

# Enhancing Decision Quality Through Information Exposure and the Moderating Effects of Explicit Factors

ADAM BOUZOUKOS

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\* This thesis is dedicated to the loving memory of my father...

## PREFACE

People, in their everyday life are confronted with decisions. These decisions can range from simple low impact decisions like at what restaurant to eat, to more meaningful and imperative decisions such as what professional career to choose to follow. Although everybody perceives themselves as good decision makers, there are a few predispositions or bias that affect the objective ‘collection’ of all information concerning alternatives (Hart, Albarracín, Eagly, Brechan, Lindberg & Merrill, 2009). One such bias is the confirmation bias, also termed as selective exposure to information. Selective exposure to information refers to the tendency people display towards confirming information that reinforce preexisting attitudes or opinions they uphold, whilst evading disconfirming information (Sears, & Freedman, 1967; Fischer, Greitemeyer, & Frey, 2008). Generally, selective exposure is considered as a negative phenomenon that hinders people’s objective decision-making abilities (Kray & Galinsky, 2003; Janis, 1981).

The goal of this thesis is to stand opposite to limited previous findings and provide empirical evidence that decision quality can be enhanced by selective exposure. **Chapter 1** will present the general introduction of the thesis regarding the theories and the literature review of decision-making and information exposure. **Chapter 2** will provide a detailed explanation on how selective exposure and decision quality were quantified and assessed. **Chapters 3-8** will present each of the 6 studies separately in the chronological order they were conducted. Specifically, in each chapter/study, the hypotheses, the theoretical background of every hypothesis, the methodology, the results and the discussion will be described in detail.

Finally, **Chapter 9** of the thesis will present the general discussion of the thesis as a whole. In particular, this chapter will evaluate the thesis, highlight the findings, pinpoint the weaknesses, identify aspects that could have been carried out differently, present the implications of the results, and provide suggestions for future research in order to take the thesis’ findings one step further.

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## ABSTRACT

### *Background*

Limited past research has stated that selective exposure is *negatively correlated* with decision quality and has demonstrated that when participants were *steered* into making a poor preliminary decision they made a worse final decision. However, the effect of *free choice* concerning the relationship between selective exposure and decision quality has not been investigated before.

### *Aim*

The aim of the PhD was to address the gap in literature, examine in depth and reveal the true nature of the relationship between decision quality and selective exposure. Based on the limited literature and unilateral methodological designs of previous research, it was hypothesized that decision quality is *positively correlated* with selective exposure.

### *Methods*

To test this hypothesis six consecutive studies were conducted, where participants were allowed to *freely* make a preliminary decision as opposed to preceding research. Additionally, the impact of specific moderators was assessed for the first time according to their effect on selective exposure and consequently on decision quality. Additionally, two novel decision-making tasks were employed to measure selective exposure, a survival scenario paradigm and a nutrition value paradigm.

### *Results*

The results of all studies revealed that the moderators examined significantly increased participants' degree of selective search and that selective exposure was *positively correlated* to the decision quality they exhibited during the completion of the decision-making exercises.

### *Conclusion*

In conclusion, the main contribution to the literature is that it was shown that when participants were allowed to *choose freely* their preliminary decision, selective exposure and decision quality were positively correlated. Such finding has not been found before. Finally, the knowledge acquired from this thesis can be applied in

ultimately all areas where decision-making takes place. Such areas include minor importance contexts such as consumer behavior and spread out to more significant areas such as health practice or military action. It is essential for decision-makers to be allowed to *choose freely* between alternatives and not be restricted by non-flexible decision-making interests or policies.

# CHAPTER ONE

## **“Enhancing Decision Quality Through the Effect of Selective Exposure to Information Under the Prism of Explicit Moderators.”**

*‘On a deaf person’s door, knock all you want’ is an old Greek proverb. It is widely used to mock someone that only hears what they want to hear. Essentially, it expresses someone that only pays attention to whatever stimuli they prefer, and crafts themselves ‘deaf’ to any other stimuli that they do not find fitting. Such stimuli include anything that a person can be exposed to in a social context. In a more scientific framework, this ancient proverb can be adopted in the realm of selective exposure to information.*

## INTRODUCTION

### 1.1 Decision-Making

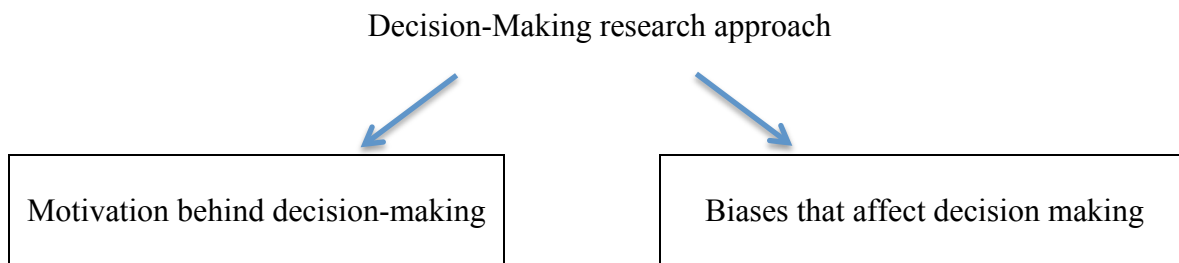
Decision-making is an everyday fundamental activity and people are constantly confronted with making decisions. These decisions range from low impact ones, such as what to eat or what clothes to wear, to more significant decisions like what car to buy or what career to follow. As a general definition, decision-making refers to the evaluation of alternatives and the selection of the one that is perceived as the best. When people make a decision, they do not know the exact consequences of their decision (Tversky & Fox, 1995). That can be accredited to the fact that some information might be missing or all the information received might not be perceived as reliable or valid (Matlin, 1998).

From a psychological perspective, decision-making has often been researched from observing what decisions people make in comparison to what decisions they should have made. This resulted in two theories emerging, the normative theory and the descriptive theory (Koehler & Harvey, 2004). Normative theory outlines the assumed

*ideal* decision while descriptive theory attempts to illustrate how people *actually* make decisions (Koehler & Harvey, 2004). However, this dichotomy automatically implies that there is a margin for human error in decision-making and has long been an area of research interest (Cohen, 1981). Consequently, if people do not engage in decision-making as the normative theories suggest, how can one assure that people will make the best decisions? This question provided the basis for the prescriptive approach that proposed techniques that would help people make better decisions (Sternberg, 2011). In essence, according to the prescriptive approach, various techniques are implemented to aid people to make better decisions that conform to the normative theory.

Due to the fact that there is an inevitable divergence between ideal decision-making and actual decision-making accredited to human error, initial research took two directions (Diagram 1.1).

*Diagram 1.1:* The two different approaches of research on decision-making.



The first direction encompassed researchers studying the motivation behind decision-making. That is, how people weigh the costs and benefits of the perceived outcome of their decisions. Researchers gave special focus to whether or not people select the outcome with the uppermost expected value (Higgins & Sorrentino, 1990). For example, consider a future college student. They will have to make a list with the positives and the negatives of each college they are interested in (e.g. tuition costs, quality of education, distance from home and so on). By doing so and weighing up the positives and the negatives, it is likely that person will make the best final choice on which university to attend. It should be noted that the researchers studying the motivation behind decision-making assumed that on a theoretical basis people are rational decision makers. However, as mentioned earlier, there is a discrepancy between ideal decision-making and actual decision-making, and consequently people are not rational decision makers (Ranyard, Crozier, & Svenson, 1997).

This lead to the second direction of research on decision-making that focused on the bias and shortcomings in how people reach decisions. Although in most cases people implement decision-making strategies that efficiently confront a variety of problems (Nisbett & Ross, 1980), there are still a number of biases that people are prone in making

that affects the quality of their decision (Stanovich, 1999). One such bias is confirmation bias. Confirmation bias refers to the preference people display towards information that supports their attitudes, beliefs or stands (Plous, 1993).

As extensive research began to take place, confirmation bias took a broader meaning and was termed selective exposure to information (Sullivan, 2009). Specifically, selective exposure to information does not regard solely about confirmation, rather it refers to the phenomenon where people prefer information supporting their attitudes and decisions, and *also* neglect information conflicting them (Frey, 1981). In addition, the hypothesis of selective exposure argues that even when people are exposed to conflicting information, they will perceive that conflicting information as unreliable or inaccurate (Lazarsfeld, Berelson, & Gaudet, 1948). The core definition of selective exposure argues that people favour confirmative information and at the same time disregard any information conflicting with their attitudes or beliefs (Zillman & Bryant, 1985).

## **1.2 Selective Exposure to Information**

Through mere observation, sociologists in the 1950's detected that mass media campaigns were unsuccessful in changing peoples' attitudes and behaviours. It was assumed that although the media campaigns were successful in increasing knowledge they failed to change attitudes or behaviours as they are highly resistant to change (Rogers, 1973). This was the point when the notion of confirmation bias and later selective exposure began to gain ample attention. The failed attempts of mass media campaigns to change peoples' attitudes were attributed to the operating mechanisms of selective exposure. Furthermore, many researchers stressed that media campaigns were condemned to fail also because of the influence of phenomenon of selective exposure (Larson, 1964). For example, Griffiths and Knutson (1960) reported that during World War II, all media campaigns of a specific community were focused on promoting a movie that would heighten peoples' identification with the war effort. However, only 5% of that community watched the movie. Afterwards, when people that watched the movie and people that did not watch the movie were interviewed, a high percentage of people that watched the movie were already engaged in some way with the war effort (e.g., donating blood to the Red Cross) than those that did not watch the movie. This demonstrated that the media campaign was a failure and only had an effect on people that agreed with the content of the campaign.

In addition, not only did selective exposure hinder attitude change or have any kind of important persuasion impact, but it was also argued that selective exposure activates and reinforces pre-existing attitudes (Klapper, 1960; Lazarsfeld et al., 1948). In the same direction, Lipset, Lazarsfeld, Barton, and Linz (1954) stated that the majority of time people voluntarily exposed themselves to information that they already agreed to begin with. Klapper (1960) argued that people are likely to expose themselves to communications that comply with their pre-existing attitudes. Also, Lazarsfeld, et al. (1948) expressed that there is a positive link between peoples' opinions and what they choose to listen to or read. They concluded that most often, people expose themselves to



information that they concur to begin with. Finally, McGuire (1964) based a broad research series on the supposition that people don't even consider counter-attitudinal information because of selective exposure.

Furthermore, numerous studies have shown that people consistently seek confirming information. For example, Schramm and Carter (1959) discovered that from the interviewed voters after a California election, twice as many Republicans than Democrats had seen the Republican candidate's program. Also, from the same study, they revealed that more than thirty percent of the viewers that watched the Republicans program did so in Republican homes than in Democrat homes; and that the average Republican spectator viewed the Republican's program for about one hour longer than the Democratic spectator. Additionally, Wolfinger, Wolfinger, Prewitt and Rosenhack (1964) reported that a Christian Anti Communist Crusade School that was organized mainly by white Protestants attracted a large number of students that perceived communism as an existent threat. Specifically, when those students were compared with a random national sample of students, over three times more expressed anti communism attitudes. Moreover, from the attendants of that school, sixty-six percent of them declared themselves as Republicans and only eight percent of them declared themselves as Democrats.

Additional support of confirming information search was also reported when it was found that students were more inclined to read newspapers whose editorial policy was closest to their own opinions (Lipset, 1953). Likewise, Ehrlich, Guttman, Schonbach and Mills (1957) revealed that people read a higher percentage of ads about their own type of car than about other brands. In another study, Freedman and Sears (1963) asked participants to choose from a package of pamphlets of two governmental candidates. The results showed that fifty eight percent of the participants chose a pamphlet of their favouring candidate. Childs (1965) concluded that in general, people read what they agree with or approve of. Similarly, Berelson and Steiner (1964) stressed that people are inclined to being exposed to communications that are agreeable to their own predispositions. Also, they stressed that people tend to ignore and reject communications that are neutral or opposite of their predispositions. They reached the conclusion that such predispositions can cover a vast area of social context and expressions, such as ethnic status; political attitude; sex role; interest and involvement; educational status and so on.

More contemporary studies have shown that confirming information search weakens in later stages of information seeking procedure (Fischer, Lea, Kastenmuller, Greitemeyer, Fischer & Frey, 2010). The majority of research has focused mainly on identifying a range of determinants of selective exposure. There are diminutive reports investigating the confirmatory searching strength during an information search course. The researchers approached selective exposure through a different angle, suggesting that people prefer confirmatory information and evaluate it as more important in the initial stages of information search rather than the later stages. The results of the studies conducted, yield exactly what the researchers proposed. In detail, the participants displayed increased confirmatory preference while searching or evaluating information

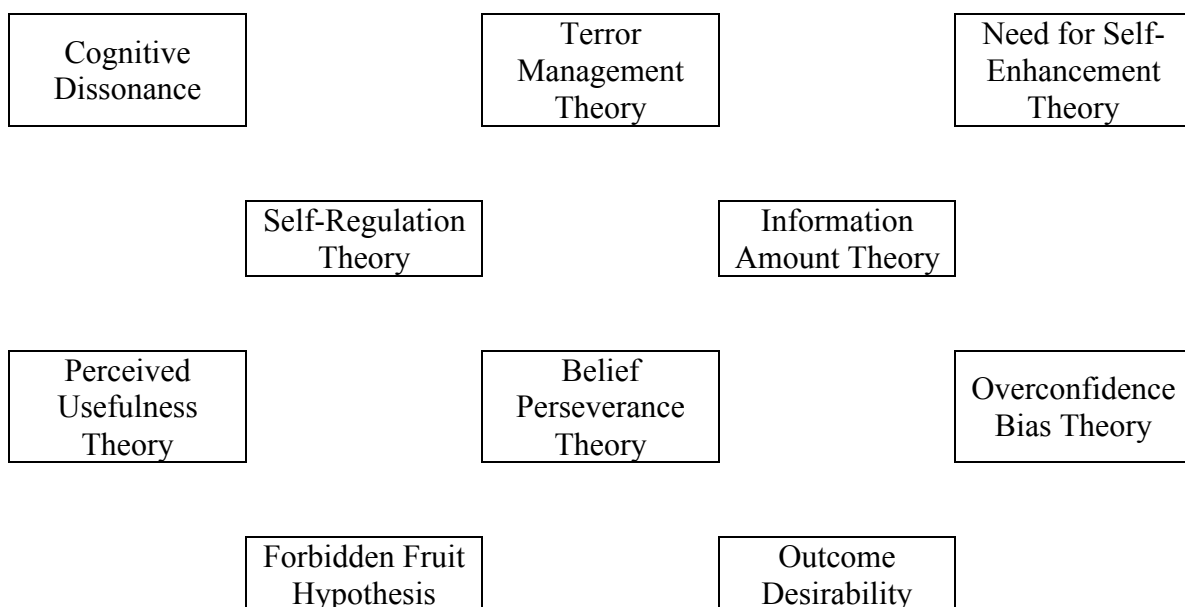
immediately after making an initial decision in comparison with confirmatory preference they exhibited in the later stages of the information searching procedure.

Two psychological mechanisms have been identified to support selective exposure strength in the beginning of information search procedure (Fischer, et al., 2010). The first mechanism is a defense-motivational process, according to which the initial search for confirmatory information operates as a self-concept up lifter. That is, by originally searching for confirmatory information, the person protects and enhances his self-concept of a good decider. Consequently, after the person establishes and maintains the perception that he is a good decision maker, the cognitive system is confident enough to allow exposure to contradictory information that might be presented in later stages of information search (Frey, 1986). The second mechanism suggested to have an effect on confirmatory search over time is the accuracy-motivational process. According to this, after a person makes a decision he should immediately experience an increased motivational state to affirm he has made a good decision. The result is that the person is motivated to instantaneously search for decision-related confirmatory information.

### *1.2.1 Theories Explaining Selective Exposure*

After the acknowledgment of the existence of selective exposure in the early 50's, the focus of literature fell upon the explanation of its presence. Diagram 1.2.1 displays the main theories that explain the existence of selective exposure. It should be noted that the moderators examined in the later experimental chapters, have been extracted from the theories justifying selective exposure as they provided a solid basis to investigate their hypothesized effect on selective exposure and decision quality.

*Diagram 1.2.1: Theories explaining the presence of selective exposure.*



The first and main hypothesis of selective exposure derived from Festinger's (1957) theory of cognitive dissonance. According to Festinger's theory, people that are in a state of disagreement tend to seek matching information to their own views and stands as a means of reducing dissonance and attempt to avoid information that does not correspond with their views. He stated that selective exposure plays a vital role in reducing dissonance. As supporting evidence and based on the theory of cognitive dissonance, Cotton and Hieser (1980) found that through a range of manipulations that lead to the varying of the degree of dissonance, participants searched for consonant information and avoided dissonant information that contradicted their decision.

Furthermore, three main hypotheses have been formulated in accordance with the cognitive dissonance theory (Sears & Freedman, 1967). The first one states that selective exposure increases after a person makes a decision or they commit to a position, as they feel obligated to defend their initial decision or commitment. Therefore, they seek more selectively for information in order to avoid dissonance, remaining faithful to their initial decision and to maintain cognitive harmony. The second hypothesis suggests that people search more selectively after they have been exposed to non-supportive information as a means of reducing dissonance. Finally, the third hypothesis claims that selective exposure is negatively correlated with the amount of confidence a person exhibits upon an upholding an opinion (Sears & Freedman, 1967). That is, the less assertive a person is about an opinion they sustain, the more supportive information they search for.

The second theory that provides an explanation for the phenomenon of selective exposure is the terror management theory. According to this theory, peoples' behavior is defined by a struggle of trying to retain stability, permanence, symbolic immortality and order (Greenberg, Pyszczynski & Solomon, 1986). Specifically, when people are reminded of their own death (mortality salience) or perceive something as a potential threat, they tend to become more rigid and less flexible as a defense mechanism. Such findings were displayed in a series of studies conducted by Fischer, Kastenmuller, Greitemeyer, Fischer, Frey, & Crelley, (2011). This experience greatly affects the individuals' decision-making process, making them more vulnerable to selective exposure (Jonas, Schulz-Hardt, Frey & Thelen, 2001).

Third, the theory of the perceived usefulness of information has been proposed as having impact on selective exposure. Specifically, it is hypothesized that the more useful information is perceived to be, the more people will want to be exposed to it (Sears & Freedman, 1967). Although it is obvious that information differs according to its practical usefulness, its importance was initially ignored. However, after the formulation of the hypothesis that usefulness of information effects selective exposure, an abundant of research has been carried out to put it to the test. For instance, Adams (1961) offered women the choice between receiving information about child development and the importance of either heredity traits or environment impact. He found that women chose three times more to read about heredity traits than environment factors because the first are perceived to have greater practical importance.

Forth, there are numerous reports that suggest the basis for selective exposure is a need for self-enhancement. Specifically, Schwarz, Frey & Kumpf (1980) stated people feel obligated to shield prior opinions or attitudes as a means of remaining faithful to their initial commitment. Also when people want to maintain a positive self-image and consider themselves as good deciders (Kunda 1990), that need operates as a self-enhancement mechanism. Lastly, selective exposure expressed as a need for self-enhancement can take the form of one wanting to defend their personal views and opinions of the world (Jonas, Greenberg & Frey, 2003).

Belief perseverance is the fifth theory that attempts to explain the existence of selective exposure. According to the belief perseverance theory, people have the tendency to hold onto a belief even when presented with contradictory information (Baumeister & Vohs, 2007). This tendency is expressed through the difficulty people encounter with letting go of an idea or belief they have (Santrock, 2000). For example, consider a rock star. It is hard for people to view a rock star in a paternal role because of the belief perseverance that they are wild, party-going people.

Sixth, selective exposure can also be attributed to the overconfidence bias which refers to having excessive confidence in one owns' judgement or decisions (Pallier, Wilkinson, Danthiir, Kleitman, Knezevic, Stankov, & Roberts, 2002). Most often, this excess confidence is not even justified when taking into consideration the actual frequency of correct judgments or decisions (Santrock, 2000). For the matter, Kahneman and Tversky (1995) reported that people are overconfident in a plethora of areas, such as whether a defendant is guilty in a trial, which students will do well in college, which business will go bankrupt and so on. Evidence supporting the theory of overconfidence bias was illustrated in study where college students were requested to predict their actions in the next academic year (Vallone, Griffin, Lin, & Ross, 1990). They were asked to predict whether they would break up with their partner, if they would vote in an election and whether they would drop out from any of their courses. In the second part of the study, the students were asked to rate how confident they were with the predictions they made about their future. At the end when the students' predictions were checked, it was found that they exhibited overconfidence on what their future actions would be. Apparently, people displayed too much faith in their judgements and decisions, without the supporting evidence from statistical and objective measures to back up their overconfidence.

A seventh theory that explains selective exposure is the outcome desirability theory. Windschitl, Scherer, Smith, Rose (2013) hypothesized that outcome desirability has a direct impact on selective exposure. In detail, they suggested that if people make a judgment about an outcome, they are more likely to demonstrate preference for information that is consistent with their predicted outcome. For example, Windschitl and his colleagues (2013) asked participants to make a prediction about a novel, which one out of two would be more popular. Afterwards the participants had to choose additional information regarding both of the novels. The result was that the participants preferred information about the novel they initially chose as being more popular. Even more, in a series of studies, outcome desirability was manipulated in an attempt to see the effect that

it has on information preference. The manipulation showed that when the outcome was made desirable, participants preferred information that supported the outcome. At the same time, when the outcome was made undesirable, than participants did not show preference to supporting information regarding the outcome (Windschitl et al., 2013).

The eighth theory that explains selective exposure is the forbidden fruit hypothesis. According to this theory, whenever something is forbidden or 'showered' with restrictions, it automatically becomes more attractive (Brehm, 1972). Consequently, the hypothesis of the forbidden fruit foretells selective exposure to violence will transpire in the case where the violent content is limited or disparaged (Bushman & Stack, 1996). To test the accuracy of this theory, Bushman and Cantor (2003) analyzed the data of 18 different studies investigating the upshot of violence advisory warnings. They found that the labels with high violence warnings significantly increased selective exposure, thus confirming the forbidden fruit hypothesis.

Finally, from studies recently conducted, various conditions have been identified as moderators of selective exposure to information. For example, Fischer, Greitemeyer & Frey (2008) argued that depleted self-regulation resources functions as such a moderator. That is, people displaying low levels of self-regulation ultimately withstand attitude change, search for supporting information to achieve that and avoid contradictory information. Other moderators are limited availability of information (Fischer, Jonas, Frey & Schulz-Hardt, 2005), and at last, free choice between alternatives as proposed by Frey and Wicklund (1978). In addition, recent research showed that selective exposure is affected by the amount of information presented to participants. In specific, in a series of studies, it was demonstrated that when participants were confronted with more than two pieces of information they were more inclined into searching for consistent and confirming information (Fischer, Schulz-Hardt & Frey, 2008). Specifically, the researchers found that when participants were confronted with 10 pieces of information, they systematically preferred consistent information. On the other hand, when participants were confronted with just 2 pieces of information, they exhibited preference for decision non-consistent information (Fischer, et al., 2008).

### *1.2.2 Areas Effected by Selective Exposure*

Selective exposure to information has been confirmed in various contexts (Kastenmuller, Greitemeyer, Jonas, Fischer & Frey, 2009) that cover a vast area of everyday life (Fischer, et. al., 2005). For example, early studies demonstrated that people did actively seek for confirming information in political campaigns (Ehrlich, et al., 1957; Schramm & Carter, 1959; Freedman & Sears, 1963). More contemporary studies showed the effect of selective exposure in other frameworks such as in-group decision-making (Schulz-Hardt, Frey, Luthgens & Moscovici, 2000) when through a series of experiments found that groups of people preferred supporting information over conflicting information and in personal decision-making (Jonas, et. al., 2001). Also, selective exposure has been found in attitudes as through confirmation bias priory formulated attitudes are reinforced (Brannon, Tagler & Eagly, 2007; Knobloch-Westerwick, 2012;

Lundgren & Prislin, 1998); in stereotypes where it was shown that people prefer information that confirms their existing attitudes and displayed no modification or to those stereotypes (Johnston, 1996); in advice as it is documented that people present information supporting the advice they give and neglect information that is non-supporting of their advice (Jonas & Frey, 2003); in self-serving conclusions and evaluations people make about other people are based on information they acquired through selective exposure (Holton & Pyszczynski, 1989); and in expectations, as it was found that people engage in poorly negotiated agreements do to the effect of the fixed pie expectation (a business term that refers to the assumption negotiators hold that the pie of resources is fixed/limited) in collaboration with supportive information search (Pinkley, Griffith & Northcraft, 1995).

Additional areas that selective exposure can be accounted is in health (e.g. frequent cell phone users usually disregard the information concerning the health risks involved from prolonged usage of cell phones such as absorbing electromagnetic radiation emitted from the cell phones), in body image and body perception [e.g. women driven by the effect of selective exposure pay more attention to the stereotypically attractive thin body image which in return often leads to eating disorders (Aubrey, 2006)], in politics [e.g. voters prefer to hear about candidates with whom they expect to agree with on the various issues and/or engage into political information that they personally believe to be most important (Iyengar, Hahn, Krosnick & Walker, 2008)].

### **1.3 Rationale of Thesis**

There are three main reasons why the effect of selective exposure on decision quality was investigated in this thesis. After examining the existing literature, three areas presented a gap in the literature, or areas that demanded additional examination.

First, as mentioned earlier, the initial theories that emerged regarding decision-making created a discrepancy between ideal and actual decision-making with human error playing a main role. This suggests that there is something fundamentally incorrect or faulty with the way people make decisions. As people make decisions that are inconsistent with the normative theory, the question that rises is what decision-making strategies; modes of thinking or techniques can be employed in order to help people make better decisions. Therefore, based on the prescriptive approach discussed earlier, this thesis aimed in providing insight on increasing decision quality.

The second reason is that plenty of studies conducted (especially in the initial studies) investigating selective exposure to information produced dissimilar results (Feather, 1962; Mills and Ross, 1964; and Sears, 1965). That is, research yielded results that were both supportive and contradicting for the existence of selective exposure. Moreover, apart from not providing support for selective exposure, some studies have also displayed the exact opposite effect were participants showed significant preference for non-supportive information (Brodbeck, 1956; Sears, 1966). Therefore, more research is needed for selective exposure in order to be acknowledged as a bona fide cognitive

process which influences people on what information they prefer and what information they reject.

Finally, although selective exposure to information was commonly acknowledged to have an effect on decision-making, there is only a limited amount of empirical literature investigating the direct effect of selective exposure on decision quality. Specifically, it has been displayed in only two studies that selective exposure can decrease the quality of decisions and that decision quality and selective exposure are negatively correlated (Janis, 1982; Kray & Galinsky, 2003). That is, the more selectively participants searched for information after a preliminary decision, the worse their final decision was. It should be noted that the main issue with those findings is that the studies were carried out in a fashion that ‘directed’ participants in making a poor preliminary decision, suggesting a limitation in methodological approach of those studies.

Do people make poor choices because they are impelled by selective exposure; what would the outcome of the quality of their final decision be if participants were allowed to freely make a preliminary decision; are there any positive benefits from the effects of selective exposure? Important questions like the above that have never been fully addressed demonstrate the necessity for further exploration of selective exposure in correlation to decision quality, and consist the backbone of the rationale of this thesis.

## CHAPTER 2

### QUANTIFYING SELECTIVE EXPOSURE AND DECISION QUALITY

This chapter will provide a detailed explanation on how selective exposure and decision quality were quantified for testing. Even more, the methodology of assessing selective exposure and decision quality was consistent throughout the six studies allowing the testing of each stated hypothesis within this thesis.

#### 2.1 Selective Exposure

Selective exposure was quantified by assessing two separate variables, *confirmation bias* and *evaluation bias*.

##### 2.1.1 Confirmation Bias

For each study, participants were presented with a series of paired statements, one that was supportive relating to a decision they made within each study, and one that was contradictory. The participants had to choose for every pair of statements, which of the two they would prefer to read, the one supporting their previously made decision, or one contradicting it. *Confirmation bias* was then calculated by subtracting the number of contradictory statements a participant read, from the number of supportive statements they read:

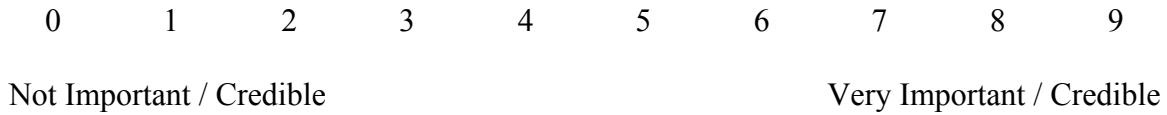
$$\text{Confirmation bias} = \text{supportive statements read} - \text{contradictory statements read}$$

##### 2.1.2 Evaluation bias

Additionally to choosing what statements they wanted to read, each participants was asked to evaluate each statement on two different dimensions, on how important and how credible they believed they were. Diagram 2.1.2 displays the evaluation scale for both dimensions. This enabled the computing of an average evaluation score for both the supportive statements evaluated and the contradictory statements evaluated.



Diagram 2.1.2: The evaluation scale for the two dimensions important and credible.



The *evaluation bias* for each participant was then computed by subtracting their average evaluation score of the contradictory statements, from their average evaluation score of the supportive statements:

$$\text{Evaluation bias} = \text{supportive average evaluation} - \text{contradictory average evaluation}$$

## 2.2 Decision Quality

Decision quality was quantified by assessing two different variables, the *ranking bias* and the *decision bias*. It should be noted that the ranking bias was employed from Study 2 and on.

### 2.2.1 Ranking Bias

For the decision task of each study, participants were asked to rank six items from most important to least important, according to how important the participants perceived them to be. They were asked to make a preliminary ranking at the beginning of each study before they were presented with the selective exposure task, and a final ranking at the end of the study. In order to evaluate each participant's rankings (preliminary and final ranking) and determine their quality, all rankings were compared to the ranking conducted by experts relevant to the field the decision task was extracted from. Specifically, nutrition specialists ranked the food items employed in Study 1, Study 5 and Study 6; and survival experts ranked the survival items employed in Study 2, Study 3 and Study 4.

The first step in calculating the quality of each ranking was to determine the range the ranking scores could have. For the matter, it was considered that the absolute perfect ranking score could be achieved only when the participant's ranking was exactly the same with the experts' ranking, and their difference would total '0' (Diagram 2.2.1a).

Diagram 2.2.1a: The highest-ranking score.

Experts' ranking	Participant's ranking	Difference between rankings
1	1	0
2	2	0
3	3	0
4	4	0
5	5	0
6	6	<u>0</u>
Total of difference		= 0

On the other hand, the worse ranking score was considered the exact reverse ranking of the experts' ranking and the difference would total '18' (Diagram 2.2.1b).

Diagram 2.2.1b: The lowest-ranking score.

Experts' ranking	Reverse ranking	Difference between rankings
1	6	5
2	5	3
3	4	1
4	3	1
5	2	3
6	1	<u>5</u>
Total of difference		= 18

However, because the determined range had a negative direction (the better a person's ranking was, the smaller that number was and the closer it was to '0') each achieved ranking score was reversed. This was simply done by subtracting each participant's ranking score from the lowest-ranking number (18). As a result, the range of ranking scores became (Diagram 2.2.1c):

Diagram 2.2.1c: The range of ranking scores.

0	2	4	6	8	10	12	14	16	18
Lowest ranking score					Highest ranking score				

For the next step and to illuminate how ranking bias was computed, consider the example from Table 2.2.1 (the food items presented were extracted from Study 5).

Table 2.2.1: Example of how ranking bias was computed.

	Expert ranking	Ranking example	Ranking Difference
Almonds	4	5	1
Avocado	5	2	3
Banana	6	4	2
Cabbage	1	6	5
Cauliflower	2	1	1
Green Peppers	3	3	0

Note. The six food items are alphabetically presented.

From Table 2.2.1 it can be seen that participants ranked as most nutritious the Cauliflower and ranked as least nutritious the Cabbage (3<sup>th</sup> column). In order to compute the ranking score, the difference between the experts ranking (2<sup>nd</sup> column) and the participants ranking was calculated providing a set of scores (4<sup>th</sup> column; ranking difference). Next, the ranking difference scores were added to provide a ranking total score:  $1 + 3 + 2 + 5 + 1 + 0 = 12$ . Finally, that score was revised by subtracting it from '18':  $18 - 12 = 6$ . As a result, the ranking quality of the example ranking, achieved a score of '6'.

The final step included the computation of the *ranking bias* for each participant. After obtaining each participant's ranking score for both their preliminary and their final ranking, *ranking bias* was calculated by subtracting the preliminary ranking score from the final ranking score. Therefore, the formula for quantifying *ranking bias* was:

$$\text{Ranking bias} = \text{final ranking} - \text{preliminary ranking}$$

### 2.2.2 Decision Bias

For the decision task of each study, participants were asked to make a preliminary decision before they were presented with the selective exposure task, and a revised final decision at the end of the study. The decisions entailed the participant choosing three items out of six as being most nutritious for Study 1, Study 5 and Study 6; and choosing three out of six items as being most valuable in a survival scenario for Study 2, Study 3 and Study 4. Similar computing the *ranking bias* mentioned earlier, each decision (preliminary and final decision) was compared to the ratings of the experts, providing a means of comparing and calculating decision quality.

First, to compute *decision bias*, the range of decision scores had to be determined. For the matter, the total of the three most important items ( $1 + 2 + 3 = 6$ ) was subtracted from the total of all importance values ( $1 + 2 + 3 + 4 + 5 + 6 = 21$ ). As a result, the highest decision quality score took the form:

Total importance values – Total of three best items = Highest decision score 

$$21 - 6 = \underline{15}$$

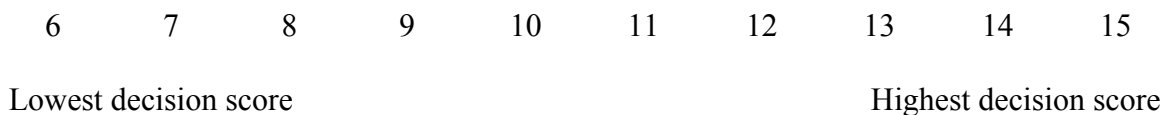
Accordingly, the lowest possible score that would indicate the worse decision was determined by subtracting the total of the three least valuable items ( $4 + 5 + 6 = 15$ ) from the total of all item importance values:

Total importance values – Total of three worse items = Lowest decision score ➡

$$21 - 15 = 6$$

The above provided the range of the decision quality scores (Diagram 2.2.2).

Diagram 2.2.2: The range of decision scores.




Next step was calculating the decision score for each decision the participants made (both preliminary and final decision). To illustrate how that was done, consider the example from Table 2.2.2 (the survival items were extracted from Study 4):

Table 2.2.2: Example of how decision bias was computed.

Objects	Importance value	Example
Chocolate bar	4	
Compass	5	Compass
Extra pants/shirt	2	
Lighter/ no fluid	1	Lighter
Map	6	Map
Can of shortening	3	

Note: Survival experts determined the survival importance of each item.

The example of Table 2.2.2 shows that the participant chose as most important in a survival situation the compass, the lighter and the map. The decision quality score was computed by adding the importance value (2<sup>nd</sup> column) of each chosen object (3<sup>rd</sup> column):  $5 + 1 + 6 = 12$ . Then, that total was subtracted from the total of all importance values providing the decision quality value for that participant.

