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### **Emotions and Decision-making**

Name student: Ulonnam Akwataghibe

Student ID number: 449991

Supervisor: Julia Rose

Second Assessor: Aurelien Baillon

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## Abstract

**Background:** Consumer behaviour is a topic that has been researched with growing interest lately. Contemporary studies on consumer behaviour implement many behavioural concepts and theories on emotion and decision-making in order to model consumer behaviour more completely. This has given rise to studies which aimed to investigate other psychological influences of behaviour such as emotions. Since this development, there has been significant discourse on how emotions can be used to predict consumer behaviour in different contexts such as limited availability and risky choice.

**Methods:** The purpose of this study was to investigate the impact of emotions on decision-making behaviour under risk. This examination was done to better inform research on consumer behaviour. Using a between-subject experimental design, we aimed to assess whether any differences in risk attitudes are observed across two emotion conditions; fear and happiness. Moreover, the paper investigates if services influence risk aversion levels differently from goods.

**Results:** Overall, we found no significant effect of emotions on behaviour or product type on risk preferences. We posit that this was largely due to the emotion induction failure in the fear condition. However, some variables demonstrated significant results in the linear regression. We found that educational background, geographical location and gender have some association with the risk attitudes in participants.

**Implications:** If a follow-up experiment was to be conducted, a more stringent and lengthy induction period may be necessary in order to effectively induce emotion in participants. Our results indicate that increased focus should be given to the factors such as educational background and geographical location when looking at risk preferences.

Keywords: Emotions, Risk-preferences, Consumer behaviour, Fear, Happiness

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## 1. Introduction

Consumption is all around us, and in this day and age, almost everyone is a potential consumer. Firms and marketing managers are on a never-ending journey to understand more about the habits, mannerisms, and motivations of consumers. One pathway to doing this is by observing the emotional responses of consumers to consumption stimuli such as price promotions, limited-time offers, product innovations and other marketing efforts. It is through this observation that conclusions have been drawn about the effect of different emotions on consumer behaviour. These effects are distinct depending on the emotion experienced. If one was able to isolate, observe and compare two shoppers, one under the influence of fear and another under the influence of happiness, predictions about the behaviour under these emotions would differ greatly. Standard predictions under fear speak more to the deliberate and methodological cognitive approach to reasoning (Coget et al, 2011), while behaviour under happiness is characterized by impulsive and automatic mental processes (Park and Banaji, 2000). These differences have implications in terms of the time one spends shopping, the products selected for purchasing, the willingness to try new products, and the money spent on goods.

However, one does not need to review many articles to understand that in most individuals one fact remains clear, different emotions will induce different behaviour. As already stated, everyone is a consumer, this implies that findings on emotions and decision-making on an individual level can be translated to consumer behaviour. This logic will serve as the basis for the research undertaken in this paper. By understanding how emotions influence the individual we gain insight into the mind of the consumer.

Ultimately, this paper aims to investigate the effect of positive and negative emotional states (namely, fear and happiness) on consumer purchasing behaviour, with the focus being on the difference between their risk attitudes. To observe this, participants' will have emotions induced and their risk preferences will be elicited across different decision situations with varying products. Following this, the aim of this paper will be to extrapolate the results to a consumption context in order to examine the link between emotions and consumer behaviour. By doing so, we can better inform policymakers and institutions about the factors and processes which underpin consumption decisions taken under emotional stimuli.

Consequently, the main examination in this paper is: *How does fear and happiness influence consumer purchasing behaviour?*

Due to the fact that the findings have potential outcomes for consumer behaviour, it is important to describe this concept. Consumer behaviour is described as the behaviour around the purchase, usage, and disposal of a product (Pachauri, 2001). There are several psychological aspects to consumer behaviour, and it presents an important pathway to understanding more about the antecedents of decision-making.

The role of emotions on consumer behaviour has been increasingly well documented.

Emotions influence consumers through different channels in the consumer decision-making process. For many commercial firms, emotion induction through marketing and advertising is a key pathway to influencing consumer behaviour during purchasing. (Rostomyan, 2014). However, there are distinct behavioural differences between the effects of negative and positive emotional states on purchasing behaviour (Bagozzi et al, 2016). While positive emotions such as joy and happiness have been seen to have encouraging results on purchasing behaviour, some negative emotions may also provide beneficial consumer purchasing outcomes for firms (Cotte & Ritchie, 2005).

Another factor which has been noted to influence consumer purchasing behaviour is the risk attached to the purchase. Bauer's (1960) seminal article on consumer behaviour and risk argued that in all consumption decisions there lies an element of uncertainty about the outcome. This uncertainty is what drives the perceived risk in a purchasing choice. Perceived risk is defined as the risk assessment performed by the customer before purchasing. This view is echoed in the research of Cox and Rich (1964) as they surmise that before the decision situation, consumers are impacted through the medium of perceived risk. Consumers will typically process information before the purchase decision in order to reduce the risk perception. Assael (1987) underlines this observation as he found that purchase decisions with higher risk attached to them lead to more information gathering and processing in the evaluation stage. In contrast, habitual purchases have a higher reliance on experience and heuristic-based processing.

It is through this information processing stage that the differing levels of risk are formed around a particular product or service (Johnson, 2005). There are many factors which contribute to the perceived risk of a decision situation, examples are brand loyalty, quality, mode of purchase and product availability (Naami et al, 2017).

Most research on the influence of the product itself on risk attitudes and preferences examines this connection through the pathway of product involvement. Product involvement is described as the personal relevance of a product to an individual (Zaichkowsky, 1985). It follows that products with a higher involvement may then increase the perceived risk in situations involving the product. However, Dholakia (1997) finds that while they are connected, risk attitudes and product involvement are distinct concepts with no strong links.

Despite these academic advancements in investigating consumer behaviour, more research is needed into examining the effects of consumer products on the perceived risk in consumers. Product involvement theories give us some insight into the effect of individual products on consumer behaviour (Bauer et al, 2006) but it is not comprehensive enough and their implications for risk preferences are still unclear.

To fulfil the aim of this paper, we must use a between-subject experimental design to compare the effects of fear and happiness on decision-making behaviour. Such a comparison will allow us to examine if the standard predictions for the risk-preference behaviour under these emotions hold. Marketing research discussing the impact of emotional valence on consumer behaviour highlights the importance of this contrast, as fear and happiness both have the potential to garner positive consumption outcomes in customers but the pathway through which they do so varies (Hajli, 2019). Therefore, investigating the differences in their effects will help inform approaches for inducing behaviour under these emotions. This exploration will be done over three goods in separate product markets, these are; electronics, clothing and food.

Many product development studies have identified the consumer electronics industry as an extremely relevant and prominent industry (Cohan, 2020). According to Hankammer et al (2018) part of this growth is due to devices such as smartphones, tablets, and artificial intelligence, these items possess superior capabilities and represent the ever-growing potential of the electronics industry.

Similarly, the apparel/clothing industry has experienced growth and relevance in its trends, with fast fashion and e-commerce creating a boom in the market for almost all kinds of clothing (Gazzola et al, 2020).

Lastly, the food industry is another market in which profitability and importance have been noted. One reason for this success has been establishments such as fast-food diners and restaurants. (Opstad et al, 2022) states that the restaurant industry is crucial for both tourism and employment in any country, making it an extremely relevant sector of the food industry.

Despite the similarities across the industries, there have been no studies comparing the risk attitudes in products across these three industries. It has been found that each industry will have its own distinct sources of risk (Sohdi & Lee, 2007; Bhardwaj & Fairhurst, 2010), it follows that consumer perceptions and responses to these risks will not be equal across industries and products. Investigation into consumer behaviour under the influence of emotion should also include comparative findings across different products/industries. This comparison allows us to observe any possible differences in risk perception across products. Such an observation would inform both firms and consumers better when approaching purchasing situations related to certain products.

The literature gap that has been identified presents an opportunity for some novelty in this research. Typically, research on consumer risk preferences in consumption situations has little focus on the impact of the product itself. Currently, there is hardly any research discussing the varying risk preferences between product groups. We have minimal info on how behaviour in a risky consumption situation may vary depending on the product or goods presented. Some uniqueness this research adds is by offering a comparative analysis of the different risk preferences across product groups.

Our study found that emotions had no significant effect on the risk preferences between participants. Additionally, we observed that product group did not affect the risk attitudes of subjects across treatments. However, our linear regression indicated that some interesting associations for future research are present between variables such as geographical location and educational background.



## 2. Theoretical Background

This section focuses on the early literature on individuals and decision making and its transition to more affective models of behaviour. Following this, we discuss popular and foundational frameworks for modelling behaviour under emotions and risk. We then distinguish between the influence of positive and negative emotions on behaviour. Lastly, we discuss the impact of attributes such as availability and product group on risk preferences in consumers.

### 2.1 Early Literature

Morgenstern and Von Neumann (1953) present a potential model of consumer behaviour with their idea of utility theory. Under this framework, when a consumer is faced with choices with varying levels of outcome certainty, they will select the choice that maximises their satisfaction. This satisfaction is called the expected utility, which denotes the optimization problem faced by consumers during decision-making scenarios. This behavioural model has provided a conceptual framework through which consumer choice behaviour during evaluation and purchasing could be examined. Traditional Keynesian theory has influenced economic views on consumer behaviour. However, this approach often lacks the ability to incorporate the role of emotions in decision-making (Pixley, 2002). Concepts such as the rational choice theory evaluate decision-making under uncertainty and risk using theoretical models of utility with little to no focus on the internal and psychological influences on choices (Green, 2002).

The main drawback of the early literature on consumer theory was its focus on the rational consumer (Bray, 2008). This depiction of the consumer as the logically thinking individual limited the decision-making choice to a singular dimension of rationality, presenting decision choices as a rigid optimization problem influenced only by cognitive reasoning. These traditional models of consumer decision-making illustrate that emotions were seen as sequential acts to the cognitive evaluation and lacked multiple cognitive and affective facets (Bell, 2011). Emotions such as anticipation, regret and fear were not seen as factors affecting choices at the time of the decision-making (Loewenstein, 2000). These limiting frameworks of decision-making led to the conceptualization of more encompassing extensions of traditional expected utility,

such as anticipation utility (Loewenstein, 1987). These extensions have evolved over time and become more complete. Current economic choice theory now implements other social and psychological disciplines to have a more comprehensive assessment of decision-making in individuals. (Edwards, 2009).

Consequent research has observed that emotions have pronounced effects on consumers' judgements and decision-making in a purchasing context (Ayadi, 2010; Bagozzi et al, 2016). This research on affect and consumer behaviour has since dispelled these traditional models and presented a more complete process of decision-making. In such research, emotions and cognitive processing are seen as simultaneous actions that occur during the assessment of a decision situation (Hansen, 2005). Anderlová and Pšurný (2020) also found that emotions had a significant influence on the brand choice and buying intention of luxury skincare goods in the Czech market.

Since this progression, there has been significant research which has examined the link between emotional states and decision-making (Elster 1998). Emotions have been recognized as an important cognitive tool in decision-making behaviour, which in some cases acts as a prompt for certain actions to be taken. Fortunately, several frameworks and conceptual models have been proposed to help explain the influence of emotions on decision-making behaviour and to predict choice-making under the influence of certain emotions.

## 2.2 Emotions and Decision-Making: Conceptual Frameworks

One early conceptual framework that was presented as a way to model decisions under emotional influences was the cognitive appraisal theory of emotion. This is a model of affective cognitive reasoning under decision-making that was first introduced by Richard Lazarus (1982). Cognitive appraisal states that different environmental conditions will stimulate different responses in our evaluation process, the evaluation of a specific situation will then lead to the development of a particular emotion or reaction which would then consequently affect behaviour (Shewder, 1993). This framework presents a method to examine the influence of emotions in different decision situations and has been recognized as the foundational theory behind hedonic reasoning and behaviour.

