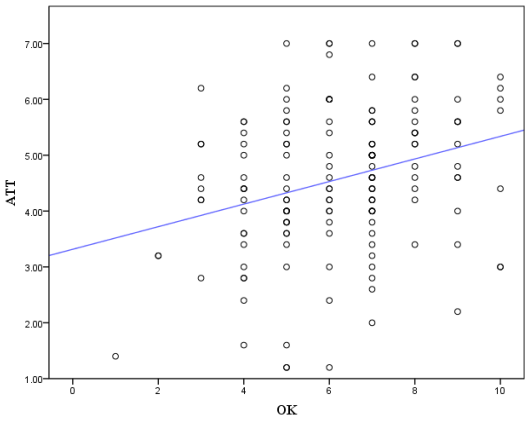

Figure C11: Scatter plot of the variables attitude towards store brand OTC painkillers (Y-axis) and objective knowledge of OTC painkillers (X-axis).

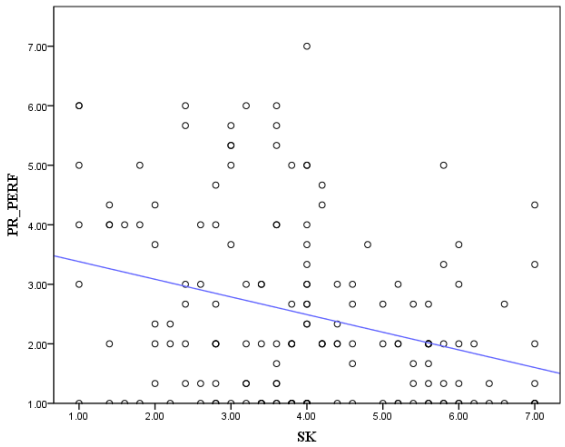

Figure C12: Scatter plot of the variables perceived performance risk of store brand OTC painkillers (Y-axis) and subjective knowledge of OTC painkillers (X-axis).

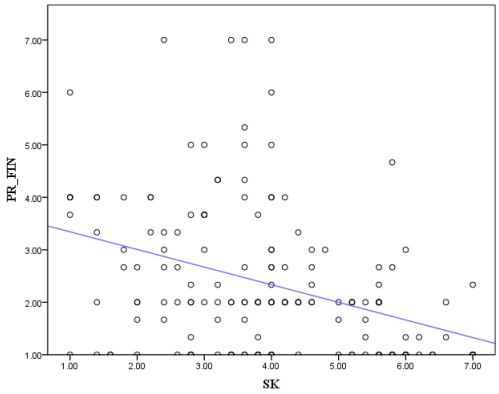

Figure C13: Scatter plot of the variables perceived financial risk of store brand OTC painkillers (Y-axis) and subjective knowledge of OTC painkillers (X-axis).

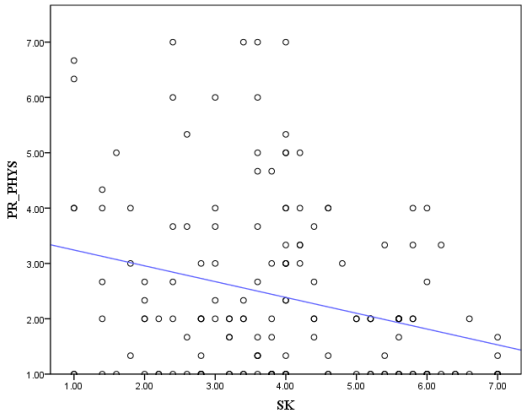

Figure C14: Scatter plot of the variables perceived physical risk of store brand OTC painkillers (Y-axis) and subjective knowledge of OTC painkillers (X-axis).

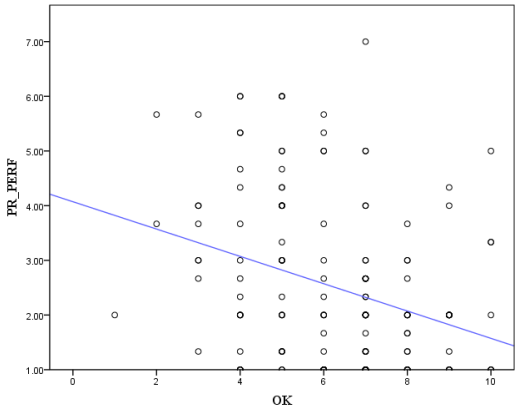

Figure C15: Scatter plot of the variables perceived performance risk of store brand OTC painkillers (Y-axis) and objective knowledge of OTC painkillers (X-axis).