Total of all importance values – example total = decision quality score 

$$21 - 12 = 9$$

The final step included the computation of the *decision bias* for each participant. After obtaining each participant's decision score for both their preliminary and their final decision, *decision bias* was calculated by subtracting the preliminary decision score from the final decision score. Therefore, the formula for quantifying *decision bias* was:

$$\text{Decision bias} = \text{final decision} - \text{preliminary decision}$$

## CHAPTER THREE

### *“Enhancing Decision Quality through Information Exposure and the Moderating Effects of Information Source and Decision Commitment”*

Study 1 was designed to provide evidence that higher levels of supportive information exposure enhance decision quality. Simultaneously, the effects of two moderators were assessed in order to examine the effect they have on information exposure and in turn on decision quality. Specifically, participants were asked to make a preliminary decision on a food item nutritious task and then to complete an exercise that assessed information exposure through the manipulation of two specified moderators. It should be noted that specialized nutritionists evaluated the nutrition value of each food item. After information exposure was assessed the participants were asked to make a final decision. Next, each decision participants made was compared to the evaluations of the specialized nutritionists and was assigned a value number. The closer the evaluations of the participants were with the nutritionists, the better their decision was and the higher that number was. As a result, decision quality was calculated by subtracting the preliminary decision number from the final decision number. This allowed the testing of whether decision quality is enhanced by supportive information exposure. In sum, *information exposure* was utilized as the independent variable of the study; *decision quality* as the dependent variable; and *information source* (2 levels: known vs. unknown) and *decision commitment* operated as moderating factors. Finally, it should be noted that although participants were recruited from three different countries, a cross-cultural variable was not taken into consideration.

### 3.1 Hypotheses

*Hypothesis 1:* Higher levels of supportive information exposure increase decision quality. In particular, the more selectively participants search for information the better their final decision.

*Hypothesis 2:* Information source has a significant effect on information exposure, which in turn has a direct effect on decision quality. Hence, it is hypothesized that a known source (as opposed to an unknown source) of information significantly increases how selectively people search for information which in turn has a significant effect on their final decision.

*Hypothesis 3:* Higher levels of decision commitment significantly increase supportive information exposure that in turn increases decision quality. Specifically, it is hypothesized that the more decision commitment people possess the more selectively they will search for information and the better their final decision will be.

### 3.2 Theoretical Basis of Study Hypotheses

#### 3.2.1 *Hypothesis 1: Information Exposure and Decision Quality*

There is only limited amount of literature that investigates the connection between selective exposure and decision quality. In specific, Kray and Galinsky (2003) hypothesized that by inducing contradicting pieces of information and people being open to disconfirming information, group decision errors could be minimized. That is, the researchers suggested that if confirmation bias is reduced by induction of counterfactual thoughts, people belonging to a group could avoid wrong decisions and make better decisions. Kray and Galinsky (2003) hypothesized that within the context of a group, selective exposure is negatively correlated with decision quality. To test their hypothesis, they conducted two experiments that were modelled after the space shuttle Challenger disaster that took place in 1986. In both experiments, the researchers demonstrated that with the priming of counterfactual mind-sets, members of a group searched for more disconfirming information and ultimately reached a better decision compared to groups that were not initially evoked with counterfactual thoughts. Similar, Janis (1982) found that fatal past decisions were made due to high levels of selective exposure the decision-makers exhibited. Also, just as in the studies conducted by Kray and Galinsky (2003), Janis also 'guided' the participants in making a bad preliminary decision. It was hypothesized that a more balanced search of information forces decision-makers to re-evaluate their poor preliminary decision and ultimately make a better final decision (Janis, 1982).

Although previous studies demonstrated that selective exposure has a negative impact on decision-making, the current study differs in two main areas. First, the researchers examined the relationship of selective exposure and decision quality from an in-group context, opposed to the present study that examined decision quality from an individual basis. Second, previous studies directed participants into making a poor

preliminary decision, whereas participants in current study were *freely* allowed to make a preliminary decision of their choice, poor or good.

### *3.2.2 Hypothesis 2: Information Source and Information Exposure*

A moderating factor that was examined in the study was information source. It was hypothesized that people tend to search more selectively for confirming information when the source is provided to them is known, as opposed to when the source is unknown. The theoretical basis for this hypothesis can be traced back to the social learning theory (Bandura, 1977). According to the social learning theory, learning takes part from observation, comparison and interaction in a social context (Bandura, 1963; Miller, 2011). The theory stresses that people tend to identify and imitate the behaviour of role models (Bandura, 1977). In the current study, one level of the moderating variable ‘information source’ included well-known (as opposed to unknown/anonymous that constituted the second level of the variable) and prestigious people that could generally be considered as role models that have a modelling effect on other peoples’ behaviour. In correspondence to *hypothesis 2* of the study and based on the social learning theory, it is hypothesized that people will identify more with the stance of well known people and exhibit increased selectivity while searching through information from a known source.

### *3.2.3 Hypothesis 3: Commitment and Information Exposure*

Hypothesis 3 of the study investigates the relationship between the degree of commitment a person upholds and how selectively he searches for information. Therefore, for the purpose of the study, *commitment* was exploited as a moderating factor of Selective Exposure. The theoretical background of this was based on the notion of escalation of commitment. Escalation of commitment refers to a pattern of behavior where a person remains committed to a decision even in the presence of alternatives or even when they are faced with negative outcomes (Whyte, 1986). In essence, people tend to continually justify their increased commitment based on their prior engagement to that decision, despite the presence of new evidence that suggests more beneficial decision outcome (Arkes & Ayton, 1999). Confirmation bias and escalation of commitment are interrelated, as people are less then likely to identify any alternative course of actions or to recognize the negative results of their decisions. An example of escalation of commitment or ‘commitment bias’ is when in auctions, bidders commit to a ‘bidder’s war’ and end up paying a lot more than the product is worth. The force that renders them spellbound to such behavior is the commitment to the initial investment expended while making the decision. Finally, in correspondence to *hypothesis 3* of the study and based on the escalation of commitment phenomenon, it is hypothesized that people with a higher degree of decision commitment will search more selectively for confirming information.



### 3.3 Method

#### 3.3.1 Participants

An opportunity sample of ninety-three students was recruited from the John Moores University in Liverpool (UK), the Kent University (Ashtabula, Ohio Campus, USA) and the British Hellenic College (GR). From those participants, forty-eight were women and forty-five were men. It should also be noted that forty-seven participants were recruited from UK, twenty-two from USA and twenty-four from Greece.

#### 3.3.2 Ethics

Approval for conducting the study was requested and granted from the ethics committee of the three educational institutions mentioned above.

#### 3.3.3 Design

The study had a 2 (type of information: supporting vs. contradicting) X 2 (information source: known vs. unknown) between groups correlational design with decision quality operating as the dependent variable (DV) of the study.

#### 3.3.4 Material

Regarding *hypothesis 1*, a short article presenting the significance of a healthful diet and the importance of one knowing which foods are nutritious was used. Also each participant was presented with a list of six food items (brown rice, Brussels sprouts, carrots, eggs, low fat yogurt and sunflower seeds) and statements that were either supportive or contradictive of their nutritious value (Appendix 1). Furthermore, for *hypothesis 2* a list of known people was used as a reference to the supportive or contradictive statements presented as a means of assessing the moderating factor of *information source* (Appendix 2). Finally, for *hypothesis 3*, a five-item Commitment Questionnaire was used in order to assess the moderating factor *commitment* (Appendix 3).

#### 3.3.5 Procedure

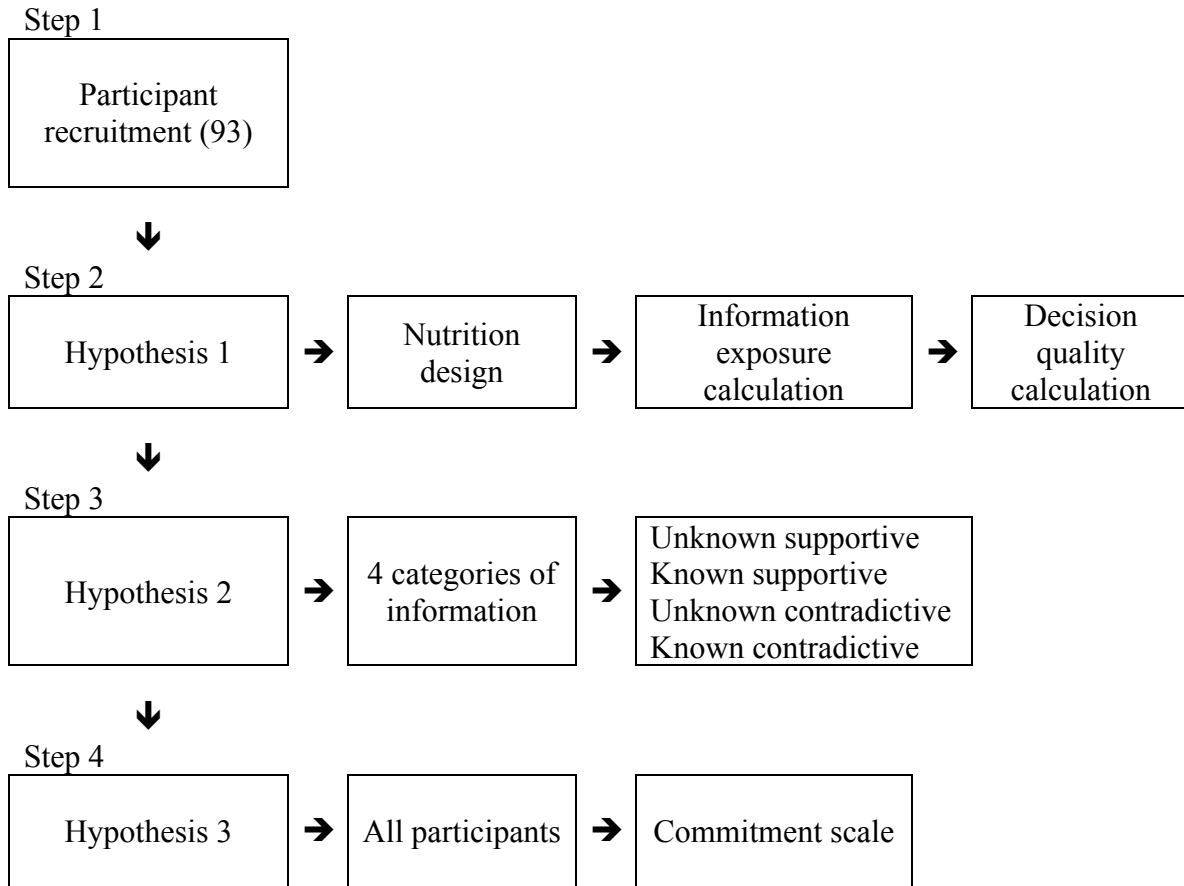
The completion of the study and data collection was separated into four specific steps. First step was participant recruitment and was achieved by being personally approached and asked to partake in a study about decision-making regarding attitudes towards nutritious values of various foods. The second step regarded collecting data in order to test *hypothesis 1*. Specifically, each participant was presented with six food items and was asked to choose the three they believed to pack the most nutritious and beneficial

value. At this point it was specified that this was merely a preliminary decision and that they would have the opportunity to reevaluate and make a final decision at the end of the study. Next, each participant was presented with one brief piece of information at a time that was either supportive or contradictory for each food item regarding its nutritious value. After reading each brief statement, the participants were then asked to evaluate that piece of information on two different dimensions, how important the statement was and how credible it was. In addition, after evaluating each brief statement participants were then prompted to choose whether they would want to read the full statement (either supportive or contradictory according to the brief statement) of that same food item. Step 2 concluded with each participant revising their preliminary decision on which three food items were the most nutritious and making a final decision.

Next, step 3 included the testing of *hypothesis 2*. Specifically, when participants were presented with the supportive and contradictory statements for each food item, they were also presented with the source of each statement. As a result, four groups of statements were composed and included: supportive from a known source, supportive from an unknown source, contradictory from a known source and contradictory from an unknown source. Through this process, the effect of the variable information source was assessed. Finally, in step four, *hypothesis 3* of the study was tested. This was done with the use of a novel five-item questionnaire that measured a person's degree of commitment to a decision.

All ninety-three participants that were recruited followed and completed every step of the study which can be seen in Flowchart 3.3.5:

Flowchart 3.3.5: The sequence of steps carried out for the procedure of the study.



### 3.4 Data Analyses

A Pearson Correlation analysis was conducted in order to test the relationship between information exposure and decision quality in order to test *hypothesis 1*. Additionally, to test *hypothesis 2* and the effect of the variable *information source* upon *information exposure*, consecutive t-test analyses were conducted between the grouping variable *information source* (known vs. unknown) and the variables that measure *information exposure* (confirmation bias and evaluation bias) and *decision quality*. Next, to test *hypothesis 3*, a Pearson Correlation analysis was carried out between participants' average score on the commitment scale and the variables that measured *information exposure* and *decision quality*. Finally, a post hoc power analysis was conducted to determine the statistical power of the sample.

### 3.5 Results

The frequencies of the variables *gender* and *age* are displayed in Table 3.5. It can be seen from the table that from a total of 93 participants, 45 were males and 48 were females. In addition, the majority of the participants were between the age group of 18-24, which made up 68.8% of the data set.

Table 3.5: Frequencies for the variables *gender* and *age*.

		N	Percent
Gender	Total	93	100
	Male	45	48.4
	Female	48	51.6
Age	Total	93	100
	18-24	64	68.8
	25-29	15	16.1
	30-36	11	11.8
	37- up	3	3.2

#### 3.5.1 Hypothesis 1

To test *hypothesis 1* and to determine whether a higher degree of supporting information exposure leads to a better final decision, a Pearson Correlation Analysis was conducted between the variables that measured *information exposure* and *decision quality* (*decision bias, DB*). It should be noted that two variables measured information exposure were: *confirmation bias (CB)*, which referred to the supportive number of information read minus the contradicting number of information read; the *evaluation bias (EB)*, which referred to the evaluations of the supporting pieces of information minus the evaluations of the contradicting pieces of information; and that the decision bias referred to the final decision participants made minus their preliminary decision. The results of the analysis revealed that the higher a person's confirmation bias was the better their decision quality was  $r(91) = 0.38$ ,  $p < 0.00$ ; and the higher a person's evaluation bias was the better their decision quality was  $r(91) = 0.28$ ,  $p < 0.01$ .

In conclusion, the significant correlations found between *decision quality* and the *information exposure* variables allowed the acceptance of *hypothesis 1* of the study. Specifically, the results suggest that the more selectively a person seeks for information the better decision quality they exert.

### 3.5.2 Hypothesis 2

Table 3.5.2a and Table 3.5.2b displays the descriptive statistics for the grouping variable Information Source with the variables that measured *Information Exposure* (*confirmation bias* and *evaluation bias*).

*Table 3.5.2: The means and standard deviations for information search and information evaluation as a function of the experimental condition information source (IS).*

Experimental Condition	<u>Types of information read</u>											
	<u>Supporting</u>		<u>Contradicting</u>		<u>CB<sup>a</sup></u>		<u>SAve<sup>b</sup></u>		<u>CAve<sup>c</sup></u>		<u>EB<sup>d</sup></u>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
IS Known N= 93	4.20	1.09	3.75	1.05	.45	1.82	3.20	.78	2.60	.91	.60	1.49
IS Unknown N= 93	3.25	1.04	2.75	.99	.49	1.54	2.83	.67	2.54	.72	.29	1.20

Note. <sup>a</sup>CB= Confirmation bias, which corresponds to the difference between the supportive pieces of information minus the contradictory pieces of information. <sup>b</sup>SAve= the average score of the supporting pieces of information as evaluated by the participants. <sup>c</sup>CAve= the average score of the contradictory pieces of information as evaluated by the participants. <sup>d</sup>EB= evaluation bias, which corresponds to the difference between SAve minus CAve.

First, a t-test analysis was conducted in order to check whether the variable Information Source (known source vs. unknown source) had an effect on information exposure. The analysis revealed that the participants significantly read more supportive pieces of information if the source was known compared to when the source was unknown,  $t(92) = 7.05$ ,  $p < 0.00$ ; significantly read more contradictory pieces of information from a known source  $t(92) = 7.27$ ,  $p < 0.00$ ; evaluated significantly higher supporting information from known source  $t(92) = 4.49$ ,  $p < 0.00$ ; and that a significant difference in the evaluation bias  $t(92) = 2.81$ ,  $p < 0.01$  existed. On the other hand, the t-test analysis did not display a significant difference in means between the confirmation bias for known and unknown source pieces of information  $t(92) = -0.22$ ,  $p < 0.83$ ; and between the evaluations of the contradictory information irrelevant if they were acquired from a known or unknown source  $t(92) = 0.65$ ,  $p < 0.52$ .

Second, a Pearson Correlation analyses was conducted in order to see the exact effect of the variable *information source* upon *decision quality*. The Correlation analysis disclosed that there is a significant positive correlation between the supportive pieces of information read from known source with *decision bias* (the variable that measured decision quality)  $r(91) = 0.34$ ,  $p < 0.00$ ; on the other hand, there was no correlation between the supportive pieces of information read from unknown source and decision bias  $r(91) = -0.07$ ,  $p < 0.50$ . Also, the analysis showed that there was no correlation between the contradictory pieces of information read from known source and decision

bias  $r(91) = -0.07$ ,  $p < 0.02$ ; whereas a negative correlation was found for the contradictory pieces of information from an unknown source with decision bias  $r(91) = -0.30$ ,  $p < 0.00$ . Furthermore, a positive correlation was found for decision bias with both the confirmation bias for known source  $r(91) = 0.25$ ,  $p < 0.02$ ; as well as the confirmation bias for unknown source  $r(91) = 0.41$ ,  $p < 0.00$ . Similar, a positive correlation was found for decision quality with both the evaluations of supportive pieces of information from known source  $r(91) = 0.21$ ,  $p < 0.04$  as well as from unknown source  $r(91) = 0.29$ ,  $p < 0.01$ . Additionally, a negative correlation was revealed between the evaluations of the contradictory pieces of information acquired from a known source and decision quality  $r(91) = -0.23$ ,  $p < 0.03$ ; in contrast there was no correlation between decision quality and the contradictory pieces of information acquired from unknown source  $r(91) = -0.18$ ,  $p < 0.09$ . Finally, positive correlations were found between decision bias and both the evaluation bias from known source  $r(91) = 0.25$ ,  $p < 0.02$ ; as well as evaluation bias from unknown source  $r(91) = 0.27$ ,  $p < 0.01$ .

The above results of the consecutive t-tests and the Pearson Correlation analysis in reference to the first hypothesis of the study revealed that *information source* has a significant effect on the evaluation bias (the evaluations of the supportive pieces of information minus the evaluations of contradictory pieces of information) and decision quality, but not on how selectively people searched for information. As a result, *hypothesis 2* can be partially accepted, as decision quality was enhanced not through supportive information exposure but by the positive evaluations of the supportive pieces of information.

### 3.5.3 Hypothesis 3

Finally, in order to test *hypothesis 3* of the study a Pearson Correlation analysis was conducted between participants' *commitment average* and the variables that measure *information exposure* and *decision quality*. The results of the analysis revealed that commitment average was positively correlated with the amount of supporting pieces of information a person read  $r(91) = 0.37$ ,  $p < 0.00$ ; negatively correlated with the amount of contradicting pieces of information a person read  $r(91) = -0.30$ ,  $p < 0.00$ ; positively correlated with the confirmation bias (the supporting pieces of information minus the contradicting pieces of information read)  $r(91) = 0.39$ ,  $p < 0.00$ ; positively correlated with the evaluations of the supporting pieces of information  $r(91) = 0.57$ ,  $p < 0.00$ , negatively correlated with the evaluations of the contradicting piece of information  $r(91) = -0.36$ ,  $p < 0.00$ ; positively correlated with the evaluation bias (supporting evaluations minus the contradicting evaluations)  $r(91) = 0.50$ ,  $p < 0.00$ ; and positively correlated with the decision bias  $r(91) = 0.23$ ,  $p < 0.03$ . On the other hand, there was no correlation found between commitment score and the preliminary decision  $r(91) = -0.01$ ,  $p < 0.35$  and the final decision  $r(91) = 0.17$ ,  $p < 0.10$ .

The correlations found from the Pearson Correlation analysis between the moderating variable commitment and the variables that measure *information exposure* and *decision quality* allow the acceptance of *hypothesis 3*. These results suggest that the

more committed a person feels towards a decision, the more selectively they search for information and the better decision quality they exert.

To summarize, the results of the various analyses for this study revealed that: *information source* had a partial significant effect upon *information evaluation* and *decision quality* allowing the partial acceptance of *hypothesis 2*; that the moderating factor *commitment* was significantly correlated with *information exposure* and *decision quality* allowing the acceptance of *hypothesis 3*; and that the more selectively people searched for information the better their *decision quality* was, allowing the acceptance of *hypothesis 1*.

#### *3.5.4 Post Hoc Statistical Power Analysis for Study 1*

A post hoc power analysis was performed to determine the achieved power of the study, using the Pearson Correlational test. This particular study with the sample size of 93 achieved a power of 0.91 (91%), given a medium effect size (0.30) and  $\alpha$  of  $p = 0.05$ . In other words, the sample size was sufficient to detect moderate to large correlations between variables. Post hoc power analysis was also performed to determine achieved power based on a paired samples t-test. The study achieved a power of 0.99 (99%) given sample size of 93, an  $\alpha$  of  $p = 0.05$  and a medium effect size (0.5).

### **3.6 Discussion**

#### *3.6.1 Study 1 Results in Correspondence to Literature*

The prime purpose of Study 1 was to provide support for the hypothesis that higher levels of information exposure enhance decision quality. As a result, the positive correlation found between decision quality and information exposure provided such support. That is, people make a better final decision the more selectively they search for supporting pieces of information. However, apart from support for the main question under investigation in Study 1, there are a few other points that have need to be discussed. First, the results of the analyses revealed that participants did in fact search more selectively for information irrelevant of the conditions or the manipulations of the study. The effect of selective exposure was evident and it does influence how people search for information. This falls in perfect harmony with the many studies that pose as a testimony for selective exposure (Schramm & Carter, 1959; Freedman & Sears, 1963; Adams, 1961). Second, the conclusion that derived from the analyses of the data was that selective exposure was positively correlated with decision quality. Specifically, the more selectively participants searched for information and the more selectively participants evaluated those pieces of information (higher evaluations of confirming pieces of information and lower evaluations of contradicting pieces of information), the better their final decision was. This comes in disparity to the diminutive amounts of previous literature reports that found selective exposure to be negatively correlated to decision quality (Kray & Galinsky 2003; Janis, 1982).

Furthermore, the second hypothesis of the study portrayed a significant affect of information source (known versus unknown) on information evaluation and decision quality. Specifically, the results of the study revealed that people exhibited a higher evaluation bias (the evaluations of the supporting pieces of information minus the evaluations of the contradicting pieces of information) to information when the source was known rather than information from an unknown source, which lead to a better final decision. However, a significant effect of information source on confirmation bias was not found. That is, the results of the analyses showed that although people searched more selectively for supporting pieces of information from a known source compared to an unknown source, nevertheless, they also searched more contradicting pieces of information from a known source over an unknown source. This can be interpreted as although people searched for information in a more balanced manner when the source of the information was known, nevertheless, they evaluated higher the supportive pieces of information over the contradictive pieces of information from the same source. These findings fall within the study's predictions based on the social modeling theory that proposes that people tend to identify and imitate social role models (Bandura, 1963). As a result, based on the above findings, *hypothesis 2* of the study was partially accepted.

Finally, the results of the analysis disclosed that a high degree of commitment to a decision was positively correlated with how selectively people searched for information. Specifically, it was found that *commitment* was positively evaluated with confirmation bias and the evaluation bias. These findings fall in accordance to the theory of escalation of commitment (Whyte, 1986; Arkes & Ayton, 1999), which suggests that people maintain a course of action, often disregarding the presence of alternatives, due to investment to the initial course. Also, a positive correlation was found between commitment and decision quality. This finding allowed the acceptance of *hypothesis 3*; however, the relationship between the two with selective exposure operating as the binding factor has never been before investigated.

### 3.6.2 Limitations / Future Reference

Although significant statistical correlations and significant statistical differences in mean scores were found from the analyses of the data, there are a few considerations and limitations that have to be brought forward regarding this study. First of all, because the data sample was acquired from three different educational institutions all located in different countries; a confounding variable might have been at work that has not been detected. Specifically, differences in language and culture might have skewed the results found in the study. It should be noted though, that although data was gathered from three different countries, the material employed was standard, in English and the participants were all college students attending English taught courses. Nevertheless, for future reference it might be more sensible for the data gathering to be limited to only one country.

A second limitation of this study could be considered the assessment of the moderating factor *commitment*. The commitment scale was devised and employed for the first time as an assessment tool. As a result issues of content validity might arise and for



future reference should be addressed. This could be accomplished either by conducting a within subjects correlation study between the results of the commitment scale used in the study with the results of other commitment assessment methods; or by using a method that measures content validity devised by Lawshe (1975), that employs a panel of judges that evaluate how essential every item of the scale is in accordance to if they measure what they are suppose to measure.

Next, *hypothesis 2* of the study was based on the Social Learning Theory (Bandura, 1963) according to which people learn behaviors from observing and imitating people that they view as role models. From testing the hypothesis, it was shown that people evaluate higher supporting pieces of information when the source of the information was from well-known source. Nevertheless, it can be criticized, that the people consisting the known source, although popular social figures, maybe not all participants recognized them or perceived them as role models. For future reference, an initial questionnaire could be employed that would assess whether participants did recognize the people used for the known source and if they could be considered as role models.

Furthermore, the analyses of the data yield many statistically significant results. However, as in all statistical results, a threat of misinterpretation is always present. Such threat that applies to this study is the type 1 error. The type 1 error refers to the incorrect rejection of a true null hypothesis, and the claim of an effect that is not present. To overcome this risk and for future reference, either a Neyman-Pearson hypothesis test (Neyman & Pearson, 1933) or the Fisher test of significance should be calculated to guarantee that the null hypothesis can be rejected and the alternative hypothesis accepted (Fisher, 1925). Through either of the two methods, a real statistical significant value level can be established and factual significance can be detected.

Finally, this study does not conclude the examination of the relationship between selective exposure and decision quality. First, in Study 2, a new variable that will measure decision quality will be introduced. Specifically, in Study 1 decision quality was measured by only one variable, the *decision bias*, whereas selective exposure was measured by two variables, *confirmation bias* and the *evaluation bias*. By introducing a second variable for decision quality (*ranking bias*), a more balanced measure of selective exposure and decision quality will be made possible. Second, a new method of assessing selective exposure will be introduced in Study 2, as a means of assuring that the results found in Study 1 were not tainted by the selective exposure paradigm used. Lastly, two new moderators will be examined in the next study, as a means of grasping a deeper and more spherical understanding of how selective exposure is influence by and how it effects decision quality.

### 3.6.3 Conclusion

In conclusion, the main finding fulfilled the purpose of this study. Specifically, Study 1 was designed in order to provide evidence that higher levels of supportive information exposure enhance decision quality. The results showed that the more

selectively people searched for confirmatory information, the better their final decision and their decision quality was. This came in contrast to the limited viewpoint of selective exposure having only negative and hindering consequences. Furthermore, the study revealed a high degree of commitment to a decision and the source of information had a partial impact on information exposure. This, in turn, helped participants with increasing the quality of their final decision.

Selective exposure to information is a broadly acknowledged phenomenon with its implications affecting a wide range of social interaction, decision-making and behavior. Ever since researches observed the influential power of selective information exposure in political settings in 1950's it has been a fashionable research topic. There is plenty of research investigating this active seeking process of information with the intent of acquiring a deeper understanding of its synthesis and how it is expressed in common daily decision. Regardless of the attention though, there is still a lot to unravel and many dimensions and functions of selective exposure that are waiting to be unlocked.

## CHAPTER FOUR

### *“Enhancing Decision Quality Through Information Exposure and the Moderating Effects of Emotional State and Death Related Thoughts”*

Study 2 was designed to provide additional support that higher levels of supportive information exposure enhance decision quality. Simultaneously, the effects of two new moderators were assessed in order to examine the effect they have on information exposure and in turn on decision quality. Specifically, participants were asked to make a preliminary decision on a survival scenario activity, to choose three items from a list of six relevant to the activity and then to complete an exercise that assessed information exposure through the manipulation of two specified moderators. Simultaneously, they were asked to rank all six items depending on how important they believed they were in a survival situation. It should be noted that survival experts evaluated the survival importance of each of the six items. After information exposure was assessed the participants were asked to revise their preliminary decision and their preliminary ranking; and make a final decision and a final ranking. Next, each decision and rankings participants made (preliminary and final) were compared to the evaluations of the survival experts and were assigned a value number. The closer the evaluations of the participants were with the survival experts, the better their decision quality was and the higher that number was. As a result, decision quality was calculated by subtracting the preliminary decision number from the final decision number and by subtracting the preliminary ranking from the final ranking respectively. This allowed the testing of whether decision quality is enhanced by supportive information exposure. In sum, *information exposure* was utilized as the independent variable of the study; *decision quality* as the dependent variable; and *emotional state* (2 levels: positive vs. negative) and

*death related thoughts* operated as moderating factors. Finally, it should be noted that although participants were recruited from three different countries, a cross-cultural variable was not taken into consideration.

## **4.1 Hypotheses**

*Hypothesis 1:* The emotional state people are in has a significant effect on information exposure that in turn has a direct effect on decision quality. In specific, we hypothesize that the more negative emotional state someone is in the more selectively they will search for information and in turn the better their decision quality will be.

*Hypothesis 2:* Death related thoughts have a significant effect on information exposure that in turn has a direct effect on decision quality. Specifically, we hypothesize the more death related thoughts one holds, the more selectively they will search for information and in turn the better their decision quality will be.

*Hypothesis 3:* Higher levels of supportive information exposure lead to higher decision quality. In particular, the more selectively a person searches for information, the better their decision quality will be.

## **4.2 Theoretical Basis of Study Hypotheses**

### *4.2.1 Emotional State and Information Exposure*

A moderating factor that was examined in the current study was *emotional state*. Specifically, it was hypothesized that the more negative mood a person is in, the more selectively they will search for information. The theoretical basis for this hypothesis can be traced to the mood management theory as proposed by Zillmann (1988). According to the theory, people selectively expose themselves to messages and information as a means of regulating and enhancing mood (Zillmann & Bryant, 1985; Zillmann, 1988). In order to lead to the mood management theory, Bryant and Zillmann (1984) found that participants reported overcoming their boredom or stress through selective exposure of television programs they perceived as exciting or relaxing. In addition, Knobloch and Zillmann (2002) displayed that people could improve their negative moods by selecting music to listen to that they perceived as being elated. Furthermore, Jonas, Graupmann and Frey (2006) investigated the effect of a negative mood compared to that of a positive mood as to how selectively people searched for information. In their first study, the researchers found that participants in a negative mood displayed increased selective exposure of information where as on the other hand, participants in a positive mood searched for information in a more balanced manner. Likewise, in the other study, the participants in a negative mood evaluated confirming information as more pleasant and conflicting information as more annoying, compared to those that were in a positive mood.

In summary and based on the mood management theory, it is hypothesized that emotional state is negatively correlated with information exposure and decision quality.

#### *4.2.2 Death Related Thoughts and Information Exposure*

A moderating factor that was examined in the study was *death related thoughts*. It was hypothesized that the more death related thoughts a person has at any given moment, the more selectively that person searches for information. The theoretical bases for this hypothesis can be attributed to the terror management theory. According to the terror management theory peoples' behavior is outlined by a struggle of trying to retain stability, permanence, and symbolic immortality (Greenberg, et. al., 1986). More specific, when people are reminded of their own death (mortality salience), they tend to become more rigid and less flexible as a defense mechanism. The result of this struggle significantly affects the individuals' decision-making process, making them more vulnerable to selective exposure (Jonas, et. al., 2003). In summary and based on the terror management theory, it is hypothesized that death related thoughts is negatively correlated with information exposure and decision quality.

#### *4.2.3 Information Exposure and Decision Quality*

Empirical literature regarding the relationship between *information exposure* and *decision quality* is scarce if not non-existent. There is very limited amount of literature that investigates the connection between how selectively people search for information and the quality of their decision. For the matter, researchers hypothesized that by minimizing confirmation bias, better decisions can be made and wrong decisions can be avoided (Kray & Galinsky, 2003). Specifically, after conducting two studies Kray and Galinsky demonstrated that selective exposure was negatively correlated with decision quality and that when people read more disconfirming pieces of information they made a better decision. Also, Janis (1982) demonstrated that fatal historical decisions occurred partly because decision makers held high levels of confirmation bias. It should be noted that in most cases of research of selective exposure, nearly all the participants were purposely provoked in making a poor preliminary decision. It was suggested that low confirmation bias makes decision makers rethink their poor preliminary decision which in turn led to a better final decision (Janis, 1982). In conclusion, the evidence that attempts to shed light into the relationship between information exposure and decision quality is limited to the above few studies, portraying a negative correlation between the two. Therefore, the purpose of the current study is to provide further insight on how information exposure and decision quality are interrelated.

## 4.3 Method

### 4.3.1 Participants

An opportunity sample of one hundred twelve students was recruited from the John Moores University in Liverpool (UK), the Kent University (Ashtabula, Ohio Campus, USA) and the British Hellenic College (GR). From those participants, sixty-three were women and forty-nine were men. Also, from the total of participants, sixty-two were recruited from the UK, twenty-one from USA and twenty-nine from Greece.

### 4.3.2 Ethics

Approval for conducting the study was requested and granted from the ethics committee of the three educational institutions mentioned above. It should be noted that for the manipulation of the moderator *emotional state*, participants were presented with pictures geared into provoking a negative mood. Nevertheless, it was made clear beforehand, that if the participants experienced discomfort or wished to withdraw at any point of the study, they were free to do so without any further explanation.

### 4.3.3 Design

The study had a 2 (type of information: supporting vs. contradicting) X 3 (emotional state path: neutral pictures vs. natural disaster pictures vs. terrorism act pictures) between groups experimental design with decision quality operating as the dependent variable (DV) of the study.