Under cognitive appraisal theory, emotions impact behaviour through two steps. Firstly, the formation of the emotion is key in determining the final outcome or behaviour to be taken. Initially dubbed the primary appraisal by Lazarus (1982), the emotion formation process occurs when the situational context is evaluated in terms of harms and benefits. In a purchase situation, this may be in the form of a cost-benefit analysis or another form of payoff assessment. Based on this description, the environment under which the decision-situation is presented and experienced will be a determinant of the choice selected. The second and final step is the action taken also known as the secondary appraisal (Folkman et al. 1986), in this part of the process the individual will evaluate the actions and decisions to be taken and select the most favourable given the circumstances and the emotions experienced.

Cognitive appraisal theory has implications for the presence and impact of emotions in decision-making. Firstly, emotions cannot be generated without the presence of a primary appraisal (Shewder, 1993), the relation of the individual to their environment or stimuli is what prompts the affective response. This hedonic influence will then drive the actions taken by the individual. Under this model of emotive decision-making, emotions are seen as goal-orientated and objective-focused, cognitive appraisal predicts without these incentives, that there would be no emotions formed.

As behavioural theories continue to permeate current marketing strategies, there has been a rise in modern marketing approaches which incorporate cognitive appraisal theory into their marketing efforts (Wen et al, 2018; Ma et al, 2013 and Manthiou et al, 2017). Several studies have identified the value of cognitive appraisal theories in understanding consumer emotions during purchasing. By understanding the relationship between cognitive appraisals and consumer emotions, marketing managers and firms will be better positioned to enhance their strategies when creating advertisements and promotions. Through the individual appraisal of the buying or consumption context, the consumer will generate specific emotions which will then influence the way they interact with the product or brand. Nyer (1997) was able to demonstrate this in his research on cognitive appraisals and consumer behaviour. By influencing three distinct appraisals, he observed that each appraisal induced a different emotion in participants, which are joy, sadness, and anger. Nyer (1997) then surmised that each emotion had a varying effect on the word-of-mouth behaviour, with

individuals who experienced anger exhibiting negative word-of-mouth behaviour. Contemporary research has supported this link between appraisals and customer behaviour as Jiang's (2020) study shows. Jiang (2020) demonstrates that in appraisals where customers interpret employee behaviour as helpful, positive emotions such as delight are experienced, and this emotion then drives positive word-of-mouth behaviour.

Appraisals also have important implications for purchasing choices as indicated by research. When faced with a purchasing choice, consumers will gather information concerning the product in order to facilitate the evaluation process (Bai et al, 2015). It is this external evaluation that helps to form the appraisal of the context. Chen et al (2017) found that such appraisals will impact the decision to purchase the product. Siew et al (2018) expanded on this research by stating that appraisals on the brand image or reputation will not just influence the decision to purchase but also the willingness to pay as positive appraisals saw an increase in the amount paid. This argument is also reinforced by several articles documenting the impact of consumer appraisals on their willingness to pay. Powell et al (2018) studied the impact of disgust on the willingness to pay for sustainable alternatives. The authors found that negative appraisals can also increase the willingness to pay. By generating feelings of disgust towards unsustainable products, customers were able to curb their consumption of these products. Conversely other studies found that that negative appraisals can also reduce the willingness to pay for a product (Bertini et al. 2012 and Christian et al. 2016). This intrinsic link between cognitive appraisal and price paid acts as a further demonstration of the relevance of cognitive appraisal theory in consumer behaviour.

When a consumer evaluates information around a good or service, a crucial part of that evaluation will revolve around the risk attached to the product. This risk may present itself in many ways such as performance risk, risk of damage or risk of availability (Page, 1983). Lerner and Keltner (2007) argued that one crucial contextual factor that affects cognitive appraisal is the area of risk. Using their Appraisal Tendency Framework (Lerner et al, 2000), the authors observed that the level of risk felt in an environment could impact the appraisal process and in turn generate certainty or uncertainty-associated emotions. These are emotions formed directly due to the risk factor of the environment, emotions like anxiety, fear and happiness are examples of

these. These risk assessments serve as a form of cognitive appraisal called certainty appraisal (Watson et al, 2007) and research has shown that the appraisal of the situational risks can not only influence the emotions formed but may also reverse the influence of these emotions in consumer behaviour (Bagneux et al, 2012).

The risk attached to a situation will influence consumer emotion and behaviour and has wider ramifications on predicting behaviour. There is evidence to suggest that predictions for emotions generated under risky appraisals may lead to different behaviour than what is typically theorised. In Bagneux et al (2012) research they find that under certainty appraisals, participants under the influence of happiness ended up displaying more risk-averse behaviour than those experiencing fear. Such a finding violates standard predictions about the behaviour under emotions as happiness is stated to lead to more risk-seeking behaviour in general when compared to fear (Smith et al, 1985 and Tiedens, 2001).

While cognitive appraisal theory remains an important mechanism for analysing emotions and decision-making there are some limitations in the assumptions underpinning this framework. Similarly to most models of cognitive evaluation, it is impossible to physically observe the internal appraisals as they are taking place. Most authors agree that the appraisal process is largely a subconscious act and therefore difficult to isolate and examine (Yarwood, 2022).

A major critique of this model comes from Zanjoc (1984) as he observed that a major assumption of cognitive appraisal is the fact that the primary appraisal is needed to formulate the emotion. He considered this view as slightly unrealistic as it assumes that emotions are only generated by situational stimuli, in such a case the decision situation will generate the emotion to be felt. This is not necessarily the case as consumers may bring their own emotional contexts to the decision situation itself and such an assumption implies that emotions cannot be formulated outside these specific contexts.

Another well-known framework through which decisions under emotions can be modelled is the affect heuristic. Heuristics can be described as mental shortcuts which increase information processing and reduce the cognitive load in the decision-making

process. Tversky and Kahneman (1974) observe that under uncertainty, heuristics can be employed to circumvent some risks in choice situations.

In the case of the affect heuristic, this is a heuristic in which the current emotion at the time of the judgment or decision-making situation influences the actions taken by the individual. This concept was first discussed by Robert Zajonc (1980) who argued that rather than being a post-cognitive presence, affective reactions are the first responses to external stimuli. Under the affect heuristic, the emotional response of the individual plays a primary role, and this subconscious response acts as the driving force behind the choices selected. Evaluations under the affect heuristic tend to be automatic, quick, and responsive to on-the-spot stimuli. Epstein's (1994) dual system theory identifies space for the affect heuristic in information processing as he notes that one of the ways people evaluate their surroundings is via an experiential and intuitive form of cognitive processing. This sentiment is echoed by Kahneman (2011) in his review of thinking processes as he observes that individuals are guided by two distinct systems of information processing: a fast and unconscious one and a more analytical and deliberate one. It is through this pathway that affective judgements are formed and can be observed. As a result, this framework has been used to model the link between emotions and behaviour, as people are often influenced by subliminal affective processes while making decisions.

An area of decision-making that has been intertwined with the affect heuristic has been the realm of judgments under risk. Risks present an interesting avenue to observe emotive decision-making behaviour as risks are present when there is some uncertainty around the outcome. Skagerlund et al (2020) identified two different types of cognitive processes in risky situations. Firstly, risks may be seen from a more analytical standpoint, with the risk assessment being driven by more intentional mental processes. The second cognitive process evaluates risks from a more impulsive and emotive angle, in which the risk judgements are stimulated by transient emotional stimuli. It is under this latter process that the affect heuristic is often utilized in the form of a snap judgement tool in instances in which the external stimuli are sudden and create a sense of uncertainty about the outcome. As a result, there has been widespread research investigating the involvement and effect of the affect heuristics in these risky situations.

One well-documented area of research looking at the impact of the affect heuristic in risky situations is the realm of investment decisions under the influence of emotions. Traditional investment theory has described the stock market (and other forms of investment) as an inherently risky environment. Several risky attributes of investing such as a potentially large loss and below-target return have been identified in literature (Li and Mei, 2013). Such a climate presents an ideal scenario in which to observe the effects of emotions on decision-making. Finucane et al (2000) researched individual investors in their study and found that in all cases, investment decisions were, to some extent, impacted by emotional and behavioural biases.

Fear and anger have been well-documented emotions which can affect investment outcomes as indicated by Charles and Kasillingham (2015). In their research, they suggest that investor emotions can be grouped into three categories, these being; positive, neutral and negative. Depending on the emotion group, investment behaviour can be swayed in different directions. In instances where negative emotions are present, studies have observed higher levels of risk evasion in the behavioural responses of participants (Hassan et al, 2013). This finding has been supported in follow-up research. For example, Lucey and Dowling (2005) found that fear triggers risk avoidance mechanisms in investment behaviour. Lee and Andrade (2015) concurred with this sentiment in their study, in which they found that incidental fear triggered risk-averse behaviour in participants when the decision scenario was in a stock investment setting. Moreover, in instances where there were crucial unknowns such as a new market or an uncertain asset, these risk-averse responses were very strong (Cao et al, 2011), indicating that uncertainty may lead to more conservative investment decisions in individuals. These findings all give credence to the contemporary research linking negative affect to risk aversion in decision making.

While negative affect presents important evidence for emotive reasoning under risk, positive emotions have also been found to influence decision-making in risky situations as well. There is evidence to suggest that even before a decision is made, positive emotions negatively influence risk aversion in evaluation and information processing. An example of this is given in the case of Zhang et al's (2021) study as they observed that in the context of COVID-19, positive emotions impacted the public's risk perception of the virus. In a more relevant context, Ayadi (2010) found that during the consumer

evaluation period (pre-purchase), the influence of positive anticipatory emotions can lead to more risk-taking behaviour in the consumer. This view is reiterated in the research of Savadori et al (2015) as they suggest that positive emotions will induce an affect heuristic response which reduces perceived risks and increases expected benefits in the mind of the consumer.

Findings from investment theory also corroborate this observation. In Brooks et al (2022) research, they investigated 970 retail investors in the UK and concluded that when influenced by positive emotions risk tolerance was increased. Another research found that in an investment scenario, positive affect influences decision-making through the realm of familiarity (Cao et al, 2004). A key conclusion of this study is that assets where investors have had prior experience, generate more positive affect than unknown or volatile assets.

Drače and Ric (2012) attempt to explain such an effect by suggesting that consumer affect may act as a form of information signalling to the individual. In situations where positive affect is present, the environment is seen as safe and familiar and as a result, less mental effort is used in assessing possible risks which may lead to the underweighting of these risks. Conversely, negative affect may signal uncertainty or apprehension about the decision environment. This evaluation would then lead to overweighting of the risks and generate a more analytical and deliberative approach in the cognitive reasoning of the individual.

Contemporary research confirms the hypothesis that different emotions tend to skew risk perceptions in individuals and this observation has been used to explain certain behaviour in decision-making under uncertainty (Raewf et al; 2021, Singh et al, 2018 and Solt et al, 2018). Regarding investment decisions, Sinyard (2013) observed that in the case of private equity firms the affect heuristic was a key influence in the investment process. Their research observed that mediums such as familiarity and experience gave way to an increased use of the affect heuristic in investment decisions. In this example, the affect heuristic lessened (at least mentally) the potential risk of investment.

It should be noted that a drawback of this kind of research is the fact that the scenario of investment decision-making is not one that is universally understood by many



people. While it is relatively straightforward, there tends to be different levels of experience and skill with investment among participants and these differences can be difficult to reconcile in an experimental setting.