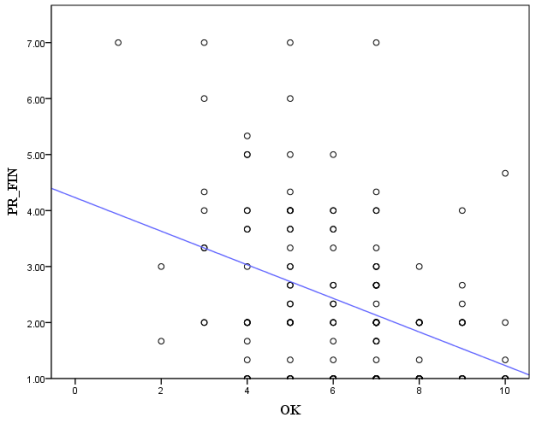

Figure C16: Scatter plot of the variables perceived financial risk of store brand OTC painkillers (Y-axis) and objective knowledge of OTC painkillers (X-axis).

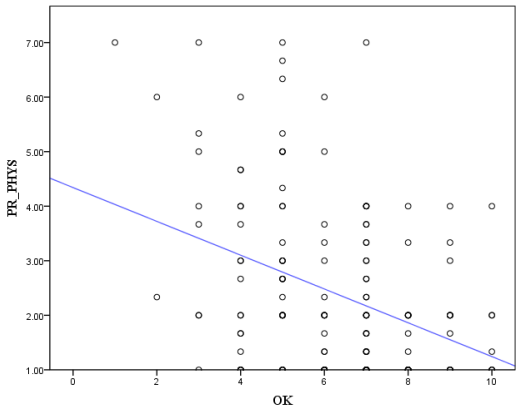

Figure C17: Scatter plot of the variables perceived physical risk of store brand OTC painkillers (Y-axis) and objective knowledge of OTC painkillers (X-axis).

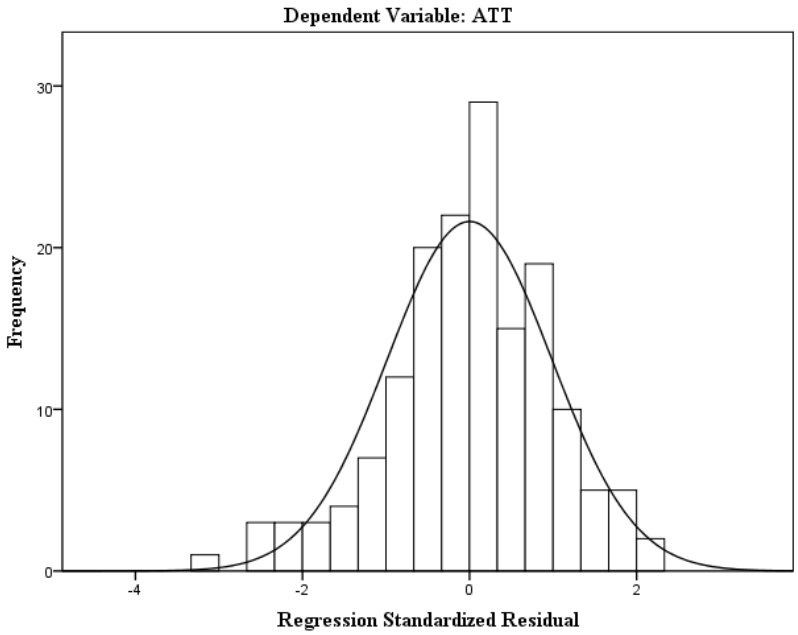

Figure C18: Histogram showing that the distribution of errors is normal. Outcome variable is ATT = attitude toward store brand OTC painkillers.

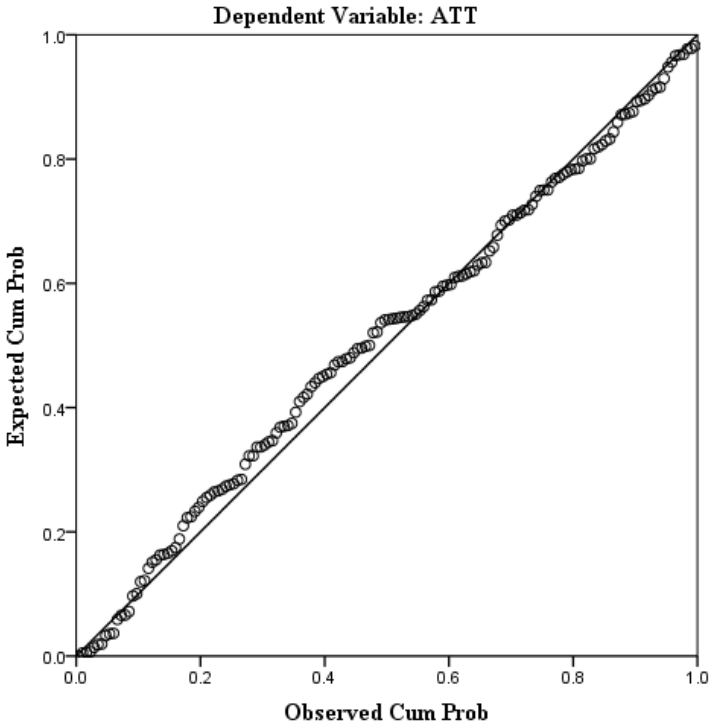

Figure C19: Normal P-P of regression standardized residuals showing that the distribution of errors is normal. Outcome variable is ATT = attitude toward store brand OTC painkillers.