### 4.3.4 Material

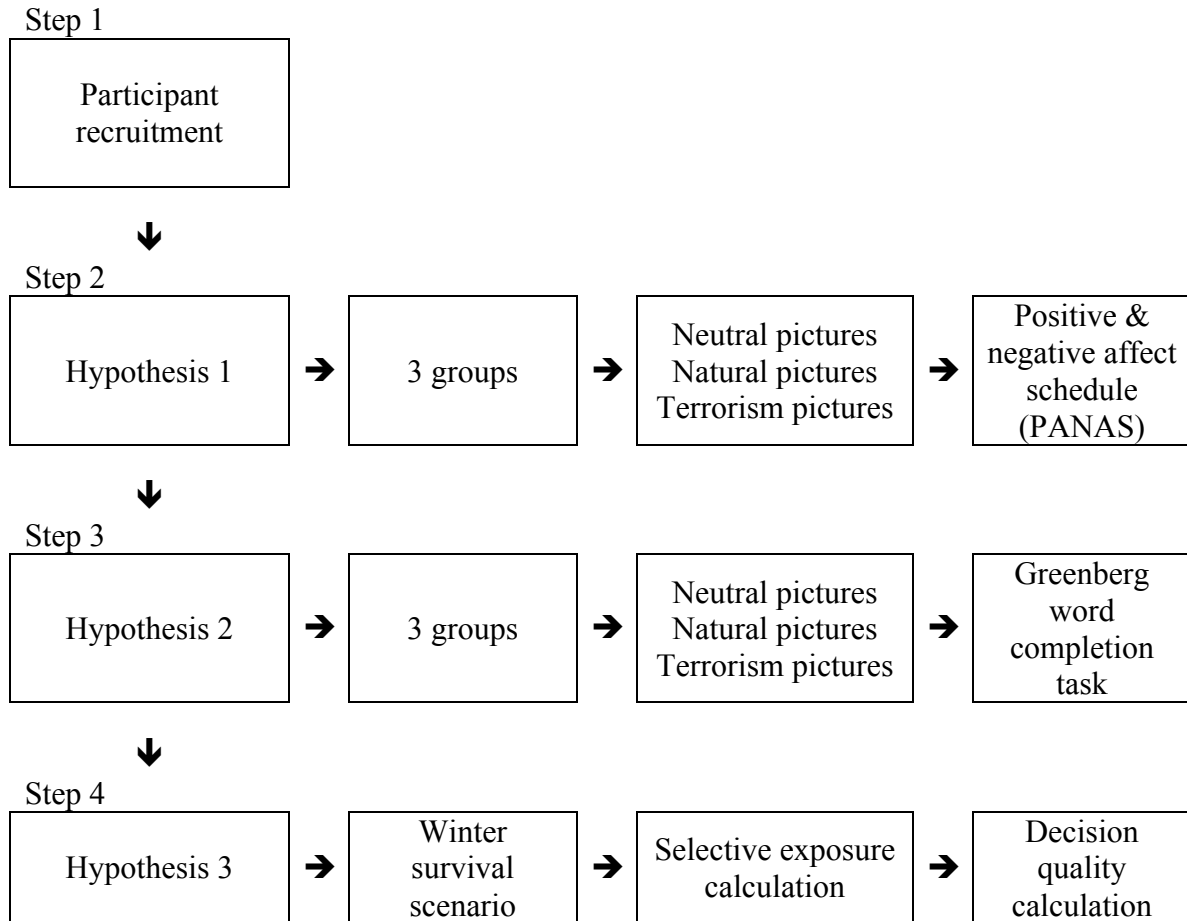
Concerning *hypothesis 1* of the study, three sets of pictures (emotional state path, ESP) were presented: pictures portraying terrorism act, pictures that presented scenes from natural disasters and neutral pictures than mainly displayed inanimate objects (all three sets can be found in Appendix 4). Also, the positive and negative affect schedule (PANA's - Watson, Clark, & Tellegen, 1988; Appendix 5) was employed. The PANA's is a twenty-item, two-mood (a positive and a negative mood) scale that measured positive and negative affect respectfully. Next, for *hypothesis 2*, five word-fragments from the Greenberg word completion task (Schimel, Greenberg & Martens, 2003; Appendix 6) were employed and provided each participant's death thoughts. Finally, for *hypothesis 3* a winter survival scenario was used (Winter survival exercise, 2005; Appendix 7) and a list of six items (chocolate bar, compass, extra pair of pants/shirt, lighter with no fluid, aerial map and can of shortening) accompanied with statements that were either supportive or contradictive of their survival importance (Appendix 8).

#### 4.3.5 Procedure

The completion of the study and data collection was separated into four specific steps. The first step involved participant recruitment. Specifically, each participant was recruited either through personal approach, or through the SONA schema set up by the John Moores University of Liverpool, and was asked to partake in a study about decision-making regarding a hypothetical winter survival scenario. The second step regarding testing *hypothesis 1* and included each participant being randomly shown one of the three sets of different pictures (neutral, terrorism or natural disaster), one picture at a time with a 3 second interval. After each participant viewed the set of pictures, they were asked to complete the PANA's scale in order to assess each participant's emotional state. Next, for the third step was asked to complete the Greenberg word completion task. In specific, they were presented with 5 word stems, one at a time, and they had to complete the missing letters with the word that first comes to their mind. By doing so, it was made possible to assess participants' death related thoughts and to test *hypothesis 2* of the study.

Finally, in the last part of the study, each participant was presented with the winter survival scenario story (winter survival exercise (2005)). After reading the story, they were asked to pick three objects from a list of six as and then to rank all six objects, from most vital to least vital in such a scenario. At this point it was made clear that this was only a preliminary decision and at the end of the study they could revise. Next, for the assessment of information exposure, each participant was randomly presented with a brief statement of each object (one positive and one negative for each object) and was asked to read it, evaluate it on two dimensions (important and credible), and choose whether they would want to read a full statement similar to the brief statement. Finally, each participant was asked to revise their preliminary decision and to choose again which three objects they now perceive as most vital and to make a final ranking decision of the importance of all six objects. All one hundred twelve participants that were recruited followed and completed every step of the study which can be seen in Flowchart 4.3.5:

Flowchart 4.3.5: The various steps for the procedure of the study.



#### 4.4 Data Analyses

In order to test *hypothesis 1* and the effect of the moderating variable *emotional state* on information exposure, an initial One Way Anova analysis was conducted between the grouping variable *emotional state path* that entailed three groups of pictures: neutral, natural disaster and terrorism with the participants' score on the PANAS. Second, a post hoc Tukey analysis was carried out in order to detect which groups of the three for the variable *emotional state path* significantly differed. Finally, concerning *hypothesis 1*, a Pearson Correlation Analysis was conducted between the variable *emotional state* and the variables that measured *information exposure* (confirmation bias and evaluation bias) and *decision quality* (decision bias and ranking bias). Similar, to test *hypothesis 2*, a One Way Anova analysis was conducted between the grouping variable *emotional state path* (neutral vs. natural disaster vs. terrorism act) and participants' score on the Greenberg word completion task. Next, a post hoc Tukey analysis was conducted in order to detect between which three groups there was a significant difference. Finally, a Pearson Correlation analysis was carried out between the variable *death related*



*thoughts* and the variables that measured *information exposure* and those that measured *decision quality*. Concerning *hypothesis 3*, a Pearson Correlation analysis was conducted between the variables that measured *information exposure* and the variables that measured *decision quality*. Finally, a post hoc power analysis was conducted to determine the statistical power of the sample.

## 4.5 Results

Table 4.5 displays the frequencies of the *gender* and *age* variables for the one hundred twelve participants of the study. From the table one can notice the variable ‘gender’ is almost balanced (57.1% females and 42.9% males) and the majority of the participants were between the age group of 18-24 making up the 46.4% of the data set.

*Table 4.5: Frequencies for gender and age.*

		N	Percent
Gender	Female	64	57.1
	Male	48	42.9
	Total	112	100
Age	18-24	52	46.4
	25-29	20	17.9
	30- up	40	35.7
	Total	112	100

### 4.5.1 Hypothesis 1

Regarding *hypothesis 1*, Table 4.5.1a and Table 4.5.1b display the descriptive statistics for the grouping variable *emotional state path* in correspondence with the variables that measure *information exposure* (confirmation bias and evaluation bias) and *decision quality* (decision bias and ranking bias).

*Table 4.5.1a:* The means and standard deviations for information search as a function of the grouping variable *emotional state path* (ESP)

Experimental Condition	Types of information read													
	<u>Supporting</u>				<u>Contradicting</u>		<u>CB<sup>a</sup></u>		<u>SAve<sup>b</sup></u>		<u>CAve<sup>c</sup></u>		<u>EB<sup>d</sup></u>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
ESP neutral	4.63	1.87	4.49	1.84	.14	1.10	4.33	1.05	3.42	1.24	.92	1.12		
N= 43														
ESP natural disaster	5.03	1.72	4.71	1.61	.32	1.17	4.44	1.09	3.67	1.18	.77	1.14		
N= 38														
ESP terrorism	4.29	2.07	3.90	2.32	.39	1.33	4.03	.99	2.89	0.78	1.13	.93		
N= 31														

Note. <sup>a</sup>CB= Confirmation bias, which corresponds to the difference between the supportive pieces of information minus the contradictive pieces of information. <sup>b</sup>SAve= the average score of the supporting pieces of information as evaluated by the participants. <sup>c</sup>CAve= the average score of the contradictory pieces of information as evaluated by the participants. <sup>d</sup>EB= evaluation bias, which corresponds to the difference between SAve minus CAve.

*Table 4.5.1b:* The means and standard deviations for the rankings and the decisions made as a function of the grouping variable *emotional state path* (ESP).

Experimental Condition	RP <sup>a</sup>		RF <sup>b</sup>		RB <sup>c</sup>		DP <sup>d</sup>		DF <sup>e</sup>		DB <sup>f</sup>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
ESP neutral	8.18	3.18	8.90	3.62	.73	3.82	10.37	2.57	10.67	2.88	0.31	2.86
N= 43												
ESP natural disaster	8.95	3.31	9.41	3.81	.46	2.46	10.13	2.79	11.11	2.45	.09	1.82
N= 38												
ESP terrorism	8.47	3.76	10.62	4.62	2.15	4.84	10.81	2.63	10.97	2.63	1.52	3.14
N= 31												

Note. <sup>a</sup>RP= the preliminary ranking of the six objects used in the manipulation of selective exposure activity. <sup>b</sup>RF= the final ranking of the six objects. <sup>c</sup>RB= ranking bias,

which corresponds to the difference between the final ranking minus the preliminary ranking. <sup>d</sup>DP= the preliminary decision participants made on the decision task. <sup>e</sup>DF= the final decision participants made on the decision task. <sup>f</sup>DB= decision bias, which corresponds to the difference between the final decision minus the preliminary decision.

First, a One Way Anova analysis was conducted in order to test whether the manipulation for *hypothesis 1* (the three different groups participants were divided into depending on the type of pictures they were presented with – neutral, natural disaster and terrorism) had an effect on the participants' emotional state. The One Way Anova analyses revealed a significant difference of emotional state between the three picture groups [ $F(2, 109) = 9.75, p < 0.00$ ]. A post hoc Tukey test showed that the neutral pictures group ( $M = 0.22, SD = 0.84$ ) differed significantly with both the terrorism pictures group ( $M = 1.14, SD = 0.87$ ) and the natural disaster pictures group ( $M = 0.76, SD = 0.98$ ) at  $p < 0.05$ ; On the other hand there was no significant difference between the natural disaster pictures groups and the terrorism pictures group.

Second, a Pearson's Correlation Analyses was conducted in order to determine whether a person's emotional state had a significant effect on how selectively they searched for information and on their decision quality. The results of the Pearson Correlation analyses revealed that the more *positive emotional mood* a person was in, the less pieces of supporting information they read  $r(110) = -0.23, p < 0.02$ ; the less confirmation bias they exhibited  $r(110) = -0.32, p < 0.00$ ; the less they evaluated supportive pieces of information  $r(110) = -0.24, p < 0.01$ ; the less evaluation bias they exhibited  $r(110) = -0.31, p < 0.00$ ; the worse their ranking bias was  $r(110) = -0.27, p < 0.01$ ; and the worse their decision bias was  $r(110) = -0.20, p < 0.03$ ; On the other hand, no correlation was found between *emotional state* and the amount of contradicting pieces of information a person read [ $r(110) = 0.01, p < 0.96$ ] and the evaluation of the contradicting pieces of information [ $r(110) = 0.10, p < 0.29$ ].

In conclusion for *hypothesis 1* of the study, the results of the Pearson Correlation analysis indicated a person's emotional state had a significant effect on information exposure and decision quality. That is, the more negative emotional state a person was in, the more selective exposure they exhibited and the better their decision quality was. As a result, *hypothesis 1* was accepted.

#### 4.5.2 Hypothesis 2

First, a One Way Anova analysis was conducted in order to test whether the manipulation of randomly exposing participants to one of three specific sets of pictures (neutral, natural disaster or terrorism) had an effect on the participants' *death related thoughts*. The One Way Anova analyses revealed a significant difference between the grouping variable with the three levels and *death related thoughts*  $F(2, 109) = 5.34, p < 0.01$ . A post hoc Tukey test showed that the neutral pictures group ( $M = 3.21, SD = 1.70$ ) differed significantly with the terrorism pictures group ( $M = 2.00, SD = 1.44$ ) at  $p < 0.05$ .

Second, a Pearson Correlation analyses was conducted in order to test whether a person having more *death related thoughts*, the more selectively they would search for information. However, prior to the Correlation analyses a One Way Anova analyses was carried out in order to examine which group of pictures the participants were presented with had an impact on their overall death related thoughts. The analyses revealed a significant difference of death related thoughts between the three groups  $F(2, 109) = 5.34, p < 0.01$  with the post hoc Tukey test pinpointing the difference between the neutral pictures and the terrorism pictures at  $p < 0.05$ .

Returning to the Pearson Correlation analyses the results revealed that death related thoughts are positively correlated with the supportive pieces of information read [ $r(110) = 0.28, p < 0.00$ ] and with the confirmation bias [ $r(110) = 0.52, p < 0.00$ ]. On the other hand, no correlation was found between *death related thoughts* and the contradicting pieces of information read. Additionally, the results yield that the more *death related thoughts* a person had the higher he evaluated supporting pieces of information [ $r(110) = 0.28, p < 0.00$ ]; the lower he evaluated contradicting pieces of information [ $r(110) = -0.21, p < 0.03$ ]; and the higher his evaluation bias was [ $r(110) = 0.45, p < 0.00$ ]. Finally, the results of the Pearson Correlation Analyses showed that people that had more *death related thoughts* had better ranking bias [ $r(110) = 0.35, p < 0.00$ ], had better final decision [ $r(110) = 0.24, p < 0.01$ ] and had better *decision bias* [ $r(110) = 0.37, p < 0.00$ ].

In conclusion, the correlations found between *death related thoughts*, *information exposure* and *decision quality* indicated that *death related thoughts* have a significant effect on how selectively a person seeks for information and the quality of their decision. Therefore, *hypothesis 2* of the study was accepted.

#### 4.5.3 Hypothesis 3

Finally, to test *hypothesis 3* and to determine whether a higher degree of supporting *information exposure* leads to a higher *decision quality*, a Pearson Correlation Analyses was conducted between the decision quality variables (ranking bias and decision bias) and the variables that measured selective exposure (confirmation bias and evaluation bias). It should be noted that *ranking bias* is the new variable introduced in Study 2 that measures decision quality and refers to the final ranking participants made minus their preliminary ranking. The results of the analysis revealed that the higher a person's confirmation bias was the higher their ranking bias was [ $r(110) = 0.30, p < 0.00$ ] and the higher their decision bias was [ $r(110) = 0.37, p < 0.00$ ]. Similar, the higher a person's evaluation bias was, the higher their ranking bias was [ $r(110) = 0.34, p < 0.00$ ] and the higher their decision bias was [ $r(110) = 0.27, p < 0.00$ ]. In conclusion, due to the positive correlations found between the *decision quality* variables and the *information exposure* variables, *hypothesis 3* of the study was accepted.

In summary, the results of the various analyses conducted to test the hypotheses of the study showed that *emotional state* had a significant effect on *information exposure* and *decision quality* allowing the acceptance of *hypothesis 1*; *death related thoughts* had

a significant effect on *information exposure* and *decision quality* allowing the acceptance of *hypothesis 2*; and that the more selectively people searched for information the better their *decision quality* was, allowing the acceptance of *hypothesis 3*.

#### 4.5.4 Post Hoc Statistical Power Analysis for Study 2

A post hoc power analysis was performed to determine the achieved power of the study, using the Pearson Correlational test. This particular study with the sample size of 112 achieved a power of 0.95 (95%), given a medium effect size (0.30), and an  $\alpha$  of  $p = 0.05$ . This means that the sample size was sufficient to detect moderate to large correlations between variables. Post hoc power analysis was also performed to determine achieved power based on a One Way Anova test. The study achieved a power of 0.64 (64%) given sample size of 112, an  $\alpha$  of  $p = 0.05$  and a medium effect size (0.25). However, when conducting the post hoc analysis based on the same One Way Anova test with a large effect size (0.40), sample size of 112 and an  $\alpha$  of  $p = 0.05$  the achieved power was 0.97 (97%). This means that the sample size was sufficient to detect large effects.

## 4.6 Discussion

### 4.6.1 Study 2 Results in Correspondence to Literature

As an initial inference that arose from the various statistical analyses conducted in order to test the hypotheses of the study was the empirical presence of the phenomenon of information exposure. That is, participants displayed a significant degree of supporting information exposure through out the completion of the various tasks that assessed *information exposure*. These findings fall in place with the plethora of research literature that constitute selective exposure as an existent and influential phenomenon (Fischer, et. al., 2008; Kray & Galinsky, 2003; Jonas, et. al., 2001; Schulz-Hardt, et. al., 2000; Schulz-Hardt, Jochims, & Frey, 2002; Johnston, 1996; Lundgren & Prislín, 1998; and Chen, Schechter, & Chaiken, 1996) with its effects extending into decision-making.

Furthermore, the analysis of the data revealed significant statistical results concerning all three hypothesis of the study. In particular and regarding *hypothesis 1*, the results showed that *emotional state* is negatively correlated with *information exposure*. That is, a person's emotional state significantly effects how selectively they search for supporting information (increased negative mood produced increased supporting information exposure). This falls in accordance with the literature stating that when people are in a negative mood or emotional state, they tend to search more selectively for information than people that are in better or more positive emotional states (Zillmann & Bryant, 1985; Zillmann, 1988; Zillmann, 1984; Knobloch & Zillmann, 2002; and Jonas, et. al., 2006).

Next, the *hypothesis 2* presumed that the more death related thoughts a person espouses at any given moment, the more supporting information exposure they will

exhibit. The results backed up the hypothesis as a positive correlation was found between the amounts of death related thoughts a person has and how selectively they search for information. Specifically, the more death related thoughts a person had the more supporting information exposure they displayed and the higher they evaluated the confirming pieces of information they read. These findings fall along the terror management theory (Greenberg et al. 1986; and Jonas, et. al., 2003) and the theory of mortality salience (Jonas, et al., 2003) that state when people are reminded of their death or mortality, they become less flexible and resistant to new attitudes or opinions.

Last, *hypothesis 3* reputed that increased information exposure would lead to a better final decision. The results of the study yielded a positive correlation between information exposure and decision quality implying that the more selectively people searched for information the better their final ranking and their final decision was. As a result, the constructive relationship between information exposure and decision quality has never been displayed before. When referring to information exposure, the inclusive focus falls upon its negative consequences and how it worsens decision quality. This study provided support that information exposure could possibly have positive effects as well.

#### *4.6.2 Limitations / Future Reference*

Although significant statistical correlations were found from the analyses of the data, there are a few issues and limitations that have to be brought forward regarding this study and taken into account for future reference in order to progress this study one step further. In specific, the method that was used to assess peoples' degree of selective exposure was a novel procedure that has not been used before. As a result, issues of reliability and validity may arise. In order to deal with such issues, a future study that can implement the same method of selective exposure assessment can be devised. In doing so, and by duplicating the results found in this study, reliability and validity can be increased.

A second concern that should be brought to attention is that the participants that took part in the study where recruited from three different educational institutions located in three different countries. Additionally, although the material used in the study was in English and the participants were college students that attended English taught courses, still some confounding variables might have been at play that could of tampered the results that derived from the data analysis. For instance, cultural differences or English language limitations (English was not the native language to all the participants) may have jeopardized the results. Nonetheless, for future reference and since a cross-cultural variable was not taken into consideration, it might be more wise to recruit participants from only one country.

Finally, the fact that the relationship of selective exposure and decision quality has been researched only in a few instances makes any new evidence to be dealt with hesitation and skepticism, especially when the new evidence comes in contrast to what the diminutive existing literature already depicts. Nevertheless, careful scientific future

investigation of the relationship of selective exposure and decision quality which will lead to reputation of the results found here, will justify and constitute this study as a starting point that can shed light into a new unmapped research area.

#### *4.6.3 Conclusion*

In conclusion, the study revealed that information exposure does take part in decision-making, affecting how people search for supporting information and avoid or reject disconfirming information. Also, it was shown that when people are in a negative mood or have increased death related thoughts, they tend to display increased supportive information exposure. Finally, a solid connection was established between information exposure and decision quality, suggesting that the more selectively people searched for confirming pieces of information, the better their decision quality was. The finding of a significant correlation between information exposure and quality of decision has opened up a novel undiscovered realm. The next step is to progress from one or two findings to establishing a rule of significance. Since a positive consequence of information exposure has been detected, it is now vital that the research focus should be directed towards establishing a stronger link between information exposure and quality of decision, and by doing so, taking this research are one step forward.

Finally, this study does not conclude the examination of the relationship between information exposure and decision quality. Firstly, the main question under investigation will remain the relationship between information exposure and decision quality. The aim is to build on the results of the Studies 1 and 2, and provide additional support for the positive correlation found so far. Secondly, in Study 3 a new survival scenario will be employed. Specifically, in Study 2 the winter survival scenario was used, however in Study 3 the lost at sea survival scenario will be used. This is done as a means of reducing the threat that the results found in Study 2 were attributed solely to the specific survival scenario. Lastly, two new moderators will be examined in Study 3 as a continuum of the effort to gain a more spherical image of how information exposure influences decision quality.

## CHAPTER FIVE

### ***“Enhancing Decision Quality through Information Exposure and the Moderating Effects of Prior Knowledge and Justification”***

Study 3 was designed to provide additional support that higher levels of supportive information exposure enhance decision quality through the effects of two new moderators. Specifically, participants were asked to make a preliminary decision on a new survival scenario task (different from the one used in Study 2), to choose three items from a list of six relevant to the task and then to complete an exercise that assessed information exposure through the manipulation of two specified moderators. Simultaneously, they were asked to rank all six items depending on how important they believed they were in a survival situation. It should be noted that survival experts evaluated the survival importance of each of the six items. After information exposure was assessed the participants were asked to revise their preliminary decision and their preliminary ranking; and make a final decision and a final ranking. Next, each decision and rankings participants made (preliminary and final) were compared to the evaluations of the survival experts and were assigned a value number. The closer the evaluations of the participants were with the survival experts, the better their decision quality was and the higher that number was. As a result, decision quality was calculated by subtracting the preliminary decision number from the final decision number and by subtracting the preliminary ranking from the final ranking respectively. This allowed the testing of whether decision quality is enhanced by supportive information exposure. In sum, *information exposure* was utilized as the independent variable of the study; *decision quality* as the dependent variable; and *prior knowledge and justification* (2 levels: yes vs. no). Finally, it should be noted that although participants were recruited from three different countries, a cross-cultural variable was not taken into consideration.

### **5.1 Hypotheses**

*Hypothesis 1:* Prior Knowledge has a significant effect on information exposure, which in turn has a direct effect on decision quality. Specifically, we hypothesize the



more prior knowledge one possesses in a certain area, the more selectively they will search for information concerning that specific area and the better their decision quality will be.

*Hypothesis 2:* Justification has a significant effect on information exposure, which in turn has a direct effect on decision quality. Specifically, we hypothesize that by justifying a decision people will tend to search more selectively for information and the better their decision quality will be.

*Hypothesis 3:* Higher levels of supportive information exposure lead to higher decision quality. In particular, the more selectively a person searches for information, the better their decision quality will be.

## **5.2 Theoretical Basis of Study Hypotheses**

### *5.2.1 Prior Knowledge and Information Exposure*

A moderating factor that was investigated in this study was *prior knowledge*. Specifically, it was hypothesized that people with higher levels of prior knowledge in a specific subject area would search more selectively for information within that area as compared to people with lower levels of prior knowledge. The basis of this hypothesis can be traced to a collaboration of the false-consensus effect and the viewpoint that selective exposure is a byproduct of a need to increase self-enhancement. In specific, the false-consensus effect states that people tend to overestimate the extent to which their opinions or attitudes are typical of those of other people (Ross, Greene, & House, 1977; Botvin, Botvin, Baker, Dusenbury, & Goldberg, 1992). As a result, any information that is decision-inconsistent is rejected as a means of protecting a person's self-perception of a good decision-maker, while showing preference to information that is decision-consistent (Kunda, 1990; Jonas, et al., 2003). In summary, people overestimate their attitudes or decisions as being typical and correct while at the same the motivation of increasing self-enhancement forces them in defending their decision. Based on the above approach, it is hypothesized that higher levels of prior knowledge will result in higher levels of supportive information search and higher decision quality.

### *5.2.2 Justification and Information Exposure*

A moderating factor that was examined in this study was *justification*. Specifically, it was hypothesized that when participants had to justify their preliminary decision than they would search more selectively for information compared to the people that did not have to justify their preliminary decision. The theoretical basis of this hypothesis can be traced to the plentiful reports that suggest selective exposure is a need for self-enhancement. Specifically, researchers have suggested that people often feel obligated to defend prior decisions as a means of maintaining a positive self-image and perceiving themselves as good decision-makers (Kunda, 1990; Jonas, et al., 2003). Even

more, Schwarz, Frey & Kumpf (1980) stated that people feel obligated to shield prior opinions or attitudes as a means of remaining faithful to their initial decision. In summary and based on the assumption that selective exposure stems from self-enhancing mechanisms, it is hypothesized that people who justify their preliminary decision will exhibit higher levels of supportive information search and will increase decision quality.

### *5.2.3 Information Exposure and Decision Quality*

The third hypothesis of the study examined the relationship between *information exposure* and *decision quality*. Nevertheless, there is very limited research investigating the effect of confirmatory search on the quality of decision. In general, confirmation bias (the preference in supportive pieces of information) is considered to be an aversive phenomenon and by restricting its effect, better decisions can be made (Kray & Galinsky, 2003). In specific, Kray and Galinsky (2003) demonstrated that supportive information exposure was negatively correlated with decision quality and that when people searched more balanced for information they reached a better decision. In addition, another supporting study of the negative correlation between supportive information exposure and decision quality was brought forward by Janis (1982) who demonstrated that fatal historical decisions occurred partly because decision makers held high levels of confirmation bias. In conclusion, the relationship between information exposure and decision quality is based solely on a limited number of empirical studies. As a result, this study attempts to provide a broader and deeper understanding of the nature of the association between the two.

## **5.3 Method**

### *5.3.1 Participants*

An opportunity sample of one hundred sixty-three college students was recruited from the John Moores University in Liverpool (UK), the Kent University (Ashtabula, Ohio Campus, USA) and the British Hellenic College (GR). From those participants, eighty-six were women and seventy-seven were men. Also, from the total of participants, one hundred twelve were recruited from the UK, twenty-three from USA and twenty-eight from Greece.

### *5.3.2 Ethics*

Approval for conducting the study was requested and granted from the ethics committee of the three educational institutions mentioned above.

### 5.3.3 Design

The study had a 2 (type of information: supporting vs. contradicting) X 2 (justification: yes vs. no) between groups correlational design with decision quality operating as the dependent variable (DV) of the study.

### 5.3.4 Materials

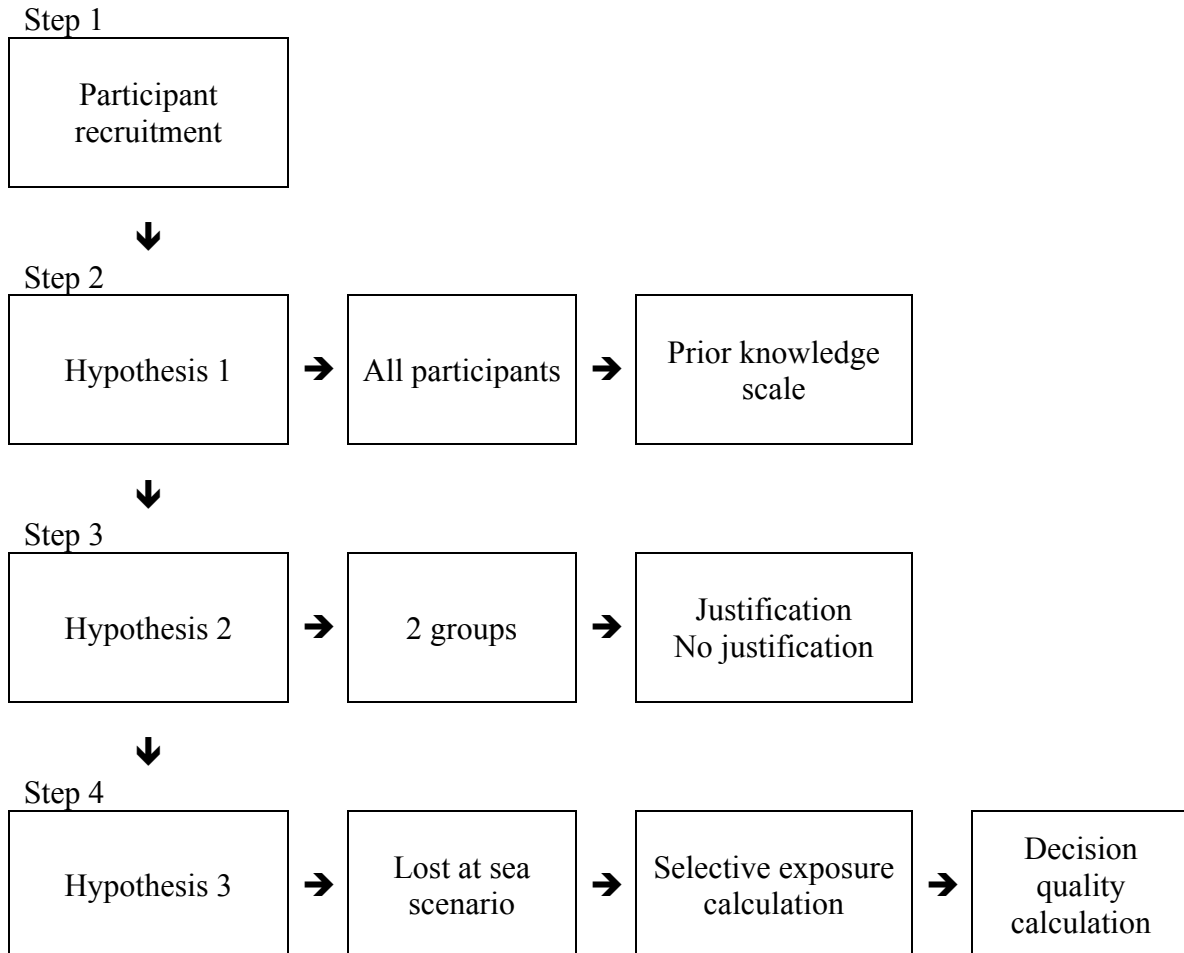
Regarding *hypothesis 1*, a novel six-item questionnaire was employed to assess peoples' degree of knowledge concerning survival situations (Appendix 9). Also, for *hypothesis 3*, a lost at sea survival scenario was used (Lost at sea, 2009; Appendix 10) and a list of six items (chocolate bar, fishing kit, floating seat cushion, a gallon of oil/petrol, shark repellent and a shaving mirror) accompanied with statements that were either supportive or contradictive of their survival importance (Appendix 11).

### 5.3.5 Procedure

The completion of the study was separated into four specific steps. First, each participant was recruited either through personal approach, or through the SONA schema set up by the John Moores University of Liverpool, and was asked to partake in a study about decision-making regarding a hypothetical lost at sea survival scenario. *Step 2* entailed each participant completing a novel six-item prior knowledge assessment scale. This scale allowed the evaluation of each participant's level of prior knowledge on survival situations as a reference point of how the moderator *prior knowledge* influenced information exposure and quality decision. Next, in *step 3* participants read a lost at sea survival scenario. Afterwards they were asked to choose three items out of six they would take with them as most valuable in surviving in such a situation. Simultaneously to choosing the three objects, the participants were also asked to rank all six objects according to their importance in such a survival situation. It was stressed that this was merely their preliminary decision and ranking of the six objects as the participants would be given the opportunity to choose and rank the items once again at the end of the study. After participants made their preliminary decision and ranking, they were randomly separated into two groups. The first group had to justify their preliminary decision by briefly reporting in 2-3 sentences why they choose the three items they did. In contrast, the second group proceeded to the next part of the study without needing to justify their preliminary decision. Finally, in *step 4* each participant was asked to revise their preliminary decision and make an ultimate decision of which three objects they now perceived as more valuable. Specifically, after reading all 12 brief statements and the full statements of their choice, the participants now had the opportunity to re-evaluate the six objects and to make a final decision on which three they would want to have with them. Simultaneously, each participant was given the opportunity to rank once more all six objects from best to worst according to their vitality in a lost at sea survival situation. Through this process selective exposure and decision quality was measured therefore making possible the testing of *hypothesis 3*.

All the steps of the study were completed by the one hundred sixty-three participants and are summarized in Flowchart 5.3.5:

*Flowchart 5.3.5: The four steps of the study.*



## 5.4 Data Analyses

To test *hypothesis 1*, Pearson Correlation analysis was conducted between the average score participants achieved on the *prior knowledge* assessment scale with those variables that measured *information exposure* (confirmation bias and evaluation bias) and *decision quality* (decision bias and ranking bias). Next, to test *hypothesis 2*, consecutive t-test analyses were conducted between the grouping variable *justification* (participants were separated into two groups depending on whether they had to justify their preliminary decision or not) and the variables that measured *selective exposure* and *decision quality*. Furthermore, to test *hypothesis 3*, a Pearson Correlation analysis was

conducted between the variables that measured *information exposure* and the variables that measured *decision quality*. Finally, a post hoc power analysis was conducted to determine the statistical power of the sample.

## 5.5 Results

Table 5.5 displays the frequencies of the *gender* and *age* variables for the 163 participants of the study. From the table one can notice that the variable ‘gender’ is almost balanced (47.2% males and 52.8% females) and that the majority of the 163 participants were between the age group of 18-24 making up the 72.4% of the data set.

*Table 5.5: Frequencies for gender and age.*

		N	Percent
Gender	Total	163	100
	Male	77	47.2
	Female	86	52.8
Age	Total	163	100
	18-24	118	72.4
	25-29	36	22.1
	30- up	9	5.5

### 5.5.1 Hypothesis 1

Table 5.5.1a and Table 5.5.1b display the means and the standard deviations of the experimental variable *prior knowledge average* and the variables that measure *information exposure* and *decision quality*.

*Table 5.5.1a: The means and standard deviations for information search as a function of the experimental condition prior knowledge.*

Experimental Condition	Types of information read				CB <sup>a</sup>		SAve <sup>b</sup>		CAve <sup>c</sup>		EB <sup>d</sup>	
	Supporting		Contradicting									
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Prior Knowledge Average (PK_Ave) N= 163	4.71	1.10	4.20	1.08	.50	1.32	4.65	.84	3.23	0.53	1.42	1.03

Note. <sup>a</sup>CB= Confirmation bias, which corresponds to the difference between the supporting pieces of information read minus the contradicting pieces of information read. <sup>b</sup>SAve= the average score of the supporting pieces of information as evaluated by the participants. <sup>c</sup>CAve= the average score of the contradictory pieces of information as

evaluated by the participants. <sup>d</sup>EB= evaluation bias, which corresponds to the difference between SAve minus CAve.

*Table 5.5.1b: The means and standard deviations for information search as a function of the experimental condition prior knowledge.*

Experimental Condition	<u>RP<sup>a</sup></u>		<u>RF<sup>b</sup></u>		<u>RB<sup>c</sup></u>		<u>DP<sup>d</sup></u>		<u>DF<sup>e</sup></u>		<u>DB<sup>f</sup></u>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Prior Knowledge												
Average (PK_Ave)	9.06	3.73	10.97	3.65	1.91	3.91	11.02	2.41	11.50	2.11	.47	2.26
N= 163												

Note. <sup>a</sup>RP= the preliminary ranking of the six objects used in the manipulation of selective exposure activity. <sup>b</sup>RF= the final ranking of the six objects. <sup>c</sup>RB= ranking bias, which corresponds to the difference between the final ranking minus the preliminary ranking. <sup>d</sup>DP= the preliminary decision participants made on the decision task. <sup>e</sup>DF= the final decision participants made on the decision task. <sup>f</sup>DB= decision bias, which corresponds to the difference between the final decision minus the preliminary decision.