It is through these hedonic responses that the affect heuristic influences behaviour. These observed patterns and mannerisms under emotions help in predicting behaviour under the affect heuristic and the evidence ultimately suggests that risk perception is impacted greatly under the influence of this heuristic. Slovic et al (2002) found significant proof which proposes that the affect heuristic has strong negative correlations with judgement accuracy under risk. Pachur et al (2012) corroborate this in their paper as they observe that individuals under the influence of positive emotions such as happiness have a skewed evaluation of the risks and benefits of the situation. Such a finding highlights the usefulness of the affect heuristic as a method of risk minimisation in a choice set.

Overall, the affect heuristic offers a relevant and validated framework for observing hedonic decision-making. The assumptions and mechanisms propagated in the framework are applicable across a wide range of scenarios around emotions and consumer behaviour

### 2.3 Emotions and Consumer Behaviour

One of the first models of emotions in consumer behaviour was the categorical approach (Ekman, 1969). This school of thought posits that there are six separate categories of emotion, these being; happiness, anger, sadness, surprise, disgust and fear. Consequently, they observed that these different emotions will lead to different behavioural consequences. Since Ekman's (1969) seminal paper the categories of emotions have been broadened but the same premise remains; different emotion groups will lead to distinct outcomes for consumption behaviour.

It has been observed that certain products, brands, or even purchasing contexts can evoke different emotions in consumers (Pandey et al, 2012). Under the categorical approach, these emotions will then explicitly shape the purchasing behaviour that the consumer takes. This response is often exploited in a marketing context (Holbrook & Batra, 1987). Many adverts and promotions are displayed with the aim of forming an

emotive connotation in the mind of the consumer. This connection will then be recalled during the purchasing decision and influence behaviour. This mechanism is used to encourage different purchasing habits in consumers. One example of this is the use of positive affect in candy and sweets advertisements to present these goods as a rewarding snack to their consumers (Mizerski & White, 1986). Studies have illustrated that right from the first phase of the decision-making process, emotions play a role in affecting the evaluation and perception of a product before the purchase decision is undertaken.

The main drawback of this model is the fact that the categorical approach to emotions does not explain why the differences between emotion groups persist. Rather, the approach simply predicts that there will be deviations in consumption behaviour depending on the specific emotion felt at the time of decision-making. While useful, there remains a need to understand why these differences between emotion groups occur, as distinct emotions have been shown to impact different consumers at varying points in time. It is important to examine the mechanisms and channels through which behaviour can be hedonically influenced as Jung et al (2014) notes that different emotion groups may induce distinct cognitive processes in the mind of the consumer. By underpinning the systems through which these affective responses are created, we can gain more insight into consumer purchasing actions.

Another prominent academic viewpoint discussing emotions and marketing is the area of dimensionality in emotions. In such studies, it is recognized that both the valence and arousal of the emotion may affect the behaviour displayed by the consumer (Lau-Gesk & Meyers-Levy, 2009). The valence refers to the direction of the emotion and if it is positive or negative. On the other hand, arousal is in reference to the strength of the emotion felt. Some papers have observed that positive emotions such as happiness have an increased impact on the consumer's willingness to pay, a finding dubbed the happiness premium by Yuan and Dennis (2014). Moreover, positive emotions with high levels of arousal have been found to influence the strength of attachment formed around a brand or product (Roche, 2015). These findings mean that firms may try to invoke these emotions to stimulate product attachment in consumers as this attachment could lead to higher retention and more recurring

purchases from the customer. Such pathways will typically open up encouraging avenues for firms to explore, utilising positive emotions as a way to nudge consumers.

## 2.4 Valence: Happiness and Fear

Since Simon's (1967) seminal paper on emotions and decision-making, nuanced studies investigating the role of specific emotions on behaviour have been developed. These studies have facilitated a more in-depth understanding of emotionally driven behaviour. One such study by Sinclair and Mark (1992) illustrates this as they conclude that the mood state of an individual has direct consequences on their decision-making behaviour. Research such as this speaks to the valence of emotions and based on Fridja's (1986) description, we can interpret valence as the inherent attractiveness or unpleasantness of a situation. Increasing analysis on the valence of emotions has led to more complete predictions of behaviour as certain actions and cognitive processes can be attributed to different emotions depending on their valence. In Coget's (2011) study, he finds that decision-making behaviour under negative valence emotions such as anger and fear is often associated with more analytical and deliberate reasoning.

Conversely, positive valence emotions may have a whole different range of behaviour ascribed to them. This is demonstrated in Monin's (2003) research as they found that when an emotion with positive valence is at play the increased familiarity with the stimulus is increased. It is this aspect of familiarity that leads to snap-judgements in decision-making. This view is consistent with other research in this field which finds a positive correlation between happiness and heuristic processing (Ottati et al. 1997).

From a marketing standpoint, the impact of happiness on decision-making carries significant implications for consumer behaviour. Previous research has identified the need to incorporate metrics which attempt to measure the level of customer happiness (or at least some adjacent positive emotion). Such scales include customer satisfaction (Day, 1977; Tse et al, 1990 and Yi, 1990), consumer delight (Wang, 2011 and Oliver et al, 1997) and consumer happiness (Desmeules, 2002 and Araujo, 2017). Psychological marketing theories have recognized the benefit of invoking happiness in the consumer experience. Discourse on happiness and its involvement in consumer behaviour has led to many marketing strategies and campaigns utilizing affective responses to trigger consumption. An example of this can be found in Desmeules's

(2002) research, he coined the term “consumer happiness” as a way to examine the link between marketing strategies and happiness. His research found that educational and informative strategic approaches had an increased effect on consumer happiness.

A crucial area of market research on happiness is the mechanism through which happiness influences consumer behaviour. Research on this topic has noted that invoking happiness in customers has beneficial outcomes for a plethora of consumer actions. Firstly, Mogilner et al (2012) observed that happiness had an influence on the evaluation behaviour of the consumer prior to the purchase. In their research, they observed that customers who experienced happiness during the evaluation phase were more likely to accept the product offerings and promises. This is supported in further research as Belanche et al, (2013) observed that happiness increased the likelihood of forming positive judgements and connotations about a product.

In regard to purchasing habits, happiness has been shown to have a direct impact on consumer buying behaviour. Kehlil et al (2015) found that in purchasing decisions, happier consumers displayed an increased buying intention. A conclusion that is reiterated in the work of (Schnebelen and Bruhn, 2018) as they also observed that customers under the influence of happiness consumers revealed a higher likelihood of re-purchasing a product and paying a price premium for the product. Belanche et al (2013) offered an explanation for these observations by suggesting that happiness influences consumers through the realm of commitment and trust, these feelings will then invoke a sense of attachment and familiarity when the customer is exposed to the brand or product again (Kim et al, 2016). It is these relationships that help drive the behaviour we see in consumers, as the familiarity experienced serves as a kind of heuristic which signals positive messages to the buyer (Park et al, 1981).

When exploring happiness and consumer decision-making, behaviour under risk presents an accurate representation of some purchasing contexts, as risk assessment is an essential part of consumer evaluation (Théolier et al, 2021). In these instances of uncertainty, the aforementioned snap-judgment effect is often observed (Maldonat and Dell’Orco, 2011). Therefore, discussing the influence of happiness when risk is involved adds value to research linking happiness and consumer behaviour. In certain research (Park and Banaji, 2000), happiness has been presented as a trigger for heuristic processing when faced with a risky choice. One explanation for this is found

in Yuen and Lee's (2003) study as they surmised that under the influence of happiness individuals will tend to overweight the benefits and underweight the risks of the decision. This revelation has severe ramifications for consumer behaviour as it could skew the judgment accuracy of customers in the product evaluation and purchasing phase. Sinclair and Mark (1995) echoed these concerns as they noted that happiness significantly reduced analytical processing and judgement accuracy under decision-making situations.

Despite its initial connotations, negative emotions can also prove useful in a marketing context. There are several studies which investigate the effect of fear on decision-making and their findings have since been translated to the marketing sphere as a way to influence consumer behaviour.

Fear appeals in marketing have been a crucial conduit to studying and understanding the beneficial impact of negative emotions on consumer behaviour (Spence & Moinpour, 1974). De Pelsmacker and Geuens (1997) described fear appeals as consumer exposure to different kinds of risks through ad marketing and promotion. The idea of fear appeals in marketing is one that was first introduced by Janis and Feshbach (1953), in their study, they found no correlation between fear arousal and behaviour. Since this seminal paper, there has been significant research that contradicts this finding (Zheng, 2020). Sternthal and Craig's (1974) review of fear appeals presented several validated studies which suggest that fear has a significant impact on purchasing behaviour. An example of this is in McDaniel and Zeithaml's (1984) study where they observed a positive correlation between fear and purchasing intentions.

In contrast to positive emotional appeals, fear appeals create stress or strain in the mind of the consumer (De Jong et al, 2005). These feelings of distress serve as catalysts to motivate purchase or consumption in customers. An astute representation of this structure is the impact of the fear of missing out (FOMO) on purchase behaviour (Hodkinson, 2019). Przybylski et al (2013) define FOMO as "pervasive apprehension that others might be having rewarding experiences from which one is absent." When applied to a consumption context, the FOMO has been noted as driving positive consumer behaviour (Dinh et al, 2021). Solt et al (2018) observed an increased purchase intention in cases where buyers were influenced by FOMO. An apt

explanation of this phenomenon is offered in Good and Hyman's (2021) article as they found links between the increased FOMO and anticipated satisfaction and self-enhancement.

This mechanism has been used to explain behaviour such as consumer hoarding, in these cases, the customer buys excessive amounts of a good out of anticipatory fear of not having enough (Mckinnon et al, 1985). Recent examples of this were documented during the COVID-19 pandemic, where protective and cleaning equipment such as sanitisers and masks were hoarded by consumers in an attempt to avoid the inevitable shortage spurred on by the nationwide lockdown. A further display of this effect is seen in the example of limited-time offers on purchasing behaviour. It has been observed that these kinds of promotions induce a behavioural response by creating a sense of urgency in consumers (Mukherjee et al, 2017). The FOMO on these deals will then drive the purchase frequency up. Firms often exploit this inherent FOMO through their marketing efforts. The framing of certain promotional material is intended to play on this behavioural response to fear in a purchasing context.

Phenomena such as hoarding, and the FOMO serve as supporting evidence of standard predictions of behaviour under risk (Gupta and Shrivastava, 2021). The findings in these studies indicate that in individuals experiencing fear, a primary response to a risky choice is to avoid, evade or mitigate this risk (Liu and Jiao, 2018). This behaviour has been stated to be facilitated by increasing analytical and systematic cognitive reasoning.

More recent studies have been able to build on the foundation of this research to examine the relationship between fear and decision-making under risk. Similar to happiness, fear motivations have distinct implications for risky choice behaviour. Coget et al (2011) found that under the influence of fear, decision-makers tend to implement more of a rational thinking approach. This was observed in the context of directors on a film set, in the research, it was highlighted that directors' who were impacted by fear and less familiar experiences displayed more deliberative reasoning in their decision-making. While this research was in a highly specific context of filmmaking, the results from it have been largely corroborated by a multitude of studies exploring the connection between fear and decision-making. These findings have been observed in other contextual scenarios such as investments and risky choices. In this area, it has

been widely stated that fear has a positive correlation with risk-averse behaviour in judgements under risk (Aren and Hamamci, 2020). When analysing facial expressions when faced with a risky lottery, Nguyen and Noussair (2014) observed that individuals who selected safer options displayed more negative emotions such as fear and anger. Kligyte et al (2013) support this with their findings as they observed that fear was consistent with a higher level of ethical and rational decision-making when compared to the anger and the no emotional condition treatments. From a consumption context, these results still hold as shown in Kanwal's (2021) research. In this study, it was observed that fear negatively moderated the relationship between perceived risk and buying intention. This means that consumers under the influence of fear had reduced purchasing intention as a result of higher perceived risk.