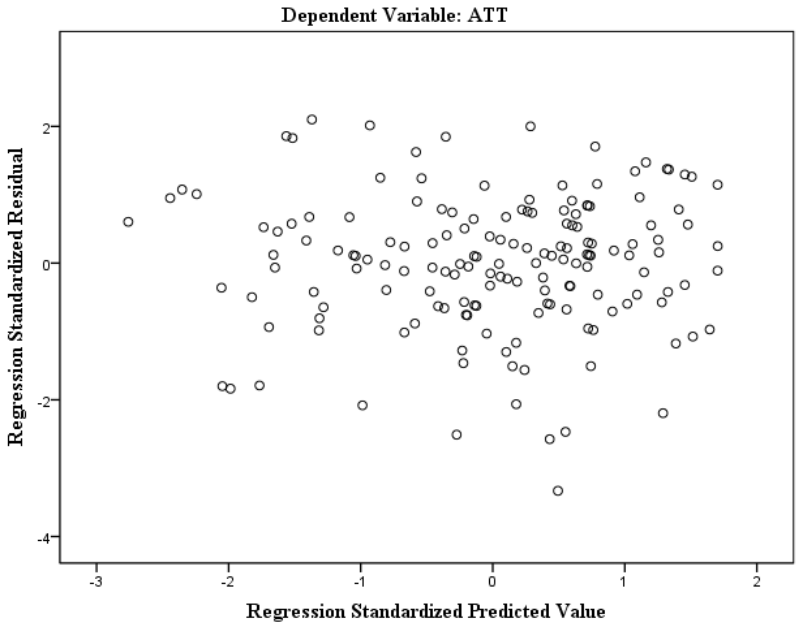

Figure C20: Scatterplot of the standardized residuals against the standardized predicted values, indicated that there is no heteroscedasticity. Outcome variable is ATT = attitude toward store brand OTC painkillers.

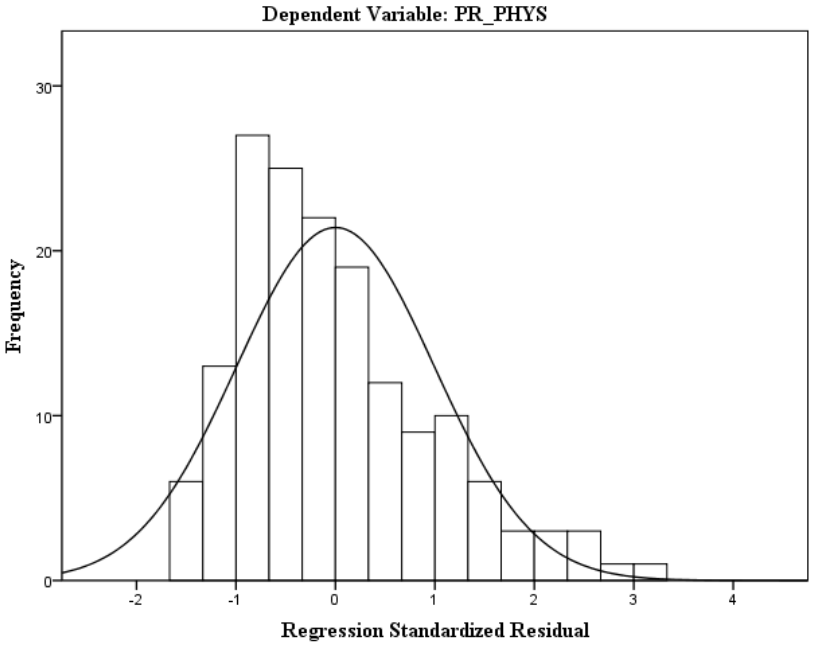

Figure C21: Histogram showing that the distribution of errors are fairly normal. Outcome variable is PR_PHYS = perceived physical risk of store brand OTC painkillers.