In order to test the effect of the experimental condition *prior knowledge* upon selective exposure and decision quality, a Pearson Correlation analyses was conducted. The results of the correlation revealed that *prior knowledge* is positively correlated with the amount of supporting pieces of information participants read [ $r(161) = 0.30, p < 0.00$ ]; is positively correlated with the confirmation bias [ $r(161) = 0.25, p < 0.00$ ]; is positively correlated with the evaluation participants made for the supporting pieces of information [ $r(161) = 0.20, p < 0.01$ ]; and positively correlated with the evaluation bias [ $r(161) = 0.17, p < 0.03$ ]. In addition the results yield that the more prior knowledge a participant had, the better their ranking bias was [ $r(161) = 0.18, p < 0.02$ ]; the better their final decision was [ $r(161) = 0.33, p < 0.00$ ]; and the better their decision bias was [ $r(161) = 0.25, p < 0.00$ ].

From the results of the Pearson Correlation analyses between *prior knowledge* and the variables that measure *information exposure* and *decision quality* it was made possible to accept *hypothesis 1* of the study. In specific, this finding suggests that the more prior knowledge a person possesses about a subject, the more selectively they search for information and the better decision they make within that same subject.

### 5.5.2 Hypothesis 2

For *hypothesis 2*, Table 5.5.2a and Table 5.5.2b display the descriptive statistics for the grouping variable *justification* with the variables that measured *information exposure* and *decision quality*.

*Table 5.5.2a: The means and standard deviations for information search as a function of the experimental condition justification.*

Experimental Condition	Types of information read											
	Supporting		Contradicting		CB <sup>a</sup>		SAve <sup>b</sup>		CAve <sup>c</sup>		EB <sup>d</sup>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Justification Yes N= 85	4.98	.95	3.94	1.02	1.04	1.14	4.79	.70	3.15	0.47	1.63	0.84
Justification No N= 78	4.42	1.19	4.47	1.09	-.08	1.27	4.51	0.96	3.31	0.58	1.20	1.17

Note. <sup>a</sup>CB= Confirmation bias, which corresponds to the difference between the supportive pieces of information minus the contradictive pieces of information. <sup>b</sup>SAve= the average score of the supporting pieces of information as evaluated by the participants. <sup>c</sup>CAve= the average score of the contradictory pieces of information as evaluated by the participants. <sup>d</sup>EB= evaluation bias, which corresponds to the difference between SAve minus CAve.

*Table 5.5.2b: The means and standard deviations for the rankings and the decisions made as a function of the experimental condition justification.*

Experimental Condition	RP <sup>a</sup>		RF <sup>b</sup>		RB <sup>c</sup>		DP <sup>d</sup>		DF <sup>e</sup>		DB <sup>f</sup>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Justification yes N= 85	9.55	3.77	12.13	3.27	2.58	3.86	11.42	2.16	12.32	1.90	.89	2.02
Justification no N= 78	8.53	3.64	9.71	3.64	1.18	3.87	10.59	2.60	10.60	1.97	.01	2.43

Note. <sup>a</sup>RP= the preliminary ranking of the six objects used in the manipulation of selective exposure activity. <sup>b</sup>RF= the final ranking of the six objects. <sup>c</sup>RB= the difference between the preliminary ranking minus the final ranking. <sup>d</sup>DP= the preliminary decision participants made on the decision task. <sup>e</sup>DF= the final decision participants made on the decision task. <sup>f</sup>DB= the difference between the preliminary decision minus the final decision.

Furthermore, a t-test analysis conducted in order to check whether the condition *justification* had an effect on *information exposure* and *decision quality*. Firstly, the analysis revealed that the participants that had to justify their preliminary decision significantly (compared to those that did not justify their decision) read more supportive pieces of information  $t(162) = 3.29, p < 0.00$ ; significantly read less contradicting pieces of information  $t(162) = 3.23, p < 0.00$ ; and displayed significant higher confirmation bias  $t(162) = 5.90, p < 0.00$ . Additionally, the t-test analysis revealed that a justified decision influenced participants into significantly evaluating higher supporting pieces of information  $t(162) = 2.10, p < 0.04$  and displayed a significantly higher evaluation bias  $t(162) = 2.73, p < 0.01$ . However, there was no significance effect found of justification on the evaluation of contradicting pieces of information  $t(162) = -1.92, p < 0.06$ .

In addition, with reference the ranking variables and the decision quality variable, participants that justified their initial decision significantly ranked higher their final ranking  $t = 4.48$ ,  $p < 0.00$  and displayed higher ranking bias  $t(162) = 2.31$ ,  $p < 0.02$ . In contrast, there was no significant effect of justification on the initially ranking  $t(162) = 1.77$ ,  $p < 0.08$ . Finally, a significant difference was found between justification and the preliminary decision  $t(162) = 2.24$ ,  $p < 0.03$ ; justification and the final decision  $t(162) = 5.66$ ,  $p < 0.00$ ; and justification and the decision bias  $t(162) = 2.53$ ,  $p < 0.01$ .

The above results of the consecutive t-tests in correspondence to *hypothesis 2* showed that justification has a significant effect on selective exposure and decision quality. As a result *hypothesis 2* is accepted.

### 5.5.3 Hypothesis 3

Finally, to test *hypothesis 3* of the study and to determine whether a higher degree of supportive information exposure leads to a better final decision, a Pearson Correlation analysis was conducted between the decision quality variables and the variables that measured selective exposure. The results of the analysis revealed that higher confirmation bias a person showed, the higher their ranking bias was [ $r(161) = 0.17$ ,  $p < 0.03$ ] and the higher their decision bias was [ $r(161) = 0.41$ ,  $p < 0.00$ ]. Likewise, that higher evaluation bias a person showed, the higher their ranking bias was [ $r(161) = 0.29$ ,  $p < 0.00$ ] and the higher their decision bias was [ $r(161) = 0.28$ ,  $p < 0.00$ ]. These significant correlations found between the variables of *decision quality* and those of *information exposure* allowed the acceptance of *hypothesis 3*.

To summarize, the results of the various analyses for this study revealed that: *prior knowledge* was positively correlated with supportive *information exposure* and *decision quality* allowing the acceptance of *hypothesis 1*; *justification* increased supportive *information exposure* and *decision quality* allowing the acceptance of *hypothesis 2*; and that the more selectively people searched for information the better their decision quality was, allowing the acceptance of *hypothesis 3*.

### 5.5.4 Post Hoc Statistical Power Analysis for Study 3

A post hoc power analysis was performed to determine the achieved power of the study, using the Pearson Correlational test. This particular study with the sample size of 163 achieved a power of 0.99 (99%), given a medium effect size (0.30) and an  $\alpha$  of  $p = 0.05$ . Also, a post hoc power analysis was performed to determine the achieved power based on an independent samples t-test. The study achieved a power of 0.94 (94%) given sample size of 163, an  $\alpha$  of  $p = 0.05$  and a medium effect size (0.5). In other words, the sample size was sufficient to detect moderate to large effects between variables.



## 5.6 Discussion

### 5.6.1 Study 3 Results in Correspondence to Literature

The analyses of the study revealed various significant results that allowed the acceptance of all three hypotheses avowed. Specifically, concerning *hypothesis 1*, it was shown that the more prior knowledge a person possessed about a subject, the more selectively they searched for information within that same subject and the better their decision quality was. This falls in place with the assumption that prior knowledge significantly affects supportive information exposure based on the association of the false-consensus effect that suggests that people tend to overestimate their decisions (Ross, et. al., 1977; Botvin, et. al., 1992) and then shield guard them in an attempt to maintain and increase their degree of self-enhancement (Kunda, 1990; Jonas, et. al., 2003).

Furthermore, concerning *hypothesis 2*, the results suggested that when participants had to justify their preliminary decision, they exhibited higher levels of supportive information exposure and made a better final decision compared to those participants that did not justify their initial decision. This falls in place with the theories that imply that supportive information exposure is created by an internal need for self-enhancement (Schwarz, et. al., 1980), as a means of maintaining a positive self-image of a good decider (Kunda1990) or defending one's views or opinions (Jonas, et. al., 2003). Therefore, according to the theory and as it was hypothesized, when participants justified their preliminary decision, they felt 'obligated' to defend their preliminary decision as a way of increasing self-enhancement and feeling better about themselves.

Finally, in reference to information exposure and decision quality it should be noted that the analysis of the data unveiled two distinct conclusions. First, a persistent influential effect was noticeable through out the study. That is, the majority of participants significantly exhibited an elevated degree of confirmation bias. Even more, the impact of selective exposure on information search was evident and provides a testimony of its existence and impact. These results fall in accordance with the plethora of studies conducted in the past that provide evidence and support for selective exposure (Cotton & Heiser, 1980; Festinger, 1957; Schulz-Hardt, et. al., 2002; Jonas, et. al., 2003; Greenberg, et. al., 1986; and Holton & Pyszczynski, 1989). In addition, the second conclusion that derived from the study was that the more selectively participants searched for information, and the higher they evaluated confirming pieces of information compared to their evaluations of disconfirming pieces of information, the better their final decision was. In essence, the study disclosed that supportive information exposure was positively correlated with decision quality. This finding contrasts with the scarce experimental studies that report of a negative correlation between supportive information exposure and decision quality (Kray & Galinsky 2003; Janis, 1981).

### 5.6.2 Limitations / Future Reference

Although significant statistical results were shown through the study, a few considerations should be brought to attention and addressed for future reference. For instance, the participants that were recruited for the study were drafted from three different countries: United Kingdom, Greece and United States of America. While a cross cultural variables was not taken into consideration, there is always a threat of a confounding variable deriving from differences in culture or language that could of tampered with the results. As a result, for future reference, it would pose wise to retain participant recruitment to only one country.

Secondly, the assessment of the moderating factor 'Prior Knowledge' posses a concern. In specific, the Prior Knowledge assessment scale was created and employed for the first time as an assessment tool. As a result issues of content validity are a concern and should be addressed for future reference. This could be accomplished either by using the same scale in another future study and then running a correlational analysis between the results of both studies; or by conducting a within subjects correlational study between the results of the prior knowledge scale used in the study with the results of another prior knowledge assessment methods; or by measuring content validity by employing a method created by Lawshe (1975), by using a panel of 'judges' that can evaluate how essential every item of the scale is in accordance to if they measure what they are suppose to measure.

Another limitation of this study that should be reported is the method of assessing selective exposure in the study was the survival scenario *lost at sea*, a similar survival scenario to the one employed in a previous study (winter survival scenario). Although both studies utilizing the specific methodology produced parallel significant results, reliability and validity cannot be guaranteed by this fact alone. Further steps need to be taken in order to increase construct validity and reliability for future reference. For instance, to increase validity, the survival scenario used should ensure that the goals and objectives are clearly defined (Moskal & Leydens, 2000); employ a panel of 'specialists' to ensure that the content area is adequately addressed (Lawshe, 1975); or to increase reliability by employing a survival scenario in another future study as a means of creating parallel forms of reliability (Cozby, 2001).

Finally, the results yield that *prior knowledge* and *justification* are significant moderators of *information exposure* to information. However, the psychological mechanisms behind this significant effect were not investigated. For instance, does justification of a decision activate self-enhancing mechanisms that then influences supportive information exposure, as suggested by various studies conducted (Kunda1990; Jonas, et. al., 2003; and Schwarz, et. al., 1980), and decision quality; or do other more complex cognitive frameworks come into play. As a result and for future reference, it would be interesting in devising an experimental design that would manipulate and investigate in depth the exact parameters of the above moderators that generate such influence upon *information exposure*.

### 5.6.3 Conclusion

In conclusion, it can be claimed that the phenomenon of supportive information exposure does exist and it does have a significant effect on how people decided on what information they expose themselves to. Additionally, it becomes fairly safe to state that selective exposure is positively correlated with decision quality, a testimonial that comes into disparity with the general approach of selective exposure that portrays selective exposure as a phenomenon that only produces adverse byproducts that interfere and tamper with subjective information search and decision-making.

Furthermore, both moderators investigated in the study did elicit noteworthy implications. In specific, the study revealed that a high degree of prior knowledge to a subject had a significant impact on information exposure within that subject, which in turn supported participants in increasing the quality of their final decision. Likewise, when the participants were asked to justify their preliminary decision, then they displayed increased supportive information seeking and made a better final decision compared to the participants that did not justify their preliminary decision. As a result, by incorporating/manipulating the variables *justification* and *prior knowledge* in an experimental context, supportive information exposure and decision quality can be increased.

Finally, the investigation of the relationship between *information exposure* and *decision quality* does not end here. A forth study will follow and attempt provide addition support of the positive correlation found in the previous 3 studies. Also, as a means of increasing validity and reliability for the results found so far, various factors of the previous studies will be repeated. Specifically, the winter survival scenario (used in Study 2) will be used again as a means of measuring information exposure and the moderator *prior knowledge* (examined in Study 3) will be measured again. However, taking the previous study one step further, in Study 4, *prior knowledge* will be manipulated in a different way that the way it was manipulated in Study 3. By obtaining similar results in the two studies, it will be safe to assume that the significant effect found can be attributed to the variables examined and not to some undetected confounding variable. Lastly, a new moderator as well as a previously examined moderator will be examined in Study 4. This is done as an effort to obtain a broader understanding of the psychological mechanisms that effect information exposure and ultimately decision quality.

## CHAPTER SIX

### ***“Enhancing Decision Quality through Information Exposure and the Moderating Effects of Prior Knowledge and Self-Enhancement”***

Study 4 was designed to provide additional support that higher levels of supportive information exposure enhance decision quality and to examine the effect of two new moderators. Also, similar to Study 2 and Study 3, decision quality was assessed by comparing participants' decisions and rankings to those done by survival experts. In general, *decision quality* was utilized as the dependent variable; *information exposure* was utilized as the independent variable; and *prior knowledge* (2 levels: yes vs. no) and *self-enhancement* (3 levels: positive vs. average vs. negative) operated as moderating variables. It should be noted that *prior knowledge* was also examined in Study 3, however in the current study it was manipulated in a different manner to ensure and strengthen the effect it possesses on information exposure. Finally, although participants were recruited from three different countries, a cross-cultural variable was not taken into consideration.

#### **6.1 Hypotheses**

*Hypothesis 1:* Prior knowledge has a significant effect on information exposure, which in turn has a direct effect on decision quality. Specifically, we hypothesize the more prior knowledge one possesses in a certain area, the more selectively they will search for information concerning that specific area and the better their decision quality will be.

*Hypothesis 2:* Self-enhancement has a significant effect on information exposure, which in turn has a direct effect on decision quality. Specifically, we hypothesize that people with higher levels of self-enhancement will search more selectively for information and the better their decision quality will be.

*Hypothesis 3:* Higher levels of supportive information exposure lead to higher decision quality. In particular, the more selectively a person searches for information, the better their decision quality will be.

## **6.2 Theoretical Basis of Study Hypotheses**

### *6.2.1 Prior Knowledge and Information Exposure*

The first hypothesis of the study examined the moderating factor *prior knowledge*. Specifically, it was hypothesized that higher levels of prior knowledge lead to higher levels of supportive information search. The basis of this hypothesis originated from the combination of two theories, the false-consensus effect and the hypothesis that selective exposure is a derivative of self-enhancement (Kunda, 1990; Jonas, et. al., 2003). According to the false-consensus effect, people tend to overestimate the extent to which their attitudes or decisions are typical and common to those of other people (Ross, et. al., 1977; Botvin, et. al., 1992). Therefore, when people are confronted with decision-inconsistent information they feel obligated in defending their initial decision and sustain the self-image of a good decision maker. This motivates people to prefer decision-consistent information and to avoid decision inconsistent information (Jonas et al., 2003).

In conclusion, due to the false-consensus effect people tend to overestimate their decisions or attitudes as being common and correct while simultaneously the motivation of self-enhancement forces them in shielding their initial decision, thus increasing supportive information exposure. Based on this approach, the first hypothesis of the current study investigated the relationship between prior knowledge and information exposure; and how that relationship ultimately affected decision quality.

### *6.2.2 Self-enhancement and Information Exposure*

A moderating factor that was examined was *self-enhancement*. Specifically, it was hypothesized that an increased motive of self-enhancement would increase supportive information exposure and lead to increased decision quality. The theoretical basis of this assumption can be traced to the plentiful reports that attribute the existence of supportive information exposure to a need for self-enhancement. Self-enhancement is described as a need to maintain or boost self-esteem (Santrock, 2000). For instance, researches have reported people strive to sustain a positive self-image and perceive themselves as good decision-makers as a function of self-enhancement (Kunda, 1990). In addition, self-enhancement can motivate someone in defending his or her own views and opinions, thus increasing selective exposure (Jonas et al., 2003). Finally, the link between information exposure and self-enhancement has been detected by research that found people often

feel obligated to armour their attitudes or opinions as a means of remaining truthful to their preliminary commitment (Schwarz, et al., 1980).

In conclusion, due to the postulation deriving from various research reports that self-enhancement can lead to increased supportive information search, *hypothesis 2* investigated the relationship between self-enhancement and information exposure; and how that ultimately affected decision quality.

### *6.2.3 Information Exposure and Decision Quality*

The goal of the third hypothesis was to investigate the relationship between information exposure and decision quality. There has been very little empirical research examining the effects of information exposure upon decision quality, with the few that has been done, portraying a negative effect. In specific, the diminutive research examining this relationship has stated that selective exposure is negatively correlated with decision quality, and in order for people to achieve a better decision, they have to search more balanced for information (Kray & Galinsky, 2003). Additionally, other reports have brought forward the assumption that past fatal decisions have taken place because decision makers have held high levels of selective exposure (Janis, 1982). In both instances selective exposure is presented as being an aversive phenomenon that only worsens decision-making.

In conclusion, due to the very little research that has been conducted examining how decision quality is affected by information exposure, this study attempts to examine and provide a more in-depth understanding of the nature and the direction of the effect supportive information exposure has on decision quality

## **6.3 Methods**

### *6.3.1 Participants*

An opportunity sample of one hundred seventy-eight students was recruited from three different educational institutions: the John Moores University in Liverpool (UK), the Kent State University (Ashtabula, Ohio Campus, USA) and the University of Wales (Athens, Greece campus). From those participants, ninety-eight were women and eighty were men. Also, from the total of participants, one hundred thirty-one were recruited from the UK, twenty-one from USA and twenty-six from Greece.

### *6.3.2 Ethics*

Approval for conducting the study was requested and granted from the ethics committee of the three educational institutions mentioned above. It should be noted, that for the experimental manipulation of *self-enhancement*, a group of participants received phony negative feedback for their performance. However, it was made known beforehand

that if they experienced any discomfort during the study they could withdraw if they pleased so. Also, at the end of the study, each participant was briefed that for the purpose of the study they were given bogus feedback.

### 6.3.3 Design

The study had a 2 (type of information: supporting vs. contradicting) X 2 (prior knowledge: yes vs. no) X 3 (self-enhancement: positive vs. average vs. negative) between groups experimental design with decision quality operating as the dependent variable (DV) of the study.

### 6.3.4 Material

Regarding *hypothesis 1*, two articles were randomly presented to the participants, one article that provided information about survival situations (3 keys to assessing a survival situation, 2011; Appendix 12) and another article of a neutral story, irrelevant to a survival situation (Glass recycling, 2012; Appendix 13). Also, a six-item questionnaire was used to assess peoples' degree of knowledge concerning survival situations (same scale employed in Study 3). Concerning *hypothesis 2*, three types of bogus feedback were presented to the participants: positive, negative, and neutral/average (Appendix 14). Also, the HSM self-enhancement scale (Taylor, Lerner, Sherman, Sage & McDowell 2003) was used, which consisted of a twenty quality or skill items scale that participants had to rate themselves in comparison to their peers (Appendix 15). Finally, for *hypothesis 3*, a winter survival scenario was used (same used in Study 2) and a list of six items (chocolate bar, compass, extra pair of pants/shirt, lighter with no fluid, aerial map and can of shortening) accompanied with statements that were either supportive or contradictive of their survival importance.

### 6.3.5 Procedure

The first step of the study involved participant recruitment. Specifically, each participant was recruited through personal approach at one of three educational institutions: John Moores University of Liverpool, University of Wales, and Kent University. They were asked to partake in a study about decision-making regarding a hypothetical winter survival scenario. For the second step, each participant was randomly assigned to one of two groups. The first group received an article presenting survival tips and pitfalls, and the second group received an irrelevant article to a survival situation. After reading their assigned article, the participants completed a six-item prior knowledge assessment scale that allowed the measurement of the degree of prior knowledge a person possessed, allowing the testing of hypothesis 1. Next, for step 3, each participant was asked to complete a reaction time exercise and an accuracy task. After they finished with the simultaneous exercises each participant was randomly provided with one of three different kinds of bogus feedback in order to manipulate participants' *self-enhancement*. The three types of bogus feedback were positive, negative, and neutral/average. After the

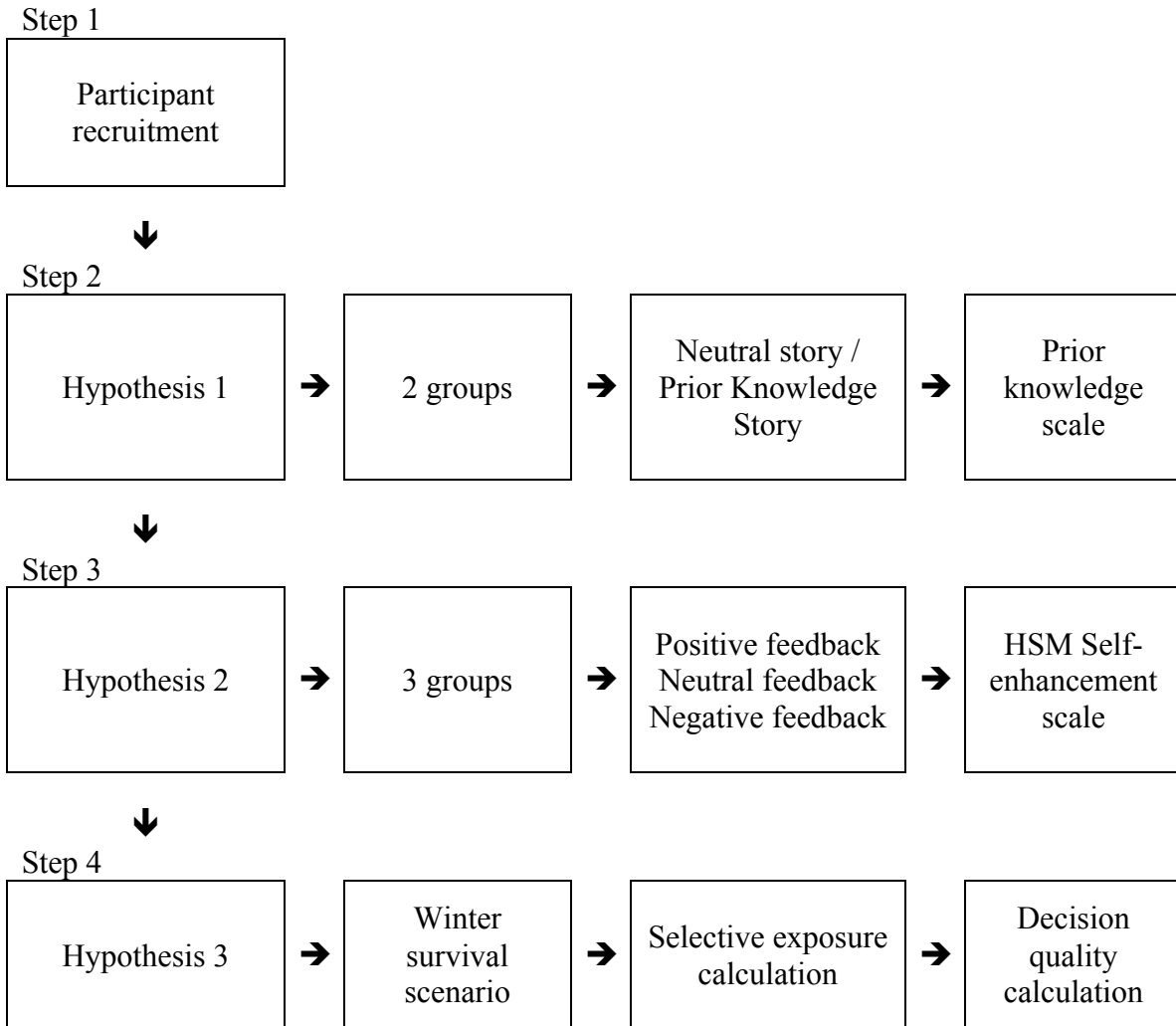
participants received the feedback for their performance on the tasks, they were asked to complete the HSM self-enhancement scale (Taylor et al., 2003). Through the manipulation of self-enhancement with the three different types of bogus feedback and the HSM scale, it was made possible to measure the participants' degree of self-enhancement. This enabled the assessment of the effect of self-enhancement on information exposure and in turn on decision quality, thus testing *hypothesis 2*.

Finally, for step 4, each participant was presented with the winter survival scenario and after reading it, they were asked to make a preliminary decision and select which three objects out of a list of six they perceived as most important and would take with them for surviving and awaiting rescue given the chance. Next, they were asked to rank all of the six objects starting from the most important and finishing with the least important in a winter survival situation. Similar to the preliminary decision, this was only a preliminary ranking and it was made clear to the participants that they would be given the opportunity at the end of the study to revise and make a final decision and a final ranking. After selecting the three objects and ranking all six, the participants had to choose to read one of two brief statements (either the supporting or the contradicting one) for each of the six objects. Additionally, for all statements read, the participants had to evaluate the statements on two different dimensions: on whether the information of the brief/full statement was important (importance dimension) and on whether the information was credible (credibility dimension) in a winter survival situation. For the concluding part of the study, each participant was asked to revise their preliminary decision and preliminary ranking and make their final ones. Through this process, information exposure and decision quality were assessed, allowing the testing of *hypothesis 3*.

All the steps of the study were completed by the one hundred seventy-eight participants and are summarized in Flowchart 6.3.5:



Flowchart 6.3.5: The procedure of the study in steps.



## 6.4 Data Analyses

To test *hypothesis 1*, a t-test analysis was conducted between the grouping variable Prior Knowledge (participants were assigned to two groups depending whether they received initial information about survival situations or not) and the variables that measured information exposure (confirmation bias and evaluation bias). Second, a Pearson Correlation analysis was conducted between the scores participants achieved on the prior knowledge assessment scale with the variables that measured information exposure and the variables that measured decision quality (ranking bias and decision bias). Next, in order to test *hypothesis 2*, initially a One Way Anova analyses was conducted between the grouping variable self-enhancement feedback (negative, neutral and positive) and self-enhancement. Afterwards, a Pearson Correlation was conducted between self-enhancement score and variables that measured information exposure and

the variables that measured decision quality. Furthermore, to test *hypothesis 3*, a Pearson Correlation analysis was conducted between the variables that measured information exposure and the variables that measured decision quality. Finally, a post hoc power analysis was conducted to determine the statistical power of the sample.

## 6.5 Results

Table 6.5 displays the frequencies of the *gender* and *age* variables for the 178 participants of the study. From the table one can notice that the variable ‘gender’ is almost balanced (55.1% females and 44.9% males) and that the majority of the 178 participants were between the age group of 18-24 making up the 76.4% of the data set.

Table 6.5: Frequencies for *gender* and *age*.

		N	Percent
Gender	Female	98	55.1
	Male	80	44.9
	Total	178	100
Age	18-24	136	76.4
	25-29	33	18.5
	30-up	9	5.1
	Total	178	100

### 6.5.1 Hypothesis 1

For *hypothesis 1*, Table 6.5.1a and Table 6.5.1b display the descriptive statistics for the grouping variable *prior knowledge* with the variables that measured information exposure and decision quality.

Table 6.5.1a: The means and standard deviations for information search as a function of the grouping variable *prior knowledge* (PK).

Experimental Condition	Types of information read													
	<u>Supporting</u>				<u>Contradicting</u>		<u>CB<sup>a</sup></u>		<u>SAve<sup>b</sup></u>		<u>CAve<sup>c</sup></u>		<u>EB<sup>d</sup></u>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
PK Yes	5.30	.95	4.23	1.38	1.03	1.37	4.69	.93	3.31	0.73	0.36	1.22		
N= 93														
PK No	4.96	1.09	4.65	1.16	.32	1.28	4.00	0.67	3.64	0.91	1.38	1.14		
N= 85														

Note. <sup>a</sup>CB= Confirmation bias, which corresponds to the difference between the supportive pieces of information minus the contradictive pieces of information. <sup>b</sup>SAve= the average score of the supporting pieces of information as evaluated by the participants. <sup>c</sup>CAve= the average score of the contradictory pieces of information as evaluated by the participants. <sup>d</sup>EB= evaluation bias, which corresponds to the difference between SAve minus CAve.

Table 6.5.1b: The means and standard deviations for the rankings and the decisions made as a function of the grouping variable *prior knowledge* (PK).

Experimental Condition	RP <sup>a</sup>		RF <sup>b</sup>		RB <sup>c</sup>		DP <sup>d</sup>		DF <sup>e</sup>		DB <sup>f</sup>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
PK Yes	8.53	3.68	10.47	3.99	1.95	4.23	10.71	2.34	12.19	2.70	1.48	2.75
N= 93												
PK No	8.51	3.14	8.73	4.01	.22	3.33	11.12	2.04	10.85	2.47	-.27	2.44
N= 85												

Note. <sup>a</sup>RP= the preliminary ranking of the six objects used in the manipulation of selective exposure activity. <sup>b</sup>RF= the final ranking of the six objects. <sup>c</sup>RB= ranking bias, which corresponds to the difference between the final ranking minus the preliminary ranking. <sup>d</sup>DP= the preliminary decision participants made on the decision task. <sup>e</sup>DF= the final decision participants made on the decision task. <sup>f</sup>DB= decision bias, which corresponds to the difference between the final decision minus the preliminary decision.

Next, a t-test analysis was conducted in order to check whether the grouping variable *prior knowledge* had an effect on selective exposure and decision quality. First, the analysis revealed that the participants of the experimental group that were giving a story with survival information (compared to the control group that were given an irrelevant neutral story) significantly read more supportive pieces of information  $t(177) = 2.20, p < 0.03$ ; significantly read less contradicting pieces of information  $t(177) = -2.19, p < 0.03$ ; and displayed significant higher confirmation bias  $t(177) = 3.58, p < 0.00$ . Additionally, the t-test analysis showed that the group that read the prior knowledge story significantly evaluated higher supporting pieces of information; significantly evaluated less contradicting pieces of information  $t(177) = -2.68, p < 0.01$ ; and displayed a significantly higher evaluation bias  $t(177) = 5.71, p < 0.00$ .

Also, in reference to the ranking variables and the decision quality variable, participants that were presented with the prior knowledge story (experimental group) significantly ranked higher their final ranking  $t(177) = 2.91, p < 0.00$  and displayed higher ranking bias  $t(177) = 3.00, p < 0.00$ . In contrast, there was no significant effect of prior knowledge story on the initially ranking  $t(177) = 0.04, p < 0.97$ . Finally, the prior knowledge story group had a significant difference for the final decision  $t(177) = 3.46, p < 0.00$  and for the decision bias  $t(177) = 4.48, p < 0.00$ . On the contrary, no significant difference was found between prior knowledge and the preliminary decision  $t(177) = -1.24, p < 0.22$ . From the above results it becomes evident that the prior knowledge story had a significant effect on selective exposure and decision quality compared to the neutral story.

Furthermore, a Pearson Correlation analysis was conducted in order to test whether participants' degree of prior knowledge on survival situations had an influence on how selectively they searched for information and on their decision quality. Table 6.5.1c and Table 6.5.1d display the means and the standard deviations of the variables that measure selective exposure and decision quality in correspondence to the experimental variable *prior knowledge average*:

Table 6.5.1c: The means and standard deviations for information search as a function of the experimental condition *prior knowledge average*.

Experimental Condition	Types of information read											
	Supporting				Contradicting				CB <sup>a</sup>		SAve <sup>b</sup>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Prior Knowledge												
Average (PK_Ave)	5.14	1.03	4.43	1.29	.69	1.37	4.36	.88	3.47	.83	.89	1.29
N= 178												

Note. <sup>a</sup>CB= Confirmation bias, which corresponds to the difference between the supporting pieces of information read minus the contradicting pieces of information read. <sup>b</sup>SAve= the average score of the supporting pieces of information as evaluated by the participants. <sup>c</sup>CAve= the average score of the contradictory pieces of information as evaluated by the participants. <sup>d</sup>EB= evaluation bias, which corresponds to the difference between SAve minus CAve.

Table 6.5.1d: The means and standard deviations for information search as a function of the experimental condition *prior knowledge average*.

Experimental Condition	RP <sup>a</sup>		RF <sup>b</sup>		RB <sup>c</sup>		DP <sup>d</sup>		DF <sup>e</sup>		DB <sup>f</sup>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Prior Knowledge												
Average (PK_Ave)	8.52	3.42	9.64	4.08	1.12	3.91	10.90	2.20	11.55	2.67	.65	2.75
N= 178												

Note. <sup>a</sup>RP= the preliminary ranking of the six objects used in the manipulation of selective exposure activity. <sup>b</sup>RF= the final ranking of the six objects. <sup>c</sup>RB= ranking bias, which corresponds to the difference between the final ranking minus the preliminary ranking. <sup>d</sup>DP= the preliminary decision participants made on the decision task. <sup>e</sup>DF= the final decision participants made on the decision task. <sup>f</sup>DB= decision bias, which corresponds to the difference between the final decision minus the preliminary decision.

The results of the Pearson Correlation analyses revealed that the higher participants Prior Knowledge Average was, the more selectively they searched for supporting pieces of information  $r(176) = 0.19$ ,  $p < 0.01$ ; the less contradicting pieces of

information they read  $r(176) = -0.21, p < 0.01$ ; and the more their confirmation bias was  $r(176) = 0.34, p < 0.00$ . Additionally, the results indicated that *prior knowledge average* is positively correlated with the evaluation participants made for the supporting pieces of information  $r(176) = 0.39, p < 0.00$  and positively correlated with the evaluation bias  $r(176) = 0.35, p < 0.00$ . In contrast, there was no correlation found between *prior knowledge average* and the evaluation participants made for contradicting pieces of information  $r(176) = -0.13, p < 0.10$ .

Additionally, the analysis revealed that the higher participants scored on the *prior knowledge scale*, the higher their final ranking was  $r(176) = 0.20, p < 0.01$  and the higher their ranking bias was  $r(176) = 0.17, p < 0.03$ . Contrary, there was no correlation between *prior knowledge average* and participants' preliminary ranking  $r(176) = 0.04, p < 0.56$ . Finally, a positive correlation was found between *prior knowledge average* and final decision  $r(176) = 0.25, p < 0.00$  and decision bias  $r(176) = 0.29, p < 0.00$ . On the other hand, no correlation was found for the *prior knowledge average* and the preliminary decision participants made  $r(176) = -0.06, p < 0.45$ .

In conclusion, the results from the t-test analysis and the Pearson Correlation analysis indicated that *prior knowledge* had a significant effect on supportive information exposure and decision quality thus allowing the acceptance of *hypothesis 1*.

### 6.5.2 Hypothesis 2

A One-Way Anova Analysis was conducted to determine whether the type of feedback participants received would have an impact on how selectively they would search for information and on their decision quality. Table 6.5.2a and Table 6.5.2b display the descriptive statistics for the variables that *measured information exposure* and *decision quality* in correspondence with the grouping variable *self-enhancement feedback*:

Table 6.5.2a: The means and standard deviations for information search as a function of the grouping variable *self-enhancement feedback* (S-EFeed).