Additionally, fear has been shown to impact the evaluations of individuals when appraising risky choices. It has been noted that emotions typically send situational signals to the buyer and consequently influence their estimations (Avnet et al, 2012). Conclusions indicate that consumers use their emotions as a judgment criterion, there is an increased bias in the risk perception of the individuals. This is something that Marroquín et al (2016) aimed to explore in their research on feelings as information and negative affect. They observed that individuals in the negative affect treatment displayed higher risk perceptions in their assessments and concluded that negative affect impacts future orientated evaluations.

What is crucial is to understand the rationale behind this apparent connection between fear and risk aversion. One promising explanation for this is presented in the feelings as information theory (Scharwz, 2001). The underlying principle behind this theory is that different emotions and mood states can serve as a source of information for individuals (Schwarz, 2012), through which they are able to assess the situational context and calibrate their actions accordingly. This theory provides a foundational basis for explaining risk-aversion under fear. These ideas are also highlighted in Lowenstein et al (2001) research as they posit the risk-as-feeling hypothesis. This states that emotional responses to risky situations are a product of the cognitive assessments of those risks. This is something that is indicated in Lindquist and Barrett's (2008) research as they found that the subjects who had fear induced assessed their environment as threatening. It is these judgments about the

surrounding environment that prompt the behaviour we see under fear. This presents a feasible pathway through which behaviour under risk can be modelled. Schwarz (2012) suggests that fear generated in risky situations serves as a communicative signal to the individual. Consequently, decision-makers will then employ a more pragmatic cognitive reasoning and this process will generate more risk aversion in decisions as is commonly observed throughout literature.

Clearly, the interplay of emotional valence on consumer judgments and processing is a highly relevant area of consumer behaviour and should be explored further. This leads us to the first hypothesis:

***H1:** Subjects under the influence of fear will display more risk-averse behaviour in consumption situations when compared to subjects under the influence of happiness.*

## 2.5 Availability and Risk

Because the experimental design will rely on an availability measure to help elicit the risk preferences, it is important to review marketing literature which examines the relationship between product availability and risk.

Product availability influences risk through the avenue of scarcity. Steinhart et al, (2013) found that scarcity affects the desirability of products in a purchasing context. The reason for this being that the assumed quality of the product or service increases when consumers observe that there are less of the item in stock. In such cases, the risk is attached to the probability of obtaining the product (this is different from product risk where the risk is attached to the performance of the product or service) and this risk factor will play a role in the behavioural outcomes of the consumer. In short, scarcer products are often inferred to be more expensive or higher quality and such assumptions impact the perceived risk of the item.

There has been significant research corroborating the relationship between product availability and consumer behaviour (Raewf & Jasim, 2021). Specifically, the availability of a product has implications for the corresponding risk associated with the product. (Byun & Sternquist, 2012). Limited product availability will often create a higher perception of risk around the acquisition of the item itself. Examples of this behaviour has been documented in phenomena such as panic hoarding (Mckinnon et



al, 1985). In this case, stimuli such as limited product availability may induce consumers to buy up large quantities of the product to avoid a shortage. Effectively, hoarding is used to minimize the risk of missing out on the good (Frost & Gross, 1993).

The theoretical background discussed has provided useful insight to the pathway and approach needed to answer the question at hand, with the affect heuristic being the preferred model. Additionally, the valence of emotions is a critical area for exploring when looking at affective decision-making. In this research it will be important to make in-depth comparisons between the behavioural differences that may arise when a positive valence emotion like happiness is shaping behaviour and when a negative valence emotion like fear is influencing actors.

## 2.6 Product Groups and Risk

There is significant research which suggests that the individual good or product can influence the level of risk experienced in the purchasing situation. This research takes strong foundations in theories of perceived risk and consumer behaviour. Kaplan et al (1974) found that the risk perceived during consumer evaluation varied depending on the product or good being assessed. Factors affecting perceived risk in products have long since been debated. However, one scarcity in the literature is an investigation into the influence of the product itself on risk assessment.

According to Roselius (1971), perceived risk influences products through six mediums; financial, psychological, physical, social, performance and time loss (time lost replacing a faulty product). Risk assessment on a product level often involves some or all of these dimensions of perceived risk. However, according to Jacoby and Kaplan (1972), different products are evaluated on different dimensions of risk and these judgment discrepancies could be the driving force behind risk differences across goods. An example of this is observed in the research of Murray and Schlacter (1990) as they observed that in a consumption context, services generated heightened risk perception in consumers as opposed to goods. This means that in contexts such as eating out or going to a service-based attraction, there is an increased risk aversion in the consumers. This observation is supported and enhanced in Laroche et al (2004) research as they found a positive correlation between product intangibility and perceived risk. Essentially, the more intangible the product or service is, the higher the

risk aversion in the mind of the consumers. They found that intangibility is an attribute closely associated with services and the increased risk perception is due to the lack of information in services when compared to goods. This trait influences consumer confidence and leads to less certainty being generated around the service.

In contrast, goods may be associated with lower levels of risk aversion. In a comparative study done by Mitchell and Grotto (1993), it was concluded that goods generated lower amounts of risk aversion in the perception of participants. This research also supported the idea that services increase the uncertainty around consumer choices through the realm of intangibility. Goods lack this attribute of intangibility and therefore cannot induce the same level of uncertainty in consumer decision-making (Laroche et al, 2004).

Such findings may have implications for our experiment as participants may be influenced by the product type presented in the decision tasks. As a result, another hypothesis has been constructed.

*H2: Services will invoke a higher level of risk aversion compared to goods in subjects across both treatments.*

### 3. Methodology

As mentioned previously, the scope of this paper is to observe any potential emotional motivations that influence decision-making behaviour. By extension, the results could provide useful insights into some of the hedonic forces underpinning consumer purchasing behaviour. To do this, an online survey was utilized to collect relevant data from participants. The survey was constructed using an online survey-creating platform, Qualtrics. Survey dissemination was done via networking and peer-to-peer contact, making use of various social and professional relationships. Social media apps such as Instagram, Meta Platforms (formerly known as Facebook), and WhatsApp were the main platforms through which participants were contacted and recruited. Due to the scope of the research, there were few demographic restrictions on the subject pool as the findings have implications for a wide range of consumers. Consumers are simply identified as anyone who has had personal experiences with purchasing consumer products of any shape or fashion (a criterion satisfied by a large percentage of people). Therefore, it was not seen as necessary to have constraints on participant age, gender, educational background, or place of residence. Despite this, data collection was focused on The Netherlands for added relevance but respondents from outside the country were also taken into account for comparative analysis.

#### 3.1 Experimental Design

The aim of the experimental design was to answer the overarching question posed at the start of the paper. We wanted to explore any potential behavioural differences across individuals under the influence of fear and happiness. The behavioural differences were assessed through the medium of risk attitudes elicited through choice tasks. The experimental format used was an online survey, respondents were first put into one of the two treatments, these being fear and happiness. Exposure to the treatment effect simply meant that one of these emotions was induced in the respondent. To validate that the treatment effect was actually experienced, a follow-up emotion check was performed to assess the extent of positive and negative valence in the subject. Following this, participants took part in a decision-making task where they compared two purchase alternatives with varying levels of risk, these comparisons were made across three distinct products. Lastly, a demographic section was utilized

to control for any potential omitted variable bias and to perform more in-depth analysis on drivers of behaviour.

The survey began with an autobiographical recall, subjects in the fear treatment were asked to recount a time in the past when they experienced fear and subjects in the happiness treatment recounted a time when they felt happy. An autobiographical recall is a validated method of emotion induction which has been utilised in several behavioural studies to prime specific emotions in participants. A critical review of emotion induction methods states that autobiographical recall remains an effective method of implicitly provoking emotions in an experiment setting (Mills & D'Mello, 2014). The idea behind this approach is that by simply thinking back and recalling the scenario in question, the recollected emotion will be subconsciously induced and will be at play for the rest of the experiment.

The experiment followed a between-subject design, and subjects were distributed evenly between the fear and happiness treatment conditions. When discussing different emotion induction approaches, Lench et al (2011) state that the more cognitive effort exerted in recalling the event, the stronger the arousal of the emotion. To increase the internal validity of the experiment, it is imperative that subjects feel some arousal of the induced emotion. Therefore, respondents were encouraged to think back strongly and present some detail when recalling the event in question. This was also enforced by including a minimum character limit of 250 characters (around four sentences), by doing so we ensured that the respondents took some time in recalling and recounting the event in question. This section took roughly around four to five minutes to complete.

Once the emotion induction section is complete, participants completed a shortened version of the Positive and Negative Affect Scale (PANAS). First utilised by Watson et al (1998), the PANAS consists of 20 emotional states, 10 positive emotions and 10 negative emotions. Subjects were then asked to select how much they agree with feeling this way. The scale provides an effective way of observing and quantifying the level or extent of a respondent's overall emotional state, the idea being that subjects under the happiness treatment will display higher positive affect and lower negative affect when compared to those under the fear treatment. This scale also acts as a manipulation check to observe if the emotion induction was successful. The

expectation was that those in the fear treatment would have a higher negative affect score and those in the happiness treatment would have a higher positive affect score. The shortened PANAS utilised in this experiment was limited to 10 emotions, five negative and five positive. The reason for the truncated scale was primarily for the convenience of the respondents, a longer scale may have appeared repetitive to the subject as some of the emotions in the original 20-point scale are extremely similar. Examples of items that were removed due to their similarity with other items are the item "Alert" was removed due to similarity with the item "Attentive", the item "Afraid" was removed due to similarity with the item "Scared". Additionally, some words were removed because non-native English speakers may have trouble understanding what the word means, an example of this was the word "Jittery". The full 10-point scale can be found in the appendix.

Following the PANAS elicitation, the decision choice section of the experiment was started. For this section, multiple price lists were used to elicit the risk preferences of subjects' across three different consumer products, with each product represented by a decision block. In this experiment, the risk preference indicator is somewhat unconventional as risk attitudes were elicited by observing the number of safe choices across each decision task. For each choice set in the multiple price list, participants made trade-offs between the price of the product and the probability of them attaining the product (labelled availability in the experiment). Across each choice set, one combination of price and availability represented the riskier option, and another denoted the safer choice. Risk attitudes were inferred by observing the number of safe choices across the multiple price list.

Each decision block consisted of a multiple price list with five rows, where each row represented a new choice set. The multiple price list followed a similar structure to Holt and Laury's (2002) in their pivotal paper on measuring risk preferences. In each list, there was an unchanging risky choice, and this was compared with a safer choice. The safer option would then gradually become riskier in each stage of the multiple price list.

Before beginning the decision tasks, two key terms were explained to respondents, price, and availability. Price was simply described as the cost of acquiring the good while availability was presented as the probability that the good or product was in stock. Having a higher availability denoted an increased chance of obtaining the product,

making the product a safer choice. The main objective of the decision-making task was to examine the trade-off that was made between price and availability for each product category. The rationale was that this trade-off would inform us of the individual's risk preferences as preferences for a higher-priced product with higher availability indicated a risk-averse subject. In contrast, selecting a lower-priced product with low availability was indicative of a risk-seeking respondent. To reconcile any confusion or uncertainty about the experiment, participants went through a test decision-making scenario with a shorter multiple price list before beginning the decision-making tasks. The idea behind this was to familiarize subjects with the price list format allowing them to enter the real decision tasks with more clarity about how they should select their choices. For all choices the words "Price" and "Availability" were written in bold font, this was done to highlight to participants' that they should pay special attention to these two attributes when evaluating each choice set.

