Are decisive and rational people more likely to be at the top of the career ladder? A quantitative investigation of cognition and behaviour in decision making as predictors of career outcomes

Are decisive and rational people more likely to be at the top of the career ladder? A quantitative investigation of cognition and behaviour in decision making as predictors of career outcomes

Margarita (Meg) Kiseleva

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Abstract

In this thesis, the relationships between decision making and career outcomes were examined in a series of pre-registered quantitative studies. Career outcomes were defined as hierarchical status, authority in the organisation, and career satisfaction. Studies 1 and 2 focused on rationality and intuition in making decisions. Study 3 examined decision avoidance and dependent decision making.

After controlling for demographic variables and decision confidence, neither rational nor intuitive decision making predicted career outcomes. However, decision confidence was a significant predictor of hierarchical status and authority level in both studies and of career satisfaction in one study. Based on prior research showing that confidence is often confused with competence and therefore may confer an unfair social advantage, this suggest that people exhibiting decision confidence may be favoured for higher-level jobs. Alternatively, being in a high-level job may make people more confident in their decisions and not the other way around. Existing research proposes that this relationship may be bi-directional.

In Study 3, decision avoidance predicted authority level and career satisfaction, but not hierarchical status, while dependent decision making did not predict any career outcomes. This suggests that positions below senior may still wield significant authority and thus decision-making power and are likely to be occupied by people who proactively approach decisions. Viewing these findings from the person-situation interaction perspective, it is suggested that even in employees predisposed to decision avoidance, such behaviour may be mitigated to help them improve career outcomes.

With that in mind, organisational factors that may be linked to increases in avoidant and dependent decision making, such as psychosocial work environment and anxiety, were examined. Study 4, which used mediation analysis, provided initial evidence for such links and a basis for future causal research, with a view to gathering knowledge on mitigating undesirable decision-making behaviour through improving employee well-being.

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1 Introduction

1.1 Decision making and career outcomes

The importance of making good decisions is often overlooked. That is partly because people do not always realise how many choices they make throughout the day. Such choices range from mundane ones, such as at what time to leave home on a rainy day to arrive at work in time for a nine o'clock meeting, to important and complex ones, such as who to hire for an open position in the team. The consequences of poor decision making in these situations are obvious. Not leaving home earlier than usual when there is likely to be heavy traffic on the road and train delays may result in being late to an important meeting and inconveniencing the other participants. Making a poor hiring decision is likely to affect the productivity of the team. These are just two examples of common choices people may have to make that may affect their own performance at work or that of their organisations. In a typical working day, there are many more, and as bad decisions accumulate, so do their consequences.

The focus of this thesis is on the decision making of individual employees and its relationships with their career outcomes. It is an understudied area of research, which may, however, bring benefits in terms of improved hiring processes and promotability of employees. While attempts have been made to integrate the knowledge acquired in the area of research on human decision making into Industrial and Organisational (I/O) Psychology (e.g., Highhouse, 2001; Zhang & Highhouse, 2018), the progress has generally been fragmented. The question of whether the differences in how people approach making decisions are associated with different career outcomes has remained unexplored. This is the gap that this thesis is aimed to fill.

There are a number of dimensions on which people tend to differ when making choices. On the one hand, people may rely on rational thinking or intuitive judgments, or instead tend to make impulsive choices that are not backed by thorough consideration; on the other hand, people may behave differently from one another in

decision-making situations, exhibiting more or less proactivity and independence (Harren, 1979; Leykin & DeRubeis, 2010; Mann et al., 1997; Scott & Bruce, 1995). These differences are likely to have an effect on the quality of decisions that are made. For example, those people who reported that they tended to choose rationally were found to be more competent at handling various decision-making tasks and have better decision-making outcomes in their lives in general; conversely, respondents who reported being decision avoidant and making many spontaneous choices exhibited less decision-making competence and worse decision outcomes (Bruine de Bruin et al., 2007).

These differences in decision making are likely to affect the quality of decisions not only in one's personal, but also in one's professional life. The results of decisions accumulate and many poor choices made in relation to one's career and in one's professional capacity may eventually lead to poor career outcomes. The question of whether different decision-making tendencies (e.g., to decide rationally or intuitively, to avoid decisions and to rely on other people for making them) are indeed related to career outcomes will be explored in this thesis.

The work presented here builds on a framework suggested in previous research on individual differences in decision making, which recognises two components of decision-making approach: on the one hand lies the cognitive dimension, comprised of rationality and intuition; on the other hand are behaviours that may affect choice: avoidance and dependence on others (Dewberry et al., 2013). In addition to that, another important aspect of decision making, decision confidence, which has received significant attention in previous research (e.g., Kruger & Dunning, 1999; Leykin & DeRubeis, 2010; Lichtenstein & Fischhoff, 1977), will be examined. The relationship that these decision-making tendencies, or styles, have with career outcomes will be considered in three empirical studies presented in this thesis.

Importantly, decision-making styles are not immutable. Instead, they are conceptualised as habitual responses to decision situations which may change depending on the context of the decision and on the kind of feedback one receives in response to making choices (Scott & Bruce, 1995). If individual differences in decision making are associated with career outcomes, their malleability has implications for both individual employees and organisations. Understanding the root causes of certain suboptimal decision-making behaviours may allow people to modify or mitigate them, potentially resulting in better career outcomes.

Why is the question of individual differences in decision making important for organisations? Any job, even with the least autonomy, involves some decisions. Any action in the presence of other alternatives constitutes a choice and as such choices accumulate, so do their outcomes. A few minor errors of judgment or choices delayed due to avoidance may not have far-reaching consequences. However, a consistent pattern of such behaviour may negatively affect not only the individual employee, but also the performance of their organisation, thus making effective decision making an important consideration.

If the relationship between decision making and career outcomes proves to be significant, it may give organisations an additional recruitment tool to more easily identify those candidates who are likely to progress in their careers. It may also have implications for training existing staff to equip them with techniques for better decision making and increase awareness of common decision biases and suboptimal decision behaviours, such as excessive avoidance of decisions. For individual employees seeking career advancement, such knowledge may be helpful in adapting their decision-making approach to improve the efficiency of their choices.

This introductory chapter is structured in the following way. First, the field of Judgment and Decision Making (JDM), which this thesis builds upon, will be introduced. Then, existing research into individual differences in decision making relevant to the work

presented here will be discussed. After that, the relevance of decision-making research to organisations will be explained. Finally, a brief overview of the structure of the remaining chapters of this thesis will be provided.

1.2 A brief introduction to Judgment and Decision Making

The way people make decisions has long been of interest to researchers. The study of human decision making is closely intertwined with the study of risk since decisions tend to involve a degree of uncertainty. Usually, it is not possible to perfectly predict the outcomes of different choices. Besides, which outcomes are preferred depends on the goals that the decision maker pursues. Therefore, what one person would consider to be a good outcome might be judged as failure by another. Although the last half a century has seen extensive growth in the interest in decision making research, attempts to quantify how people make decisions go far back in history.

Of particular note is Daniel Bernoulli's expected utility theory, which attempted to explain why different people may have different preferences and has had far-reaching influence on research in the area of decision making (Bernoulli, 1738/1954). This theory suggested an explanation as to why a poor and a rich person would react differently to the prospect of the same increase in wealth and, therefore, why they would differ in their decisions to pursue or not to pursue the same opportunity to increase their wealth (for example, by accepting a physically difficult job). According to Bernoulli's expected utility theory, the person's existing wealth dictates the benefit, or the *utility,* they receive from an increase in it. The perceived value of offers, good, or services priced the same way, therefore, differs between people based on how much wealth they already hold.