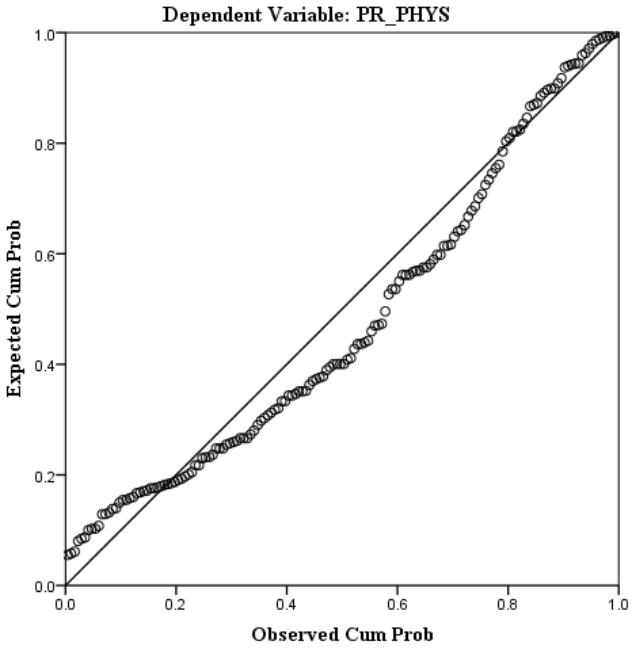

Figure C22: Normal P-P of regression standardized residuals showing that the distribution of errors is fairly normal. Outcome variable is PR_PHYS = perceived physical risk of store brand OTC painkillers.

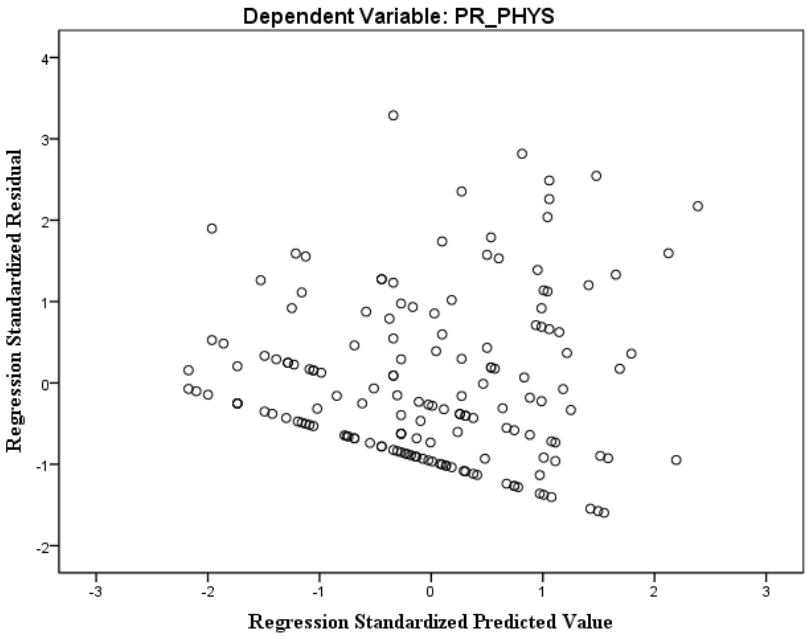

Figure C23: Scatterplot of the standardized residuals against the standardized predicted values, indicated that heteroscedasticity might be present. Outcome variable is PR_PHYS = perceived physical risk of store brand OTC painkillers.

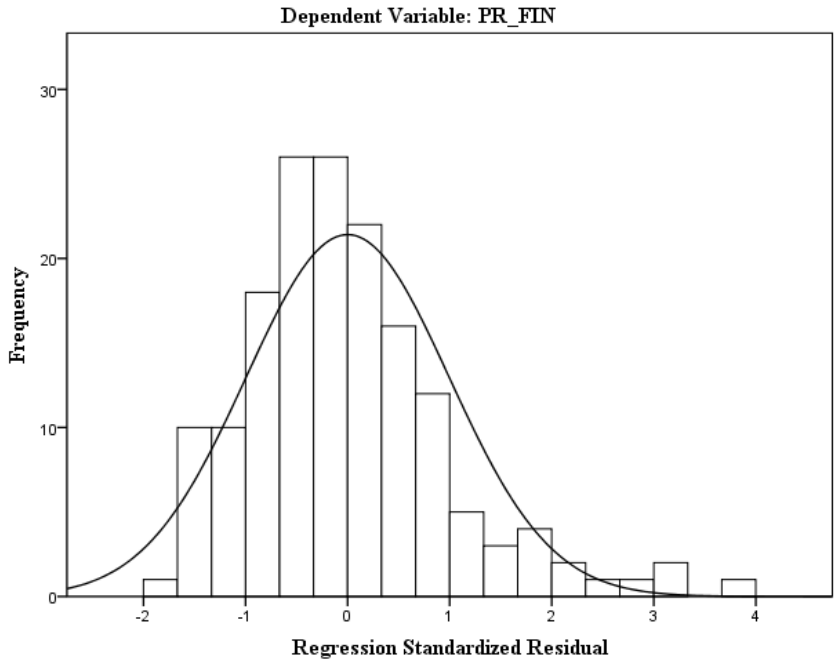

Figure C24: Histogram showing that the distribution of errors are fairly normal. Outcome variable is PR_FIN = perceived financial risk of store brand OTC painkillers.