## Figure 1

### *Survey explanations on the price and availability terms*

For the next section of the survey, you will be asked to make a few choices. For context please imagine you are online shopping and are evaluating which item to purchase. The **price** denotes the amount you will spend to acquire the good and the **availability** represents the probability of you receiving the good, i.e products with **70% availability** represent a **70% chance of obtaining the product**. To better understand this task please complete the following examples.

In the experiment, the riskier choice was denoted as the option having the lower price and lower availability, while this option appears appealing because of the price, the element of risk is created with the lower availability, as it represents a smaller chance of acquiring this better-priced deal. In contrast, the safer choice in the experiment was more expensive but had a higher probability of being obtained by the subject.

These consumption groups are electronics, clothing, and food. As per the research mentioned, these consumer product markets provide an interesting avenue to observing consumer behaviour as they are industries with high relevance and penetration in today's society.

*Electronics decision making scenario*

For the electronics group, a phone was selected to represent this consumer group. This is largely due to the fact that, most people have some experience with purchasing a phone so there is a significant relatability aspect with this example. Subjects were asked to imagine a hypothetical scenario in which they were trying to purchase a phone, they had the choice of two different physical stores (Store A and Store B) to buy the phone from and due to the distance between both stores, they could only purchase from one store. In this experiment, Store A represented the safer option for most of the choices, while Store B denoted the riskier option. For both Stores, the price of the phone was kept constant, in Store B's case both the price and the availability were kept constant. This was done to present an unchanging risky choice for comparison throughout the Multiple Price List (MPL). The only variable throughout the MPL was the availability of the phone in Store A.

Table 1 indicates the choice structure for this scenario, for each potential choice set, subjects were asked to select their preferred product based on the scenario presented, so subjects would compare both "Choice 1" alternatives, then "Choice 2" alternatives and so on and so forth till five choices had been selected.

**Table 1**

*Multiple price list for the phone scenario*

Choice 1	Choice 1
Price: €250 Availability: 90%	Price: €200 Availability: 50%
Choice 2	Choice 2
Price: €250 Availability: 80%	Price: €200 Availability: 50%
Choice 3	Choice 3
Price: €250 Availability: 70%	Price: €200 Availability: 50%
Choice 4	Choice 4
Price: €250 Availability: 60%	Price: €200 Availability: 50%
Choice 5	Choice 5
Price: €250 Availability: 50%	Price: €200 Availability: 50%

### *Clothing decision-making scenario*

The clothing scenario had an identical structure to the electronics group as seen in table 2, with the product of choice being a coat. In this scenario the subjects imagined they were choosing between two coats from two sellers. Store A also represented the safer choice for four out of the five choices in the MPL and Store B was the riskier choice. Both the price (250 for Store A and 200 for Store B) and availability (beginning at 90% and declining to 50% for Store A and constant 50% for Store B) figures were exactly the same for the phone and coat scenarios.

**Table 2**

#### *Multiple price list for the coat scenario*

Choice 1	Choice 1
Price: €250 Availability: 90%	Price: €200 Availability: 50%
Choice 2	Choice 2
Price: €250 Availability: 80%	Price: €200 Availability: 50%
Choice 3	Choice 3
Price: €250 Availability: 70%	Price: €200 Availability: 50%
Choice 4	Choice 4
Price: €250 Availability: 60%	Price: €200 Availability: 50%
Choice 5	Choice 5
Price: €250 Availability: 50%	Price: €200 Availability: 50%

### *Food decision making Scenario*

This setting is similar to the two previous scenarios. However, in this case the product in question is going out to dinner at a restaurant. This was chosen in an attempt to equalize the value of all goods across the three groups, as simply picking a singular food item or product no matter how expensive would not have the same comparative value as a coat or phone. It was imperative to maintain this value equivalence (or at least similarity) across all goods because a deviation from this could lead to incomparable results across the groups. Part of our research focuses on the impact of different product categories on the risk preferences of participants. However, if there



is no similar perception of value in the eyes of the subjects, then we cannot make any valid conclusions about possible differences in risk attitudes across goods. In this setting, the price was described as the average price of one person eating out at the restaurant and availability was the probability of your favourite or desired meal being in stock. Nevertheless, it is still difficult to equate the food scenario with the other two, while this can be done experimentally by following the pricing of the phone or coat products and setting the price at 250 or 200 but such a price for a single person at a restaurant would create barriers around the relatability of this scenario. To obtain the most robust answers, it is essential that subjects can relate to the pricing in the scenarios. Obscene and unrealistic prices could affect the ability of the subject to relate to the scenario. In such a case, the revealed preference aspect of the experiment is compromised as the lack of connection between the subject and the instances they must assess would reduce the trustworthiness of their answer. If we cannot trust that the answers given are representative of the subject's beliefs, then any analysis performed on the responses would be undermined. Due to this, it was decided to have cheaper prices in the food option. As shown in table 3, participants were asked to compare one restaurant which had a fixed price of 25 euros and another with a fixed price of 20 (the same price difference is maintained across scenarios to retain value equivalence). It was indicated that the restaurants were some distance apart, so going to one would mean missing out on the other. Similar to the previous structures, the more expensive option had a higher availability starting at 90%. In contrast, the cheaper option had a lower availability at 50% and this was done to depict an increased risk factor in this option. The cheaper option's availability was also fixed at 50% while the more expensive choice saw a 10% decrease in availability for each choice set, going from 90% to 50% across the five choice sets.

**Table 3**

*Multiple price list for the food scenario*

Choice 1	Choice 1
Price: €25 Availability: 90%	Price: €20 Availability: 50%
Choice 2	Choice 2
Price: €25 Availability: 80%	Price: €20 Availability: 50%

Choice 3	Choice 3
Price: €25 Availability: 70%	Price: €20 Availability: 50%
Choice 4	Choice 4
Price: €25 Availability: 60%	Price: €20 Availability: 50%
Choice 5	Choice 5
Price: €25 Availability: 50%	Price: €20 Availability: 50%

### 3.2 Controls

Following the decision tasks, subjects were given demographic questions to add further control variables to the experiment. The controls added were age, gender, annual income, the field of study, and country of residence.

When attempting to predict or observe decision-making behaviour, one must be cognizant of the confounding influence of age. There have been several studies examining the link between age and risk preferences, general findings seem to suggest that there is a positive correlation between age and risk aversion. Mather et al (2012) found that when choosing between a risky gamble and a safer choice, differences in risk attitudes persist between different age groups. Additionally, they found that older adults displayed more risk aversion in gains and increased risk-seeking behaviour in losses. This means that the treatment effect could potentially increase risk-seeking behaviour in older participants as the MPL presented is in terms of losses (seen as a price to be paid). If this was the case, then adults under the influence of happiness could select even riskier choices while those under the influence of fear may select fewer safe choices than predicted. We expected that controlling for age would enable us to explain any other potential deviation in risk attitudes between subjects. Subject age choices were split into seven groups, with the first group being the 0 to 17 age range and the last group being the 65 and above age range. The full age section is presented in the appendix B, table B2.

In the same vein, there is significant evidence which suggests that gender may have an impact on risk preferences. Traditional studies on risk preferences across gender have noted that females tend to be more risk-averse (on average) when compared to males (Borghans et al, 2009). Assuming these findings hold in the subjects, the

implications would mean that female respondents could display higher levels of risk-aversion than predicted. Such behaviour could skew the effects of the treatment across both treatment conditions. Reasons for this gender disparity have been offered up in a wide range of gender studies, Van Veldhuizen (2016) suggested that in a tournament situation these differences in risk attitudes can be explained by overconfidence in males and lack of competitiveness in females. However, the experimental design in this research does not utilize any tournament features so these factors may not play a role in affecting risk preferences across genders. Despite this, there was still a need to control for gender in this study as other research identified gender differences in risk attitudes outside of tournament scenarios (Croson & Gneezy, 2009). For analysis we focused on differences in risk perception between men and women as literature on the other genders and risk attitudes is scarce.

Subjects were also split into income groups; this decision is backed by academic research on risk preferences across income brackets. While literature investigating the correlation between annual income and risk attitude is scarce, there have been studies which observe a relationship between wealth and risk aversion. Guiso and Paiella (2008) observed that wealth and risk aversion were negatively correlated, the wealthier the individual the lower their level of risk aversion was. This means that individuals with lower wealth may be more risk averse. This had the potential to impact results in the research as several of the respondents were students and were likely to be on the lower end of the income bracket. We assumed that if this relationship between wealth and risk-aversion is present in the experiment it could mean that higher levels of risk aversion could be observed across both treatment groups. Therefore, annual income was controlled for as it may be an indication of wealth and could influence choices in the experiment. Income choices were split into six brackets, ranging from less than 15,000 euros to over 100,000 euros. The full breakdown of the income choices are given in appendix A, figure A4.

Another potential influence on risk preferences is the field of study of the participant. First and foremost, the set-up of the experiment may be familiar to Economics students. Multiple price lists are covered extensively in any higher education Economics study and using them for the decision-situation could affect the choices of participants who have a background in Economics. In addition to this, there is research

which suggests that people with backgrounds in competitive disciplines such as Medicine, Law or Accounting may display more risk-seeking behaviour (Hartlaub and Schneider, 2012). This observation meant that the treatment effects of subjects in the fear condition could be lessened and for the subjects in the happiness condition, the treatment effect could be enhanced. The different study choices presented were 11 in total and a full breakdown of each discipline is given in appendix A, figure A3.

Lastly, a control for the location was added to the survey. The rationale behind this is based on the fact that consumer behaviour may be different per region. In regard to the consumer market in the Netherlands, there could be societal effects which influence risk preferences in Dutch consumers. The Netherlands is a society in which individualism is encouraged (Zondag, 2013) and this could have implications for consumer behaviour within the country. Bruer et al (2014) found that due to overconfidence and over-optimism, individualism has a positive correlation with financial risk-seeking behaviour. This argument could hold ramifications for results in Dutch respondents as the impact of the treatment condition could be influenced by this added risk-seeking element.

To begin with, several basic statistics were compared. The mean, standard error and confidence intervals were compared across both treatment groups. Moreover, to observe if the emotion induction effect worked, the average score for the positive and negative affect scales were compared across treatment groups, with the expectation that subjects in the fear treatment would have a higher negative affect score and lower positive affect score when compared to those in the happiness treatment.

In addition, an Ordinary Least Squares (OLS) regression was utilised, using the number of safe choices as a dependent variable which was a discrete variable ranging from 1 to 5. The main explanatory variable was the treatment condition, which was a binary variable, taking the value 1 for happiness and 0 for fear. As mentioned previously, several control variables were included in the regression, these were; age, gender, educational background, , place of residence and annual income. These were added to enrich the analysis and avoid any cases of omitted variable bias. These controls also allowed us to examine any potential determinants of risk attitudes.

The statistical test used was a non-parametric test as the assumptions of a parametric test did not hold, namely, the observations were not drawn from a normally distributed population, and the two groups did not have the same variance. While we could have performed blocking and randomization to reduce error variance, there was no guarantee that both treatment variances would be the same. The best approach was a non-parametric test in the form of a Man-Whitney U test to test if the average number of safe choices differed across the fear or happiness treatment groups.