In mid-20th century, works such as von Neumann and Morgenstern's (1944) *Theory of Games and Economic Behavior* and Savage's (1954) subjective expected utility (SEU)

theory brought the study of human decision making under an academic spotlight. These works centred on the normative rules of decision making. However, it soon became apparent that people often do not behave in a way that is considered normative: that is, they do not always follow decision-making rules that can help them maximise the utility of their choices. Scholars began noticing “paradoxes” in decision making in which people tended to break the normative rules (Allais, 1979; Ellsberg, 1961). It was also pointed out that people’s changing preferences, limited access to information, limited computational abilities, and situational constraints often prevent them from adhering to the traditional notion of rationality (H. A. Simon, 1955). Therefore, there was a need for new theories that would more accurately predict how people in real life, rather than in economic textbooks, are likely to make decisions.

That marked the advent of the psychological field of JDM, with contributions to the understanding of human decision making such as prospect theory (Kahneman & Tversky, 1979), the study of heuristics and biases (Tversky & Kahneman, 1974), the framing effect (Kahneman & Tversky, 1984), the sunk cost fallacy (Arkes & Blumer, 1985), the decoy effect (Huber et al., 1982), the endowment effect (Thaler, 1980), and others, which will be discussed in Chapter 2 along with a more detailed overview of JDM as a field of study and its relevance to decision making in organisations.

The contributions made in the field of JDM have elucidated the way decisions are made in real life, with human cognitive limitations and within the constraints of the environments in which choices are made. Understanding these broad, population-wide tendencies has guided the development of programmes to improve decision making. For example, once an investment of time, money, or effort is made into a specific project, people are likely to pursue that project even if abandoning it would be more efficient, which is known as the sunk cost fallacy (Arkes & Blumer, 1985). This has led researchers to the conclusion that organisations should be implementing barriers to the escalation of commitment to projects whereby employees have to justify any further investments (Roth et al., 2015). In another area, behavioural science, people’s known

tendency to adhere to the status quo option instead of making an active choice has given rise to interventions aimed at “nudging” people towards better choices by providing default options that are believed to be beneficial (Thaler & Sunstein, 2008). The notable areas where such “nudges” have been implemented include enrolment in pension plans (Benartzi & Thaler, 2007) and organ donation schemes (van Dalen & Henkens, 2014), as well as energy saving (Brown et al., 2013).

The work in the area of JDM has highlighted rationality as a skill that can be acquired and improved rather than as an inherent human quality, giving way to the creation of tools that measure individuals’ decision competence (Bruine de Bruin et al., 2007; Parker & Fischhoff, 2005) and training targeted at improving the quality of decisions (Jacobson et al., 2012; Kavathatzopoulos, 1994; Nota & Soresi, 2004; Sellier et al., 2019). Research into human rationality (or rather *ir*rationality) has identified common scenarios where people tend make suboptimal choices affected by harmful heuristics and biases and decision fallacies (discussed in more detail in Chapter 2).

People are not immune to decision errors in an organisational setting either, and poor decisions made by employees may negatively reflect not only on them as individuals, but on the organisation as a whole. Besides, a pattern of poor decision making in employees is likely to have a negative effect on their performance and the impression they make on people who make promotion decisions, thus jeopardising their career prospects. These individual-level decision-making tendencies and their relationships with career outcomes are the subject of this thesis.

JDM research has typically focused on population-level tendencies in decision making. However, the idea that people are susceptible to a range of decision-making biases and errors and that they do not all approach decision making in the same way has paved the way for research into individual differences in decision making, which will be discussed in the next section.

1.3 Individual differences in decision making

Studies in the JDM tradition have documented many cases when people tend to break the rules of rational decision making. For example, researchers observed that while the majority of participants chose a certain option out of two alternatives when it was presented in a positive way, only a minority chose the same option when it was presented using a negative framing (Tversky & Kahneman, 1986). However, the fact that there was still variation in preferences indicates that people approach such decisions differently and there is room for the study of such individual differences.

It has long been noted that people differ in the way they engage in information gathering and processing, including how much they reflect on a problem and evaluate their options before acting, which has an effect on their decision making (Messick, 1994; Sternberg & Grigorenko, 1997). Due to the differences in how people think about decision problems, they may interpret the decision situation differently, which may also influence the kinds of choices they make.

However, individual differences in decision making go beyond cognition. The construct of rationality has received much attention in this area, along with intuition (Hamilton et al., 2016; Harren, 1979; Henderson & Nutt, 1980; Scott & Bruce, 1995). But in addition to that, researchers have highlighted different behaviours people may be prone to in decision situations, such as the avoidance of decisions and dependence on others in making them (Harren, 1979; Leykin & DeRubeis, 2010; Scott & Bruce, 1995).

Crucially, such differences in how people approach decisions have been conceptualised as learned response patterns that may vary when the decision maker is confronted with different types of choices rather than persistent traits (Scott & Bruce, 1995). A large body of research, some of which will be discussed in Chapters 3 and 4, exists that highlights potential situational effects on behaviours such as decision avoidance and dependence on others in making choices. This suggests that not only

personal predispositions, but also situational factors influence decision making, as is the case with many personal characteristics (Terborg, 1981).

The same may be said for rational and intuitive decision making in different decision situations. The same person may engage in extensive information gathering and thorough deliberation when an important choice is made and follow their gut feeling with a decision is inconsequential (although it may be argued that the person behaves rationally in both situations because in the case of a trivial decision they choose not to invest much time and effort that may be better spent elsewhere).

Decision-making styles is not the only concept of interest in the study of individual differences in decision making. The way different people perceive, and respond to, risk as well as how competently different people are able to approach decision-making problems have also received attention in this area of research.

Risk is a central concept in the study of decision making. When making choices, a decision maker often does not know how different courses of action will turn out and has to make predictions about the probabilities of different outcomes, on which choices are based. In the case of choices that have a potential negative outcomes (which may manifest in either a negative event happening or a positive event not happening, or, more broadly, in a goal not being achieved), research shows that people have different perceptions of risk (Blais & Weber, 2006; Dowling, 1986). That is, two different people may rate the riskiness of the same event differently, which is likely to have an effect on the kind of decisions that they make. Perception of high risk generally makes an option less attractive, thus tending to lead to the avoidance of that option (Figner & Weber, 2011). Both people making risk assessments may act rationally on the basis of their judgment of the probability of a negative outcome, but arrive at different choices. Risk perception and its relevance to decision making will be discussed in more detail in Chapter 4.

The concept of individual differences in decision-making competence is linked to JDM research on rational decision making (Bruine de Bruin et al., 2007; Finucane & Gullion, 2010). A competent decision maker is expected to be able to follow the rules of decision-making rationality to make efficient choices aimed at reaching the goals they set. As such, among other skills, resistance to common decision errors, such as being affected by whether the choice problem is presented in a positive vs in a negative way (the framing effect) or by whether an investment in an unprofitable activity has already been made (the sunk cost fallacy), is expected from a person deemed to be competent in making decisions (Bruine de Bruin et al., 2007).