Experimental Condition	Types of information read													
	<u>Supporting</u>				<u>Contradicting</u>		<u>CB<sup>a</sup></u>		<u>SAve<sup>b</sup></u>		<u>CAve<sup>c</sup></u>		<u>EB<sup>d</sup></u>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
S-EFeed negative	4.79	1.18	4.48	1.17	.31	1.29	3.97	0.83	3.63	0.98	.34	1.37		
N= 62														
S-EFeed neutral	5.18	1.03	4.45	1.31	.66	1.24	4.33	.73	3.56	0.81	.77	1.11		
N= 56														
S-EFeed positive	5.47	.72	4.35	1.41	1.12	1.47	4.78	.89	3.21	0.60	1.57	1.03		
N= 60														

Note. <sup>a</sup>CB= Confirmation bias, which corresponds to the difference between the supportive pieces of information minus the contradictory pieces of information. <sup>b</sup>SAve= the average score of the supporting pieces of information as evaluated by the participants. <sup>c</sup>CAve= the average score of the contradictory pieces of information as evaluated by the participants. <sup>d</sup>EB= evaluation bias, which corresponds to the difference between SAve minus CAve.

Table 6.5.2b: The means and standard deviations for the rankings and the decisions made as a function of the grouping variable *self-enhancement feedback* (S-EFeed).

Experimental Condition	<u>RP</u> <sup>a</sup>		<u>RF</u> <sup>b</sup>		<u>RB</u> <sup>c</sup>		<u>DP</u> <sup>d</sup>		<u>DF</u> <sup>e</sup>		<u>DB</u> <sup>f</sup>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
S-EFeed negative	8.18	3.18	8.90	3.62	.73	3.82	10.37	2.03	10.68	2.71	0.31	2.86
N= 62												
S-EFeed neutral	8.95	3.31	9.41	3.81	.46	2.46	11.34	1.92	11.43	2.40	.09	1.82
N= 56												
S-EFeed positive	8.47	3.76	10.62	4.62	2.15	4.84	11.05	2.53	12.57	2.57	1.52	3.14
N= 60												

Note. <sup>a</sup>RP= the preliminary ranking of the six objects used in the manipulation of selective exposure activity. <sup>b</sup>RF= the final ranking of the six objects. <sup>c</sup>RB= ranking bias, which corresponds to the difference between the final ranking minus the preliminary ranking. <sup>d</sup>DP= the preliminary decision participants made on the decision task. <sup>e</sup>DF= the final decision participants made on the decision task. <sup>f</sup>DB= decision bias, which corresponds to the difference between the final decision minus the preliminary decision.

The results of the One-Way Anova analysis revealed a statistically significant difference between the grouping variable *self-enhancement feedback* (S-EFeed) and the supporting pieces of information read  $F(2, 175) = 7.10, p < 0.00$  with the post hoc Tukey test showing that the difference was found between the positive ( $M = 5.47, SD = 0.72$ ) and the negative ( $M = 4.79, SD = 1.18$ ) feedback groups at  $p < 0.05$ ; between S-EFeed and the *confirmation bias*  $F(2, 175) = 5.60, p < 0.00$  with the post hoc Tukey test showing that the difference was found between the positive ( $M = 1.12, SD = 1.47$ ) and the negative ( $M = 0.31, SD = 1.29$ ) feedback groups at  $p < 0.05$ ; between S-EFeed and the average evaluations of the supportive pieces of information  $F(2, 175) = 14.82, p < 0.00$  with the post hoc Tukey test showing that the difference was found between all three groups (positive:  $M = 4.78, SD = 0.89$ ; negative:  $M = 3.97, SD = 0.83$ ; neutral:  $M = 4.33, SD = 0.73$ ) at  $p < 0.05$ ; between S-EFeed and the average evaluations of the contradictory pieces of information  $F(2, 175) = 4.73, p < 0.01$  with the post hoc Tukey test showing that the difference was found between the positive ( $M = 3.21, SD = 0.60$ ) and the negative ( $M = 3.63, SD = 0.98$ ) feedback groups at  $p < 0.05$ ; between S-EFeed and the *evaluation bias*  $F(2, 175) = 17.05, p < 0.00$  with the post hoc Tukey test showing that the difference was found between the positive ( $M = 1.57, SD = 1.03$ ) and the negative ( $M = 0.34, SD = 1.37$ ) feedback groups and between the positive ( $M = 1.57, SD = 1.03$ ) and neutral ( $M = 0.77, SD = 1.11$ ) feedback groups at  $p < 0.05$ ; between S-EFeed and the *ranking bias*  $F(2, 175) = 3.27, p < 0.04$  with the post hoc Tukey test showing that the difference was found between the positive ( $M = 2.15, SD = 4.84$ ) and the neutral ( $M = 0.46, SD = 2.46$ ) feedback groups at  $p < 0.05$ ; between S-EFeed and the preliminary



decision  $F(2, 175) = 3.11, p < 0.05$  with the post hoc Tukey test showing that the difference was found between the negative ( $M = 10.37, SD = 2.03$ ) and the neutral ( $M = 11.34, SD = 1.92$ ) feedback groups at  $p < 0.05$ ; between S-EFeed and the final decision  $F(2, 175) = 8.34, p < 0.00$  with the post hoc Tukey test showing that the difference was found between the positive ( $M = 12.57, SD = 2.57$ ) and the negative ( $M = 10.68, SD = 2.71$ ) feedback groups and between the positive ( $M = 12.57, SD = 2.57$ ) and neutral ( $M = 11.43, SD = 2.40$ ) feedback groups at  $p < 0.05$ ; between S-EFeed and *decision bias*  $F(2, 175) = 4.84, p < 0.01$  with the post hoc Tukey test showing that the difference was found between the positive ( $M = 1.52, SD = 3.14$ ) and the negative ( $M = 0.31, SD = 2.86$ ) feedback groups and between the positive ( $M = 1.52, SD = 3.14$ ) and neutral ( $M = 0.09, SD = 1.82$ ) feedback groups at  $p < 0.05$ ; and between S-EFeed and the self-enhancement score (acquired on the HSM)  $F(2, 175) = 28.78, p < 0.00$  with the post hoc Tukey test showing that the difference was found between all three groups (positive:  $M = 1.27, SD = 1.11$ ; negative:  $M = -0.37, SD = 1.39$ ; neutral:  $M = 0.19, SD = 1.08$ ) at  $p < 0.05$ .

On the other hand, the One Way Anova analysis did not show a significant effect between S-EFeed and the contradictory pieces of information read  $F(2, 175) = 0.17, p < 0.84$ ; between S-EFeed and the preliminary ranking  $F(2, 175) = 0.75, p < 0.47$ ; and between S-EFeed and the final ranking  $F(2, 175) = 2.88, p < 0.06$ . The conclusion that can be drawn from the results of the One-way Anova analysis is that the participants were significantly influenced by the feedback they received (with the majority being between the positive and negative feedback groups), both on how selectively they searched for information and on the decision quality they exhibited.

Afterwards, a Pearson correlation analysis was conducted to examine whether a person's degree of self-enhancement has an impact on selective exposure and decision quality. From the results of the Pearson correlation analysis between participants' self-enhancement score with the statements they read a positive correlation was found for the supporting pieces of information read  $r(176) = 0.22, p < 0.00$ ; a negative correlation for the contradicting pieces of information  $r(176) = -0.23, p < 0.00$ ; and a positive correlation with the confirmation bias  $r(176) = 0.36, p < 0.00$ . Next, for the evaluation variables of the study, the analysis showed a positive correlation between self-enhancement and the evaluations made for the supporting pieces of information  $r(176) = 0.39, p < 0.00$ ; a positive correlation with the evaluation bias  $r(176) = 0.33, p < 0.00$ ; on the other hand, no correlation for the evaluations of the contradicting pieces of information was found  $r(176) = -0.09, p < 0.23$ .

Furthermore, the analysis revealed that the higher participants' self-enhancement score the higher their final ranking was  $r(176) = 0.23, p < 0.00$  and the higher their ranking bias  $r(176) = 0.23, p < 0.00$ . Contrary, no correlation was found between self-enhancement and preliminary ranking  $r(176) = 0.01, p < 0.90$ . Finally, a positive correlation was found between self-enhancement score and final decision  $r(176) = 0.33, p < 0.00$  and between self-enhancement score and decision bias  $r(176) = 0.27, p < 0.00$ . In contrast, there was no correlation found between self-enhancement and preliminary decision  $r(176) = 0.07, p < 0.39$ .

In conclusion, the results of both the One-Way Anova analysis and the Pearson Correlation analysis revealed that *self-enhancement* was affected by the manipulation of

the study (the three different types of feedback participants received) and had a significant effect on supportive *information exposure* and *decision quality*. Therefore, *hypothesis 2* was accepted.

### 6.5.3 Hypothesis 3

Finally, to test *hypothesis 3* and to determine whether a higher degree of supportive information exposure leads to a better decision quality, a Pearson Correlation Analyses was conducted between the decision quality variables and the selective exposure variables. The results of the analysis revealed that the higher a person's confirmation bias was the better their ranking bias was [ $r(176) = 0.25, p < 0.00$ ] and the better their decision bias was [ $r(176) = 0.31, p = 0.00$ ]. Similar, the higher a person's evaluation bias was the better their ranking bias was [ $r(176) = 0.18, p < 0.01$ ] and the better their decision bias was [ $r(176) = 0.30, p < 0.00$ ]. In conclusion, the significant correlations found between the decision quality variables and the information exposure variables allowed the acceptance of *hypothesis 3*.

To summarize, the results of the various analyses for this study revealed that: *Prior knowledge* increased *supportive information exposure* and *decision quality* allowing the acceptance of *hypothesis 1*; that *self-enhancement* was positively correlated with *supportive information exposure* and *decision quality* allowing the acceptance of *hypothesis 2*; and that the more selectively people searched for information the better their decision quality was, allowing the acceptance of *hypothesis 3*.

### 6.5.4 Post Hoc Statistical Power Analysis for Study 4

A post hoc power analysis was performed to determine the achieved power of the study, using the Pearson Correlational test. This particular study with the sample size of 178 achieved a power of 0.99 (99%), given a medium effect size (0.30) and an  $\alpha$  of  $p = 0.05$ . Also, a post hoc power analysis was performed to determine the achieved power based on an independent samples t-test. The study achieved a power of 0.95 (95%) given sample size of 178, an  $\alpha$  of  $p = 0.05$  and a medium effect size (0.5). Finally, Post hoc power analysis was also performed to determine achieved power based on a One Way Anova test. The sample size achieved a power of 0.85 (85%) given sample size of 178, an  $\alpha$  of  $p = 0.05$  and a medium effect size (0.25). as a result, it can be assumed that the sample size was sufficient to detect moderate to large effects between variables.

## 6.6 Discussion

### 6.6.1 Study 4 Results in Correspondence to Literature

The analyses of the data of the study revealed numerous significant results. In specific, a first deduction that can be drawn from the results is that supportive information exposure does exist and it does take part in decision-making. That is, throughout the manipulations of the study, participants searched more selectively for information and they significantly evaluated higher supporting pieces of information compared to contradicting pieces of information. This finding falls in accordance to the plethora of studies that testify for the presence of supportive information exposure and classify it as an influential phenomenon of decision-making (McGuire, 1964; Festinger, 1957; Jonas et al., 2005; Fischer et al., 2010).

Second, concerning *hypothesis 1*, the results revealed that prior knowledge is a significant moderating factor of information exposure. Specifically, the more prior knowledge participants held about a specific subject, the more selectively they searched for information within that specific subject. In addition, people with higher levels of prior knowledge, significantly evaluated higher pieces of information that supported their preliminary decision as opposed to their evaluations of contradicting pieces of information. These findings falls in accordance with the postulation that higher levels of prior knowledge significantly affect confirmation bias due to a tendency people have in overvaluing their decisions (false-consensus effect; Ross, et. al., 1977; Botvin, et. al., 1992) in combination with an interpersonal motivation that pushes people to shield their prior decisions as a mechanism of self-enhancement (Kunda, 1990; Jonas, et. al., 2003), thus motivating them in preferring decision-consistent information and evading decision-inconsistent information (Jonas et al., 2003).

Next, the analyses of the data regarding *hypothesis 2* revealed that people that uphold higher levels of self-enhancement search more selectively for information compared to those people that posses lower levels of self-enhancement. Also, the people with higher levels of self-enhancement evaluated higher supporting pieces of information compared to their evolutions of contracting pieces of information. These findings fall in place with the research reports that suggest that selective exposure stems from a need of self-enhancement (Kunda, 1990; Jonas et al., 2003; Schwarz, et. al., 1980). In specific, people with higher levels of self-enhancement posses a need to perceive themselves as good decision-makers; therefore they feel obligated to defend their decisions which is expressed through them reading supporting pieces of information and disregarding with contradictory pieces of information; or by evaluating higher supporting pieces of information.

Finally, the results concerning *hypothesis 3* disclosed a significant positive correlation between supportive information exposure and decision quality. That is, the more selectively people searched for confirmatory information and the higher they evaluated that information, the better their final decision and their final ranking was. The above findings allowed the acceptance of *hypothesis 3*, however they do come in contrast to the research literature that already exists regarding the relationship between information exposure and decision quality. Specifically, previous studies have stated that

higher levels of selective exposure lead to a worse decision (Kray & Galinsky, 2003; Janis, 1982). The explanation why a positive correlation was found, in contrast to the negative found in past research, might be attributed to two main reasons: first, there were basically only two previous studies that had examined the effect of supportive information exposure on decision quality, a fact by itself that cannot be sufficient in establishing a rule. It is evident that more research is necessary in order to be able to doubtlessly claim that selective exposure effects decision quality in one direction or in the other. Second, the methodology of the current study was different from that of the previous studies. In specific, the preceding studies provoked a negative preliminary decision (Janis, 1982), whereas the current study let participants' preliminary decision entirely up to them. In conclusion, it is suggested that through extensive research and an altered methodological approach, supportive information exposure can positively affect decision quality.

#### *6.6.2 Limitations / Future Reference*

Although the study yield significant effects and the hypotheses were accepted, there are still a few considerations that have to be discussed. For instance, for the assessment of information exposure a winter survival situation was employed. This was the case in two other previous studies were two other survival scenarios were used. As a result, since this methodology was employed in a total of three studies, and in all significant results were produced, it can be safe to assume that the current study in correspondence with the previous two, increases the validity and reliability of the specific method concerning the assessment of information exposure.

A moderating factor examined in study 4 was prior knowledge. The same factor was also examined in a previous study (study 3) however in the current study it was manipulated differently. In specific, in the previous study participants merely completed a prior knowledge assessment scale whereas in the current study participants were divided into two groups with the experimental group receiving a small article with information regarding survival situations (the information was relevant to the selective exposure exercise). The results showed that the people belonging to the experimental group significantly displayed higher degree of selective exposure compared to those that were in the control group and did not receive additional information. The implications of this is significant as it shows that it is possible that selective exposure can be manipulated (either increased or decreased according to the desired outcome) by providing extra information before hand. Moreover, a future study with a within groups experimental design could provide with extra insight on how additional information before hand can really effect selective exposure. Specifically, the same participants could go through a selective exposure exercise with additional information provided beforehand, and then they could complete a second similar selective exposure exercise without receiving extra information. By doing so, and by conducting a simple correlation analysis between the results of the two similar selective exposure exercises, the true impact of additional information provided beforehand could be revealed.

Additionally, the prior knowledge assessment scale that was employed in the study was the second time it had been used as an assessment tool for measuring prior knowledge. That fact set alone raises issues of content validity and reliability. However, in both circumstances the results were significant and exposed an effect of prior knowledge upon selective exposure. Therefore, although significant results in two studies do not guarantee validity and reliability, it still provides a good indication that the scale does indeed measure what it is suppose to measure. For future reference, steps should be taken to establish validity or reliability. This could be done by either recruiting a panel of judges to evaluate the items of the scale, thus increasing validity (Lawshe, 1975); or by running a correlation analysis of the results derived from the specific scale with the results of other scales that measure prior knowledge, thus increasing reliability (Murphy & Davidshofer, 2004).

### *6.6.3 Conclusion*

Research in selective exposure has been carried out for many decades with plentiful reports concerning its implications and byproducts. The vast majority of these reports all define confirmation bias as a negative phenomenon that tampers with decision-making. Nevertheless, the current study hypothesized and examined a possible positive effect of selective exposure, as an attempt to provide a diverse approach that would deviate from previous research. Subsequently, the results of the study back up the stated hypotheses, showing that people with higher levels of prior knowledge displayed higher levels of selective exposure; people with higher levels of self-enhancement showed higher levels of selective exposure; and people who searched more selectively for information and evaluated higher supporting pieces of information, reached a better final decision.

Finally, this study does not conclude the investigation of the relationship between information exposure and decision quality. A fifth study will follow in an effort to add further support for the positive correlation found in the previous studies. The aim of a further study will be to increase the support acquired from previous studies that indicate that supportive information exposure is positively correlated to decision quality. Additionally, in Study 5, the assessment method of information exposure will divert from survival situations employed in Studies 2, 3 and 4, and will go back to the nutrition value paradigm employed in Study 1. However, in the next study, six new food items will be introduced, different from the ones used in Study 1. By this, if similar results were found in both studies, it would then be safe to postulate that the nutrition value paradigm is effective in measuring information exposure and that a true effect exists. Lastly, two new moderators will be examined in Study 5 as a continuation of the attempt to gain a more spherical understanding of how information exposure is affected by specific factors and how that effect contributes to the relationship between information exposure and decision quality.

## CHAPTER SEVEN

### ***‘Enhancing Decision Quality through Information Exposure and the Moderating Effects of Cognitive Dissonance and Information Quantity’***

Study 5 was designed to provide further evidence that higher levels of supportive information exposure enhance decision quality. Parallel, the effects of two new moderators were assessed in order to examine the effect they have on information exposure and in turn on decision quality. Also, similar to Study 1 decision quality was assessed by comparing participants’ decisions and rankings to those done by specialized nutritionists. Furthermore, *decision quality* was utilized as the dependent variable; *information exposure* was utilized as the independent variable; and *cognitive dissonance* (2 levels: consonant vs. dissonant) and *information quantity* (2 levels: 2 pieces of information vs. 6 pieces of information) operated as moderating variables. Finally, it should be noted that although participants were recruited from three different countries, a cross-cultural variable was not taken into consideration.

### **7.1 Hypotheses**

*Hypothesis 1:* Cognitive dissonance has a significant effect on information exposure, which in turn has a direct effect on decision quality. Specifically, we hypothesize the more cognitive dissonance a person experiences, the more selectively they will search for information and the better their decision quality will be.

*Hypothesis 2:* Information quantity has a significant effect on information exposure, which in turn has a direct effect on decision quality. Specifically, we hypothesize that the more pieces of information people have to choose from the more selectively they will search through those pieces of information and the better their decision quality will be.

*Hypothesis 3:* Higher levels of supportive information exposure lead to higher decision quality. In particular, the more selectively a person searches for information, the better their decision quality will be.

## **7.2 Theoretical Basis of Study Hypotheses**

### *7.2.1 Cognitive Dissonance and Information Exposure*

A moderating factor that was examined in the study was *cognitive dissonance*. It was hypothesized that when people experienced increased cognitive dissonance, they would display increased supportive information search, which in turn would lead to better decision quality. The theoretical basis of the hypothesis is traced to Festinger's theory of cognitive dissonance. According to the theory, when people are confronted with disconfirming or decision-inconsistent information they experience a state of cognitive stress. The result of which, motivate people in searching for consonant information and avoiding dissonant information as a means of reducing dissonance (Festinger, 1957). Festinger (1962) argued that an essential role in minimizing dissonance was played out by people engaging in increased levels of supportive information search.

In addition, there is plenty of research evidence that ties information exposure to the theory of cognitive dissonance. For instance, researchers have shown that people searched for consonant information and evaded contradicting information when they were provoked in experiencing dissonance (Cotton & Hieser, 1980). Similar, Mullikin (2003) found that consumers often search for information, retailers and substitute products that comply with their prior beliefs. Finally, a meta-analytic review of previous studies reported that selective exposure is certainly associated with the theory of cognitive dissonance and as a means of reducing dissonance (D'Alessio & Allen, 2002). In conclusion, the cognitive dissonance theory and the supporting research studies have brought forth the effect and the increase in confirmatory search produced by feelings of distress and dissonance, asserting that *cognitive dissonance* and supportive information exposure are positively correlated.

### *7.2.2 Information Quantity and Information Exposure*

The moderating effect of the variable *information quantity* was investigated in the current study. The theoretical basis for this variable can be traced to a series of studies conducted by Fischer, Schulz-Hardt and Frey (2008) when they manipulated the quantity of information provided to the participants. In specific, the researchers conducted four consecutive studies that they altered the amount of pieces of information the participants received and found that people significantly preferred decision consistent information when they had to choose from ten pieces of information as compared to those that had only two pieces of information to choose from. They attributed the results of their studies to the selection criteria participants used in every condition. Specifically, when participants were confronted with only two pieces of information, the criteria was solely consistent vs. inconsistent. However, when there were more pieces of information the

selection criteria was quality of the information, leading to participants heavily preferring decision consistent information.

In conclusion, the research findings from Fischer and colleagues (2008) make clear that the amount of information a person has to choose from, effects how selectively they search for information; that is, the more pieces of information presented, the more supportive information exposure people display. Consequently, the second hypothesis of the study, which is based on these findings, attempted to investigate the relationship between information quantity and information exposure, and how that ultimately affected decision quality.

### *7.2.3 Information Exposure and Decision Quality*

The third hypothesis of the study investigated the connection between *information exposure* and *decision quality*. There is a limited amount of studies that investigate how information exposure effects decision quality with the results indicating a negative correlation. For instance, Kray and Galinsky (2003) found that when participants were provoked in making an initial bad decision, through information exposure they made an even worse final decision. The researchers claimed that in order for participants to reach a better decision, they had to minimize the effect of selective exposure and to search more balanced for information. Similarly, Janis (1982) reported that the more selectively a person search for information the worse their final decision was. Specifically, the researcher suggested that past disastrous decisions have been a product of people displaying high degree of selective exposure, tragic decisions that could have been avoided if the decision-makers held lower levels of supportive information exposure. In contrast, the current study proposed an opposite effect of information exposure as it has been presented by previous literature, and attempted to provide evidence that supportive information exposure is positively correlated with decision quality.

In conclusion, the theoretical platform for the third hypothesis of the current study is based on a restricted number of studies that suggest an opposite effect. As a result, the aim of this study is to provide an extensive and methodical investigation required in order to gain an in-depth perception of the true nature of the relationship between information exposure and decision quality.

## **7.3 Methods**

### *7.3.1 Participants*

An opportunity sample of one hundred seven students was recruited from three different educational institutions: the John Moores University in Liverpool (UK), the Kent State University (Ashtabula, Ohio Campus, USA) and the University of Wales (Athens, Greece campus). From those participants, sixty-one were women and forty-six



were men. Also, from the total of participants, sixty-four were recruited from the UK, seventeen from USA and twenty-six from Greece.

### 7.3.2 Ethics

Approval for conducting the study was requested and granted from the ethics committee of the three educational institutions mentioned above. It should be noted, that for the experimental manipulation of *cognitive dissonance*, a group of participants received dissonant information that could produce some degree of discomfort. However, it was made known beforehand that if they experienced any distress or anxiety during the study they could withdraw if they pleased so with no further explanations. Also, at the end of the study, each participant was briefed that for the purpose of the study they were purposely given dissonant information.

### 7.3.3 Design

The study had a 2 (type of information: supporting vs. contradicting) X 2 (cognitive dissonance: consonant vs. dissonant) X 2 (information quantity: 2 pieces of information vs. 6 pieces of information) between groups correlational design with decision quality operating as the dependent variable (DV) of the study.

### 7.3.4 Material

Concerning *hypothesis 1*, a set of statements that either affirmed that nuclear power was beneficial for mankind or that stated the risks of nuclear power production (Buzz, 2009; Maehlem, 2013; Appendix 16). Also, the participants were asked to complete the state anxiety part of the Spielberger's State-Trait Anxiety Inventory (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), which consisted of a twenty-item self-evaluation questionnaire that assesses a person's degree of anxiety they are experiencing at any given moment (Appendix 17). Additionally, for *hypothesis 3* a nutritious value task (similar to the one used in Study 1) was used with a list of six food items (cabbage, cauliflower, green peppers, almonds, avocado and banana) and statements that were either supportive or contradictive of their nutritious value (Appendix 18).

### 7.3.5 Procedure

The first step of the study involved participant recruitment that was done through personal approach at one of three educational institutions: John Moores University of Liverpool, University of Wales, and Kent University. For the next step, each participant was asked to express their opinion on whether they were in favor or against the

production of nuclear energy. Specifically, they were presented with two statements; one that affirmed that nuclear power was beneficial for mankind and one that stated that it was not. Participants expressed their personal opinion by circling the statement they believed expressed their views on the matter. Afterwards, each participant was randomly presented with either consonant (agreeing) or dissonant (non-agreeing) information (depending on their personal expressed opinion). For instance, if a participant that expressed they were in favor of nuclear energy randomly received information that brought forth the negative aspects of nuclear energy, then they were assigned to the dissonant information group. Likewise, if the same person received information that brought forth the positive aspects of nuclear energy, then they were randomly assigned to the consonant information group. Furthermore, in order to test the effect of the manipulation of variable cognitive dissonance, participants were asked to complete the state anxiety portion of the Spielberger's State-Trait Anxiety Inventory (STAI). This allowed the assessment of the effect of cognitive dissonance provoked to participants that were presented with the dissonant information in correspondence to how selectively they searched for information and how their decision quality was affected.

Next step was geared into testing *hypothesis 2*. Specifically, the variable *information quantity* was manipulated during the presentation of the statements that measured information exposure. In general, information exposure is investigated by presenting a participant with the choice between two opposing statements/pieces of information, one that is supporting and one that is contradicting of a specific opinion or stance. However, in the present study, participants were randomly divided into two groups: one that received the typical two opposing pieces of information (control group), and one that was exposed to six pieces of information (experimental group) with three being supportive and the other three that were contradictive. By this process, it was made possible to measure the effect of *information quantity* on *information exposure* and *decision quality*.

Finally, the last step of the study included the assessment of information exposure and decision quality. In order to do so, each participant was presented with a list of six food items that they had to choose the three they considered to be the most nutritious. They were informed that this was merely a preliminary decision that they could reevaluate at the end of the study and then make a final decision. In addition with their preliminary decision participants were also asked to put in ranking order all six-food items from most nutritious to least nutritious. As with the preliminary decision, they were informed that this was only a preliminary ranking that they could reevaluate at the end and then make a final ranking.

After participants made their preliminary decision and their preliminary ranking, they had to choose to read the brief statements they wanted that were both supporting and contradicting for each food item. Simultaneously to reading each brief statement, participants were asked to decide and express whether they would want to read at the end of the study the full statement of that food item. For instance, when a participant read the supporting brief statement for *avocado*, they then were asked to decide whether they would want to also read the supporting full statement for the *avocado*. By doing so, it was

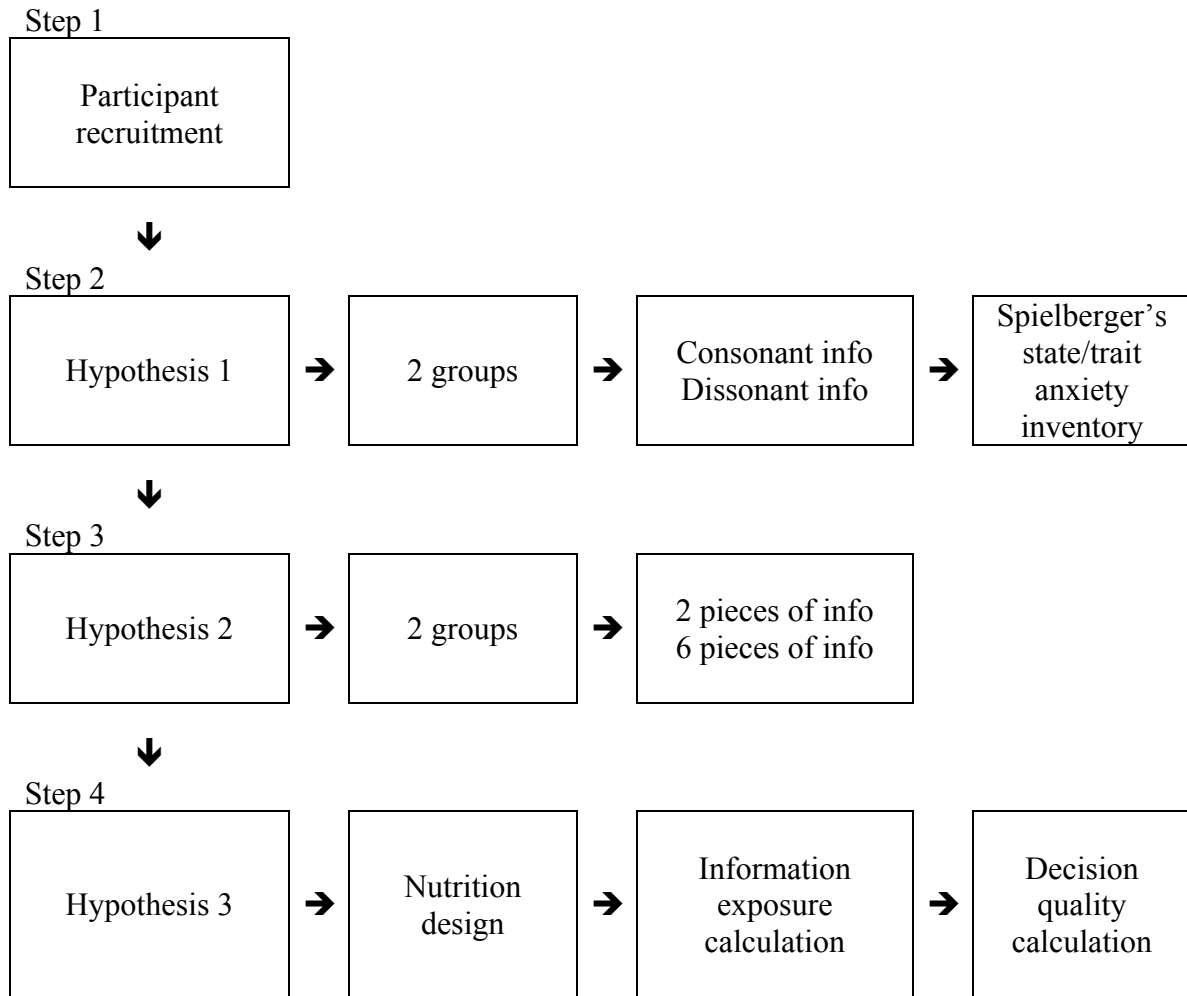
made possible to assess the degree of supportive information exposure for each participant. This was done simply by adding the total number of supporting full pieces of information they expressed they would want to read and subtracting from that total the number of contradicting full pieces of information they expressed they would want to read. It should be noted that the full statements of choice for each food object were never presented, as participants were merely made to believe they would read them at the end of study.

Additionally, for all the brief statement, participants had to evaluate them on two different dimensions: on whether the information of the brief statement was important (importance dimension) and on whether the information was credible (credibility dimension). Therefore, a second measure of information exposure was calculated and termed *evaluation bias*, by subtracting the mean evaluation score of the contradicting brief statements from the mean evaluation score of the supporting brief statements.

For the concluding part of the study, each participant was asked to revise their preliminary decision and preliminary ranking, and make an ultimate decision on which three food items they now perceived as most nutritious and to put all six in a final ranking order. Through this process decision quality for each participant was calculated by computing the difference between the final and the preliminary decision (decision bias); and likewise by computing the difference between the final ranking and the preliminary ranking (ranking bias). This procedure allowed the testing of *hypothesis 3*.

All the steps of the study were completed by the one hundred seven participants and are summarized in Flowchart 7.3.5:

Flowchart 7.3.5: The procedure of the study in steps.



## 7.4 Data Analyses

To test *hypothesis 1* an initial t-test analysis was conducted between the grouping-variable *cognitive dissonance* and the average score participants made on the Anxiety Scale. Afterwards, a Person Correlation Analysis was conducted between the Anxiety Average Score with the variables that measure *information exposure* (confirmation bias and evaluation bias) and *decision quality* (ranking bias and decision bias). Next, in order to test *hypothesis 2* consecutive t-test analyses were carried out between the grouping variable information quantity and the variables that measured information exposure and decision quality. Furthermore, to test the *hypothesis 3*, a Pearson Correlation analysis was conducted between the *information exposure* variables and the *decision quality* variables. Finally, a post hoc power analysis was conducted to determine the statistical power of the sample.

## 7.5 Results

The frequencies of the demographic variables *gender* and *age* are displayed in Table 7.5. From the table, it can be seen that 46 of the participants were males and 61 were females. In addition, the majority of the participants were between the age group of 18-24, making up for the 87.9% of the data set.

Table 7.5: Frequencies for the variables *gender* and *age*.

		N	Percent
Gender	Total	107	100
	Male	46	43
	Female	61	57
Age	Total	107	100
	18-24	94	87.9
	25-29	8	7.5
	30-up	5	4.7

### 7.5.1 Hypothesis 1

Table 7.5.1a and Table 7.5.1b display the descriptive statistics for the grouping variable *cognitive dissonance* with the variables that measured *information exposure* and *decision quality*:

Table 7.5.1a: The means and standard deviations for information search as a function of the experimental condition *cognitive dissonance* (CD).

Experimental Condition	Types of information read											
	Supporting		Contradicting		CB <sup>a</sup>		SAve <sup>b</sup>		CAve <sup>c</sup>		EB <sup>d</sup>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
CD No N= 50	3.14	1.16	3.20	1.13	.06	1.32	3.64	.67	3.51	.73	.13	1.09
CD Yes N= 57	4.12	1.30	3.00	1.23	1.12	1.60	4.01	.74	3.10	.55	.91	1.01

Note. <sup>a</sup>CB= Confirmation bias, which corresponds to the difference between the supportive pieces of information minus the contradictive pieces of information. <sup>b</sup>SAve= the average score of the supporting pieces of information as evaluated by the participants. <sup>c</sup>CAve= the average score of the contradictory pieces of information as evaluated by the participants. <sup>d</sup>EB= evaluation bias, which corresponds to the difference between SAve minus CAve.

Table 7.5.1b: The means and standard deviations for the rankings and the decisions made as a function of the experimental condition *cognitive dissonance* (CD).

Experimental Condition	RP <sup>a</sup>		RF <sup>b</sup>		RB <sup>c</sup>		DP <sup>d</sup>		DF <sup>e</sup>		DB <sup>f</sup>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
CD No N= 50	10.84	3.31	10.12	2.75	.72	3.15	9.60	1.75	9.44	2.24	.16	1.86
CD Yes N= 57	11.37	2.73	12.25	2.75	.88	2.80	10.84	1.70	12.19	1.74	1.35	2.07

Note. <sup>a</sup>RP= the preliminary ranking of the six objects used in the manipulation of selective exposure activity. <sup>b</sup>RF= the final ranking of the six objects. <sup>c</sup>RB= ranking bias, which corresponds to the difference between the final ranking minus the ranking. <sup>d</sup>DP= the preliminary decision participants made on the decision task. <sup>e</sup>DF= the final decision participants made on the decision task. <sup>f</sup>DB= decision bias, which corresponds to the difference between the final decision minus the preliminary decision.

First, a t-test analysis was conducted in order to check whether the grouping variable *cognitive dissonance* had an effect on *information exposure* and *decision quality*. The analysis revealed that the participants that received dissonant information significantly read more supportive pieces of information,  $t(106) = 4.11, p < 0.00$ ; displayed significantly more confirmation bias,  $t(106) = 4.21, p < 0.00$ ; evaluated significantly higher supporting information,  $t(106) = 2.70, p < 0.01$ ; evaluated significantly lower contradicting information,  $t(106) = 3.31, p < 0.00$ ; significant displayed increased evaluation bias,  $t(106) = 3.82, p < 0.00$ ; significantly made a higher final rank,  $t(106) = 3.40, p < 0.00$ ; displayed a significantly higher ranking bias,  $t(106) = 2.78, p < 0.01$ ; made a significantly higher preliminary decision,  $t(106) = 3.72, p < 0.00$ ; significantly made a higher final decision,  $t(106) = 7.15, p < 0.00$ ; and displayed significantly higher decision bias,  $t(106) = 3.95, p < 0.02$ . On the other hand, the t-test analysis did not display a significant difference in means between the contradicting pieces of information read,  $t(106) = 0.88, p < 0.38$ ; and the preliminary ranking,  $t(106) = 0.91, p < 0.37$ . The above results of the t-test displayed that the manipulation of *cognitive dissonance* provoked a significant difference in mean scores of the variables of the study.