## 4. Results

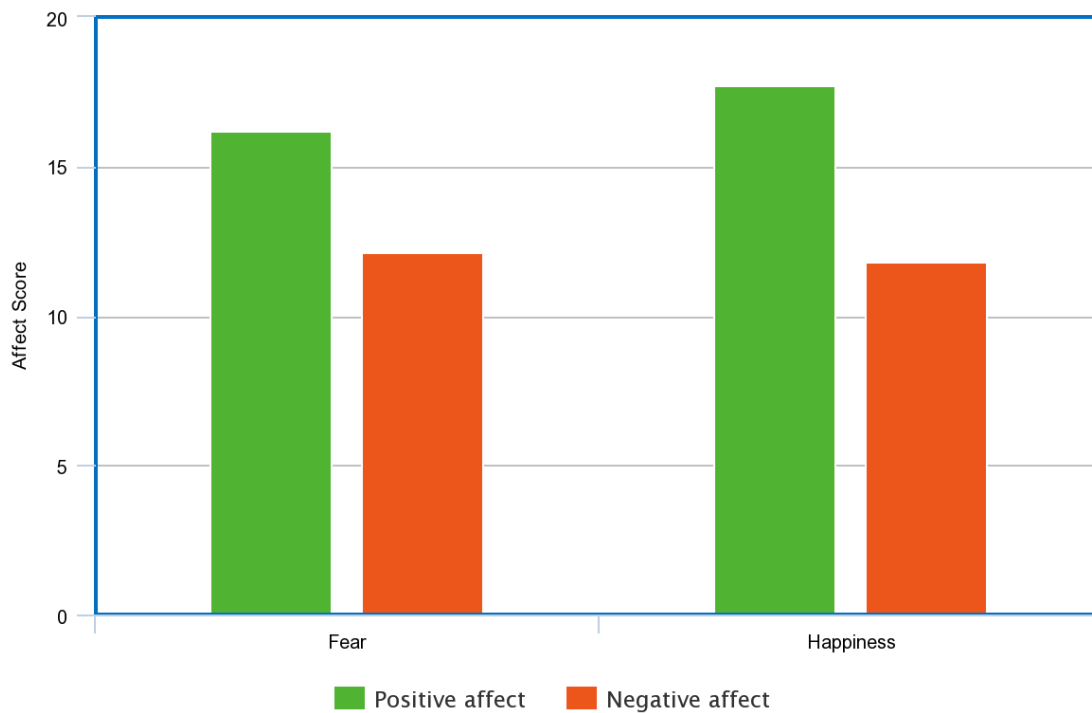
### 4.1 Descriptive results

Initially, we acquired 134 responses, but two responses were excluded for failing to properly answer the autobiographical recall section. This section was extremely important as this was how the emotion induction and by extension, treatment groups were constructed. Therefore, we were able to obtain 132 valid responses. Of these responses, 65 respondents were in the fear condition and 67 were in the happiness group. Summary statistics of the sample breakdown are given in appendix B from tables B1 to B5.

The PANAS was used directly after the autobiographical recall to observe if the emotion manipulation was effective. For analysis, the positive and negative affect scores were calculated and compared across treatments. The PANAS was calculated by quantifying the responses of the subjects for each positive and negative item. For each item, subjects could state how much the emotion or feeling resonated with them at that moment and then these responses are given a number. The highest score of 5 was attributed to the highest level of agreement which was “Strongly Agree”. On the other hand, a score of 1 was assigned to the emotions where “Strongly Disagree” was chosen. Finally, the responses were summed up and allowed us to observe the level of positive or negative affect. As there were five positive emotions and five negative emotions, both the positive and negative affect scores were given out of 25. The results are illustrated in figure 2 below.

#### **Figure 2**

*PANAS outcomes for fear and happiness treatment groups*



*Note: Bar graph depicting the PANAS outcomes for each of the treatment groups*

*Y-axis indicates the affect score given out of 25 and the X-axis represents the treatment condition.*

From the figure above we can deduce that the induction was effective for the happiness treatment but not for the fear treatment. The happiness group experienced a higher positive affect score compared to their negative affect score (17.7 vs 11.8), an indication of a successful induction. Additionally, the happiness condition had a higher positive affect score than the fear treatment, which had a positive affect score of 16.2. The Man – Whitney U test was performed to observe if there was statistical significance in the differences in the affect scores. The p-value for the test output for the positive affect scores was 0.035, which means the differences between the positive affect scores across both treatments is significant.

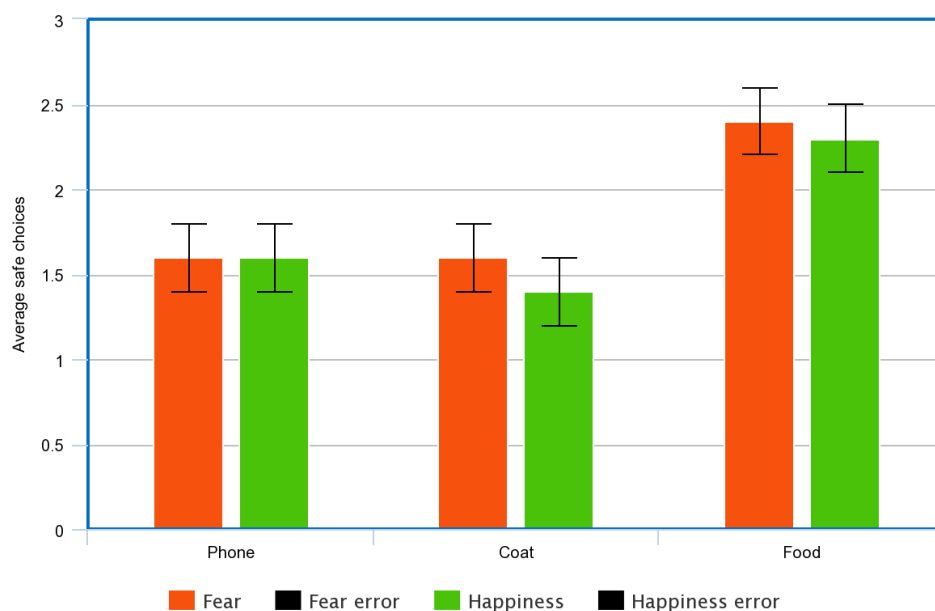
Conversely, our findings suggest the induction was not effective in the participants in the fear condition. Similar to the happiness group, the fear group had a higher positive affect score than the negative affect score. Ideally, respondents under the influence of fear would have a reversed illustration with the negative affect score being higher than the positive affect score. Nevertheless, there may have been some treatment effect in the fear condition as participants in this group did display higher levels of negative

affect compared to the happiness condition. However, this difference was marginal with the fear condition having an average negative score of 12.2 and the happiness condition having a score of 11.8. The Man Whitney U test for the negative affect scores had a p-value of 0.40, an indication that the compared means were not statistically significant.

To analyse the risk attitudes of respondents, we examined the number of safe choices they selected. For each product, there was a maximum of four safe choices to be selected, the final 5<sup>th</sup> choice was between two situations with equal availability but differing prices. In this choice, there was no safe choice as the cheaper priced good would simply be the logical selection. Figure 3 illustrates the full results.

**Figure 3**

*Average safe choices selected across all decision scenarios for both treatment groups*



*Note: Bar chart depicting the average number of safe choices for each treatment group across the 3 consumption scenarios.*

*Y-axis represents the average safe choices and the x-axis represents the decision scenarios.*

*Average safe choices are presented out of 5 and error bars represent the amount of variability of the measurement results.*



From the results, we see that across the different consumer products the treatment effect was present. In the phone scenario, the average safe choices were equal for both treatment groups at 1.6 safe choices. However, this observation is not statistically significant, having a p-value of 0.94 (Man Whitney U test). Across both treatments, the fear group selected safer choices for 2 out of the 3 decision tasks. In the coat scenario, we observe an average 1.6 safe choices for the fear group. On the other hand, for subjects under the happiness treatment the average safe choice made was 1.4. The means of both treatment groups were tested using a Man Whitney U test and the p-value of 0.44 indicated statistical insignificance in the results. This is contrary to literature that highlights the impact of fear on decision-making behaviour, stating that under the presence of fear, increased risk-aversion is present in choice making.

The food scenario also demonstrated this idea as the subjects in the fear treatment selected 2.5 safe choices on average. In comparison, the participants in the happiness treatment had an average of 2.3 safe choices. Once again, the means of both groups were compared for statistical significance using a Man Whitney Test and the consequent p-value of 0.83 means that there was no statistical significance in these results.

The means for both treatment groups across all scenarios have extremely small standard errors, ranging around the 0.2 mark. With the highest error being in the mean for the happiness group in the food scenario at 0.2 and the lowest being the mean in the happiness group in the coat scenario at 0.17. This means our results here display very little variation and the sample mean is likely to be representative of the population mean.

It must be noted that, while there are differences between the treatment effects, they are extremely marginal with the largest difference being an increase of 0.2 in safe choices selected.

Using the Mann-Whitney U test, we were able to observe if there were any statistical differences between the means of the different treatment conditions across the three decision scenarios. As previously mentioned, for all tests across all scenarios, the p-values obtained were greater than the 5% level of significance. With these results, we have enough data to comment on the status of our two hypotheses. The first

hypothesis stated that subjects in the fear treatment would display higher levels of risk aversion in their choice selection across all three decision scenarios. This hypothesis was not confirmed in our experiment due to the statistically insignificant results obtained. Our 2<sup>nd</sup> hypothesis posited that risk differences would persist between the services and goods. We aimed to confirm that service-based products invoked a higher level of risk aversion in participants and non-service-based products led to lower levels of risk aversion in participants. The statistical tests for these displayed insignificant results which means that we could not confirm this hypothesis either.

This means that all of our research hypotheses failed to hold in our experiment, and we find no evidence for a treatment effect on the risk preference behaviour of participants across all goods and services.

#### 4.2 Linear Regression Analysis

Lastly, we performed linear regression analysis to observe the impact of the treatment condition, age, educational background, annual income and gender on the number of safe choices across all decision scenarios. The output is presented in table 4.

**Table 4**

*Linear regression of treatment, gender, field of study, location, annual income and age on the number of safe choices in each decision scenario.*

Variable	Phone (1)	Coat (2)	Food (3)
Treatment	.165 (.275)	-.099 (.251)	.015 (.297)
<b>Gender</b>			
Male	-.101 (-.100)	-.768*** (.274)	.003 (.324)
Nonbinary	-.612 (1.012)	-1.556* (.924)	-1.480 (1.094)
Rather not say	1.825 (1.980)	-1.521 (1.808)	.164 (2.141)
<b>Field Of Study</b>			
Accounting	-.623 (.709)	-.771 (.648)	-1.244* (.767)
Other	-.497 (.352)	-.476 (.322)	.0584 (.381)
Engineering	-.461 (.619)	-.982* (.565)	-.894 (.669)

History	-1.218 (1.239)	-.773 (1.131)	-1.042 (1.340)
Law	.1720 (.786)	.0575 (.718)	.648 (.850)
Liberal arts	.375 (.809)	1.900*** (.739)	1.404 (.875)
Literature	-2.487 (1.5467)	-2.676* (1.412)	.352 (1.672)
Medicine	-1.621*** (.6333)	-1.417** (.578)	-.371 (.684)
Political science	.2171 (.674)	-.713 (.616)	-.304 (.729)
Social sciences	-.276 (.422)	-.289 (.385)	.110 (.456)
<hr/>			
Location	-.780* (.299)	-.608** (.272)	-.366 (.323)
<b>Annual Income</b>			
<hr/>			
≥ €100K	.575 (.800)	.975 (.731)	-.308 (.865)
€75K-€99,999	-.677 (1.744)	.566 (1.593)	.872 (1.886)
€50K- €74,999	.758 (.535)	.561 (.489 )	.213 (.579)
€35K- €49,999	-.4166 (.565)	-.0365 (.516)	.530 (.611)
€15K- €34,999	.346 (.365)	.0807 (.333)	-.298 (.394)
<hr/>			
<b>Age</b>			
<hr/>			
25-34	-.657* (.361)	-.768** (.329)	-.400 (.390)
35-44	-.152 (.718)	-1.164** (.655)	-.354 (.776)
45-54	.190 (.759)	-.678 (.693)	-.611 (.821)
55-64	.348 (.747)	.092 (.682)	.993 (.807)
> 65	2.284 (2.299)	1.316 (2.099)	-.469 (2.485)
<hr/>			
Constant	2.386*** (.457)	2.883*** (.416)	2.834*** (.494)
<hr/>			