In addition to that, competent decision makers should be able to decompose the decision problem, decide which aspects are of the biggest importance to them, and choose accordingly (Finucane & Gullion, 2010). For example, a manager looking to hire a new team member would evaluate the candidates for the job on different dimensions that are considered to be important for the job, assign weights to the different dimensions based on their relative importance, and choose accordingly. The inability to do so may lead the decision maker to a suboptimal decision outcome: in this example, to choose a candidate who is not as suitable for the job as another.

Decision-making competence tends to be higher in people who report approaching decisions rationally and lower in those who tend to avoid decisions and make many spontaneous choices; in addition, both rational decision making and decision-making competence have been found to be positively associated with decision outcomes (Bruine de Bruin et al., 2007). This suggests that people who tend to decide rationally (that is, to engage in thorough information gathering and evaluation of alternatives in terms of their specific goals) are likely to make choices more competently and enjoy better outcomes of their decisions. In an organisational setting, decision quality is an important aspect that is likely to contribute to the successful functioning of the organisation. Therefore, the ability to make rational choices should be an important quality in employees.

The next section will discuss the relevance of decision-making research to organisations and why efficient decision making should be an important consideration in more detail.

1.4 The relevance of decision-making research to organisations

The need for efficient decision making in organisations is self-evident. Choices based on unreliable information and poor consideration are likely to lead to suboptimal outcomes, interfering with achieving organisational goals. However, only in recent years JDM research has started to receive attention within I/O Psychology. Personnel selection (Gamliel & Peer, 2009; Slaughter et al., 1999) and performance appraisal (Belle et al., 2017; Wong & Kwong, 2005) are some of the areas where JDM research has received particular consideration.

Skilled decision makers are able to set concrete goals, gather relevant and reliable information, think through potential courses of action, and choose the alternative that is the most likely to help them achieve the desired goals (Dean & Sharfman, 1993; Hamilton et al., 2016; Scott & Bruce, 1995). At the same time, people are often affected by various heuristics and biases and fall victim to decision fallacies, which are important to consider in the organisational setting.

For example, in personnel selection, people from underrepresented backgrounds often face barriers to recruitment because they do not look like a typical person occupying the position they are applying for: that is known as the representativeness heuristic (Highhouse, 2001; Marlowe et al., 1996). This creates a vicious cycle in which people who do not appear to be representative of a job face additional barriers to attaining that job, which contributes to how poorly they are represented. This is because irrelevant

information (e.g., various aspects of the candidate's background) has an effect on judgment while rational decision making norms dictate that it should be discarded.

In performance appraisal, presenting information about employees in two different, but equivalent, formats may have a significant effect on the judgments that are made about their performance. For example, a report that says that Employee A is late 13% of the time and Employee B is late 20% of the time may result in estimating the difference between the employees as greater compared to a format in which the same numbers are presented in terms of how often the employees arrive on time: 87% vs. 80% of the time (Wong & Kwong, 2005). The perception of a bigger difference between the smaller numbers as opposed to the larger numbers, and the more favourable assessment of performance framed positively, are in line with the prospect theory (Kahneman & Tversky, 1979) and the framing effect (Kahneman & Tversky, 1984).

There are many more examples of work-related decisions that are subject to the influences of harmful heuristics and biases and decision fallacies. However, as discussed previously in this chapter, the way one approaches decisions is not immutable, but rather is a learned response to decision situations (Scott & Bruce, 1995). Rational decision making is a skill that can be acquired and improved. Debiasing interventions can be used to improve decision-making rationality of employees and help them achieve more effective decisions (Fischhoff, 1982; Morewedge et al., 2015; Sellier et al., 2019).

Another type of decision making that is of relevance to organisations is intuitive judgments. While a more contested area of research (a more detailed discussion will follow in Chapter 2), it is generally agreed that intuitive judgments performed by experts with substantial experience in relatively predictable contexts (e.g. focused on things rather than on people and in the case of repetitive tasks) may lead to successful decisions (Kahneman & Klein, 2009; Shanteau, 1992). Good intuitive judgments rely on pattern recognition: that is, on a vast arsenal of experiences in situations similar to the

one in which the decision is made (Chase & Simon, 1973; Dreyfus & Dreyfus, 2005; Klein et al., 2010). Rapid, intuitive decisions made by experienced professionals and in contexts which allow the success of intuitive judgments may therefore save organisations—and individual employees—time.

In addition to being able to approach the process of decision making competently, decisiveness seems to be another characteristic important for people who want to succeed in their careers. Leadership research, particularly that examining charismatic leadership, has long noted that leaders are expected to be decisive and to inspire confidence in their actions (and, therefore, decisions) in others (Babcock-Roberson & Strickland, 2010; Brodbeck et al., 2000; Conger & Kanungo, 1987). The little existing research suggests that decisiveness may indeed distinguish executives from the rest of the population of workers (Wille et al., 2018).

Why is it so important? Leaders who make prompt decisions often create the impression of being more knowledgeable about the problem (and therefore having to spent less time studying it) and of being skilled at processing information; in addition to that, decisiveness may help them signal strong convictions (Bernheim & Bodoh-Creed, 2020). Indecisiveness, on the other hand, may lead to missed opportunities. It is often seen as antithetical to being a successful leader (A. F. Simon, 2006) because good leaders are expected to be able to make timely decisions in times of crisis (Hogan & Kaiser, 2005).

Decisiveness is also associated with proactivity (Jenkins & Jeske, 2017): unsurprisingly, since to act proactively, one needs to make a decision to do so, and how to do so. Proactive people tend to look for opportunities, take initiative, and challenge the circumstances they are unhappy with to shape their environment to better suit their needs and goals (Bateman & Crant, 1993; Crant, 2000). As such, whose who are proactive tend to enjoy better career outcomes in terms of salary, promotions, and career satisfaction (Fuller & Marler, 2009).

People who avoid decisions, on the other hand, are more likely to miss opportunities for positive change and less likely to make a favourable impression on others. As will be discussed in Chapters 3 and 4, many situational factors have been linked to decision avoidance (Dewberry et al., 2013; Janis & Mann, 1976; Tetlock & Boettger, 1994; Tversky & Shafir, 1992; Umeh & Omari-Asor, 2011). This suggests that addressing such situational factors may mitigate some of the avoidant decision making—and, if a link between decision avoidance and career outcomes is found, to potentially help employees improve their career outcomes.

More broadly, the adaptability of decision-making styles, including the use of rationality and intuition, is promising if they are found to be related to career outcomes. Such a finding may guide the development of interventions to improve the efficiency of decision making, potentially leading to better career outcomes. Interventions may exist both at the individual and at the organisational level. For individual employees, they may include raising awareness of common decision-making biases and acquiring tools to make decisions more efficiently (Fischhoff, 1982). At the organisational level, interventions targeted at reducing potential root causes of maladaptive decision-making behaviours such as decision avoidance may be implemented. These may draw on existing research on organisational interventions to improve psychosocial working conditions (Nielsen et al., 2010).

The next section will provide an overview of the structure of the remaining chapters of this thesis.

1.5 The structure of the thesis

This thesis consists of four empirical quantitative studies presented across three chapters. They follow the framework suggested by Dewberry *et al.* (2013), whereby individual differences in decision making are considered from two different

perspectives. On the one hand is the use of rationality and intuition, which constitutes core decision processes. These will be examined in Chapter 2. On the other hand are additional processes regulating choice, which include decision avoidance and dependence on others in making decision. These behaviours are the subjects of Chapters 3 and 4.