Second, a Pearson Correlation analyses was conducted between the *anxiety average score* (acquired from the state anxiety portion of the Spielberger's State-Trait Anxiety Inventory) and the variables that measure *selective exposure* and decision quality in order to determine the exact effect of the variable *cognitive dissonance*. The Correlation analysis disclosed that there is a significant positive correlation between a high anxiety score and the supportive pieces of information read,  $r(105) = 0.24, p < 0.01$ ; high anxiety score with the confirmation bias,  $r(105) = 0.26, p < 0.01$ ; high anxiety score with evaluation of supportive pieces of information,  $r(105) = 0.23, p < 0.02$ ; revealed that high anxiety score was negatively correlated with the evaluations of the contradicting pieces of information,  $r(105) = -0.21, p < 0.03$ ; high anxiety score positively correlated with the evaluation bias,  $r(105) = 0.27, p < 0.01$ ; high anxiety score positively correlated with the final ranking,  $r(105) = 0.31, p < 0.00$ ; high anxiety score positively correlated with the ranking bias,  $r(105) = 0.29, p < 0.00$ ; high anxiety score was positively

correlated with the final decision,  $r(105) = 0.51, p < 0.00$ ; and high anxiety score was positively correlated with decision bias,  $r(105) = 0.50, p < 0.00$ . On the other hand, there was no significant correlation between anxiety score and the contradicting pieces of information read,  $r(105) = -0.08, p < 0.41$ ; with the preliminary ranking,  $r(105) = 0.01, p < 0.92$ ; and with the preliminary decision,  $r(105) = 0.10, p < 0.31$ ; The above correlations found between the effect of *cognitive dissonance* the variables that measure *information exposure* and *decision quality* allowed the acceptance of *hypothesis 1*.

### 7.5.2 Hypothesis 2

In order to test *hypothesis 2*, consecutive t-test analyses were conducted between the grouping variable *information quantity* and the variables that measured *information exposure* and *decision quality*. The results of the analysis revealed that there was significant difference between the quantity of pieces of information a participant was presented with the number of supporting pieces of information read  $t(106) = 4.28, p < 0.00$ ; with the confirmation bias,  $t(106) = 4.79, p < 0.00$ ; with the evaluations of the supporting pieces of information,  $t(106) = 6.62, p < 0.00$ ; with the evaluations of the contradicting pieces of information,  $t(106) = 3.22, p < 0.00$ ; with the evaluation bias,  $t(106) = 6.47, p < 0.00$ ; with the final ranking  $t(106) = 2.59, p < 0.01$ ; with the ranking bias,  $t(106) = 2.52, p < 0.01$ ; with the preliminary decision,  $t(106) = 2.03, p < 0.05$ ; and with the final decision,  $t(106) = 2.91, p < 0.00$ . In contrary, no significant difference was found between *information quantity* and the contradicting pieces of information read,  $t(106) = 1.33, p < 0.19$ ; the preliminary ranking,  $t(106) = 0.04, p < 0.97$ ; and the decision bias,  $t(106) = 1.49, p < 0.14$ .

In conclusion, due to the results of the t-tests, it is safe to argue that the more pieces of information a person is presented with to choose from, the more selectively they will search for information and the better their final decision will be. Therefore, *hypothesis 2* was accepted.

### 7.5.3 Hypothesis 3

Finally, to test *hypothesis 3* and to determine whether a higher degree of supportive information exposure leads to a better final decision, a Pearson Correlation Analysis was conducted between the variables that measured *information exposure* and *decision quality respectively*. The results of the analysis revealed that the higher the confirmation bias was, the better a person's ranking bias was [ $r(105) = 0.28, p < 0.00$ ] and the better their decision bias was [ $r(105) = 0.36, p < 0.00$ ]. Similar, it was found that the higher the evaluation bias was, the better a person's ranking bias was [ $r(105) = 0.29, p < 0.00$ ] and the better their decision bias was [ $r(105) = 0.32, p < 0.00$ ]. In conclusion, the significant correlations found between the *decision quality* variables and the *information exposure* variables allowed the acceptance of *hypothesis 3*.

To summarize, the results of the various analyses for this study revealed that *cognitive dissonance* had a significant effect upon supportive *information exposure* and *decision quality* allowing the acceptance of *hypothesis 1*; that *information quantity* had a significant effect on supportive *information exposure* and *decision quality* allowing the acceptance of *hypothesis 2*; and that the more selectively people searched for information the better their *decision quality* was, allowing the acceptance of *hypothesis 3*.

#### 7.5.4 Post Hoc Statistical Power Analysis for Study 5

A post hoc power analysis was performed to determine the achieved power of the study, using the Pearson Correlational test. This particular study with the sample size of 107 achieved a power of 0.94 (94%), given a medium effect size (0.30) and an  $\alpha$  of  $p = 0.05$ . Also, a post hoc power analysis was performed to determine the achieved power based on an independent samples t-test. The study achieved a power of 0.82 (82%) given sample size of 107, an  $\alpha$  of  $p = 0.05$  and a medium effect size (0.5). In other words, the sample size was sufficient to detect moderate to large effects between variables.

## 7.6 Discussion

### 7.6.1 Study 5 Results in Correspondence to Literature

The analysis of the study's data revealed various statistically significant results and provided empirical support that allowed the acceptance of the stated hypotheses. First and most important finding was the fact that supportive information exposure was an existential and influential phenomenon. In specific, the participants searched more systematically for confirming pieces of information; disregarded with contradicting pieces of information; evaluated higher supporting pieces of information; and evaluated lower contradicting pieces of information. These results fall in place with the plentiful of research studies that have been previously conducted and have displayed that decision-making is filtered through the phenomenon of selective exposure (Klapper, 1960; Ditto & Lopez, 1992; Greitemeyer, Fischer, Frey and Schulz-Hardt, 2009; Schulz-Hardt, et. al., 2001). It has become well established, when people are confronted with a choice among opposing pieces of information, they systematically search for information that confirms their opinions or attitudes (Frey, 1986; Knobloch-Westerwick, 2012; Holton & Pyszczynski, 1989).

Furthermore, an additional finding that confirmed the first hypothesis of the study was when cognitive dissonance was provoked, the participants searched more selectively for information. In particular, the participants that received the dissonant information and scored higher on the state anxiety portion of the Spielberger's State-Trait Anxiety Inventory (Spielberger, et. al., 1983) as a result of the dissonant information, displayed higher levels of supportive information exposure, that was expressed through the reading of more confirmatory pieces of information and the higher evaluation of supporting



pieces of information over contradicting ones. These findings fall in accordance with the previous literature that are based on Festinger's theory of cognitive dissonance which implies that people exhibit increased levels of supportive information exposure as a means of reducing dissonance (Festinger, 1957; Festinger 1962; Cotton & Hieser, 1980; Mullikin, 2003; D'Alessio & Allen, 2002).

Concerning *hypothesis 2* of the study, the results yielded the participants that were in the experimental group and received more pieces of information (6 as opposed to 2 that the control group were presented with) systematically searched more selectively for information, evaluated higher supporting pieces of information and evaluated less contradicting pieces of information. The positive association between information quantity and information exposure falls in place with the research studies conducted by Fischer et al., (2008) which found that the more pieces of information a person is presented with the more selectively they search for information; as participants profoundly prefer decision consistent information due to the type of quality selection criteria that is activated when they are confronted with more pieces of information.

Furthermore, concerning *hypothesis 3*, the results yielded the more selectively participants searched for information, and the higher they evaluated supporting pieces of information, the better their final ranking and their final decision was. This positive correlation was found for both of the moderators examined in this study. To clarify, the participants that scored higher on the state anxiety portion of the Spielberger's State/Trait Anxiety Inventory (Spielberger, et. al., 1983), revealing an increase in stress levels provoked by the manipulation of cognitive dissonance, displayed increased supportive information exposure and increased decision quality. Similar, the participants that received more pieces of opposing information to choose from (6 compared to 2) also displayed increased supportive information exposure and higher decision quality (which was expressed through the participants making a better final ranking and a better final decision).

Even more, the results of the effect of the two moderators on decision quality through the 'filter' of information exposure have not been examined before. However, the association between selective exposure and decision quality has been scarcely investigated, with the results of the current study coming in contrast to those of previous studies. In specific, Kray and Galinsky (2003) showed that when participants were provoked in making a bad preliminary decision, they made a worse final decision through the process of information exposure. Similar, Janis (1982) found a negative correlation between supportive information exposure and decision quality when participants made a bad preliminary decision.

Nonetheless, the opposing results found in the current study can be attributed to the fact that in the previous studies participants were lead into making an initial bad decision, whereas in the current study, participants were not provoked or lead into making an initial bad decision. This methodological difference in design is speculated in having contributed to the difference in results, and lead participants in making a better final decision. Also, it should be stressed that only a few studies have been conducted investigating the connection between information exposure and decision quality.

Therefore, it becomes evident that more research is necessary to acquire concrete conclusions about the true nature of the correlation between information exposure and decision quality.

### *7.6.2 Limitations / Future Reference*

Although the study revealed significant results and all three hypotheses were accepted, there still are a few issues that need to be addressed. First of all, the method of assessing selective exposure was a novel method, which has only been used once before. Specifically, a paradigm of six food items and numerous pieces of information regarding their nutritious significance as a means of measuring how selectively people searched among those pieces of information was employed. Since this was merely the second time such a method has been used, inevitably issues of validity and reliability emerge. Novel assessment methods always run the risk of not measuring what they were intending to, or not being able to produce similar results in an repetitive measure. Therefore, the simplest way to circuit-bend such an issue in the future is by implementing the same method again and then running a correlational analysis of the results of all the studies (using this specific assessment method), with the aim being to discovery a significant positive correlation.

A second concern that should be stressed is that for *hypothesis 1*, cognitive dissonance was manipulated and the state anxiety portion of the Spielberger's State-Trait Anxiety Inventory (Spielberger, et. al., 1983) was employed to measure how much stress participants experienced at that given moment. Afterwards, each participant's score on the inventory was compared to degree of supportive information exposure they displayed and to the quality of their decision. However, as there was no initial measure of anxiety to compare with the Spielberger inventory, or as the trait anxiety portion of the inventory was not employed, it is not sure if the level of anxiety that was measured was due to the manipulation of cognitive dissonance within the study or was it due to other interpersonal factors. As a result, and for future reference, an initial equivalent measure of anxiety should be employed or the full inventory could be used (both the state anxiety and the trait anxiety portion) to obtain a more complete image of its effect and to ensure that the anxiety levels the participants are experiencing, can be accredited to the design and the methodology of the study.

Finally, there are only a couple of research studies that have investigated the association between information exposure and decision quality. This fact set alone, leaves a lot of skepticism about the true nature of the relationship between the supportive information exposure and the quality of a decision, and if it can be truly portrayed by only a couple of studies. The need for future investigation becomes even more profound when the results of the current study depict an opposite effect of previous studies.

### 7.6.3 Conclusion

Information exposure has been extensively researched for more than fifty years. Even more, the vast majority of the empirical literature has focused and regarded supportive information exposure as an unconstructive phenomenon that obstructs with subjective decision-making. However, the current study attempted to approach information exposure from a different prospective and investigate if selectively searching for information, or systematically avoiding opposing pieces of information could produce some positive aspect to decision-making. Specifically, it was hypothesized that increased levels of supportive information exposure could increase decision quality. Indeed, the results of the study did support this hypothesis, projecting a positive correlation between supportive information exposure and decision quality, which was enhanced by the moderating effects of the variables cognitive dissonance and information quantity.

Although what was found in the study was significant, nevertheless it portrays a diverse picture from the currently prevailing one about information exposure, therefore more research has to be conducted to assure that an effect does exist. Hopefully, this study could provide the stepping ground for a new area of research within information exposure that will bring forward a diverse and more positive viewpoint of its implications as it was shown that when participants were allowed to *freely* make a preliminary decision, supportive information exposure and decision quality were *positively* correlated.

Finally, this study does not conclude the ongoing investigation of the relationship between selective exposure and decision quality. A sixth study will follow in order provide further support as found in previous 5 studies and to complete the testing of how decision quality is affected by selective exposure. Specifically, in Study 6, the moderator *information quantity* examined in Study 5 will be investigated again however this time the moderator will be controlled differently as it will have 3 levels compared to the 2 it had in Study 5. This is done mainly for two reasons. First, although *hypothesis 2* was accepted when it was found that the more pieces of information, the more participants searched for confirming information and the better their ranking bias was, this was not the case for decision bias. There was no correlation found between *information quantity* and *decision bias*. As a result, *information quantity* will be manipulated differently and assessed again in order to assure whether it has an impact on decision bias. Second, with assigning 3 levels to the moderator *information quantity*, an attempt will be made to investigate whether there is a specific number of information where the phenomenon of *selective exposure* is at its peak.

Furthermore, the moderator *commitment* will be investigated again as it was in Study 1, however this time it will also be manipulated in a different manner. This will strengthen and ensure that the results found in the previous study are attributed to the effect of the moderator and not a confounding variable, thus increasing the validity and reliability of the results obtained from both studies. Lastly, the nutrition value paradigm will be employed as a method of assessing information exposure. As in the previous studies that used this paradigm, six new food items will be introduced. By employing different food items in each of the three studies that used this method, the threat of the results being attributed to the specific food items or the threat of recruiting the same participants and presenting them the same food items is minimized. In essence,

manipulating differently a moderator and measuring them in more than one study, and using different food items in each study, increased reliability and validity of the results of those studies could be assured.

## CHAPTER EIGHT

### *“Enhancing Decision Quality through Information Exposure and the Moderating Effects Information Quantity and Commitment”*

Study 6 was the final study in this thesis and was designed to provide supplementary support that higher levels of supportive information exposure enhance decision quality. Also, as in the previous studies, two moderators were examined. Specifically, *decision quality* was utilized as the dependent variable; *information exposure* was utilized as the independent variable; and *information quantity* (3 levels: 2 pieces of information vs. 6 pieces of information vs. 10 pieces of information) and *commitment* (2 levels: commitment quotes vs. no commitment quotes) operated as moderating variables. It should be noted that *commitment* was also examined in Study 1, however in the current study it was manipulated in a different manner to ensure and strengthen the effect it possesses on information exposure. Similar, *information quantity* was also examined in Study 5, however this time an attempt was made to detect whether there is an exact number of information where supportive information exposure is at its apt. Furthermore, similar to Study 1 and Study 5, decision quality was assessed by comparing participants' decisions and rankings to those done by specialized nutritionists. Finally, although participants were recruited from three different countries, a cross-cultural variable was not taken into consideration.

## 8.1 Hypotheses

*Hypothesis 1:* Higher levels of supportive information exposure lead to higher decision quality. In particular, the more selectively a person searches for information, the better their decision quality will be.

*Hypothesis 2:* Information Quantity has a significant effect on information exposure, which in turn has a direct effect on decision quality. Specifically, we hypothesize that the more pieces of information people have to choose from the more selectively they will search through those pieces of information and the better their decision quality will be.

*Hypothesis 3:* Commitment has a significant effect on information exposure, which in turn has a direct effect on decision quality. Specifically, we hypothesize the more decision commitment a person exhibits, the more selectively they will search for information and the better their decision quality will be.

## 8.2 Theoretical Basis of Study Hypotheses

### 8.2.1 Information Exposure and Decision Quality

The relationship between information exposure and decision quality has only been investigated a couple of times with both studies revealing a negative correlation. Specifically, Kray and Galinsky (2003) found that when participants made a bad preliminary decision, they made an even worse final decision through the process of information exposure. Additionally, they argued that in order for people to make a better final decision people have to search more balanced for information. Likewise, Janis (1982) found that when people were led into making a bad initial decision, they made an even worse final decision as a result of the phenomenon of supportive information exposure. He reported that past tragic decisions occurred because the decision-makers neglected conflicting important information that could of prevented the tragic event.

In summary, the theoretical approach for the first hypothesis is based on a very limited amount of studies that portray an opposite effect of what is hypothesized in the current study. As a result, the goal of study is to provide a comprehensive and accurate description of the factual relationship between information exposure and decision quality.

### 8.2.2 Information Quantity and Information Exposure

Researchers have investigated the relationship between information exposure and information quantity and have disclosed that the more pieces of information people have to choose from, the more selectively they search amongst those pieces of information (Fischer, et. al., 2008). Specifically, in a series of studies, Fischer and colleagues (2008) divided participants into two groups, the control group that was exposed to two pieces of decision-making relevant information (one supporting and one non-supporting), and the

experimental group that was exposed to ten pieces of information, (five that were supporting and five that were non-supporting). They found that the experimental group was significantly engaged in increased selective search compared to that of the control group. The researchers justified these results on the selection criteria activated in each condition. That is, in the control group with the two pieces of information, the selection criterion was exclusively consistent or inconsistent, whereas in the experimental group, with the ten pieces of information, the selection criteria became the quality of information. This resulted in people systematically preferring decision consistent information to inconsistent information.

In summary, the above research findings made evident that information quantity had an effect on information exposure. In particular, the more pieces of information a person had to choose from, the more supportive information exposure they exhibited. Consequently, Fischer's et al. (2008) findings were incorporated into *hypothesis 2*, and it was investigated how the relationship between information quantity and information exposure affected decision quality.

### *8.2.3 Commitment and Information Exposure*

*Hypothesis 3* of the study investigated the relationship between information exposure and decision commitment. The theoretical basis for this hypothesis can be traced to the concept of escalation of commitment. Escalation of commitment refers to a pattern of behavior where a person remains committed to a decision even in the presence of alternatives or even when they are faced with negative outcomes (Whyte, 1986). More specifically, people display the tendency to constantly justify decision commitment even in the presence of opposing pieces of information (Arkes & Ayton, 1999). Even more, escalation of commitment, also referred to as commitment bias, increases supportive information exposure as it operates as a barrier for people in identifying alternative pieces of information or decision paths, and obstructs people from recognizing the negative outcomes of their initial decisions. The most common example of supportive information is found in 'bidder's war', where people find themselves 'trapped' in continuing bidding in auctions and paying a lot more than what the product is worth due to the obligation they feel in remaining faithful to their initial investment to a decision.

In summary, based on the concept of escalation of commitment, it was conjectured that the more decision commitment a person upheld, the more supportive information exposure they exhibited. As a result, *hypothesis 3* investigated how the relationship between decision *commitment* and *information exposure* affected *decision quality*.

## 8.3 Methods

### 8.3.1 Participants

An opportunity sample of ninety-eight students was recruited from three different educational institutions: the John Moores University in Liverpool (UK), the Kent State University (Ashtabula, Ohio Campus, USA) and the University of Wales (Athens, Greece campus). From those participants, fifty-seven were women and forty-one were men. Also, from the total of participants, fifty-eight were recruited from the UK, fifteen from USA and twenty-five from Greece.

### 8.3.2 Ethics

Approval for conducting the study was requested and granted from the ethics committee of the three educational institutions mentioned above.

### 8.3.3 Design

The study had a 2 (type of information: supporting vs. contradicting) X 3 (information quantity: 2 pieces of information vs. 6 pieces of information vs. 10 pieces of information) X 2 (commitment: commitment quotes vs. no commitment quotes) between groups experimental design with decision quality operating as the dependent variable (DV) of the study.

### 8.3.4 Material

Concerning *hypothesis 1*, a nutritious value task (similar to the one used in Study 1 and Study 5) was used with a list of six food items (broccoli, grapes, salmon, spinach, walnuts and whole wheat bread) and statements that were either supportive or contradictive of their nutritious value (Appendix 19). Also, for the testing of *hypothesis 3*, a set of various quotes about the importance of commitment was employed (Commitment quotes, n.d.; Appendix 20). Finally, a five-item questionnaire that measured decision commitment was used (Appendix 3).

### 8.3.5 Procedure

The completion of the study was separated into four specific steps. First, each participant was recruited through personal approach and was asked to partake in a study about decision-making regarding nutritious values of various foods. Next, step 2 encompassed the testing of *hypothesis 1*, where participants were asked to make a preliminary decision and later a final decision by choosing three food items out of a list of six they believed to be the most nutritious (similar procedure to Study 1 and Study 5).

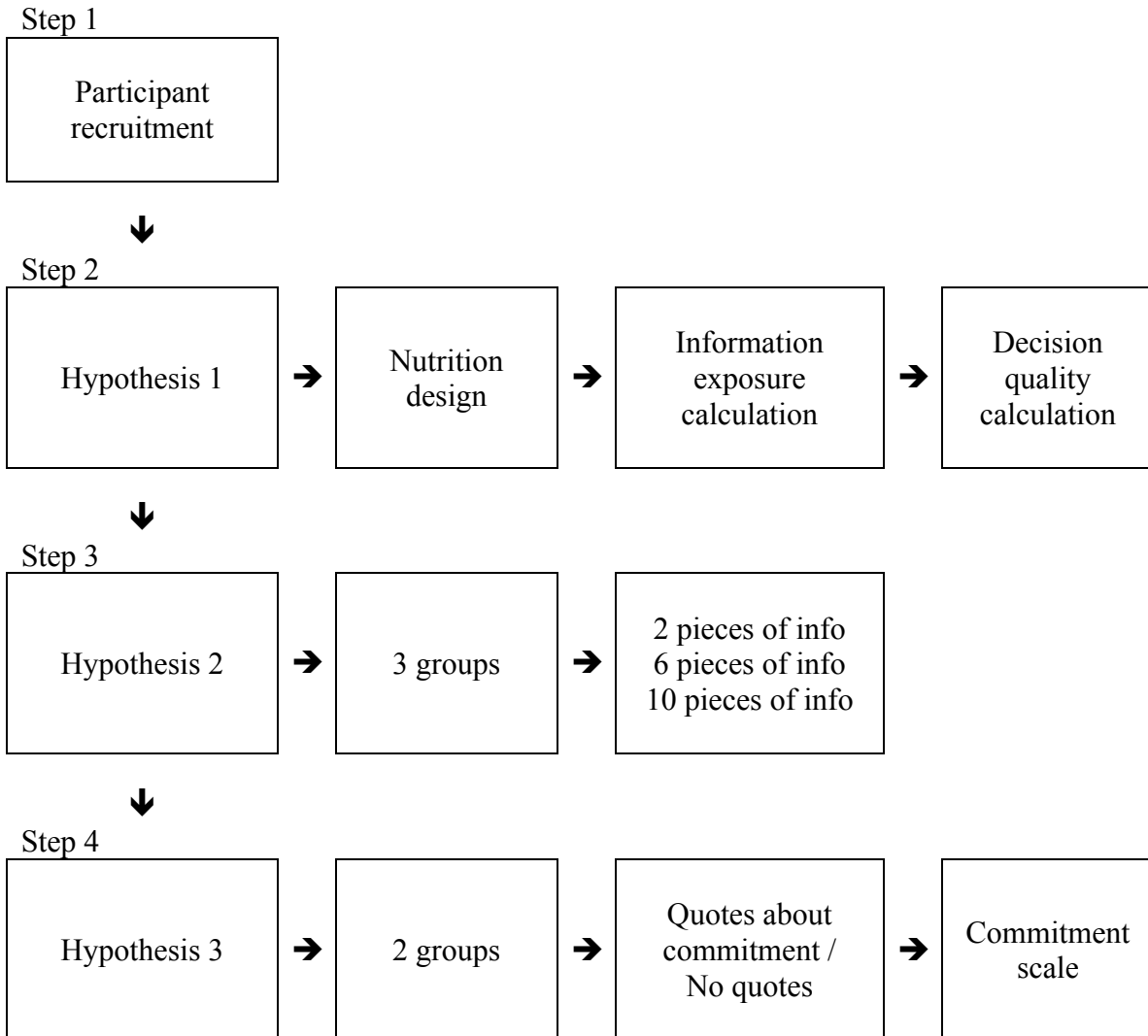


Parallel, they were asked to make a preliminary ranking and at then end a final ranking. Next, when the participants were presented with brief statement to choose to read, they prompted to evaluate each statement read on two different dimensions, on how important and how credible the participant believed they were. Simultaneously with the evaluation participants were also asked if they would want to read at the end of the study the full statement of the same item (either supportive or contradictive according to the brief statement). Through this process, participants' degree of supportive information exposure was computed.

Regarding step 3, participants were randomly separated into three groups during the procedure of selective exposure where they were presented with the brief supportive/contradictive statements of the six food items. The first group was presented with two brief pieces of information simultaneously, one that was supportive and one that was contradictive of a specific food item; the second group, participants were exposed to six brief pieces of information concurrently, three that were supportive and three that were conflicting; and the third group, participants were presented with 10 brief pieces of information, five that were supportive and five that were conflicting. By this way, it was made possible to investigate whether more pieces of information lead to a higher degree of supportive information exposure and consequently to better decision quality. Finally, for step 4, participants were randomly separated into 2 groups. In the first group (experimental group) participants were presented with various anonymous quotes about the significance of commitment and how, in general, a committed person can achieve more goals in life. Afterwards, the same participants completed a five-item commitment scale that measured their degree of commitment. In contrast, and part of the study's manipulation of the variable *commitment*, the second group (control group) of participants were not presented with the quotes about commitment and was asked to complete the commitment scale directly. As in the first group, the participants' average score on the commitment scale was calculated and used to test *hypothesis 3*.

All the steps of the study were completed by the ninety-eight participants and are summarized in Flowchart 8.3.5:

Flowchart 8.3.5: The procedure of the study in steps.



## 8.4 Data Analyses

To test *hypothesis 1* a Pearson Correlation analysis was conducted between the variables that measured *information exposure* (confirmation bias and evaluation bias) and the variables that measured *decision quality* (ranking bias and decision bias). Furthermore, to test *hypothesis 2* a One-Way Anova analysis was conducted between the grouping variable *information quantity* and the variables that measured *information exposure* and *decision quality*. Also, a post hoc Tukey analysis was carried out in order to determine between which groups of the variable *information quantity* was a significant difference of means. Next, to test *hypothesis 3*, initially, a t-test analysis was conducted between the grouping variable *commitment* and the variable *commitment average* (the average score participants scored on the commitment scale). Afterwards, a Pearson

Correlation analysis was carried out between the *commitment average* score and the variables that measured *information exposure* and *decision quality*. Finally, a post hoc power analysis was conducted to determine the statistical power of the sample.

## 8.5 Results

Table 8.5 displays the frequencies of the demographic variables *gender* and *age*. From the 98 participants that took part in the study, 41 were males and 57 were females. In addition, the majority of the participants (83.7%) belonged to the age group of 18-24.

Table 8.5: Frequencies for the variables *gender* and *age*.

		N	Percent
Gender	Total	98	100
	Male	41	41.8
	Female	57	58.2
Age	Total	98	100
	18-24	82	83.7
	25-29	14	14.3
	30-36	2	2

### 8.5.1 Hypothesis 1

In order to test *hypothesis 1* of the study and to determine whether a higher degree of supportive information exposure leads to a better final decision, a Pearson Correlation Analyses was conducted between the variables that measured *information exposure* and *decision quality*. The results of the analysis revealed that the higher the confirmation bias was, the better their decision bias was [ $r(105) = 0.22$ ,  $p < 0.03$ ]. Also, it was found that the higher the evaluation bias was, the better a person's ranking bias was [ $r(105) = 0.38$ ,  $p < 0.00$ ] and the better their decision bias was [ $r(105) = 0.47$ ,  $p < 0.00$ ]. In contrast, there was no correlation found between the confirmation bias and the ranking bias [ $r(105) = 0.09$ ,  $p < 0.37$ ]. In conclusion, the significant correlations found between the *decision quality* variables and the *information exposure* variables allowed the acceptance of *hypothesis 1*.

### 8.5.2 Hypothesis 2

Table 8.5.2a and Table 8.5.2b display the descriptive statistics for the grouping variable *information quantity* with the variables that measured *information exposure* and *decision quality*.

Table 8.5.2a: The means and standard deviations for information exposure as a function of the experimental condition *information quantity* (IQ).

Experimental Condition	Types of information read				CB <sup>a</sup>		SAve <sup>b</sup>		CAve <sup>c</sup>		EB <sup>d</sup>	
	Supporting		Contradicting									
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
IQ (10 pieces of info) N= 35	4.11	1.08	2.31	1.05	1.80	1.68	3.98	.66	3.06	.63	.91	1.04
IQ (6 pieces of info) N= 32	3.13	.94	2.81	.90	.31	1.45	3.63	1.45	3.22	.59	.41	1.59
IQ (2 pieces of info) N= 31	3.52	1.03	2.55	1.06	.97	1.47	3.38	.62	3.54	.67	.17	1.06

Note. <sup>a</sup>CB= Confirmation bias, which corresponds to the difference between the supportive pieces of information minus the contradictive pieces of information. <sup>b</sup>SAve= the average score of the supporting pieces of information as evaluated by the participants. <sup>c</sup>CAve= the average score of the contradictory pieces of information as evaluated by the participants. <sup>d</sup>EB= evaluation bias, which corresponds to the difference between SAve minus CAve.

Table 8.5.2b: The means and standard deviations for decision quality as a function of the experimental condition *information quantity* (IQ).

Experimental Condition	RP <sup>a</sup>		RF <sup>b</sup>		RB <sup>c</sup>		DP <sup>d</sup>		DF <sup>e</sup>		DB <sup>f</sup>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
IQ (10 pieces) N= 35	9.89	2.32	13.31	2.47	3.43	2.09	10.29	1.99	12.60	1.54	2.31	1.62
IQ (6 pieces) N= 32	9.88	2.69	11.50	2.87	1.63	2.94	9.91	1.71	11.00	1.74	1.09	1.69
IQ (2 pieces) N= 31	11.55	2.11	10.00	2.42	1.55	1.84	11.65	1.82	10.52	1.53	1.13	1.52

Note. <sup>a</sup>RP= the preliminary ranking of the six objects used in the manipulation of selective exposure activity. <sup>b</sup>RF= the final ranking of the six objects. <sup>c</sup>RB= the difference between the final ranking minus the preliminary ranking. <sup>d</sup>DP= the preliminary decision participants made on the decision task. <sup>e</sup>DF= the final decision participants made on the decision task. <sup>f</sup>DB= the difference between the final decision minus the preliminary decision.

Furthermore, a One Way Anova analysis was conducted between the grouping variable *information quantity* and the variables that measure *information exposure* and *decision quality*. The results of the analysis revealed a significant difference between information quantity and supporting pieces of information read at the  $p < 0.01$  level [F (2,

95) = 8.03,  $p = 0.00$ ]; information quantity and the confirmation bias at the  $p < 0.01$  level [ $F(2, 95) = 7.86$ ,  $p = 0.00$ ]; information quantity and evaluation of the supporting pieces of information at the  $p < 0.05$  level [ $F(2, 95) = 3.03$ ,  $p = 0.05$ ]; information quantity and the evaluation of the contradicting pieces of information at the  $p < 0.01$  level [ $F(2, 95) = 5.00$ ,  $p = 0.01$ ]; information quantity and the evaluation bias at the  $p < 0.01$  level [ $F(2, 95) = 6.11$ ,  $p = 0.00$ ]; information quantity and the preliminary ranking at the  $p < 0.01$  level [ $F(2, 95) = 5.18$ ,  $p = 0.01$ ]; information quantity and the final ranking at the  $p < 0.01$  level [ $F(2, 95) = 13.52$ ,  $p = 0.00$ ]; information quantity and the ranking bias at the  $p < 0.01$  level [ $F(2, 95) = 37.92$ ,  $p = 0.00$ ]; information quantity and the preliminary decision at the  $p < 0.01$  level [ $F(2, 95) = 7.71$ ,  $p = 0.00$ ]; information quantity and the final decision at the  $p < 0.01$  level [ $F(2, 95) = 15.51$ ,  $p = 0.00$ ]; and information quantity and the decision bias at the  $p < 0.01$  level [ $F(2, 95) = 38.02$ ,  $p = 0.00$ ]; On the other hand there was no significant difference between the mean scores of information quantity and the conflicting pieces of information read [ $F(2, 95) = 2.05$ ,  $p = 0.13$ ].

Additionally, due to the statistical significant results that were found from the One Way Anova analysis, a post hoc Tukey test was conducted. In specific, the post hoc comparisons using the Tukey HSD test indicated that for the supporting pieces of information read, the mean score for the ten pieces of information condition ( $M = 4.11$ ,  $SD = 1.08$ ) was significantly different from the six pieces of information condition ( $M = 3.13$ ,  $SD = 0.94$ ). However the two pieces of information condition did not significantly differ from the other two conditions. Also, for the confirmation bias, the mean score for the ten pieces of information condition ( $M = 1.80$ ,  $SD = 1.68$ ) was significantly different from the six pieces of information condition ( $M = 0.31$ ,  $SD = 0.45$ ). On the other hand, the two pieces of information condition did not significantly differ from the other two conditions.

Next, for the evaluation of the supporting pieces of information the mean score for the ten pieces of information condition ( $M = 3.97$ ,  $SD = 0.66$ ) was significantly different from the two pieces of information condition ( $M = 3.38$ ,  $SD = 0.62$ ). However, the six pieces of information condition did not significantly differ from the other two conditions. Then, for the evaluation of the conflicting pieces of information the mean score for the ten pieces of information condition ( $M = 3.06$ ,  $SD = 0.63$ ) was significantly different from the two pieces of information condition ( $M = 3.54$ ,  $SD = 0.67$ ). However, the six pieces of information condition did not significantly differ from the other two conditions. Next, for the evaluation bias, the mean score for the ten pieces of information condition ( $M = 0.91$ ,  $SD = 1.04$ ) was significantly different from the two pieces of information condition ( $M = -0.17$ ,  $SD = 1.06$ ). However, the six pieces of information condition did not significantly differ from the other two conditions.

In addition, for the preliminary ranking, the mean score for the ten pieces of information condition ( $M = 9.89$ ,  $SD = 2.32$ ) was significantly different from the two pieces of information condition ( $M = 11.55$ ,  $SD = 2.11$ ) and the six pieces of information condition ( $M = 9.88$ ,  $SD = 2.69$ ) was significantly different from the two pieces of information condition ( $M = 11.55$ ,  $SD = 2.11$ ). On the other hand there was no significant difference between the mean score for the ten pieces of information condition and the six pieces of information condition. Also, for the final ranking, the mean score for the ten

pieces of information condition ( $M = 13.31$ ,  $SD = 2.47$ ) was significantly different from the six pieces of information condition ( $M = 11.50$ ,  $SD = 2.87$ ) and the ten pieces of information condition ( $M = 13.31$ ,  $SD = 2.47$ ) was significantly different from the two pieces of information condition ( $M = 10.00$ ,  $SD = 2.42$ ). On the other hand there was no significant difference between the mean score for the six pieces of information condition and the two pieces of information condition. Next, for the ranking bias, the mean score for the ten pieces of information condition ( $M = 3.43$ ,  $SD = 2.09$ ) was significantly different from the six pieces of information condition ( $M = 1.63$ ,  $SD = 2.94$ ); the ten pieces of information condition ( $M = 3.43$ ,  $SD = 2.09$ ) was significantly different from the two pieces of information condition ( $M = -1.55$ ,  $SD = 1.84$ ); and the mean score for the six pieces of information condition ( $M = 1.63$ ,  $SD = 2.94$ ) was significantly different from the two pieces of information condition ( $M = -1.55$ ,  $SD = 1.84$ ).