Note: Standard errors are given in parenthesis. Significance levels are denoted as \*\*\*  $p < 0.01$   
\*\*  $p < 0.05$  \*  $p < 0.1$

In the phone scenario, we observed that most of the effects were not statistically significant, this is including the treatment effect. However, we observed statistically significant results for some variables including the location and Medicine. The output

for Medicine informs us that when compared to participants with an Economics background, subjects in Medicine had 1.12 fewer safe choices and this effect is significant at the 10% level of significance. Despite this, we cannot comment much on this as there is very little academic research documenting the impact of a medical background on risk aversion. Lawton et al, (2019) did observe in their research that doctors with more experience displayed lower levels of risk aversion in their behaviour. This could help explain the coefficient observed in those with a medical background, but more research is needed to understand this result. In the case of the location coefficient, when compared to regions outside the Netherlands, subjects in the Netherlands had 0.78 fewer safe choices. This effect is significant at the 5% level of significance, but it is difficult to explain this result. One potential explanation is offered in the work of Bruer et al (2014) who suggested that in cultures where individualism is promoted, higher levels of risk-seeking behaviour can be observed. The Netherlands has been stated to be an individualist country so this could drive the lower risk aversion we observe but such a conclusion is speculative given the scarcity of research on this matter.

Similar to the phone scenario, the coat setting had very few statistically significant results. Most of the significant results were observed in the educational background section with Liberal arts, Engineering and Medicine all indicating significant results. An interesting result is the fact that male participants displayed a lower level of risk aversion compared to female subjects. The male coefficient indicates that males selected 0.768 fewer safe choices than women. This observation is in line with several studies that suggest women inherently display higher levels of risk aversion in their decision-making (Carter et al, 2017; Eckel and Grossman, 2008 and Schubert et al, 1999). Location also had a significant effect on the number of safe choices in this scenario.

In the food scenario, the only significant result is observed when we look at the coefficient of those with an Accounting background, the coefficient indicates a higher level of risk-seeking behaviour in these individuals but there are few studies explaining this observation.

## 5. Discussion

As stated earlier in the paper, the goal of this research was to examine how individuals' behaviour under risk is impacted when influenced by emotional stimuli.

This focus on judgements under risk is relevant to consumer decision-making behaviour. Uncertainty was modelled through the medium of limited product availability. Additionally, we aimed to investigate if these risk preference differences are distinct across different consumer goods. Ultimately, we want to use the findings to inform the discourse on consumption behaviour and add some novelty to current literature.

From our analysis, we did observe that barring the phone scenario, subjects in the fear treatment selected safer choices than those in the happiness group across the coat and food decision scenarios. This is an indication that higher levels of risk aversion are present when fear is motivating behaviour. However, these observations were not statistically significant, meaning that we could not confirm our hypothesis which states that subjects in the fear treatment would display more risk-averse behaviour. Therefore, we must conclude that based on our experiment, emotions have no impact on the risk preferences of individuals. Such a conclusion is in contrast to current literature which observes that different emotions will induce different behaviour in individuals. Our findings on fear and happiness directly oppose that of Campo-Vazquez and Cuijly (2014) as in their research they conclude that fear triggers risk-averse behaviour in consumers and happiness leads to more risk-taking in decisions.

Additionally, it appeared that subjects had a much higher number of safe choices in the services. Such an observation gives credence to the literature on the topic which suggests that services lead to more risk-averse behaviour in consumers than products or goods. Unfortunately, these effects were not statistically significant in our research which meant we could not confirm our second hypothesis.

Our results indicated that no difference persists between the different treatment conditions, a finding that suggests that emotions have no influence on risk-taking behaviour during a choice-making setting. These findings need not be so easily accepted as evidence of emotional indifference in decision-making. There are possible

reasons why this result was observed. In the PANAS section it was concluded that the emotion induction was largely unsuccessful for those in the fear treatment. The gravitas of this outcome is seen in the consequent results. One possible reason for the failure of the emotion induction could be the time spent on the autobiographical recall section. While we mandated a minimum character limit for the writing, it may be the case that this was not enough, and more time was needed for the efficacy of the induction method to be observed. In other studies where this induction technique was utilised successfully, the minimum time spent on the recall was 10 minutes (Jallais and Gilet, 2010). Compared to this, our writing task took around 4 to 5 minutes on average, this shorter period could explain the failure in the induction. If a follow-up experiment was to be conducted, a more stringent and lengthy induction period would be necessary in order to effectively induce emotion in participants.

### *Limitations*

In regard to our experimental design, there were some limitations that could have hindered the effectiveness of our approach. Firstly, while it is crucial to observe the differences between distinct emotional states, a control group may have provided more insight into changes in behaviour. By having a non-treatment group which serves as a baseline, we could have observed the extent of decision changes under the influence of happiness or fear. Currently, we can observe some differences between the two treatment conditions, but we are not sure if they are a result of the treatment condition or if they would vary greatly with a no-treatment condition group.

Another, limitation of the experiment is that there was a potential opportunity for learning effects between the phone and coat decision tasks. In both tasks, the only change was the product, prices and availability figures were kept the same. Zizak and Reber (2004) argue that in cases with learning effects sometimes true preferences are left unrevealed as participants simply rely on familiarity and prior exposure to help inform the choices. However, there are several counters which suggest that learning effects in repeated experiments can actually lead to choice consistency and stable preferences (Brouwer et al, 2010).

These findings add to research on emotions and decision-making and by extension, emotions and consumer behaviour. Results can be extrapolated to a marketing context

when firms aim to induce favourable consumption behaviour in their customers. As firms continue to focus on different metrics of consumer success and satisfaction, research on emotions and consumer behaviour can help inform them better on how to evoke, utilise and manage different consumer mood states to create profitable outcomes for the firm.

### *Implications for future research*

Furthermore, this research also has implications for the consumer as by understanding the impact of different emotions on their evaluating processes and purchasing behaviour, consumers can have better mental preparedness when making decisions under emotional influences. This creates a space for further research on the antecedents of consumer emotion regulation in purchasing contexts.

Another area for future research is the impact of specific products or goods on consumer risk assessment. Currently, we observed some disparity in the total safe choices selected between service-based products and consumption goods. This relationship should be investigated in more detail in order to enlighten firms on the perceived risk around their offerings. Such a study would benefit service-based industries such as restaurants, museums and theme parks as it could help advise strategies on risk mitigation in these markets.

For future research, one area of interest is the impact of education background on risk-taking behaviour. Across all decision scenarios, there were several significant results when looking at the number of safe choices selected across the different educational disciplines. While we could not draw specific conclusions on the effect of educational background on risk aversion in this study, it highlights an avenue for research that has broader implications for decision-making. This area also has ramifications for the future labour market outcomes as the educational background of an individual has close ties to the kind of job they obtain and the market or industry they operate in. This implies that across different sectors different levels of risk aversion could be identified. Such findings has implications for jobs such as consultancy where interaction with distinct sectors and industries is needed. It could also allow researchers to make more precise predictions on professionals and their risk behaviour. For example, while many articles discuss the varying risk attitudes of investors, there is little mention of how other

professionals such as doctors, engineers or lawyers assess risky choices and how this impacts their field of work. Research into the risk-preferences differences across disciplines could help inform such studies.

Lastly, our results suggest that the effect of geographical location on risk aversion presents an interesting topic for further investigation. Current research on this topic looks at the influence of risk aversion on factors such as the willingness to migrate (Huber and Nowotny, 2020), the role of corruption (Costa and Mainardes, 2016) and international trade (Gervais, 2018). Future research should investigate potential antecedents of country-specific risk preferences such as culture and individualism. Such studies would help improve behavioural theories on international relations and could produce more informed approaches in interactions between countries where significant cultural differences are present. This could advise countries better on how to facilitate favourable results in global interactions such as international trade, global communications and tourism.



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## Appendix A

### Set up of experimental design

#### Figure A1

##### *Survey explanations on the price and availability terms*

For the next section of the survey, you will be asked to make a few choices. For context please imagine you are online shopping and are evaluating which item to purchase. The **price** denotes the amount you will spend to acquire the good and the **availability** represents the probability of you receiving the good, i.e products with **70% availability** represent a **70% chance of obtaining the product**. To better understand this task please complete the following examples.

#### Table A1

##### *Multiple price list for the phone scenario*

Choice 1 Price: €250 Availability: 90%	Choice 1 Price: €200 Availability: 50%
Choice 2 Price: €250 Availability: 80%	Choice 2 Price: €200 Availability: 50%
Choice 3 Price: €250 Availability: 70%	Choice 3 Price: €200 Availability: 50%
Choice 4 Price: €250 Availability: 60%	Choice 4 Price: €200 Availability: 50%
Choice 5 Price: €250 Availability: 50%	Choice 5 Price: €200 Availability: 50%

#### Table A2

##### *Multiple price list for the coat scenario*

Choice 1 Price: €250 Availability: 90%	Choice 1 Price: €200 Availability: 50%
Choice 2 Price: €250 Availability: 80%	Choice 2 Price: €200 Availability: 50%
Choice 3 Price: €250 Availability: 70%	Choice 3 Price: €200 Availability: 50%
Choice 4 Price: €250 Availability: 60%	Choice 4 Price: €200 Availability: 50%
Choice 5 Price: €250 Availability: 50%	Choice 5 Price: €200 Availability: 50%

**Table A3**

*Multiple price list for the food scenario*

Choice 1 Price: €25 Availability: 90%	Choice 1 Price: €20 Availability: 50%
Choice 2 Price: €25 Availability: 80%	Choice 2 Price: €20 Availability: 50%
Choice 3 Price: €25 Availability: 70%	Choice 3 Price: €20 Availability: 50%
Choice 4 Price: €25 Availability: 60%	Choice 4 Price: €20 Availability: 50%
Choice 5 Price: €25 Availability: 50%	Choice 5 Price: €20 Availability: 50%

**Figure A2**

*PANAS emotion items given in the survey.*

The following questions consist of words describing different emotions and feelings, please indicate on the scale below, to what extent you have felt this way in the past 15 minutes.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Excited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attentive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Figure A3**

*Survey questions on participant field of study*

What is your field of study?

- Law
- History
- Medicine
- Engineering
- Economics
- Social Sciences
- Accounting
- Political Science
- Literature
- Liberal Arts
- Other

**Figure A4**  
*Survey questions on annual income of participants*

What is your annual income?