1.5.1 Chapter 2

Building on the brief introduction into the field of JDM presented earlier in this chapter, Chapter 2 will provide an overview of existing research on human rationality and intuition and their relevance to decision making in the organisational context. It will discuss the development of the field of JDM and the shift from early normative theories to descriptive theories of rational decision making, with particular attention to the common violations of the rules of rational decision making. An overview of existing research on intuitive decision making, focusing on expert judgments and when and where they might be successful, will also be provided. In addition to the cognitive dimensions of rationality and intuition, decision confidence will be examined due to its potential relevance to how people assess their rationality (Leykin & DeRubeis, 2010). Chapter 2 will also expand on the discussion about research on individual differences in decision making, focusing on rationality, intuition, and decision confidence. Implications for decision making in organisations, and specifically the potential links between these decision making constructs and career outcomes, will be discussed.

Two empirical studies will be presented. In Study 1, the relationships between self-reported rational and intuitive decision making as well as decision confidence on the one hand, and career outcomes on the other hand, will be examined. Study 2 will build on some of the findings of Study 1 and, in addition to a self-reported measure of decision-making rationality, performance on decision-making tasks will be used. The

implications of the findings of the two studies for candidate selection decisions will be discussed.

1.5.2 Chapter 3

Chapter 3 will focus on decision avoidance and dependence on others in making decisions. Potential causes of such decision-making behaviours will be discussed, focusing on existing research into the role of emotions in making decisions. The discussion about the potential relationships between decision avoidance and career outcomes will draw from existing research on proactivity and on decisiveness in leadership as these two topics are closely related to the question of the role of decision avoidance in career outcomes. Study 3 will examine the relationships between decision avoidance and dependence on other people in making decisions on the one hand, and career outcomes on the other hand. Implications for candidate selection decisions and for mitigating decision avoidance in organisations will be discussed.

1.5.3 Chapter 4

Building on the findings of Study 3, Chapter 4 will provide a more in-depth discussion about potential causes of decision avoidant and dependent behaviour and their relevance to organisations. Of particular interest is the psychosocial work environment and employee anxiety. A potential mechanism through which psychosocial work environment may affect decision-making behaviour will be suggested based on the findings of the previous research into the causes of decision avoidance and dependence.

In Study 4, a series of mediation models examining the relationships between the psychosocial work environment, anxiety, decision avoidance, and dependence on other

people in making decisions will be tested. The findings of this study, as initial evidence for these relationships, will be discussed in terms of potential ways of mitigating maladaptive decision-making behaviours in employees, with a view to improving their career prospects.

1.5.4 Chapter 5

A general discussion will be presented in Chapter 5, bringing together the findings of the four studies reported in this thesis. The implications for organisations, with a particular focus on making hiring decisions and on maintaining employee well-being, will be discussed. The discussion will include the limitations of this work and potential future directions, building on the findings of this thesis.

An overview of the four studies presented in this thesis is provided in Table 1.1.

Table 1.1

Overview of the studies presented in this thesis

Study	Chapter	Sample size	Variables used
Study 1*	2	245	• Rational decision making; • Intuitive decision making; • Spontaneous decision making; • Confident decision making; • Hierarchical status; • Authority level; • Career satisfaction; • Career aspirations; • Demographic variables.
Study 2	2	114	• Rational decision making; • Confident decision making; • Framing effect; • Sunk cost fallacy; • Conjunction fallacy; • Hierarchical status; • Authority level; • Career satisfaction; • Demographic variables.
Study 3*	3	245	• Avoidant decision making; • Dependent decision making; • Hierarchical status; • Authority level; • Career satisfaction; • Career aspirations; • Demographic variables.
Study 4*[a]	4	122	Part 1: • Avoidant decision making; • Dependent decision making; • Demographic variables. Part 2: • Psychosocial work environment; • State anxiety; • Risk perception.

* = data came from the same sample; [a] = questionnaire was administered in two parts due to its length.

2 Rational and intuitive decision making as predictors of career outcomes

2.1 Literature review

2.1.1 Introduction

Chapter 1 provided a brief introduction into JDM and individual differences in decision making research and discussed their relevance to decision making in organisations. Expanding on the discussion so far, this chapter will focus on the use of rationality and intuition in making decisions and on potential links between rational and intuitive decision making on the one hand and career outcomes on the other.

This chapter opens with a more detailed overview of how research into rational decision making has evolved over time, shifting from normative to descriptive theories that focus on the general trends in human decision making, and then moves on to research into individual-level differences. After that, the second phenomenon of interest in this chapter, intuitive decision making, is discussed. Once these concepts are introduced, the definition of career outcomes adopted in this research is laid out and the relevance of rational and intuitive decision making to career outcomes is discussed. Following that, the findings of two empirical studies conducted to test the hypotheses proposed in this chapter are reported.

2.1.2 Rationality in decision-making research

2.1.2.1 Early theories of rational decision making

Decision making is usually characterised by uncertainty. If we knew the outcomes of all possible courses of action and how they would make us feel, the business of selecting one alternative over another would simply be a matter of personal preference. Instead, when making choices, people have to rely on the limited information they have about

the problem, an often-flawed analysis of possible outcomes and, no less importantly, their own predictions about how happy, or how unhappy, the outcome will make them feel (H. A. Simon, 1955). The expected benefit from an outcome, which may take the form of any kind of gain (e.g., financial, social, or emotional), is usually referred to as the *utility* of that outcome and has been a subject of investigation by economists and psychologists since at least the 18th century (Bernoulli, 1738/1954; Kahneman & Tversky, 1979; von Neumann & Morgenstern, 1944).

Traditional economic theory usually sees people as rational agents who know what they want and are able to utilise the tools of rational analysis to determine the best possible course of action. In reality, neither of these conditions is likely to be fulfilled. The notion that people predominantly rely on classic rationality to make decisions has long been criticised as flawed (Kahneman & Tversky, 1979; Russell & Thaler, 1985; H. A. Simon, 1955). To understand why, some context of the development of early theories of decision making is needed.

An early attempt not only to quantify human decision making but also to identify psychological factors that influence it was made in 1738 when Daniel Bernoulli formulated what is now known as expected utility theory, which states that "any increase in wealth, no matter how insignificant, will always result in an increase in utility which is inversely proportionate to the quantity of goods already possessed" (Bernoulli, 1738/1954, p. 25). This provided an early explanation for the differences in the strength of motivation to pursue a certain action between people. For example, a wealthy person would be more likely to turn down an offer of a gruelling, tiresome side job than a poor person, even if the amount of money they could earn was the same. In Bernoulli's (1738/1954) words, "the determination of the *value* of an item must not be based on its *price*, but rather on the *utility* it yields … there is no doubt that a gain of one thousand ducats is more significant to a pauper than to a rich man though both gain the same amount" (p. 24, original emphasis).