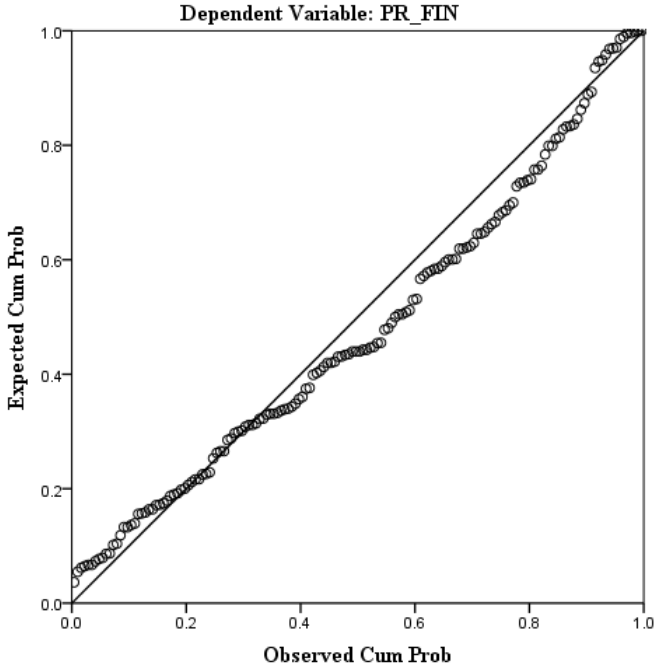

Figure C25: Normal P-P of regression standardized residuals showing that the distribution of errors is fairly normal. Outcome variable is PR_FIN = perceived financial risk of store brand OTC painkillers.

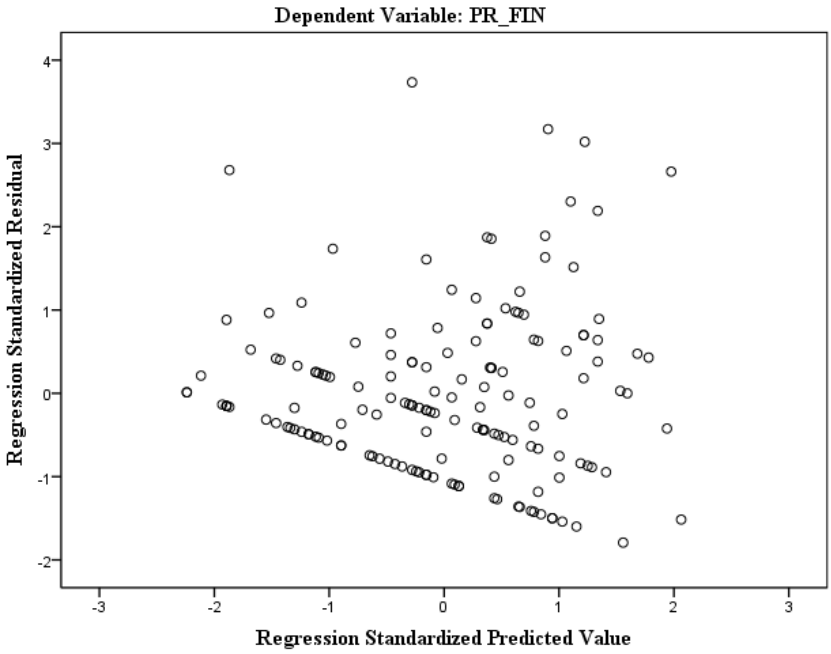

Figure C26: Scatterplot of the standardized residuals against the standardized predicted values, indicated that heteroscedasticity might be present. Outcome variable is PR_FIN = perceived financial risk of store brand OTC painkillers.