- Less than €15,000
- €15,000 - €34,999
- €35,000 - €49,999
- €50,000 - 74,999
- €75,000 - €99,999
- €100,000 or more
- Prefer not to say

**Figure A5**  
*Survey questions on participant age.*

Please indicate your age

- 0-17
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65>



## Appendix B

### Statistical Results

**Table B1**

*Breakdown of participants by treatment condition*

	Freq.	Percent	Cum.
Fear	64	48.15	48.15
Happiness	68	51.85	100.0
			0
Total	132	100.00	

**Table B2**

*Breakdown of participants by age*

Age	Freq.	Percent	Cum.
18-24	85	64.39	64.39
25-34	28	21.21	85.61
35-44	7	5.30	90.91
45-54	5	3.79	94.70
55-64	6	4.55	99.24
65>	1	0.76	100.00
Total	132	100.00	

**Table B3**

*Breakdown of participants by gender*

Gender	Freq.	Percent	Cum.
Female	80	60.61	60.61
Male	48	36.36	96.97
Non-binary / third gender	3	2.27	99.24
Prefer not to say	1	0.76	100.00
Total	132	100.00	

**Table B4**

*Breakdown of participants by income*

Income	Freq.	Percent	Cum.
Less than €15,000	59	44.70	44.70
Prefer not to say	13	9.85	54.55
€100,000 or more	7	5.30	59.85
€15,000 - €34,999	30	22.73	82.58
€35,000 - €49,999	9	6.82	89.39
€50,000 - €74,999	12	9.09	98.48
€75,000 - €99,999	2	1.52	100.00
Total	132	100.00	

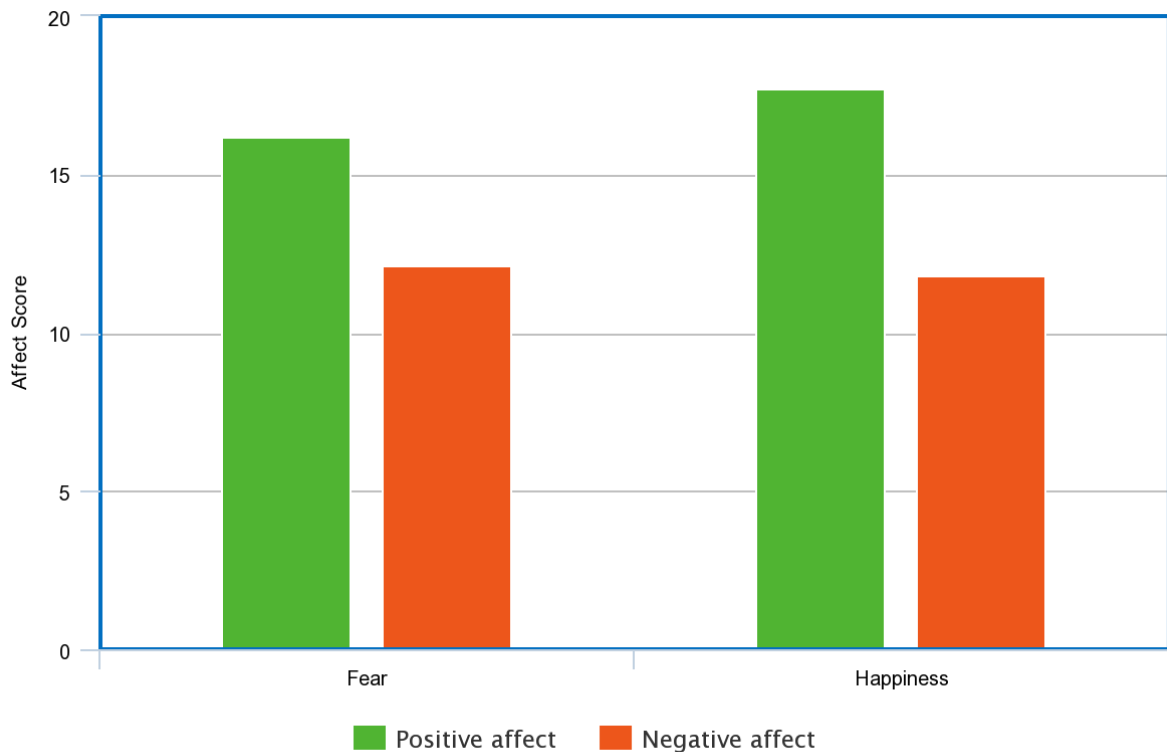
**Table B5**

*Breakdown of participants by field of study*

Study	Freq.	Percent	Cum.
Accounting	6	4.55	4.55
Economics	43	32.58	37.12
Engineering	8	6.06	43.18
History	3	2.27	45.45
Law	4	3.03	48.48
Liberal Arts	4	3.03	51.52
Literature	1	0.76	52.27
Medicine	8	6.06	58.33
Other	31	23.48	81.82
Political Science	6	4.55	86.36
Social Sciences	18	13.64	100.00
Total	132	100.00	

**Figure B1**

*PANAS outcomes for fear and happiness treatment groups*

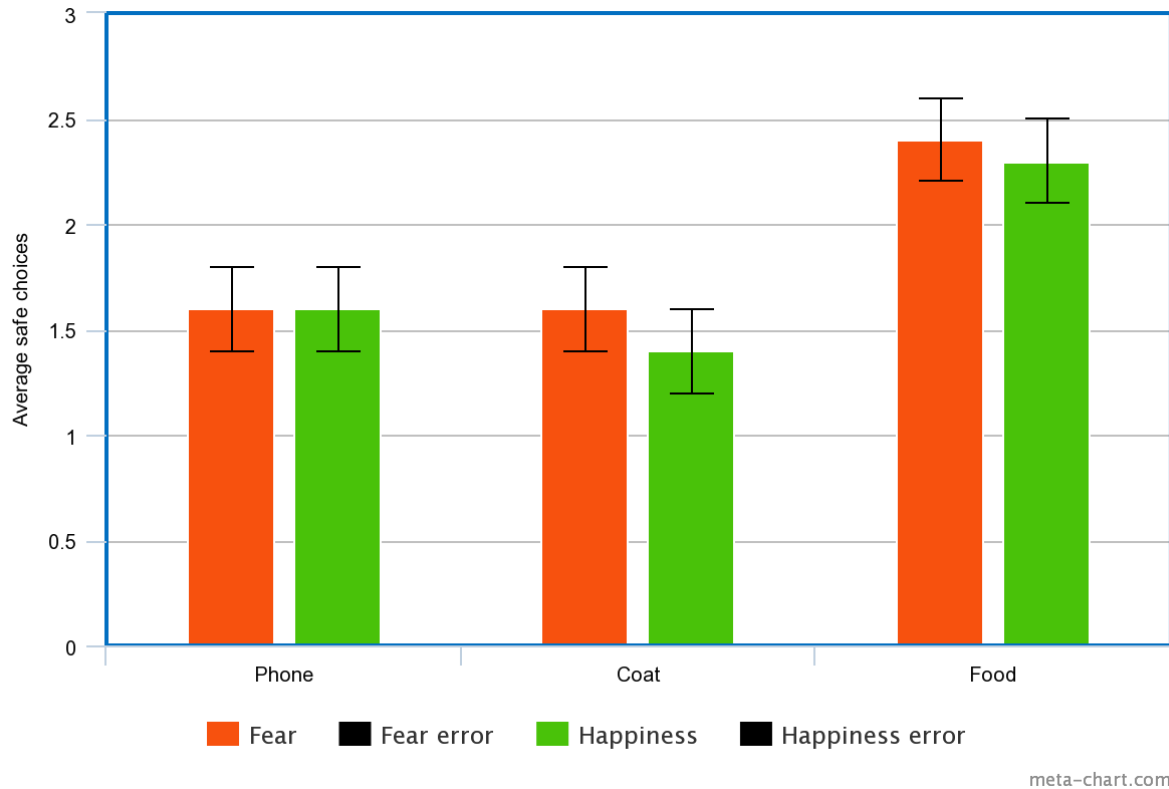


*Note: Note: Bar graph depicting the PANAS outcomes for each of the treatment groups*

*Y-axis indicates the affect score given out of 25 and the X-axis represents the treatment condition.*

**Figure B2**

*Average safe choices selected across all decision scenarios for both treatment groups*



*Note: Bar chart depicting the average number of safe choices for each treatment group across the 3 consumption scenarios.*

*Y-axis represents the average safe choices and the x-axis represents the decision scenarios.*

*Average safe choices are presented out of 5 and error bars represent the amount of variability of the measurement results.*

**Table B6**

*Linear regression of treatment, gender, field of study, location, annual income and age on the number of safe choices in each decision scenario.*

Variable	Phone (1)	Coat (2)	Food (3)
Treatment	.165 (.275)	-.099 (.251)	.015 (.297)
<b>Gender</b>			
Male	-.101 (.100)	-.768*** (.274)	.003 (.324)

Nonbinary	- .612 (1.012)	-1.556* (.924)	-1.480 (1.094)
Rather not say	1.825 (1.980)	-1.521 (1.808)	.164 (2.141)
<b>Field Of Study</b>			
Accounting	-.623 (.709)	-.771 (.648)	-1.244* (.767)
Other	-.497 (.352)	-.476 (.322)	.0584 (.381)
Engineering	-.461 (.619)	-.982* (.565)	-.894 (.669)
History	-1.218 (1.239)	-.773 (1.131)	-1.042 (1.340)
Law	.1720 (.786)	.0575 (.718)	.648 (.850)
Liberal arts	.375 (.809)	1.900*** (.739)	1.404 (.875)
Literature	-2.487 (1.5467)	-2.676* (1.412)	.352 (1.672)
Medicine	-1.621*** (.6333)	-1.417** (.578)	-.371 (.684)
Political science	.2171 (.674)	-.713 (.616)	-.304 (.729)
Social sciences	-.276 (.422)	-.289 (.385)	.110 (.456)
<b>Location</b>			
	-.780* (.299)	-.608** (.272)	-.366 (.323)
<b>Annual Income</b>			
≥ €100K	.575 (.800)	.975 (.731)	-.308 (.865)
€75K-€99,999	-.677 (1.744)	.566 (1.593)	.872 (1.886)
€50K- €74,999	.758 (.535)	.561 (.489 )	.213 (.579)
€35K- €49,999	-.4166 (.565)	-.0365 (.516)	.530 (.611)
€15K- €34,999	.346 (.365)	.0807 (.333)	-.298 (.394)
<b>Age</b>			
25-34	-.657* (.361)	-.768** (.329)	-.400 (.390)
35-44	-.152 (.718)	-1.164** (.655)	-.354 (.776)
45-54	.190 (.759)	-.678 (.693)	-.611 (.821)
55-64	.348 (.747)	.092 (.682)	.993 (.807)
> 65	2.284 (2.299)	1.316 (2.099)	-.469 (2.485)
<b>Constant</b>			
	2.386***	2.883***	2.834***

(.457)	(.416)	(.494)
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*Note: Standard errors are given in parenthesis. Significance levels are denoted as \*\*\*  $p < 0.01$  \*\*  $p < 0.05$  \*  $p < 0.1$*

**Table B7**

*Man-Whitney U test outputs on the positive affect score across both treatment groups*

<b>Positive affect score</b>	
<b>Output results</b>	
Unadjusted Variance	50456.25
Adjustment for ties	-313.56
Adjusted Variance	50142.69
z	-2.108
Prob >  z	0.0350
Exact prob	0.0348

*Note: Significance levels are denoted  $p < 0.05$*

**Table B8**

*Man-Whitney U test outputs of the negative affect score across both treatments*

<b>Negative affect score</b>	
<b>Output results</b>	
Unadjusted Variance	50456.25
Adjustment for ties	-261.09
Adjusted Variance	50195.16
z	0.844
Prob >  z	0.3989
Exact prob	0.4007

*Note: Significance levels are denoted  $p < 0.05$*

**Table B9**

*Man-Whitney U test outputs of number of safe choices across both treatment groups*

	Number of safe choices		
	Phone	Coat	Food
<b>Output results</b>			
Unadjusted Variance	50456.25	50456.25	50456.25
Adjustment for ties	-3899.02	-4148.41	-3161.92
Adjusted Variance	46557.23	46307.84	47294.33
z	0.074	0.771	0.218
Prob >  z	0.9409	0.4405	0.8271
Exact prob	0.9426	0.4425	0.8275

*Note: Significance levels are denoted as  $p < 0.05$*