These ideas were brought under the academic spotlight after von Neumann and Morgenstern's (1944) *Theory of Games and Economic Behavior,* that discussed the ways in which people act in order to maximise the value of their choices as rational agents, was published. Savage's (1954) subjective expected utility (SEU) theory further assumed that, when making decisions, people can quantify the subjective value and perceived probability of an event in order to calculate that event's subjective utility. Savage's theory suggests that people can not only carry out complex calculations in situations when they are presented with choices but also that they have clear and stable preferences. As Arrow (1986) pointed out, a rational agent needs to possess all relevant information and to be able to perform optimisation based on it. In practice, when it takes economists long hours of research and calculation to achieve maximisation, it is not reasonable to expect people with no such training and resources to be able to come up with the same solutions (Thaler, 2015).

Soon after the publication of Savage's version of SEU theory, it became apparent that the rationality of the cool-headed and analytical "economic man" is not descriptive of how people typically approach decision making (H. A. Simon, 1955). This is because in reality people are often constrained by time, have limited computational abilities, and are frequently swayed by emotion (Golman et al., 2017; Sharot & Sunstein, 2020; H. A. Simon, 1955).

Examples of situations in which the majority of experimental participants break the rules of classical rationality include the Allais paradox, where people underestimate the difference between 10% and 11% compared with the difference between 0% and 1% (Allais, 1979), and the Ellsberg paradox where people are more willing to take risks when they know specific odds (known as ambiguity aversion), even if the value of bets is the same (Ellsberg, 1961). This soon demonstrated that existing theories were at best helpful models to study but could not be used to make assumptions about how people approach decision making in real life. As Kahneman (2003) put it, psychological theories of decision making "cannot match the elegance and precision of formal

normative models of belief and choice, but this is just another way of saying that rational models are psychologically unrealistic" (p. 1449).

In making real-life decisions, people face many limitations. They are usually limited in how much information they can obtain about the problem and how accurate their judgments about the likelihoods of various outcomes are as well as in being able to foresee all possible outcomes—not to mention people's limited computational abilities that are likely to prevent them from making accurate calculations even in the presence of all the necessary information (H. A. Simon, 1955).

Even if everyday decision makers were indeed able to use the tools of rational analysis to maximise the chances of achieving the desired outcome, the question of what the desired outcome is would remain open. It has often been noted that people systematically underperform when trying to predict how specific events will make them feel in the future (Kahneman, 1994) and especially how long the emotional effect will last: this phenomenon is known as *impact bias* (Dunn et al., 2003). The *hedonic treadmill* is a term used to describe the relatively quick return to a neutral emotional state after experiencing events that were predicted to cause great happiness or great disappointment alike (Diener et al., 2006; Mancini et al., 2011). Consequently, preferences and priorities may change between making a decision and reaping its results, and people may altogether misinterpret their own desires.

With all that in mind, it is helpful to distinguish between two different kinds of rationality, which will be addressed in the next section.

2.1.2.2 Types of rationality

The discussion of rationality in decision making is further complicated by the fact the concepts of rationality in traditional economic theory and in the everyday vernacular do not fully overlap (Arrow, 1986). For example, deciding to drop a project one has put a

lot of time, money, and effort in may appear wasteful and defeatist to some while continuing to engage in an activity which it is unlikely to pay off just because one has already invested in it is known as the *sunk cost fallacy* in economic and decision theory (Arkes & Blumer, 1985). In addition to that, there are differences in the way to term *rationality* has historically been used in cognitive psychology and economics, both of which inform the field of JDM. To make that distinction clear, H. A. Simon (1976) referred to “substantive” and “procedural” rationality.

In Simon’s definition, substantive rationality is marked by behaviour aimed at achieving a particular goal and carried out the best way possible within the constraints of the environment. Problems that substantive rationality addresses are usually clearly defined and can be solved with a reasonable degree of success using mathematical tools. For example, a company may calculate how much it can maximise the profit margin by reducing production costs (often leaving ethical considerations out of the equation). In this way, according to H. A. Simon (1976), in applying substantive rationality, goal setting is the only way in which the course of action is influenced by the decision maker, with everything else depending on the environmental factors (in the simplified example above, the minimum cost at which labour and materials can be obtained).

On the other hand, procedural rationality is behaviour which results from decision maker’s deliberation: it is to do with the cognitive processes that lead the decision maker to arrive at a decision (H. A. Simon, 1976). Such cognitive processes may include strategies to find, select, and process relevant information, make predictions about possible outcomes, and evaluate different alternative actions against each other. Importantly, these processes may be flawed. They may be based on insufficient information and the lack of appropriate skill to act upon it, not to mention people’s limited ability to predict the probabilities of different outcomes. A manager behaving procedurally rationally may decide to base employees’ bonuses on the number of sales or on the number of positive reviews received from customers. In that way, the

manager would chose the algorithm, or the procedure, to base subsequent decisions on, in the context in which no single perfect algorithm exists.

According to H. A. Simon (1976), some problems that at first appear to be in the domain of substantive rationality are further complicated by their high computational complexity, which means that even if the optimal solution exists, it may never be discovered. In this way, the task of the decision maker is not only to set a goal, but also to select a method through which a good enough way of achieving it can be found, which falls within the remit of procedural rationality. In other words, while substantive rationality searches for the optimal solution, the goal of procedural rationality is a good solution that satisfies the needs of the decision maker adequately (H. A. Simon, 1976).

This feature of procedural rationality ties directly into the concept of satisficing, which is an alternative to the effort to maximise the utility of decisions in the presence of informational, computational, time, and financial, and other constraints (Schwartz et al., 2002; H. A. Simon, 1972). In many situations, it is enough for a person to approximate rational behaviour to achieve their goals. Moreover, sometimes it is more efficient because even the first step of the rational decision making process, information seeking, may be counterproductive if it is too prolonged. Indeed, information itself can be treated as a commodity that has value in terms of time, money, and effort necessary to obtain it (Schwartz et al., 2002).

For example, most people’s food shopping trips consist of relying on a few simple heuristics. Selection depends on the availability of products within the price range that the shopper can afford, their personal preferences, how healthily they intend to eat, and how much time and effort they are prepared to invest in cooking a meal. With these parameters in mind, it should be possible to calculate what the best choices would be. However, it is likely to prove to be inefficient in terms of time spent versus benefit obtained. In this way, a stop rule needs to be introduced: the decision maker sets a particular aspiration level (for example, to construct a meal that is enjoyable and

nutritious enough from the available ingredients within their price bracket) and then searches until an alternative that meets that aspiration level is found without attempting to study all available products (H. A. Simon, 1972).

Satisficing is an important skill in today's world, where choice is ample in many domains, from choosing a brand of cereal to which jobs to apply for. In the modern world, people are constantly faced with choices, but the utility of having wide ranges of options has been questioned. Studies have shown that people are not only more likely to make a purchase, but are also more satisfied with it when they are presented with fewer, not more, options (Iyengar & Lepper, 2000). A few explanations have been offered for this phenomenon.

First, the more options one is presented with, the more difficult it is to gather adequate information about them; second, having more options to choose from usually means that the decision maker's standards rise, making it more likely they will regret any choice they make because other alternatives might have worked out better; and third, the more options there are, the more people feel like they are to blame for a suboptimal outcome because they could have chosen better (Schwartz et al., 2002).

The last point is indeed often far from true: the overwhelming amount of options and information about them to study and compare often places unreasonable demands on people's time and information processing abilities. Therefore, more choice is not always desirable and people in the modern world have to develop decision-making skills that are radically different from what normative decision-making theories prescribe. That is not least because an increase in the number of options makes maximising utility more and more difficult to achieve (Schwartz et al., 2002).