Subsequently, for the preliminary decision the mean score for the ten pieces of information condition ( $M = 10.29$ ,  $SD = 1.99$ ) was significantly different from the two pieces of information condition ( $M = 11.65$ ,  $SD = 1.82$ ) and the mean score for the six pieces of information condition ( $M = 9.91$ ,  $SD = 1.71$ ) was significantly different from the two pieces of information condition ( $M = 11.65$ ,  $SD = 1.82$ ). On the other hand, there was no significant difference between the mean score of the ten pieces of information condition with the six pieces of information condition. Next, for the final decision, the mean score for the ten pieces of information condition ( $M = 12.60$ ,  $SD = 1.54$ ) was significantly different from the six pieces of information condition ( $M = 11.00$ ,  $SD = 1.74$ ) and the ten pieces of information condition ( $M = 12.60$ ,  $SD = 1.54$ ) was significantly different from the two pieces of information condition ( $M = 10.52$ ,  $SD = 1.53$ ). However, there was no significant difference between the mean score for the six pieces of information condition and the two pieces of information condition. Finally, for the decision bias, the mean score for the ten pieces of information condition ( $M = 2.31$ ,  $SD = 1.62$ ) was significantly different from the six pieces of information condition ( $M = 1.09$ ,  $SD = 1.69$ ); the ten pieces of information condition ( $M = 2.31$ ,  $SD = 1.62$ ) was significantly different from the two pieces of information condition ( $M = -1.13$ ,  $SD = 1.52$ ); and the mean score for the six pieces of information condition ( $M = 1.09$ ,  $SD = 1.69$ ) was significantly different from the two pieces of information condition ( $M = -1.13$ ,  $SD = 1.52$ ).

In conclusion, the results of the One Way Anova analysis and the post hoc Tukey test revealed that the amount of information presented to a person effects significantly the way they search for information and improves their final decision. The results disclosed that the more pieces of information a person is presented with, the more confirmation bias he exhibits. As a result, *hypothesis 2* was accepted.

### 8.5.3 Hypothesis 3

Finally, in order to test *hypothesis 3*, an initial t-test analysis was carried out between the grouping variable *commitment* and the *commitment average* score. By doing so, it was made possible to detect a difference in means between the two groups, suggesting that the manipulation of the variable *commitment* in the study did have an

effect [ $t(97) = 4.78, p < 0.00$ ]. Afterwards, a Pearson Correlation analysis was conducted between participants' *commitment average* score and the variables that measured *selective exposure* and *decision quality*. The results of the analysis revealed that the more supporting pieces of information read by the participants the higher their commitment average was  $r(96) = 0.37, p < 0.00$ ; the higher the confirmation bias was the higher the commitment average was  $r(96) = 0.23, p < 0.02$ ; the higher the evaluation of the supporting pieces of information was, the higher the commitment average was  $r(96) = 0.27, p < 0.01$ ; the lower the evaluation of the conflicting pieces of information the higher the commitment average was  $r(96) = -0.31, p < 0.00$ ; the higher the evaluation bias was the higher the commitment average was  $r(96) = 0.36, p < 0.00$ ; the lower the preliminary ranking was the higher the commitment average was  $r(96) = -0.32, p < 0.00$ ; the higher the final ranking was the higher the commitment average was  $r(96) = 0.55, p < 0.00$ ; the higher the ranking bias was the higher the commitment average was  $r(96) = 0.77, p < 0.00$ ; the lower the preliminary decision was the higher the commitment average was  $r(96) = -0.46, p < 0.00$ ; the higher the final decision was the higher the commitment average was  $r(96) = 0.38, p < 0.00$ ; and the higher the decision bias was the higher the commitment average was  $r(96) = 0.75, p < 0.00$ . However, no correlation was found between the contradicting pieces of information read and the *commitment average*. In conclusion, the correlations found from the analyses between the moderating variable *commitment* and the variables that measured *selective exposure* and *decision quality* enabled the acceptance of *hypothesis 3*.

In summary, the results of the various analyses for this study revealed that the more selectively people searched for information the better their *decision quality* was, allowing the acceptance of *hypothesis 1*; that Information Quantity had a significant effect upon *selective exposure* and *decision quality* allowing the acceptance of *hypothesis 2*; and that *commitment* was significantly correlated with *selective exposure* and *decision quality* allowing the acceptance of *hypothesis 3*.

#### 8.5.4 Post Hoc Statistical Power Analysis for Study 6

A post hoc power analysis was performed to determine the achieved power of the study, using the Pearson Correlational test. This particular study with the sample size of 98 achieved a power of 0.93 (93%), given a medium effect size (0.30) and an  $\alpha$  of  $p = 0.05$ . Also, a post hoc power analysis was performed to determine the achieved power based on an independent samples t-test. The study achieved a power of 0.79 (79%) given sample size of 98, an  $\alpha$  of  $p = 0.05$  and a medium effect size (0.5). Finally, Post hoc power analysis was also performed to determine achieved power based on a One Way Anova test. The sample size achieved a power of 0.58 (58%) given sample size of 98, an  $\alpha$  of  $p = 0.05$  and a medium effect size (0.25). However, when conducting the post hoc analysis based on the same One Way Anova test with a large effect size (0.40), sample size of 98 and an  $\alpha$  of  $p = 0.05$  the achieved power was 0.95 (99%). This means that the sample size was sufficient to detect large effects.

## 8.6 Discussion

### 8.6.1 Study 6 Results in Correspondence to Literature

The investigation of the relationship between *selective exposure* and *decision quality* with *information quantity* and *decision commitment* operating as moderating factors revealed interesting and significant effects. First of all, it becomes eminent that supportive information exposure is an existent phenomenon that prowls around decision-making. The results of the analysis showed that the majority of the participants systematically searched selectively for information and avoided reading conflicting pieces of information. This finding comes to no surprise and falls in line with the abundant of studies conducted that provide support for the existence and impact of selective exposure on decision-makers (Frey, 1986; Fischer et al., 2010; Ditto & Lopez, 1992; Greitemeyer, et al., 2009; Knobloch-Westerwick, 2012; Schulz-Hardt et al., 2001; Johnston, 1996; Holton & Pyszczynski, 1989).

Furthermore, and regarding *hypothesis 1*, the results of the study revealed that supportive information exposure is positively correlated to decision quality. That is, the more selectively people searched for information, the better final decision they made. Similar, the higher participants evaluated the supporting pieces of information over the conflicting pieces of information, the better their final decision was. These findings come in contrast to the previous studies that have exposed a negative correlation between supportive information exposure and decision quality (Kray & Galinsky, 2003; Janis, 1982). The positive correlation found can be attributed to a different methodological approach adopted in the current study. Specifically, in the previous studies, participants were controlled into making a bad preliminary decision, whereas in this study participants were freely allowed to make their own preliminary decision, good or bad. It is conjectured that this difference in the experimental design is responsible for the opposite correlation discovered here.

Next, concerning *hypothesis 2*, it was shown that the participants that received 10 pieces of information exhibited more confirmation bias compared to those that received 6 pieces of information. Similar, the participants that received 10 pieces of information compared to the people that received 6 pieces of information evaluated higher supporting pieces of information; evaluated less conflicting pieces of information; and showed higher evaluation bias. These findings fall in place with previous research conducted that suggest that the more pieces of information people have to choose from, the more systematically they search for confirming pieces of information and the higher they evaluate those pieces of information (Fischer et al., 2008).

Finally, regarding *hypothesis 3*, the results yield that the higher degree of decision commitment a person exhibits the more selectively he searches for information. Specifically, the participants that were randomly assigned to the experimental group and were presented with various quotes about commitment, scored higher on the commitment scale, searched more selectively for information, evaluated higher supporting pieces of information and made a better final decision. These results fall in line with the theory of escalation of commitment that states that people remain committed to a decision even in the presence of opposing information (Whyte, 1986; Arkes & Ayton, 1999). Precisely as



hypothesized, due to the commitment bias the participants with increased degree of commitment overlooked conflicting pieces of information and searched more selectively for information compared to those with decreased degree of commitment.

#### 8.6.2 Limitations / Future Reference

Although the study produced significant results and all of the hypotheses were accepted, various concerns need to be discussed. First, there is only a limited amount of research exploring the relationship between *selective exposure* and *decision quality*. Additionally, the few studies conducted so far, including the current study, have produced mixed results. In specific, previous research has found a negative correlation, whereas the present study discovered a positive correlation. The above accounts constitute mandatory further investigation in order to attain an accurate portrayal and the factual nature of the relationship between information exposure and decision quality can be revealed.

Second, the model used to measure information exposure was a relatively novel method that has only been used a couple of times in previous research within this thesis. Although the study revealed significant results, the fact that this method has only been used a few times raises issues of validity and reliability. As a result and for future reference, further steps need to be taken in order to increase validity and reliability. For instance, one way to reassure reliability is to conduct further studies employing this method and then statistically comparing the results with previous ones. If similar results were acquired from all the studies, then it would be safe to assume that the specific assessment method of information exposure proves reliable.

Third, the testing of *hypothesis 2* revealed that people search more selectively for information when they are presented with 10 pieces of information and that they evaluate higher supporting pieces of information. However, when it came to the supporting pieces of information read, the conflicting pieces of information read, and the confirmation bias (the difference between the amount of supporting pieces of information read minus the conflicting pieces of information read), the significant difference was between the group that received 10 pieces of information and the group that received 6 pieces of information. On the other hand, when it came for the evaluations of the supporting pieces of information, the evaluations of the contradicting pieces of information and the evaluation bias (the difference between the evaluations of the supporting pieces of information minus the evaluations of the conflicting pieces of information), the significant difference was between the group that received 10 pieces of information and the group that received 2 pieces of information. This means, that in one instance the difference was between 6 and 10 pieces and in the other instance the difference was between 2 and 10 pieces. As a result, the difference in supportive information exposure doesn't remain constant with the variations of information quantity. Therefore it is possible that a 'precise' number exists, a specific amount of pieces of information where the phenomenon of supportive information exposure is at its peak or most influential. It would be interesting for future reference, to conduct a parallel research study and attempt to determine if such a number does exist.

Finally, as the novel model used to measure selective exposure, the Commitment scale employed in the present study was also only used once before. As a result, concerns of validity and reliability need to be addressed. For instance, in order to test for increase reliability the results on the present commitment scale can be correlated with results on other verified scales that measure commitment. If a positive correlation is found between the scales than it would be safe to claim that the current scale does measure a person's degree of commitment. Additionally, attaining inter-rater validity can increase the validity of the commitment scale. Specifically, a panel of judges can evaluate every question individually on the scale whether they are accurately measuring a person's degree of commitment. By taking these simple steps in the future, the commitment scale employed in the study can obtain validity and reliability and provide a useful tool in commitment assessment.

### 8.6.3 Conclusion

In summary, the results of the current study indicated a positive relationship between *information exposure* and *decision quality*. Also, when people were confronted with a larger number of information to choose from, they searched more selectively. Finally, the higher people experienced decision commitment, the more supportive information exposure they exhibited. Although the above findings allowed the acceptance of the stated hypotheses, nonetheless, due to the limited number of studies exploring the relationship between *information exposure* and *decision quality*, further investigation is still indispensable. Only through consecutive and extensive investigation can the true nature of the association between *information exposure* and *decision quality* be revealed.

Finally, Study 6 concluded the examination of the relationship between *information exposure* and *decision quality*. In sum, a series of six studies was conducted with two information exposure paradigms being used (three studies employed a survival situation and three a nutrition value paradigm). Also, every study examined two moderating factors and the effect they had on information exposure and consequently on decision quality. Lastly, various measures were taken (i.e., repeated measures of specific moderators; using consistently specific selective exposure paradigms) in order to guarantee that each study measured what it was intended to measure and that the positive correlation found between supportive information exposure and decision quality truthfully describes an existential effect.

## CHAPTER NINE

### OVERALL DISCUSSION

#### 9.1 Main Contribution of Thesis

The main objective of the PhD project was to gain insight on increasing decision quality and investigating the relationship between selective exposure and decision quality through the influence of various moderators, in an attempt to shed light in an area where there is very limited research literature. The present thesis employed a different approach to examine the relationship between decision quality and selective exposure. Particularly, participants were allowed to *freely* make a preliminary decision, either poor or good, that was not effected or directed by the design of each study. The results of studies did indeed indicate that decision quality was enhanced through conditions of *free choice* under the prism of specific parameters of selective exposure (the methodology and the moderators employed in each study). These findings consist the main contribution of this thesis and take our knowledge of the relationship between decision quality and selective exposure one step further.

#### 9.2 Progression of Studies

Although there was a clear path and a research outline from the beginning of this thesis, due to issues that appeared while conducting a study, or to inferences drawn from the data, additional variables and conditions were taken under consideration in subsequent studies. That is, variations in methodology and other steps were carried out in order to get a better depiction of a true effect found, to increase reliability and validity, and to build on the results found in the previous study. Also, it should be stressed that the data collection and the completion of some studies overlapped, as some studies were not fully completed whilst the designing and the data collection of the next study began. As a result, the progression of the studies was carried out through a set, however flexible, research direction that was impacted by the results found as the studies progressed.

### 9.3 Results

In contrast to previous studies (Kray & Galinsky, 2003; Janis, 1982), it was found that decision quality (participants' final decision was significantly better than their preliminary decision) was enhanced by increased selective exposure. In addition, the moderators employed in the thesis were investigated for the first time to reference to their effect on decision quality through selective exposure. It should be noted that all the moderators examined throughout the succession of the studies were acquired directly from theories that account for selective exposure. The results yield that each moderator significantly increased selective exposure, which in turn contributed to people making a better final decision.

Specifically, in Study 1, the moderator *information source*, based on the social learning theory (Bandura, 1963, 1977; Miller, 2011) and the moderator *decision commitment*, based on the theory of escalation of commitment (Whyte, 1986; Arkes & Ayton, 1999), both increased selective exposure (*information source* partially increased selective exposure) and participants made a better final decision. Similar, in Study 2, the moderator *emotional state*, based on the mood management theory (Zillmann & Bryant, 1985; Zillmann, 1988; Knobloch and Zillmann 2002, Jonas, et. al., 2006) and the moderator *death related thoughts*, based on the terror management theory (Greenberg, et. al., 1986; Jonas, et. al., 2003) both increased selective exposure and enhanced decision quality. Likewise, in Study 3, the moderator *prior knowledge*, based on the false-consensus effect (Ross, et. al., 1977; Botvin, et. al., 1992) and the moderator *justification* based on the theory that selective exposure operates as means of perceiving ourselves as good decision-makers and increasing self-enhancement (Schwarz, et. al., 1980; Kunda, 1990; Jonas, et al., 2003) both increased selective exposure and made a better final decision.

In addition, for Study 4, the moderator *prior knowledge* and the moderator *self-enhancement* based on theories mentioned above, both increased selective exposure and decision quality. Also, for Study 5, the moderator *cognitive dissonance*, based on Festinger's theory of cognitive dissonance (Festinger, 1957, 1962; Cotton & Hieser, 1980; Mullikin 2003; D'Alessio & Allen, 2002) and the moderator *information quantity*, based on a series of studies that suggested the more pieces of information a participant has to choose from, the more selective exposure they will exhibit (Fischer, et. al., 2008) both increased selective exposure and lead to a better final decision. Finally, for Study 6, the moderator *information quantity* and the moderator *commitment*, based on theories previously mentioned, both increased selective exposure and enhanced decision quality.

Table 9.3 summarizes the methods of selective exposure assessment, the variables measured, the stated hypotheses and the results of each study:

Table 9.3: A synopsis of each study's methods, variables, hypotheses and results.

	Methods	Variables	Hypothesis	Results
PhD overall	Free choice	IV <sup>a</sup> : Selective exposure DV <sup>b</sup> : Decision quality	SE <sup>c</sup> is positively correlated to DQ <sup>d</sup>	Partially Accepted
Study 1 (free choice)	Nutritious value design	M <sup>e</sup> : Source of information/ Commitment of decision	M increases SE which increases DQ	Accepted
Study 2 (free choice)	Survival scenario design	M: Emotional State/ Death related thoughts	M increases SE which increases DQ	Accepted
Study 3 (free choice)	Survival scenario design	M: Prior knowledge/ Justification	M increases SE which increases DQ	Accepted
Study 4 (free choice)	Survival scenario design	M: Prior Knowledge* / Self-Enhancement	M increases SE which increases DQ	Accepted
Study 5 (free choice)	Nutritious value design	M: Cognitive dissonance/ Information quantity	M increases SE which increases DQ	Accepted
Study 6 (free choice)	Nutritious value design	M: Commitment of decision* / Information quantity*	M increases SE which increases DQ	Accepted

Note. <sup>a</sup>IV= Independent Variable, <sup>b</sup>DV= Dependent Variable, <sup>c</sup>SE= Selective exposure, <sup>d</sup>DQ= Decision Quality, <sup>e</sup>M= Moderator, \*Prior knowledge, Commitment of decision and Information quantity were manipulated differently the second time they were assessed.

#### 9.4 Implications

It is unmistakable that decision-making plays a vital role in social and interpersonal interaction. Due the significance of decision-making, plethora of research has been conducted from numerous perspectives. Prior research showed that decision quality was worsened by increased selective exposure. That is, the more selectively people search for information, the worse their final decision was (Janis, 1982; Kray & Galinsky, 2003). However, based on this thesis, it was indicated that when participants

were allowed to *freely* make a preliminary decision that was not guided, increased selective exposure led to a better final decision.

The implications of these findings could be reflected in various settings where decision-making takes place. For instance, there are significant personnel committees or ‘task forces’ that make critical decisions and could take into consideration the findings from this thesis. For example, in health, a task force convened by the Center for Devices and Radiological Health (CDRH) has the important mission of making decisions on how the CDRH can quickly incorporate new information on novel technologies or new scientific methods (CDRH and FDA, 2010). In addition, the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) had set up a task force (multiple criteria decision analysis, MCDA) in health care to deal with the difficulty of processing and systematically evaluating information and large numbers of alternatives (Thokala, Devlin, Marsh, Baltussen, Boysen, Kalo, Longrenn, Mussen, Peacock, Watkins & Ijzerman, 2016). The above task forces have the imperative assignment of collecting relevant information, evaluating them and choosing the most beneficial amongst the many alternatives. In order to accomplish this, and based on the findings of this thesis, the specific task forces will have the potential to be more effective if they are ‘allowed’ to evaluate and *choose freely* from the plethora of alternatives, not influenced or restricted by hospital policies or insurance company interests. Basically, the task forces can reach the best decision if they engage in a decision-making approach that is based on *free choice* and a high degree of professionalism and expertise in the specific field.

Also, the results of this thesis can be applied in public health and choices about diet. Obesity is an overgrowing epidemic that affects millions of people worldwide (Swinburn, Caterson, Seidell, & James, 2004). Various factors have been identified to contribute to obesity. For instance, low cost of *bad* foods compared to more expensive healthier foods, and unhealthy behavioral nutrition are such factors (Drewnowski & Darmon, 2005). To tackle the issue of obesity, many organizations and health bodies have been established throughout the world. However, based on the findings of this thesis, instead of implementing forceful diet programs or people resorting to expensive and high risk diets (Cox, Anderson, Lean, & Mela, 1998), a preventive and systematic educational health campaign accompanied by *free choice* of what to eat could potentially be more effective. Therefore, it is essential to establish policies such as educating people about healthy nutrition and providing healthier food options (Glanz, Basil, Maibach, Goldberg, & Snyder, 1998). In essence, based on the results of this thesis, proper education with *free choice* can be more beneficial on a long-term basis than by forcefully following a diet plan with little or no choice.

Apart from the field of health care, the results can also be applied in other fields, such as national security. For instance, the American National Security Task Force or the British National Security Strategy and Strategic Defense and Security Review that assesses and evaluates uncountable pieces of information on a daily bases and categorizes them as either a threat or a non-threat (National Security Task Force, n.d.). It is safe to assume that due to the enormous amount of information the members of the those task forces receive (National Security Task Force, n.d.), some of those pieces of information

are filtered out as an manifestation of the process of selective exposure. However, based on the findings of the thesis, this process should not be considered faulty or high risk, as inevitably due to time restrictions and the sheer volume of information that has to be evaluated, a lot of information will be filtered *non-risk* and disregarded. If the security task forces are *freely* allowed without additional pressure, suggestions or restrictions to evaluate the obtained information, then potentially they will have the opportunity to make the best decision.

Essentially, it goes without saying that wherever decision-making is necessary, the knowledge acquired from this thesis can be applied. When decision-makers are confronted with a decision, irrelevant if significant or not, engaging in selective exposure does not condemn the quality of their final decision. At least it does not condemn it more than if that person searched more balanced for information. Once allowed to make a straightforward and free choice among alternatives, it is more than likely that the person will make the best decision. Also, by avoiding decision-making strategies that are geared towards increasing decision quality and identifying the 'correct' choice amongst alternatives, valuable assets such as personnel, money and time can be saved (Svenson & Maule, 1993).

## **9.5 Limitations / Future Reference**

Throughout the progression of the thesis, there were a few issues that were common for more than one study and might of operated as a confounding variable or as an unpredicted factor that may of influenced the results.

Firstly, the data for all six studies was collected from three different countries. Although cross-cultural differences were not taken into consideration, a few measures were taking in order to assure that such a factor would not contaminate the results of the studies. For instance, language was not an issue for the college students of Liverpool John Moores University, UK and the Kent State University, USA. On the other hand, a small number of participants recruited were college students attending the British-Hellenic College (affiliated with the University of Wales), located in Athens Greece, with English not being their mother language. Nevertheless, those students attend an English-based institution and all lessons and assessment was carried out in English. However, before being accepted into the British-Hellenic college, each student was assessed in English in order to assure that they posses a sufficient level of English mastery. Additionally, the Greek college students were informed before they took part in the study, that if they had any questions or needed extra clarification regarding a word or phrase that they did not understand, it would be immediately provided to them. Lastly, a panel of colleagues and my supervisor examined the material employed in each study in order to identify anything that could be misinterpreted or misjudged due to cultural variances between the participants. Nothing was detected and the material was appraised as not being cultural driven or cultural dependent. For future reference nonetheless, it might be wiser to either limit the date collection to one country as a means of eliminating any skepticism about issues due to cultural factors, or to conduct a specific study that

would investigate any cultural differences on how selectively people search for confirming information.

Second, the materials used to measure selective exposure and the various moderating variables were novel assessment methods. That is, they were employed for the first time or only used once or twice before. This alone, poses a threat for the reliability and the validity of the results. Future actions are indispensable in order to assure that the results acquired portray a truthful depiction of an existing effect. Such actions could be either done by running a correlation analysis of the results acquired from the novel material with other standardized assessment tools (when that is possible); or by having evaluators judge whether the items on the material are measuring what they are intended to measure. By doing so, each study's reliability and validity can be increased and assure that an effect is present.

A third concern that needs to be mentioned is that of validity. Specifically, a few moderating factors that were controlled and measured could have been the results of the manipulations of each specific study, or could have been accredited to personal attributes. Such moderating factors could have been *emotional state*, *death related thoughts*, *self-enhancement* and *cognitive dissonance*. For instance, in Study 2 the moderating factor Emotional State was manipulated by presenting various pictures to each participant (neutral, natural disaster or terrorism act). However, their score on the assessment method that measured their emotional state could have been attributed to the viewing of the pictures, but could of also been attributed to personal factors, such as personality characteristics or an unpleasant event that took place prior to their participation and have affected their emotional state. Such confounding variables might have skewed with the results found in the studies that employed these moderators. For future reference, it might be more effective to carry out two separate measures of those variables, one before their manipulation, and on after. This way the validity of each moderator assessed could be increased, allowing for safer conclusions to be drawn from the results.

A forth concern that needs to be addressed is that although the effect of various moderators was examined in accordance to selective exposure the psychological mechanism behind their significant effect was not examined. Such moderators include *commitment*, *prior knowledge* and *justification*. For example, does commitment to a decision activate self-enhancing mechanisms (i.e., 'I am committed to a prior decision, therefore I am reliable as a person') or do other more complex cognitive frameworks come into play. As a result, it would be noteworthy in devising a study that would manipulate and explore in depth the exact parameters of the above moderators and how they affect selective exposure.

A fifth weakness of this thesis was the design and execution of the studies. Specifically, some of the studies were designed from the beginning of this thesis and did not strictly follow or build on the results found in a previous study. Basically, the only studies that built on the results of a previous study were Study 4 (that followed Study 3) and Study 6 (that followed Study 1 and Study 5). As a result, data collection overlapped between studies and it can be argued that the thesis lacks flexibility or that it is not purely



*result-driven*. This mainly occurred because of research inexperience and a sense of false overconfidence in the initial outline and planning of this thesis. It is recognized that this was a faulty approach and for future reference it would be wise to design one or two initial studies and then allow the data to lead to every subsequent study.

A sixth concern of the study is that of statistical power. The number of participants varied throughout the six studies conducted therefore a post hoc power analysis was carried out for all the statistical tests used in each study as a means of reassuring that the results found reflect a true effect. The power analysis was conducted using the free open-source computer program G-Power (2014, March 29) and the results showed different levels of power for a medium effect size, with the majority being above the conventional threshold of 80%. Specifically, within biological medical sciences, anything above 80% power is considered to be reliable indication of statistical power (Dumas-Mallet, Button, Boraud, Gonan & Munafò, 2017). As a result, concerning those studies with 80% power or above with a medium effect size; the sample sizes were adequate in finding medium to large effects. On the other hand, in Study 2 and Study 6, for the post hoc One Way Anova test analyses, the G-Power revealed for a medium size effect, a 64% and 58 % of power respectively. However, when analyzed for a large size effect, they both achieved 97% and 95% respectively. Therefore, for these studies and concerning the One Way Anova analyses tests, the sample sizes were adequate in detecting large effects.

Nonetheless, it should be noted that the purpose of power analysis is to detect the probability of a type 2 error. A type 2 error refers to not finding an effect when an effect does exist (Cohen, 1988). However, since a significant effect was found for all 6 studies, it is safe to speculate that the threat of a type 2 error is circumvented and that the results are reliable and generalizations can be drawn from them. Still, for future reference, it would be best that a prior power analysis is conducted and the minimum number of participants needed is recruited in order to avoid sample size and power concerns.

Finally, the results supported the hypothesis that decision quality is enhanced through selective exposure. However, these findings derived from two specific decision-making exercises (survival scenario exercise and nutrition value task). Therefore, it would be premature to generalize that in the context of *free choice*, increased selective exposure leads to a better final decision no matter what that decision is. Nevertheless, it undoubtedly can be argued that the results of the thesis showed that increased selective exposure lead to a better final decision regarding a survival scenario and a nutrition paradigm. This can only be considered as an indication that maybe decision quality on a broader scale can be enhanced through selective exposure. As a result, it becomes evident that more research is necessary in order for safe generalizations to be reached. Specifically, it is necessary to design further studies that will cover a larger area of decision-making, not just decisions regarding survival situations or nutrition choices. Only then it would be safer to assume as a general rule, that selective exposure leads to a better final decision.

## 9.6 Future Research Suggestions

Two separate studies (Study 5 and Study 6) investigated the effect of *information quantity* on selective exposure. Specifically, in one experimental condition, the participants that had to choose from 6 pieces of information displayed increased selective exposure whereas, in another experimental condition the participants that had to choose from 10 pieces of information searched more selectively for information. Therefore, maybe a future study could be designed that would determine whether a precise number exists where selective exposure is most profound.

Also, for future research, it would be interesting to investigate the effect of labeling the information-statements during the process of selective exposure assessment. Specifically, what would occur if each piece of information were labeled ‘supportive’ or ‘contradictive’ of an attitude or belief, as they were presented to each participant? Based on the theory of cognitive economy, which refers to the tendency for minimizing cognitive effort and resources (Toplak, West & Stanovich, 2014), selective exposure and its effect on decision-making could be increased or decreased. As a result, researchers could potentially manipulate selective exposure and devise a quick and simple method of enhancing decision quality.

Finally, in Study 2, the moderator *emotional state* was investigated. The results showed that a negative emotional state leads to increased selective exposure that leads to a better final decision. However, that study only scratched the surface as emotional state encloses countless underlying psychological mechanisms that could potentially play a central role in how they affect decision quality and selective exposure. As mentioned previously, there are plentiful factors that can influence a person’s emotional state. These factors can include external factors such as a negative experience (e.g., car accident, quarrel with family member) and internal factors such as a person’s temperament or personality. Also, according to the theory of psychological construction, emotion consists of a set of components that categorizes emotion into two dimensions, negative vs. positive (e.g., sad vs. happy) and enervated vs. energized (e.g., nervous vs. excited) (Barrett, 2006). Although briefly and inadequately described, it still becomes evident how complex and arduous the investigation of emotional state really is. Therefore, it would be interesting to base a whole series of studies that would isolate specific emotional components and focus on detecting the exact effect they have on decision quality and selective exposure. For example, a future study could either investigate how a specific emotion component (e.g., bored) affects selective exposure and decision quality, or whether there is a difference between two opposing emotional components (e.g., bored vs. relaxed).

## 9.7 Conclusion

In conclusion, it is not naively argued that this thesis *reinvented the wheel* and that indisputably every decision made by people can be enhanced through selective exposure. With merely six studies a research rule cannot be established, but rather an

indication of what has the potential of being genuine comes to surface. Nevertheless, a different and fresh approach was taken towards a practically newfangled realm of investigation regarding the relationship between decision quality and information exposure. The results in this case, provided support, justified and glorified the whole exertion of this thesis, which in turn congenially disclosed an original and unique finding; that with the *free choice* of preliminary decision, decision quality is *enhanced* through the effect of selective exposure.

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## APPENDICES

Appendix 1: The list of supporting and contradicting statements of the six food items.

### **1. Brown rice**

Supporting: Brown rice is a high in fiber, which is good for the digestive system

Contradicting: Brown rice is full of carbohydrates and should be avoided when dieting

### **2. Brussels Sprouts**

Supporting: Brussels sprouts have cholesterol-lowering benefits

Contradicting: Brussels sprouts are often associated with the enlargement of the thyroid

### **3. Carrots**

Supporting: The consumption of carrots provides the body with many antioxidants and protects against cardio vascular disease

Contradicting: Excessive consumption of carrots can increase the levels of carotene in the blood and provoke a yellow or orange cast in the skin

### **4. Eggs**

Supporting: Eggs are a good source of protein

Contradicting: The consumption of eggs can lead to elevated levels of cholesterol

### **5. Low Fat Yogurt**

Supporting: Low fat yogurt is an efficient and healthy snack

Contradicting: Low fat yogurt is not as 'low fat' as it is considered

### **6. Sunflower Seeds**

Supporting: Sunflower seeds contain vitamin E, essential for skin health

Contradicting: Sunflower seeds have no nutritious value at all

**Appendix 2:** The known people list

**Known People List**

Rihanna	Helen Mirren
Daniel Craig	Taylor Swift
Adele	Hugh Grant
Kate Beckinsale	Brad Pitt
Keira Knightley	Jennifer Lopez
Tom Cruise	Hugh Jackman

**Appendix 3:** The commitment scale

Please read the statements below and indicate the number that best describes your degree of agreement.

1. No matter the significance of a decision, I can always reconsider and change my mind.

0	1	2	3	4	5	6
Absolutely Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Absolutely Agree

2. I am a flexible person when it comes to making decisions.

0	1	2	3	4	5	6
Absolutely Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Absolutely Agree

3. I can easily change my mind once I have expressed an opinion.

0	1	2	3	4	5	6
Absolutely Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Absolutely Agree

4. I can view things differently, but I am reluctant in changing important beliefs or opinions I uphold.

0	1	2	3	4	5	6
Absolutely	Moderately	Slightly	Neutral	Slightly	Moderately	Absolutely
Disagree	Disagree	Disagree		Agree	Agree	Agree

5. As much as I hate to admit it, I find it difficult to reevaluate past decisions I have made.

0	1	2	3	4	5	6
Absolutely	Moderately	Slightly	Neutral	Slightly	Moderately	Absolutely
Disagree	Disagree	Disagree		Agree	Agree	Agree

**Appendix 4.** Set of pictures employed in study.

Neutral pictures: A spoon





A bowl



A cup



A breadbasket



A man



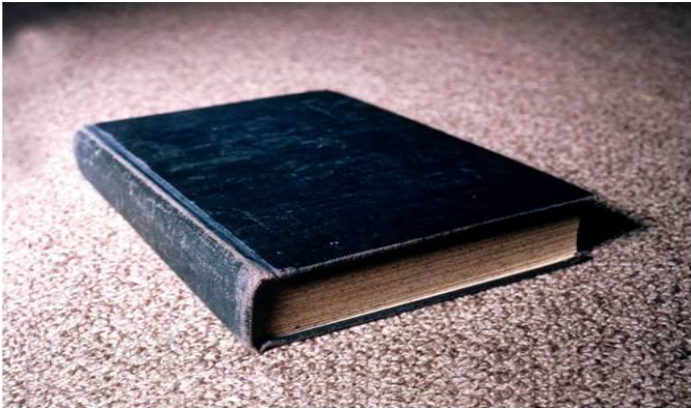
A jogger



A key chain



A book



A train station



Natural disaster pictures: Tsunami





Tsunami aftermath



Flood



Earthquake



Flood



Earthquake



Flooding



Flooding



Terrorism pictures: Twin tower attack



Twin tower





Collapse of twin tower



Osama Bin Laden



Train bombing



Bus bombing



Victim of terrorism





## Victim of terrorism



### Appendix 5: The positive and negative affect scale (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers.

- 0 = not at all
- 1 = slightly
- 2 = a little
- 3 = moderately
- 4 = quite a bit
- 5 = a lot
- 6 = Absolutely

<input type="text"/> Interested	<input type="text"/> Irritable
<input type="text"/> Distressed	<input type="text"/> Alert
<input type="text"/> Excited	<input type="text"/> Ashamed
<input type="text"/> Upset	<input type="text"/> Inspired
<input type="text"/> Strong	<input type="text"/> Nervous

___ Guilty	___ Determined
___ Scared	___ Attentive
___ Hostile	___ Jittery
___ Enthusiastic	___ Active
___ Proud	___ Afraid

**Appendix 6:** Greenberg word completion task

**WORD COMPLETION TASK**

Please complete the following word fragments by filling letters in the blanks to create words. Please fill in the blanks with the first word that comes to mind. Write one letter per blank. Some words may be plural. Thank you.

1. C O \_\_\_ S E
2. P L A \_\_\_
3. \_\_\_ O K
4. W A T \_\_\_
5. D E \_\_\_
6. B \_\_\_ T \_\_\_ L E
7. M \_\_\_ J \_\_\_ R
8. P \_\_\_ T U R E
9. F L \_\_\_ W \_\_\_ R
10. G R A \_\_\_
11. C H A \_\_\_
12. K I \_\_\_ E D
13. C L \_\_\_ K
14. T A B \_\_\_
15. K \_\_\_ G S
16. S K \_\_\_ L
17. T R \_\_\_
18. P \_\_\_ P \_\_\_ R
19. B \_\_\_ R \_\_\_ E D
20. P O S T \_\_\_

The fragment words employed in the study and the Death-Thought Accessibility Neutral & Death Related Words

1. Course/Corpse
5. Deed/Dead

- 10. Grape/Grave
- 12. Kissed/Killed
- 16. Skill/Skull
- 19. Burned/Buried

**Appendix 7:** The winter survival scenario (Winter survival exercise, 2005)

**Winter Survival Exercise: The Situation**

You have just crashed-landed in the woods of northern Minnesota and southern Manitoba. It is 11:32 a.m. in mid-January. The light plane in which you were traveling crashed on a lake. The pilot and co-pilot were killed. Shortly after the crash the plane sank completely into the lake, with the pilot's and co-pilot's bodies inside. You are not seriously injured and you are dry.