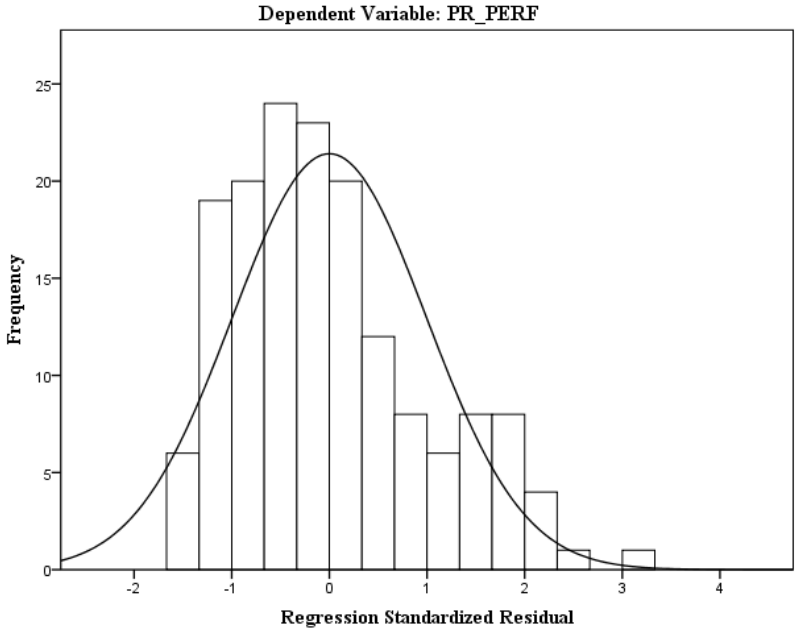

Figure C27: Histogram showing that the distribution of errors is fairly normal. Outcome variable is PR_PERF = perceived performance risk of store brand OTC painkillers.

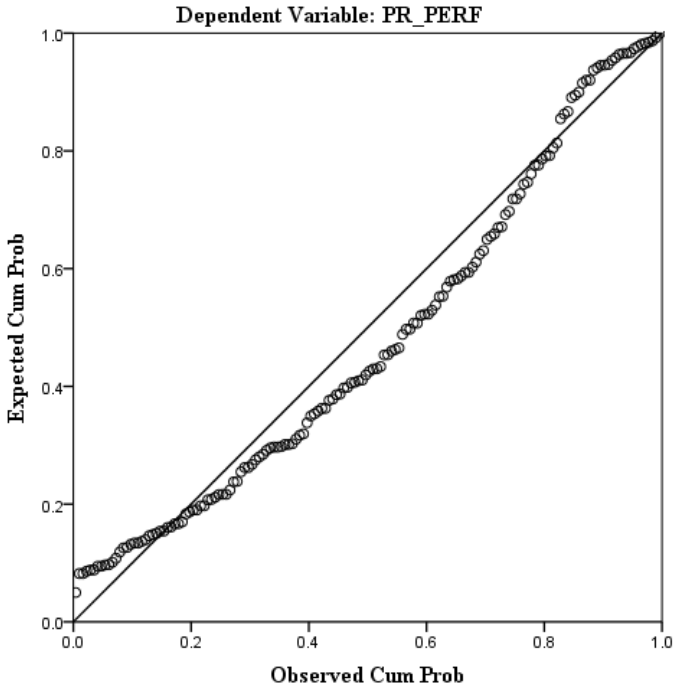

Figure C28: Normal P-P of regression standardized residuals showing that the distribution of errors is fairly normal. Outcome variable is PR_PERF = perceived performance risk of store brand OTC painkillers.

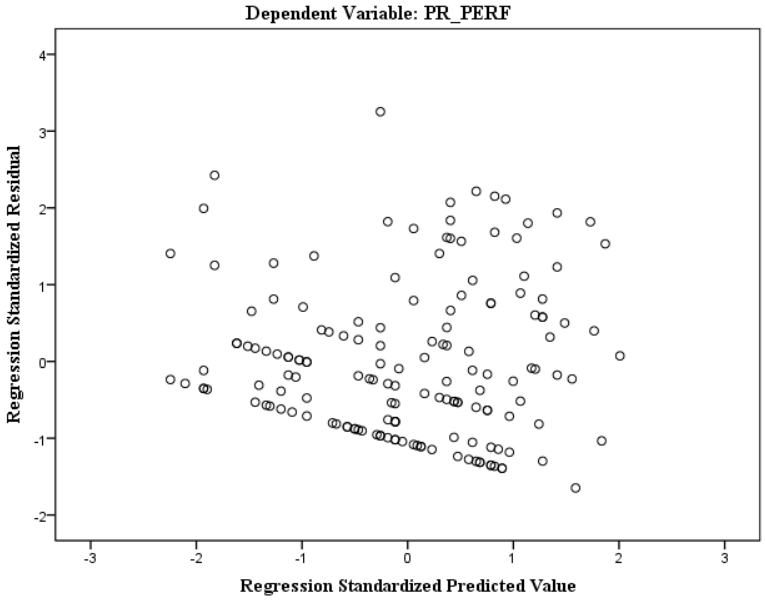

Figure C29: Scatterplot of the standardized residuals against the standardized predicted values, indicated that heteroscedasticity might be present. Outcome variable is PR_PERF = perceived performance risk of store brand OTC painkillers.

Appendix D

Table D1

Indirect, total and direct effects with SK as predictor variable and OK as covariate.