Acting approximately rationally depends not only on the decision makers' skills and limitations but also on the structure of the environment: that is, the circumstances in which the decision maker operates (H. A. Simon, 1956). Therefore, for many types of problems there is no prescribed one-size-fits-all strategy and the circumstances of the

decision need to be taken in consideration when applying procedural rationality to reach a satisfactory solution.

The definitions of substantive and procedural rationality have an interesting consequence for understanding the concept of irrationality. While traditional economic thought would see it as behaviour that contradicts the prescribed methods of maximising positive outcomes, from the point of view of cognitive psychology, irrational behaviour is impulsive and carried out without appropriate consideration (H. A. Simon, 1976). This presents a measurement problem and adds an important caveat to interpreting the results of self-reported measures of rational decision making, which will be discussed later in this chapter.

So far, the line of thought that led researchers of decision making to shift from normative models of rational choice to descriptive models, more representative of real-life decision making, has been discussed. In the next sections, this shift will be covered in more detail.

2.1.2.3 Violations of rationality and the shift from normative to descriptive

H. A. Simon (1955, 1972) was among the first to try to provide a more realistic model of human decision making than those offered by traditional economic theories, which he called bounded rationality. It assumes that people adjust their preferences in accordance with the environment and circumstances. H. A. Simon (1955) argued that uncertainty about outcomes, incomplete information, and computational limitations act as constraints forcing people to seek solutions that sufficiently fulfil their needs rather than maximise utility.

As discussed in the previous section, to encompass this notion, he used the term *satisficing* (H. A. Simon, 1956). Contrary to traditional economic theory, he proposed that in real-life situations, decision makers often do not have the full information about

available options, that gathering such information may require disproportionate investment of time and effort, and that limitations to people's computational skills are unlikely to allow them to calculate correct utilities of each of the outcomes. Besides, he noted that people are often unsure about their own preferences and that those preferences are liable to change. Therefore, in his view, adhering to classical rationality in many day-to-day situations would be unreasonable when the ratio of input and output is considered.

Some twenty years later, Kahneman and Tversky made several important contributions to the field of JDM. They, too, argued that violations of normative decision making models in real life are widespread, systematic, and too fundamental to be accommodated by mildly adapting existing theories (Tversky & Kahneman, 1986). They discussed four assumptions of normative decision making theories that are often violated in real life: *cancellation, transitivity, dominance,* and *invariance*. These assumptions will be explained in turn below.

2.1.2.3.1 Cancellation

Cancellation (also referred to as independence; von Neumann & Morgenstern, 1944) means disregarding conditions that do not discriminate between choice options. For example, if a decision maker prefers going to the seaside rather than to the countryside, then they should choose a seaside trip at the weekend provided it does not rain in either location. If the weekend is rainy in both places and thus the trip is cancelled altogether, it does not make sense to choose between the two options. Therefore, only the states (i.e. *no rain* in this example) in which the two options result in different outcomes should be considered in making decisions. In such transparent choices as the one described above, this assumption normally holds, however, in non-transparent decision problems it is sometimes violated (Tversky & Kahneman, 1986).

The Allais paradox mentioned in an earlier section is one such example (Allais, 1979). It observes that, in a study, when presented with the following two pairs of gambles:

> *A1:* 100% chance to win $1m and 0% chance to win 0 vs. *A2:* 10% chance to win $5m, 89% chance to win $1m and 1% chance to win 0
>
> and
>
> *B1:* 10% chance to win $5m and 90% chance to win 0 vs. *B2:* 11% chance to win $1m and 89% chance to win 0,

most subjects exhibited inconsistent preferences. Whereas the expected utility (EU) theory predicts that if *A1* is preferred, *B1* should also be preferred, and vice versa, if *A2* is preferred, then *B2* should be preferred, most respondents choose a combination of *A1* and *B2* (Machina, 1992). This irregularity is often interpreted as underestimating the difference between 10% and 11% compared with the difference between 0% and 1% (Bell, 1982). Such experiments show that people systematically neglect the impact of small favourable changes in probability and show a strong preference towards complete elimination of risk as opposed to a reduction of equal magnitude.

So in the Allais problem, most participants show the inability to evaluate parts of a lottery (*A1* vs *A2* and *B1* vs *B2*) independently of one another. They let information that should be irrelevant affect their choices and cause them to switch preferences, which is a violation of the EU theory. There are several explanations for the choices people tend to make in this situation (Oliver, 2003; Tversky & Kahneman, 1986). One is loss aversion: in gamble *A,* the sure win of $1m serves as a reference point which influences the evaluation of *A2,* even though it should not. In that way, the decision maker is already anchored at $1m and perceives not winning anything in *A2* as a loss of $1m. In the *B* set, there is no such anchor because neither outcome promises a sure win. Another, related, explanation is anticipated regret (Loomes & Sugden, 1982): in the *A* set, a negative outcome (not winning anything) can be entirely avoided, while in

set *B* it cannot. Therefore, set *A* has more potential for decision makers to regret their actions. In traditional economic theory, these should be extraneous factors that have no bearing on the problem.

A phenomenon that stems from violation of independence is *decoy effect.* Decoy effect is a technique whereby the introduction of option *C* (a "decoy"), which is inferior to existing options *A* and *B,* is used to flip the decision makers' preferences (Slaughter et al., 1999). While the decoy should have no influence on the decision, research has found that it often changes preferences in favour of the option that is better than the decoy on at least one dimension and is at least as good on the other dimensions. Just as for the problem above, loss aversion has been offered as a potential explanation why a decoy may change preferences: it acts as a referent, the way £1m does in *A1* in the Allais paradox, and any subsequent decision may be considered in terms of losses with the decoy as a starting point (Highhouse, 1996).

2.1.2.3.2 Transitivity

Transitivity is the next assumption that Tversky and Kahneman (1986) discussed. Transitivity means that if a decision maker prefers *x* to *y* and *y* to *z,* then they should prefer *x* to *z;* however, this assumption is sometimes violated (Tversky, 1969). For example, when people have to make a series of choices between *x* and *y,* they may choose *x* at some times and *y* at others. That is, if someone's preferred lunch consists of a sandwich (*x*), it does not preclude them from sometimes choosing soup (*y*). This means that the simple axiom $u(x) > u(y)$ if and only if $x > y$, where *u* is utility, does not always hold true as sometimes $x < y$ will be the case, which will reverse the utilities.

Instead, Tversky (1969) suggested that preferences should be expressed in terms of probabilities. That is, instead of having a consistent preference for *x,* it is more realistic to say that at any given time a decision maker has, for example, an 80% probability of choosing *x* and 20% probability of choosing *y*. Therefore, a generalisation of this rule is

that *x* is preferred to *y* if and only if *x* is preferred to *y* more than 50% of the time. The application of the same rule to the transitivity axiom results in a formulation that states that if *x* is preferred to *y* more than 50% of the time and if *y* is preferred to *z* more than 50% of the time, then if *x* is preferred to *z* more than 50% of the time. This is known as weak stochastic transitivity (Tversky, 1969).