The crash came suddenly, before the pilot had time to radio for help or inform anyone of your position. Because the pilot was trying to avoid a storm, you know the plane was considerably off course. The pilot announced shortly before the crash that you were twenty miles northwest of a small town that is the nearest known habitation.

You are in a wilderness area made up of thick woods broken by many lakes and streams. The snow depth varies from above the ankles in windswept areas to knee-deep where it has drifted. The last weather report indicated that the temperature would reach -25 F in the daytime and -40 F at night. There is plenty of dead wood and twigs in the immediate area. You are dressed in winter clothing appropriate for city wear- suits, pantsuits, street shoes, and overcoats.

While escaping from the plane, you managed to salvage three items out of six:

- Sectional air map
- Compass
- Cigarette lighter (without fluid)
- Extra shirt & pants for each survivor
- Can of shortening
- Family-size chocolate bar

**Appendix 8:** Full statements of winter survival situation

*Least important items:*

**1. Compass**

Supportive: It is extremely cold. Your body temperature is dangerously dropping. If you don't act quickly you will not make it, as time is of essence. Your mere existence depends on navigating yourself out of the winter frost and towards salvation. Undoubtedly, the best instrument to possess at a time like this is a compass. Only the flimsy steel needle can safely guide you through the hostile forest.

Contradicting: Possessing a compass in a winter survival situation can be dangerous, encouraging someone to try to walk to a nearest town or village. One should keep in mind that not everyone is born a natural alpinist and trying to trend through rough terrain can be hazardous. A person's best hope for survival in a situation like this would be to remain in one spot and wait to be located by a trained rescue team.

## **2. Sectional air map made of plastic**

Supportive: When you are stranded in a harsh snowy winter terrain one of your main concerns is keeping as dry as possible. If wet in such extreme temperatures, your chances of survival are very slim to impossible. The map made of plastic could be laid down on the ground providing a first line of defence from the cold and wet surface while you wait to be rescued.

Contradicting: Possessing a sectional air map can conceal immense danger. It is amongst the least desirable of items to have in a situation like this because it will encourage individuals to try to walk to the nearest town. By wondering about one could get more lost, injured or circle through an already checked area by rescuers, all together making the pinpointing of their exact location impossible.

## **3. Family size chocolate bar**

Supportive: When confronted with a winter survival situation, a basic concern is staying warm and vigilant. The consumption of chocolate will provide your body with some food energy. Even more, since chocolate contains mostly carbohydrates it supplies the energy without making digestive demands on the body. So chocolate can provide a useful tool in an environment that slowly but viciously drains all your energy.

Contradicting: Because chocolate can furnish you a momentarily boost of energy it can also mislead you into making poor decisions. The sudden stream of energy might deceive you into believing that you have the strength to take action and personally get yourself out of your unfortunate predicament. Only when the energy rush is over, you realize how difficult it is to proceed and that staying near the crash site was your best chance for being rescued.

### *Most Important Items*

#### **4. Cigarette lighter without fluid**

Supportive: The utmost danger facing someone in a winter survival situation is exposure to the extreme cold. As a result, rapidly producing some source of warmth becomes your number one priority. Evidently, this fact makes building a fire your first order of business. Even without fluid, a cigarette lighter can provide the necessary sparks to build a fire, keep you warm and subsequently alive until help arrives.

Contradicting: Although having a cigarette lighter sounds promising it can also lead to further anguish. Take into account that you were just in a severe accident and you saw the lifeless bodies of the pilots descend towards the abyss. You are stranded in a frozen unwelcoming environment with no clear sense of what will follow. The last thing you need is to waste your remaining deposits of physical and mental energy trying to start fire with just sparks and soggy wood.

#### **5. Extra shirt and pants**

Supportive: A fundamental issue one has to deal with in a winter survival situation is clearly the cold. Long exposure to extreme cold conditions mathematically leads to death. Therefore, extra clothes can without doubt add imperative warmth to the body. Every single minute one can endure the cold by having extra clothes, is one minute longer that they can remain alive and wait for the rescue crew to reach their location.

Contradicting: Although having more clothes in a winter survival situation does sound promising, nevertheless just one extra shirt or pants will not lead you towards your rescue. In extreme conditions like in our scenario, where the temperatures are below freezing point, will not provide you with the sufficient warmth you need to survive. The opposite, especially wet, they can hinder and decrease your mobility that is so crucial.

#### **6. Can of Crisco shortening**

Supportive: When in an emergency situation where you await to be rescued, a vital means of aiding your rescuers to locate you is finding some means of signalling your position. The can of Crisco shortening can provide you with that means. After shining the lid with a part of your clothes, you can reflect sunlight and generate a powerful reflection that can be seen beyond the horizon indicating your position.

Contradicting: A solid chunk of fat has no use in winter survival. You cannot eat it for energy or drink it when melted. Evidently, you will be fighting for your life. You will

need to deal with real life treating events. As a result, you won't have the need to set up and exotic cuisine candlelight dinner. The only use of the can of Crisco would be as a throwing device towards a potential deadly approaching pray, like a squirrel.

**Appendix 9:** The prior knowledge scale

1. Do you believe you are experienced in matters concerning survival situations?

0	1	2	3	4	5	6
Absolutely	Moderately	Slightly	Neutral	Slightly	Moderately	Absolutely
Disagree	Disagree	Disagree		Agree	Agree	Agree

2. Would you classify yourself as an expert in matters concerning survival situations?

0	1	2	3	4	5	6
Absolutely	Moderately	Slightly	Neutral	Slightly	Moderately	Absolutely
Disagree	Disagree	Disagree		Agree	Agree	Agree

3. Do you believe you are well acquainted with survival situations and survival techniques?

0	1	2	3	4	5	6
Absolutely	Moderately	Slightly	Neutral	Slightly	Moderately	Absolutely
Disagree	Disagree	Disagree		Agree	Agree	Agree

4. Do you believe that you would calmly and wisely react in a survival situation?

0	1	2	3	4	5	6
Absolutely	Moderately	Slightly	Neutral	Slightly	Moderately	Absolutely
Disagree	Disagree	Disagree		Agree	Agree	Agree

5. Have you ever had training on what procedures to follow in a survival situation?

0	1	2	3	4	5	6
Absolutely	Moderately	Slightly	Neutral	Slightly	Moderately	Absolutely
Disagree	Disagree	Disagree		Agree	Agree	Agree

6. Do you often read books or articles about survival situations?

0	1	2	3	4	5	6
Absolutely Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Absolutely Agree

**Appendix 10:** The lost at sea survival task story (Lost at sea, (2009).

Scenario: You are on a private yacht in the South Pacific. As a consequence of a fire much of the yacht and its contents have been destroyed. The yacht is now slowly sinking and you are the only survivor. Your Location is unclear because of the destruction of critical navigational equipment and because the crew were distracted trying to bring the fire under control. Your best estimate is that you are approximately one thousand miles south-southwest of the nearest land.

Following is a list of six items that are intact and undamaged after the fire. In addition to these articles, you have a serviceable, rubber life raft. The raft is large enough to carry yourself, sufficient quantity of water for a few days and only three of the six items in the following list. Furthermore, in your pockets, you have a package of cigarettes, several matches and few money notes.

The Six Items are:

- Shaving mirror
- Seat cushion (floatation device approved by the Coast Guard)
- Two gallon bottle of oil-gas mixture
- Shark repellent
- Two boxes of chocolate bars
- Fishing kit

**Appendix 11:** The 12 statements of the 6 items

*Most important items*

### **1. Shaving mirror**

Supportive: A shaving mirror is critical for signaling. When you are lost at the vast sea with no clear sense of direction, it is vital that you find a way to aid rescuers pinpoint your position. By using the shaving mirror you can use the sunlight to produce a powerful beam of salvage. You can attract not only the attention of other ships but also anything flying above.

*Conflicting:* You are lost at sea laying hopelessly in a small engineless rubber craft. With no engine on the craft to steer you feel like a leaf beaten by the wind. You have no sense of direction and your moral is low. The last thing that would cross your mind would be if you are presentable or if you have a 5 o'clock shadow. Besides, sharks do not mind the beard!

## **2. Gallon of oil/petrol**

*Supportive:* The basic supplies needed when a person is stranded in the middle of the sea are items that can attract attention and give out your position. The gallon of oil/petrol can prove to be such a vital item. When you decide appropriate, you can use the oil/petrol to signal distant passing ships or planes flying nearby. The mixture will float on the surface of the water and when ignited it can flame up and attract attention, leading to your rescue.

*Conflicting:* Although lighting up the gallon of oil/petrol sounds promising it can also lead to additional problems. While the flames might work and attract attention there is always the possibility that the flames will not be spotted. Moreover, how do you get away from the fire, especially if the wind picks up and drifts your rubber float directly into the mouth of the inferno? Attracting attention is a possibility, but without a raft survival is definitely not a possibility.

## **3. Two boxes of chocolate bars**

*Supportive:* When confronted with a lost at sea survival situation, a basic concern is staying energetic and vigilant. The consumption of chocolate will provide your body with some food energy. Even more, since chocolate contains mostly carbohydrates it supplies the energy without making digestive demands on the body. So chocolate can provide a useful tool in a situation that slowly but viciously drains all your physical and mental energy.

*Conflicting:* Because chocolate can furnish you a momentarily boost of energy it can also mislead you into making poor decisions. The sudden stream of energy might deceive one into believing that they have the strength to take action and steer their way to rescue. Only when the energy rush is over, you realize how difficult it is to proceed and saving your energy would be your best chance while waiting for rescue.

*Least important items*

## **4. Shark repellent**

*Supportive:* One of the major dangers encountered in a lost at sea survival situation is the threat of a shark attack. Any means that can minimize that threat is considered as imperative. Therefore, having and using a shark repellent guarantees you one less



problem at to worry about. Thus, you can focus on looking out for incoming help without being concerned on what menace lurks beneath.

Conflicting: In a lost at sea survival situation you are surrounded by water. First thing that comes into your mind is that there is a high possibility that the water is shark infested. For that matter, having a shark repellent seems reassuring. However, there is no scientific guarantee that shark repellents are 100% effective. Therefore, the use of shark repellents encloses the danger of a false sense of security enabling someone to take unnecessary risks.

## **5. Floating seat cushion**

Supportive: You are in the middle of the ocean. You are stranded on a small rubber craft with no engine and you depend on a rescue team to be salvaged. So without doubt having a floating seat cushion is essential. Due to bad weather, to wavy water or in an attempt to signal approaching help one might fall into the water. Therefore, the floating cushion will prevent him from drowning and aid him getting back onto the craft.

Conflicting: Because you are in the middle of the ocean anything that is relevant in keeping you afloat is important. Nevertheless, possessing a floating seat cushion provides little to not at all help. If you fall off and lose contact with your craft it is highly impossible for you to survive just holding onto the cushion. You will be wet, cold and possible easily accessible shark bait. Your survival depends on staying dry and on the craft, not on an undersized floating seat cushion.

## **6. Fishing Kit**

Supportive: You are stranded on a rubber craft; in the middle of the ocean Your survival depends on the satisfaction of basic needs until rescue arrives. Although you have sufficient amount of water you still need some source of energy. The number one food supply that the ocean contains is undeniably fish. A fishing kit can help you catch a high in protein and nutrition food source that will allow you to fuel up and await rescue.

Conflicting: Even if you attempt to use the fishing kit there is still no guarantee that you will catch any fish. In addition, preoccupied with your endeavor to catch a fish, you might miss a distant passing ship or plane. Your best hope for salvation is being vigilant and observant in order to spot and signal for help. There is no genuine expectation for survival by directing your energy and attention onto sushi.

**Appendix 12:** Survival Tips Story (3 keys to assessing a survival situation, 2011; What should I do if lost or stranded???, 2008)

What would you do if you were alone in the wild with your life in your own hands? Here are a few tips that could be vital in a survival situation. Should you become lost or stranded in a disabled vehicle or you're a survivor of a plane crash, it's best to remain with the vehicle or plane. It will be easier for a search party to find you in a stationery position than to look for a moving who has no idea where they are going.

Second, don't panic or lose your head. Listen for signs of civilization like vehicles, trains, church bells and so on. In the case that you don't hear anything, search for the highest point around that you could get to and look for buildings, towns, church steeples, railroad tracks, fences, power lines, telephone lines, anything that would that will lead you back to civilization. However always make sure that you don't wonder too far away and you can't make it back to the crash site.

Nevertheless, if you don't see or hear any form of civilization it is best to remain near crash area. Your best chance of surviving is remaining warm and dry while you wait for rescue. Your main objects, besides acquiring food and water are building a shelter, starting a fire if possible and to devise a means of signaling your positing to help the rescue team locate you. For instance, that can be by starting a fire or by using tree branches to make a big SOS on the snowed ground that can be seen by air. In a situation like this it is essential that you use your wits. Keep calm and scan your surroundings for anything you can use towards you advantage.

**Appendix 13:** Neutral Story: Glass Recycling (Glass recycling, 2012)

Glass recycling is the process of turning waste glass into usable products. First of all, glass is sorted by color and washed to remove any impurities. Most collection points have separate bins for clear, green and brown glass, as the different colors of glass are usually chemically incompatible. The glass is then crushed and melted, then molded into new products such as bottles and jars. In addition, recycled glass can also be used for alternative purposes such as brick manufacture or decorative uses.

Furthermore, the use of recycled glass in new containers also helps to save energy. It helps in brick and ceramic manufacture, and it conserves raw materials, reduces energy consumption, and reduces the volume of waste sent to landfills. Glass recycling uses less energy than manufacturing glass from sand. In specific, every metric ton (1,000 kg) of waste glass recycled into new items saves 315 kilograms (690 lb) of carbon dioxide from being released into the atmosphere during the creation of new glass.

Finally, glass is an ideal material for recycling as it does not degrade through the recycling process. As a result glass can be recycled and used over and over.

**Appendix 14:** The Three Different Types of Feedback.

Positive: Congratulations for your performance. Your scores have been compared with the scores of 930 other university students and your scores belong to the 73 percentile for the response time exercise and 81 percentile for the accuracy task. In simple terms, you scored higher than 73% of the total participants on response time, and higher than the 81% of total participants for the accuracy task. Very good performance!

Negative: Unfortunately your performance was poor. Your scores have been compared with the scores of 930 other university students and your scores belong to the 39 percentile for the response time exercise and 37 percentile for the accuracy task. In simple terms, you scored higher than only 39% of the total participants on response time and only higher than 37% of the total participants for the accuracy task. Better luck next time!

Average/Neutral: Your performance was average. Your scores have been compared with the scores of 930 other university students and your scores belong to the 48 percentile for the response time exercise and 51 percentile for the accuracy task. In simple terms, you scored similar to what 48% of the total participants scored on the response time exercise and similar to what 51% of the total participants scored on the accuracy task.

**Appendix 15:** The HSM Scale

For each of the qualities or skills below, we would like you to rate yourself in comparison to your peers. Specifically, we want you to think about how the average college student of your age and gender rates on each of these qualities or skills, and then rate yourself in comparison. Please use the following scale to rate yourself:

- 1 = Much less than the average college student of my age and gender
- 2 = Somewhat less than the average college student of my age and gender
- 3 = Slightly less than the average college student of my age and gender
- 4 = About the same as the average college student of my age and gender
- 5 = Slightly more than the average college student of my age and gender
- 6 = Somewhat more than the average college student of my age and gender
- 7 = Much more than the average college student of my age and gender

Please read each item and fill in with the number that corresponds to your self-perception.

\_\_\_\_\_ Athletic ability

\_\_\_\_\_ Academic ability

\_\_\_\_\_ Jealous

\_\_\_\_\_ Dependent

_____Leadership ability	_____Artistic ability
_____Nervous	_____Manipulative
_____Popularity with own sex	_____Understanding of others
_____Popularity with opposite sex	_____Clarity of personal goals
_____Lazy	_____Confidence in the ability to obtain personal goals
_____Public speaking ability	_____Awkward
_____Intellectual self-confidence	_____Self-respect
_____Anxious	_____Individuality
_____Creativity	_____Self-defeating
_____Lacking motivation	_____Impatient
_____Difficulty making friends	_____Originality
_____Forward	_____Social self-confidence
_____Cranky	_____Selfish
_____Mathematical ability	_____Sensitivity to others
_____Personal appearance	_____Hostile towards others
_____Shy	_____Defensive
_____Dull	_____Cheerfulness
_____Drive to achieve	_____Writing ability
_____Quiet	_____Pretentious

**Appendix 16:** The two sets of information regarding nuclear energy (Buzz, 2009; Maehlem, 2013)

**The positive aspects of nuclear energy:**

- Lower carbon dioxide (and other greenhouse gases) released into the atmosphere in power generation.
- Low operating costs (relatively).
- Known, developed technology “ready” for market.
- Large power-generating capacity able to meet industrial and city needs (as opposed to low-power technologies like solar that might meet only local, residential, or office needs but cannot generate power for heavy manufacturing).
- Existing and future nuclear waste can be reduced through waste recycling and reprocessing, similar to Japan and the EU (at added cost).
- Fission is the most energy for the least fuel with current technology.
- Less fuel means less waste, and the waste is all accounted for, not released into the atmosphere to become someone else's problem.
- Uranium is readily available, very common in the earth's crust (about the same as tin)
- Economical - operating cost about the same as coal, fuel cost is a much smaller percentage of the total, therefore less susceptible to price fluctuations.
- Reliable - Nuclear power plants have very high capacity factors.
- No combustion, no Co, CO<sub>2</sub> or SO<sub>2</sub> released.
- Creates high paying, stable jobs.
- Reduce dependence on foreign oil/ fuel. Uranium available domestically and in oceans.
- High temperature reactors could produce Hydrogen as well as electricity.
- Fantastic safety record.

**The negative aspects of nuclear energy:**

- High construction costs due to complex radiation containment systems and procedures.
- High subsidies needed for construction and operation, as well as loan guarantees.
- Subsidies and investment could be spent on other solutions (such as renewable energy systems).
- High-known risks in an accident.
- Unknown risks.
- Long construction time.
- Target for terrorism (as are all centralized power generation sources).
- Waivers are required to limit liability of companies in the event of an accident. (This means that either no one will be responsible for physical, environmental, or health damages in the case of an accident or leakage over time from waste storage, or that the government will ultimately have to cover the cost of any damages.)

- Nuclear is a centralized power source requiring large infrastructure, investment, and coordination where decentralized sources (including solar and wind) can be more efficient, less costly, and more resilient.
- Uranium sources are just as finite as other fuel sources, such as coal, natural gas, etc., and are expensive to mine, refine, and transport, and produce considerable environmental waste (including greenhouse gasses) during all of these processes.
- The majority of known uranium around the world lies under land controlled by tribes or indigenous peoples who don't support it being mined from the earth.
- The legacy of environmental contamination and health costs for miners and mines has been catastrophic.
- Waste lasts 200 – 500 thousand years.
- There are no operating long-term waste storage sites in the U.S. One is in development, but its capacity is already oversubscribed. Yucca Mountain is in danger of contaminating ground water to a large water basin, affecting millions of people. It's difficult, if not impossible, for the U.S. to impose its will on the state of Nevada (or other places) if they don't want to host long-term storage of waste.
- There are no operating "next generation" reactors, such as high-temperature breeder reactors and particle-beam activated reactors, that are reported to produce less waste and have reduced safety concerns. Even if these technologies were ready, they wouldn't be deployable commercially for another two decades.
- Shipping nuclear waste internationally poses an increased potential threat to interception to terrorism (though this has not happened yet with any of the waste shipped by other countries). Increasing the amount of waste shipped, particularly in less secure countries, is seen as a significant increase in risk to nuclear terrorism.
- Irrational fear of all things nuclear.
- High cost to build and license, large initial investment for long term pay back.
- Publicly accepted high level storage facility not domestically available.
- Reprocessing facility not domestically available.
- High cost of personnel.
- Security concerns.

### Appendix 17: Spielberger's state-trait anxiety inventory

#### **Self-Evaluation Questionnaire**

**DIRECTIONS:** A number of statements that people have used to describe themselves are given below. Read each statement and then write the appropriate number to the right of the statement to indicate how you feel **right now**, that is, **at this moment**. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your **current** feelings best.

1 = not at all  
 2 = somewhat  
 3 = moderately so  
 4 = very much so

1. I feel calm.....	1	2	3	4
2. I feel secure.....	1	2	3	4
3. I am tense.....	1	2	3	4
4. I feel strained.....	1	2	3	4
5. I feel at ease.....	1	2	3	4
6. I feel upset.....	1	2	3	4
7. I am presently worrying over possible misfortunes.....	1	2	3	4
8. I feel satisfied.....	1	2	3	4
9. I feel frightened.....	1	2	3	4
10 I feel comfortable.....	1	2	3	4
11 I feel self-confident.....	1	2	3	4
12 I feel nervous.....	1	2	3	4
13 I am jittery.....	1	2	3	4
14 I feel indecisive.....	1	2	3	4
1 I am relaxed.....	1	2	3	4
16 I feel content.....	1	2	3	4
1 I am worried.....	1	2	3	4
1 I feel confused.....	1	2	3	4
19 I feel steady.....	1	2	3	4
20 I feel pleasant.....	1	2	3	4

## **Appendix 18:** Supporting and contradicting statements of six food items

### **1. Cabbage**

Supporting: Cabbage is high in vitamin K that is necessary for the building of strong bones.

Supporting: Cabbage contains ‘good’ fat, necessary for the normal functioning of a body

Supporting: Cabbage is rich in vitamin C

Supporting: Cabbage is a great source of vitamin B6

Supporting: Cabbage provides the body with necessary fiber for the normal functioning of the digestive system

Supporting: Cabbage is perfect for a healthy diet

Contradicting: Research has shown that cabbage is sometimes associated with thyroid problems

Contradicting: Cabbage does not provide any substantial nutrition

Contradicting: Cabbage is not as nutritious as perceived

Contradicting: The consumption of walnuts can cause many allergic reactions

Contradicting: There are more nutritious foods than cabbage

Contradicting: The nutritious value of cabbage is overrated

### **2. Cauliflower**

Supporting: Cauliflower contains a high percentage of vitamin C, valuable for the immune system

Supporting: Cauliflower contains omega-3 fats important of normal metabolism

Supporting: Cauliflower is high in antioxidants

Supporting: Cauliflower is a great source of manganese that is important in oxygen-related metabolism

Supporting: Cauliflower provides the body with glucosinolates that support the cardiovascular and the immune system

Supporting: Cauliflower is perfect for a healthy diet

Contradicting: Cauliflower does not provide valuable vitamins or minerals, especially as it is usually overcooked

Contradicting: Cauliflower can create problems with the digestive system

Contradicting: The consumption of cauliflower can cause an allergic reaction

Contradicting: There are more nutritious foods than Cauliflower

Contradicting: Cauliflower packs very little nutritious value

Contradicting: The nutritious value of cauliflower is overrated



### **3. Green Peppers**

Supporting: Consuming green peppers is a great source of vitamin C and vitamin B6 important for cardiovascular and digestive function

Supporting: Green Peppers are high in vitamin A that is essential for healthy vision

Supporting: Green Peppers contain folate that plays an important role in DNA synthesis and repair

Supporting: Green Peppers are a healthy vegetable

Supporting: Green Peppers are necessary in a balanced and healthy diet

Supporting: Green Peppers are beneficial as they contain potential anti-cancer properties

Contradicting: Green peppers are among the top 12 fruits and vegetables on which pesticide residues have been most frequently found

Contradicting: Green peppers do not provide any substantial nutrition

Contradicting: The consumption of green peppers can cause many allergic reactions

Contradicting: There are more nutritious foods than green peppers

Contradicting: Green peppers pack very little nutritious value

Contradicting: The nutritious value of green peppers is overrated

### **4. Almonds**

Supporting: Almonds are a good snack with plenty of protein and vitamin E

Supporting: Consuming almonds is healthy and satisfying source of energy

Supporting: Almonds are high in biotin, a vitamin that is essential in maintaining a normal blood sugar balance

Supporting: Almonds contain copper, which plays an important role in the maintenance of major structural components of our bodies such as collagen

Supporting: Consuming almonds lowers cholesterol levels

Supporting: Almonds are beneficial in a healthy diet

Contradicting: Almonds are more fatty than nutritious

Contradicting: Almonds should be avoided when dieting

Contradicting: The consumption of almonds can cause many allergic reactions

Contradicting: There are more nutritious snacks than almonds

Contradicting: Almonds contain plenty grams of fat

Contradicting: The nutritious value of almonds is overrated

### **5. Avocado**

Supporting: Avocado contains ‘good’ fat, necessary for the normal functioning of a body

Supporting: Avocado is rich in nutrients that are valuable for the body’s immune system.

Supporting: Avocado is high in pantothenic acid that is essential for energy production

Supporting: Avocado is a great source of fiber

Supporting: Avocado provides support to body and cardiovascular system

Supporting: Avocado is ideal for a healthy diet

Contradicting: Avocado is too fatty and consuming too much can lead to weight gain

Contradicting: Avocado should be avoided when dieting

Contradicting: Avocado does not provide any substantial nutrition

Contradicting: The consumption of avocado may cause an allergic reaction

Contradicting: Avocado contains plenty grams of fat

Contradicting: The nutritious value of avocado is overrated

## **6. Banana**

Supporting: Banana is rich in nutrients that are valuable for the body's immune system.

Supporting: Banana is high in vitamin B6 necessary for the normal functioning of the digestive system

Supporting: Banana contains manganese that is important in oxygen-related metabolism

Supporting: Banana is a good source of potassium

Supporting: Banana provides the body with high energy and athletic performance

Supporting: Banana is good for a healthy diet

Contradicting: Eating too many bananas can increase body weight, as they are a fatty fruit.

Contradicting: Bananas should be avoided when dieting

Contradicting: Bananas do not provide any substantial nutrition

Contradicting: There are more nutritious fruits than bananas

Contradicting: Bananas contain plenty of grams of fat

**Appendix 19**: Supporting and contradicting statements for the six food items.

## **1. Broccoli**

Supporting: Broccoli is high in vitamin K that plays a vital role in the prevention of blood clots

Supporting: Broccoli contains high dosage of fiber

Supporting: Broccoli is a great source of Omega-3 acids, essential for good health.

Supporting: Broccoli provides the body with anti-inflammatory benefits

Supporting: Broccoli is a healthy food

Supporting: Broccoli consumption can increase vitamin D that is vital in regulating the absorption of calcium

Supporting: Broccoli is high in vitamin C

Supporting: Broccoli offers cholesterol-lowering benefits

Supporting: Broccoli is perfect for a healthy diet

Supporting: Consuming broccoli can benefit the body as it contains many nutrients

Contradicting: Broccoli does not help with muscle growth  
Contradicting: Broccoli does not provide any substantial nutrition  
Contradicting: Broccoli is not as nutritious as perceived  
Contradicting: The consumption of broccoli may cause an allergic reaction  
Contradicting: Broccoli is usually overcooked and therefore provides nothing nutritious  
Contradicting: Broccoli is often associated with goitrogens, substances that interfere with the function of thyroid gland  
Contradicting: There are more nutritious foods than broccoli  
Contradicting: Broccoli packs very little nutritious value  
Contradicting: Broccoli contains some grams of fat  
Contradicting: The nutritious value of broccoli is overrated

## **2. Grapes**

Supporting: Grapes are high in vitamin K  
Supporting: Grapes contain vitamin B2 that aids in energy production  
Supporting: Grapes are a good source of copper that is vital for preventing osteoporosis  
Supporting: The wealth of antioxidant nutrients in grapes is astonishing  
Supporting: Grapes are a healthy snack  
Supporting: Grapes are believed to play a role in longevity  
Supporting: Grapes are a satisfying and healthy fruit.  
Supporting: Grapes are beneficial as they offer better blood sugar balance  
Supporting: Grapes are perfect for a healthy diet  
Supporting: Consuming grapes can benefit the body and they contain numerous vitamins and minerals

Contradicting: Grapes pack very little nutritious value.  
Contradicting: Grapes do not help with dieting and weight watching  
Contradicting: Grapes do not provide any substantial nutrition  
Contradicting: Grapes is not nutritious or healthy  
Contradicting: The consumption of grapes may cause an allergic reaction  
Contradicting: Grapes are often the cause of problems with the digestive system  
Contradicting: A lot of pesticides are used in the growing of grapes  
Contradicting: There are more nutritious fruits than grapes  
Contradicting: Grapes contain acids that can cause heartburn  
Contradicting: The nutritious value of grapes is overrated

## **3. Salmon**

Supporting: Salmon is extremely high in B12 that is vital in DNA production  
Supporting: Salmon contains small protein molecules that control inflammation  
Supporting: Salmon is a great source of Omega-3 acids, essential for good health.  
Supporting: Salmon provides the body with selenium that plays a key role in the body's detoxification system

Supporting: Salmon consumption is associated with improved mood and cognition  
Supporting: Salmon is rich in vitamin D  
Supporting: Salmon is high in protein  
Supporting: Salmon is beneficial as it contains acids that promote many eye benefits  
Supporting: Salmon is perfect for a healthy diet  
Supporting: Consuming Salmon can benefit the body and is always included in weight watching diets

Contradicting: The nutritious value of salmon is overrated, when in fact it is essentially a fatty food.  
Contradicting: Salmon packs very little nutritious value.  
Contradicting: Salmon do not help with dieting and weight watching as it contains plenty grams of fat  
Contradicting: Salmon does not provide any substantial nutrition  
Contradicting: Salmon may contain parasites and pesticides and therefore need to be thoroughly cooked  
Contradicting: There are too many concerns about the farming conditions and the origin of salmon  
Contradicting: The nutritious value of salmon is overrated  
Contradicting: Fish such as salmon, are among the eight food types considered to be major food allergens  
Contradicting: Salmon is prone to mercury contamination  
Contradicting: Often persistent organic pollutants are found in salmon, chemicals that adversely affect human health

#### **4. Spinach**

Supporting: Spinach is extremely high in vitamin K that protects the body from infectious diseases such as pneumonia  
Supporting: Spinach contains nutrients that are important in protecting the lining of the digestive tract from damage caused from inflammation  
Supporting: Spinach is a good source of iron  
Supporting: Spinach provides the body with many antioxidants  
Supporting: Spinach is a healthy and satisfying vegetable that can be accompanied in many meals  
Supporting: Spinach is rich in magnesium essential for creating and maintaining healthy strong bones  
Supporting: Spinach is high in vitamin A essential for healthy skin  
Supporting: Spinach is beneficial as it offers anti-cancer phytonutrients  
Supporting: Spinach is perfect for a healthy diet  
Supporting: Consuming spinach can benefit the body in many ways

Contradicting: Spinach is among the top fruits and vegetables on which pesticide residues have been most frequently found

Contradicting: Spinach is not always washed thoroughly and it can carry parasites and pesticides

Contradicting: Spinach does not help with demanding exercise or muscle growth

Contradicting: Spinach packs very little nutritious value.

Contradicting: There is some level of risk involved with consumption of raw spinach due to some bacteria contamination

Contradicting: Spinach is not as nutritious or healthy as believed

Contradicting: Spinach is often the cause of problems with the digestive system

Contradicting: There are more nutritious vegetables than spinach

Contradicting: Consumption of spinach raises concerns about the risk of spinach contamination with E. coli bacteria

Contradicting: The nutritious value of spinach is overrated

## **5. Walnuts**

Supporting: Walnuts are high in omega-3 fats, the 'good' fats

Supporting: Walnuts contain manganese important for blood sugar control

Supporting: Walnuts have been viewed to possess anti-cancer properties

Supporting: Walnuts provide the body with a rich source of heart-healthy fats

Supporting: Walnuts are a healthy food that has been suggested to help reduce problems with metabolic syndrome

Supporting: Walnuts are rich in mineral nutrients that play an important role in nervous system metabolism

Supporting: Walnuts are high in copper

Supporting: Walnuts are beneficial as they decrease total cholesterol

Supporting: Walnuts are perfect for a healthy diet

Supporting: Consuming walnuts has been associated with the regulation of blood pressure

Contradicting: Walnuts should be avoided when dieting

Contradicting: Walnuts do not provide any substantial nutrition

Contradicting: Walnuts are not as nutritious as perceived

Contradicting: The consumption of walnuts can cause many allergic reactions

Contradicting: Walnut consumption has been associated with kidney problems and should be avoided if such issues arise

Contradicting: Walnut consumption can provoke various problems to the digestive system

Contradicting: There are more nutritious snacks than walnuts

Contradicting: Walnuts pack very little nutritious value

Contradicting: Walnuts contain plenty grams of fat

Contradicting: The nutritious value of walnuts is overrated

## 6. Whole Wheat Bread

Supporting: Whole wheat bread is high in magnesium

Supporting: Whole wheat bread contains copper that is necessary for supporting neurodevelopment and growth

Supporting: Whole wheat bread is a good source of important nutrients

Supporting: Whole wheat bread provides the body with protection against the formation of stones in the gallbladder

Supporting: Whole wheat bread is a healthy food supplement

Supporting: Whole wheat bread is rich in fiber, necessary for digestive system.

Supporting: Research suggests regular consumption of whole wheat and wheat grains reduce risks of type 2 diabetes

Supporting: Whole wheat bread is beneficial as it reduces risks of metabolic syndrome

Supporting: Whole wheat bread is perfect for a healthy and balanced diet

Supporting: Consuming whole wheat bread can benefit the body and maintain normal insulin levels

Contradicting: Whole wheat bread contains a lot of carbohydrates

Contradicting: Whole wheat bread may contain ingredients that can cause an allergic reaction

Contradicting: Whole wheat bread and bread in general, should be avoided when dieting

Contradicting: Elevated levels of LDL (bad) cholesterol are associated consumption of whole wheat bread

Contradicting: There are more nutritious and less fatty foods than whole wheat bread

Contradicting: The nutritious value of whole wheat bread is overrated

Contradicting: Whole wheat bread contains plenty grams of fat

Contradicting: Whole wheat bread is not as nutritious as perceived

Contradicting: Whole wheat bread is considered among the highest risk of foods when it comes to acrylamide exposure, a potential toxic substance

Contradicting: Whole wheat bread contains high levels of gluten that can cause many problems to the digestive system

### **Appendix 20:** Quotes about commitment (Commitment quotes, n.d.).

‘You always have two choices: your commitment versus your fear.’ Sammy Davis, Jr.

‘When you do something with a lot of honesty, appetite and commitment, the input reflects in the output.’ A. R. Rahman

‘Productivity is never an accident. It is always the result of a commitment to excellence, intelligent planning, and focused effort.’ Paul J. Meyer

‘Desire is the key to motivation, but it's determination and commitment to an unrelenting pursuit of your goal - a commitment to excellence - that will enable you to attain the success you seek.’ Mario Andretti

‘It was character that got us out of bed, commitment that moved us into action, and discipline that enabled us to follow through.’ Zig Ziglar

‘Many people don't focus enough on execution. If you make a commitment to get something done, you need to follow through on that commitment.’ Kenneth Chenault

‘You need to make a commitment, and once you make it, then life will give you some answers.’ Les Brown

‘You need three things to win: discipline, hard work and, before everything maybe, commitment. No one will make it without those three.’ Haile Gebrselassie

‘Commitment and creativity cannot be captured and handcuffed. Inspiration cannot be jailed. The heart cannot be contained.’ Gary Zukav

‘Unless commitment is made, there are only promises and hopes... but no plans.’ Peter Drucker

‘If you make the unconditional commitment to reach your most important goals, if the strength of your decision is sufficient, you will find the way and the power to achieve your goals.’ Robert Conklin

‘Commitment is an act, not a word.’ Jean-Paul Sartre