				95% CI	
	B	*SE*	*p*	LL	UL
a-path					
SK -> PR_PHYS	-0.104	0.091	0.256	-0.284	0.076
SK -> PR_FIN	-0.189*	0.081	0.020	-0.348	-0.030
SK -> PR_PERF	-0.182*	0.089	0.042	-0.358	-0.007
b-path					
PR_PHYS ->ATT	-0.014	0.094	0.880	-0.200	0.171
PR_FIN ->ATT	-0.226*	0.102	0.029	-0.428	-0.024
PR_PERF ->ATT	-0.121	0.090	0.179	-0.298	0.056
c'-path					
SK -> ATT	0.203**	0.071	0.005	0.617	0.343
c-path					
SK -> ATT	0.269**	0.074	0.000	0.122	0.416
a×b -path					
PR_PHYS	0.002	0.015	n.s.	-0.021	0.048
PR_FIN	0.043*	0.024	<0.05	0.006	0.103
PR_PERF	0.022	0.023	n.s.	-0.008	0.087

Note. N = 160. CI = confidence interval. LL = lower limit, UL is upper limit. Method of calculation is OLS regression and bootstrap with 5000 samples with bias corrected 95% intervals. OK= objective knowledge of OTC painkillers, SK = Subjective knowledge of OTC painkillers, ATT = attitude towards store brand OTC painkillers, PR_PERF = perceived performance risk of store brand OTC painkillers, PR_FIN = perceived financial risk of store brand OTC painkillers, PR_PHYS = perceived physical risk of store brand OTC painkillers The following equation should hold, c = c' + a×b. This equation with the unstandardized coefficients (also insignificant estimates) is as follows: 0.269 ≙ 0.203 +0.002+ 0.043 + 0.022. Method of calculation is OLS regression and bootstrap with 5000 samples with bias corrected 95% intervals for the indirect effects.

*p < .05. * *p < .01

Table D2

Indirect, total and direct effects with OK as predictor variable and SK as covariate.

				95% CI	
	B	*SE*	*p*	LL	UL
a-path					
OK -> PR_PHYS	-0.261**	0.075	0.001	-0.409	-0.113
OK -> PR_FIN	-0.211**	0.066	0.002	-0.342	-0.081
OK -> PR_PERF	-0.164*	0.073	0.026	-0.309	-0.020
b-path					
PR_PHYS ->ATT	-0.014	0.094	0.880	-0.200	0.171
PR_FIN ->ATT	-0.226*	0.102	0.029	-0.428	-0.024
PR_PERF ->ATT	-0.121	0.090	0.179	-0.298	0.056
c'-path					
OK -> ATT	0.005	0.060	0.935	-0.113	0.123
c-path					
OK -> ATT	0.076	0.061	0.214	-0.044	0.197
a×b -path					
PR_PHYS	0.004	0.028	n.s.	-0.047	0.069
PR_FIN	0.048*	0.033	<0.05	0.004	0.140
PR_PERF	0.020	0.022	n.s.	-0.008	0.081

Note. *N* = 160. CI = confidence interval. LL = lower limit, UL is upper limit. OK= objective knowledge of OTC painkillers, SK = Subjective knowledge of OTC painkillers, ATT = attitude towards store brand OTC painkillers, PR_PERF = perceived performance risk of store brand OTC painkillers, PR_FIN = perceived financial risk of store brand OTC painkillers, PR_PHYS = perceived physical risk of store brand OTC painkillers. The following equation should hold, c = c' + a×b. This equation with the unstandardized coefficients (also insignificant): 0.076 ≙ 0.005 +0.004 + 0.048 + 0.020. Method of calculation is OLS regression and bootstrap with 5000 samples with bias corrected 95% intervals for the indirect effects.