Yet, in more complex choices in which alternatives are assessed on multiple dimensions, the assumptions of transitivity, even when it is expressed in terms of probabilities, is sometimes violated (Tversky, 1969). It has been argued that such violations and resultant preference reversals would not have occurred had decision makers evaluated alternatives holistically instead of by comparing them on different individual dimensions (Slovic & Lichtenstein, 1983). However, it is not always possible or realistic because evaluating options on important dimensions often is a useful heuristic. In making significant choices, such as selecting candidates for a job, it may therefore be useful to assign weights to the different important dimensions, calculate a score for each candidate, and then compare their total scores against each other. That would allow for a holistic assessment without losing the importance of individual dimensions.

2.1.2.3.3 Dominance

Dominance is the third assumption (Tversky & Kahneman, 1986). It states that if an option is better than the other ones on at least one dimension and is at least as good on all other important dimensions, it should be selected. However, human attention and computational limitations mean that even this seemingly obvious rule is sometimes violated. Tversky and Kahneman (1986) proposed the following problem, which involves choosing one of the boxes of colourful marbles, where each colour is associated with a gain or a loss:

A: 90% white ($0), 6% red (win $45), 1% green (win $30), 1% blue (lose $15), 2% yellow (lose $15)

B: 90% white ($0), 6% red (win $45), 1% green (win $45), 1% blue (lose $10), 2% yellow (lose $15)

In this framing, it is clear that box *B* is superior because it is at least as good on three dimensions and better on two dimensions than box *A*. Indeed, all participants in the experiment chose box *B*. Now, if the yellow and blue in box *A* and the red and green in box *B* are combined, since they yield the same outcomes, the same problem may be represented in the following way:

C: 90% white ($0), 6% red (win $45), 1% green (win $30), 3% yellow (lose $15)

D: 90% white ($0), 7% red (win $45), 1% green (lose $10), 2% yellow (lose $15)

At first glance, *C&D* is a simplified version of the problem. However, when it was represented in such a way, 58% of the participants chose the inferior box *C*, which is identical to *A* (Tversky & Kahneman, 1986). On the surface, it looks like box *C* is dominating, because it involves two positive outcomes (winning) and two negative outcomes (losing or not winning anything), whereas box *D* only has one positive outcome. The probabilities of the outcomes, though, paint a different picture: just as in *B*, the value of *D* is higher. The non-transparent way in which the pair *C&D* is represented compared to *A&B* masks the dominating option.

2.1.2.3.4 Invariance

Invariance is the final of the assumptions considered by Tversky and Kahneman (1986). Invariance states that the way a choice problem is represented should not affect the decision. However, a large body of research, which will be examined more

closely in section 2.1.2.5, has documented that the representation, or *framing,* of the problem, often has a significant influence on the kind of decisions people make. For example, framing problems in terms of gains vs. losses or in terms of survival vs. mortality rate often results in different decisions, once again indicating that the assumptions of normatively rational decision making often do not hold when it comes to decision making in real life (Tversky & Kahneman, 1981).

2.1.2.4 Prospect theory

Before providing more details about observations of systematic violations of the normative decision making assumptions, a discussion about an alternative to the EU theory is in order.

One of the turning points in JDM research was the development of prospect theory (Kahneman & Tversky, 1979). Violations to normative decision-making models, such as the Allais paradox and the other problems discussed in the previous section, are seen as the most contentious deviations from classical rationality. Various laboratory experiments have consistently shown that individuals tend to be significantly more risk seeking when faced with the possibility of a loss and more risk averse when it comes to possible gains (Hershey & Schoemaker, 1980; Schoemaker & Kunreuther, 1979; Slovic et al., 1977).

Prospect theory, with its value function that is concave for gains and steeper and more convex for losses, was offered as a way to explain such violations (Kahneman & Tversky, 1979). Kahneman and Tversky's experiments have shown that when presented with two gambles, which offer (a) a sure small gain and (b) a probability of a large gain and a probability to win nothing, people tend to choose (a), which indicates risk-averse behaviour when faced with the prospect of a gain. Conversely, when the two gambles are: (a) a sure loss of a small amount and (b) a probability of a large loss

and a probability to lose nothing, most respondents select (b), which is risk-seeking behaviour in the domain of losses. Such inconsistencies in preferences go against the EU theory but fit the function of prospect theory.

The focus on changes in wealth, rather than the final state of wealth, is another important feature of prospect theory. To test whether such changes have a more significant effect on decision making than final states of wealth, Kahneman and Tversky (1979) asked participants to imagine that their wealth had increased by a certain amount and then to choose between gambles that would result in either losses or gains, with possible losses not exceeding the amount by which their wealth had been increased. They designed the following two pairs of gambles:

> *A:* In addition to whatever you own, you have been given 1,000. You are now asked to choose between:
>
> > *A1:* 50% chance to win 1,000 and 0% chance to win nothing,
> >
> > *A2:* 100% chance to win 500;
>
> *B:* In addition to whatever you own, you have been given 2,000. You are now asked to choose between:
>
> > B1: 50% chance to lose 1,000 and 0% chance to lose nothing,
> >
> > B2: 100% chance to lose 500,

In terms of final states of wealth, the two problems are identical, however, 16% of subjects chose *A1*, as opposed to 69% who chose *B1* (Kahneman & Tversky, 1979). That kind of contradiction violates the rules of rational decision making, however, it is consistent with prospect theory, which expects people to evaluate such problems in terms of gains and losses. The 1,000 or 2,000 “given” to participants before they are asked to make a choice in this case is considered to be incorporated in their pre-

existing assets, triggering the *endowment effect*, or the attribution of greater value to own possessions than to identical items not owned by the individual (Thaler, 1980).

2.1.2.5 Heuristics & biases and the framing effect

The area of research that is concerned with systematic errors observed in evaluating probabilities and making decisions under uncertainty is referred to as heuristics and biases. Heuristics are usually understood as cognitive shortcuts, or rules of thumb, that people use to speed up decision making (Tversky & Kahneman, 1974).

There are many types of common heuristics. One is the *representativeness heuristic*, which leads people to making decisions based on how representative of a kind a particular option is (Tversky & Kahneman, 1974). It has a number of different sub-types. A non-exhaustive list of examples of this heuristic is insensitivity to sample size, resulting in wrong assumptions based on too small a number of observations; misconception of chance, where a sequence of heads-tails-heads-heads-tails is seen as more random that heads-heads-heads-heads-heads, even though the probabilities of the two are the same; and the use of stereotypes in making judgments while neglecting base rates.

As an example of the latter, one is asked to guess whether a described person is an office worker or a librarian and presented with a description stereotypical of librarians, in the absence of any other information. If the number of office workers is much higher than that of librarians but the respondent uses the stereotypical description and not the statistical probability and answers that the person is a librarian, they fall prey to the representativeness heuristic. While in this made-up task the mistake is innocuous, life is full of examples of judging people by harmful and disconnected from reality stereotypes that result in tragedy. For instance, anti-Black police violence is fuelled by implicit associations between Black people and criminality (Richardson, 2015), while

neglecting the fact that the probability that a randomly selected person is a criminal is incomparably lower than that they are not a criminal.