*p < .05. **p < .01

Figure D1

SPSS output from Hayes (2012) PROCESS script testing the indirect effect a×b, with SK as predictor variable and OK as covariate

```
Run MATRIX procedure:

************* PROCESS Procedure for SPSS Release 2.16.3 *****************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3

**************************************************************************
Model = 4
    Y = ATT
    X = SK
   M1 = PR_PHYS
   M2 = PR_FIN
   M3 = PR_PERF

Statistical Controls:
CONTROL= OK

Sample size
        160

**************************************************************************
Outcome: PR_PHYS

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3809      .1451     2.1289    13.3259     2.0000   157.0000
.0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     4.4457      .4120    10.7917      .0000     3.6320     5.2594
SK           -.1040      .0913    -1.1394      .2563     -.2844      .0763
OK           -.2611      .0750    -3.4838      .0006     -.4092     -.1131

**************************************************************************
Outcome: PR_FIN

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .4315      .1862     1.6624    17.9554     2.0000   157.0000
.0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     4.4212      .3640    12.1450      .0000     3.7022     5.1402
SK           -.1891      .0807    -2.3433      .0204     -.3484     -.0297
OK           -.2114      .0662    -3.1909      .0017     -.3422     -.0805

**************************************************************************
Outcome: PR_PERF
```

```
Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3475      .1207     2.0210    10.7783     2.0000   157.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     4.2553      .4014    10.6015      .0000     3.4625     5.0481
SK           -.1823      .0890    -2.0488      .0421     -.3580     -.0065
OK           -.1644      .0730    -2.2513      .0258     -.3087     -.0202

************************************************************************
Outcome: ATT

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .5221      .2726     1.2410    11.5422     5.0000   154.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     4.6223      .4498    10.2752      .0000     3.7336     5.5109
PR_PHYS      -.0142      .0938     -.1513      .8800     -.1995      .1711
PR_FIN       -.2257      .1023    -2.2058      .0289     -.4279     -.0236
PR_PERF      -.1210      .0896    -1.3500      .1790     -.2980      .0561
SK            .2025      .0713     2.8410      .0051      .0617      .3433
OK            .0049      .0596      .0818      .9349     -.1129      .1227

************************** TOTAL EFFECT MODEL ****************************
Outcome: ATT

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3970      .1576     1.4098    14.6851     2.0000   157.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     3.0464      .3352     9.0874      .0000     2.3842     3.7085
SK            .2687      .0743     3.6169      .0004      .1220      .4155
OK            .0762      .0610     1.2490      .2135     -.0443      .1967

***************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .2687      .0743     3.6169      .0004      .1220      .4155

Direct effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .2025      .0713     2.8410      .0051      .0617      .3433

Indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
TOTAL        .0662      .0306      .0158      .1410
PR_PHYS      .0015      .0151     -.0207      .0480
PR_FIN       .0427      .0236      .0062      .1032
```

```
PR_PERF      .0221      .0233     -.0081      .0866

******************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence
intervals:
     5000

Level of confidence for all confidence intervals in output:
    95.00

------ END MATRIX -----
```

Figure D2

SPSS output from Hayes (2012) PROCESS script testing the indirect effect a×b, with OK as predictor variable and SK as covariate

```
Run MATRIX procedure:

************* PROCESS Procedure for SPSS Release 2.16.3 *****************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3

**************************************************************************
Model = 4
    Y = ATT
    X = OK
   M1 = PR_PHYS
   M2 = PR_FIN
   M3 = PR_PERF

Statistical Controls:
CONTROL= SK

Sample size
        160

**************************************************************************
Outcome: PR_PHYS

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3809      .1451     2.1289    13.3259     2.0000   157.0000
.0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     4.4457      .4120    10.7917      .0000     3.6320     5.2594
OK           -.2611      .0750    -3.4838      .0006     -.4092     -.1131
SK           -.1040      .0913    -1.1394      .2563     -.2844      .0763

**************************************************************************
Outcome: PR_FIN

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .4315      .1862     1.6624    17.9554     2.0000   157.0000
.0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     4.4212      .3640    12.1450      .0000     3.7022     5.1402
OK           -.2114      .0662    -3.1909      .0017     -.3422     -.0805
SK           -.1891      .0807    -2.3433      .0204     -.3484     -.0297

**************************************************************************
Outcome: PR_PERF
```

```
Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3475      .1207     2.0210    10.7783     2.0000   157.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     4.2553      .4014    10.6015      .0000     3.4625     5.0481
OK           -.1644      .0730    -2.2513      .0258     -.3087     -.0202
SK           -.1823      .0890    -2.0488      .0421     -.3580     -.0065

**************************************************************************
Outcome: ATT

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .5221      .2726     1.2410    11.5422     5.0000   154.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     4.6223      .4498    10.2752      .0000     3.7336     5.5109
PR_PHYS      -.0142      .0938     -.1513      .8800     -.1995      .1711
PR_FIN       -.2257      .1023    -2.2058      .0289     -.4279     -.0236
PR_PERF      -.1210      .0896    -1.3500      .1790     -.2980      .0561
OK            .0049      .0596      .0818      .9349     -.1129      .1227
SK            .2025      .0713     2.8410      .0051      .0617      .3433

************************** TOTAL EFFECT MODEL ****************************
Outcome: ATT

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3970      .1576     1.4098    14.6851     2.0000   157.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     3.0464      .3352     9.0874      .0000     2.3842     3.7085
OK            .0762      .0610     1.2490      .2135     -.0443      .1967
SK            .2687      .0743     3.6169      .0004      .1220      .4155

***************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .0762      .0610     1.2490      .2135     -.0443      .1967

Direct effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .0049      .0596      .0818      .9349     -.1129      .1227

Indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
TOTAL        .0713      .0327      .0167      .1457
PR_PHYS      .0037      .0284     -.0472      .0688
PR_FIN       .0477      .0330      .0038      .1399
```

```
PR_PERF      .0199      .0220     -.0084      .0805

****************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence
intervals:
     5000

Level of confidence for all confidence intervals in output:
    95.00

------ END MATRIX -----
```