Other common heuristics described by Tversky and Kahneman (1974) include the *availability heuristic*, which refers to assessing the frequency or probability of an event based on how easy it is to retrieve an instance of such an event from memory, and *anchoring*, in which priming respondents with a particular number or value may affect their quantity or value judgments. There are many more heuristics and cognitive fallacies observed and documented in research. They include the sunk cost fallacy (Arkes & Blumer, 1985), the decoy effect (Huber et al., 1982), and the endowment effect (Thaler, 1980), described in the previous sections, as well as confirmation bias, which refers to selective information seeking and distorted information processing in favour of a pre-existing opinion (Nickerson, 1998); hindsight bias, in which people perceive past events as more obvious than they were at the time based on the knowledge gained after the fact (Hawkins & Hastie, 1990); and, among others, affect heuristic, which results in basing judgment in affective response to the decision problem (Finucane et al., 2000). The role of emotions in decision making will be discussed in more detail in Chapters 3 and 4.

Furthermore, Tversky and Kahneman (1981) demonstrated how the phrasing of a problem can affect choices, which is known as framing effect. For example, in evaluating treatments, more people tend to favour those presented, or "framed", in terms of survival rates rather than mortality rates, even though the actual statistics are the same, which has important implications for enabling people to make independent judgments. The framing effect can be explained by prospect theory's utility function. For example, when framing messages that would encourage people to engage in behaviours leading to an early detection of health problems, loss-framed messages are thought to be more effective since people tend to be more willing to take risks (i.e. of discovering a health problem) when considering potential losses (i.e. a missed opportunity to start treatment early) than gains (Rothman & Salovey, 1997). Therefore,

employing the effect of framing can be a persuasion tactic that, in addition to encouraging people to make beneficial choices, may be used to the detriment. Understanding the framing effect may thus be useful in resisting such persuasion.

Heuristics can assist in developing quick solutions, but they can be damaging when a problem requires a more thorough evaluation. While Simon's (1972) bounded rationality deals with studying behaviour that deviates from normative theories of decision making but can still be described as rational within individual and situational constraints, in heuristic and biases literature such violations are usually viewed as systematic mistakes—with a few notable exceptions, such as some of the work by Gigerenzer (e.g., Todd & Gigerenzer, 2000).

The use and avoidance of heuristics are often associated with the dual-process theory of judgment, where Type 1 processes are described as the fast and frugal kind of thinking that relies on intuition, and Type 2 processes as the slow and deliberate ones that involve conscious reasoning (Evans & Stanovich, 2013; Kahneman, 2011). This will be elaborated on in the next section.

2.1.2.6 Dual-process theories of decision making

Dual-process theories, common in JDM and psychology of reasoning, stipulate that people possess two separate types of cognitive processes, which can be roughly described as intuition and reasoning (Evans, 2008; Kahneman & Frederick, 2002; Stanovich et al., 2011). Type 1 processes are often defined as fast, associative, performed in parallel, and independent of cognitive ability, and Type 2 processes as slow, controlled, sequential, and correlated with cognitive ability (Evans & Stanovich, 2013). Authors such as Stanovich and West (2000) initially referred to the two kinds of thinking as System 1 and System 2 but many scholars, including Stanovich and West themselves, have since called for the abandonment of the "Systems" label and

advocated for the use of “Types”. That is due to the lack of evidence that there are two distinct brain systems that underlie the cognitive processes involved in decision making and reasoning as well as the inconsistent mapping of Type 1 and 2 processes on Systems 1 and 2 (Evans & Stanovich, 2013; Stanovich et al., 2011). Some authors, however, continue using the systems terminology or use the terms almost interchangeably.

Dual-process accounts of thinking and reasoning are often invoked as an explanation why people are prone to cognitive biases. In this view, quick intuitive judgments achieved by the automatic Type 1 thinking rely on heuristics, simplification, and the ease of retrieval of information from memory, hence they are prone to error (Kahneman & Frederick, 2002). On the contrary, the slow and deliberate Type 2 processes monitor and override the automatic responses produced by Type 1 thinking at a higher cognitive cost (Evans, 2003). To test the presence of the two processes, the Cognitive Reflection Test has been designed to initially invoke a flawed Type 1 response and measure the engagement of the reflective Type 2 thinking (Frederick, 2005). For example, one of the questions is as follows:

> A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? _____ cents.

A large number of participants provide the wrong answer “10 cents”, which is hypothesised to be the “intuitive” first response supplied by Type 1 thinking, as supported by post-task verbal reports and notes on the margins of the questionnaire (Frederick, 2005). The correct response, 5 cents, is thought to require a participant to perform a conscious calculation, which is a Type 2 process in the dual-process model adopted in this line of research (Toplak et al., 2011).

Kahneman and Frederick (2002) recognise that the dual-process account “may suggest the image of autonomous homunculi” (p. 3)—unidentified beings inside one’s brain making decisions to invoke Type 1 or Type 2 thinking—but state that such

meaning is not intended. To counter this impression, Frankish (2009) has proposed bringing the “personal/subpersonal” distinction from philosophy (Dennett, 1969). When it comes to mental processes, “personal” roughly equates “conscious” and such processes are attributed to the person as a whole entity (e.g., engaging in information gathering or drawing up a decision tree); on the other hand, “subpersonal” in this framework corresponds with “subconscious” and relates to mental processes outside of one’s awareness, such as pattern recognition or cued recall (Frankish, 2009).

Personal-level states and processes thus rely on sub-personal level ones. In order to create a decision tree, one needs the information stored in semantic and/or episodic memory to evaluate the probabilities and run mental simulations. They also need procedural memory in order to physically draw the diagram of the tree. Therefore, Frankish (2009) suggested that the distinction between System 1 and System 2 (he used this terminology rather than Type 1 and Type 2) be equated with that between subpersonal and personal reasoning: while subpersonal reasoning is fast, automatic, and cognitively non-demanding, in the way System 1 is typically described, personal reasoning is slow, effortful, and sequential because it requires working memory to support it, similarly to System 2.

However, Stanovich and West (2003) characterised both systems as subpersonal entities but warned against assigning subpersonal qualities to rationality, which is performed at the personal level. In that sense, both systems can be viewed as reliant on processes operating subpersonally. Still, the decision to engage in analytic thinking is made by a person since the notion of rationality is meaningless at the level of mental modules.

Dual-processes theories have attracted much criticism. For example, Gigerenzer and Regier (1996) note that the fact that some tasks elicit two conflicting responses from participants does not imply that there exist two competing systems of reasoning. They suggest other explanations, such as ambiguity in the wording of the task, the use

different types of formal reasoning resulting in conflicting responses, or unclarified assumptions.

Moshman (2000) argued that Stanovich and West's (2000) dual-process theory confounds two orthogonal dimensions of automatic/explicit processing and heuristic/rule-based processing. He suggested that four types of processing should indeed be considered: automatic heuristic, automatic rule-based, explicit heuristic, and explicit rule-based, only two of which (automatic heuristic and explicit rule-based) are represented in the dual-process model. Osman (2004) suggested that the single-system dynamic graded continuum (DGC) framework (Cleeremans & Jiménez, 2002) offers advantage over dual-process theories because it accommodates the generation of erroneous responses as a result of an analytical process (for example, when the wrong rules are applied, calculations are not performed correctly, or irrelevant features of a task are given weight).

Keren and Schul (2009) analyse dual-process theories at three levels: brain, structural, and functional. First, they emphasise the scarcity of evidence for the existence of two different anatomical structures corresponding to System 1 and System 2. Second, they argue that double-dissociation paradigms, often invoked to argue the case for the existence of two systems, often indicate the presence of different components within a system but not the division of such components *into* separate systems (imagine a short-sighted and a long-sighted person, whose differences in performance on an eye test may erroneously suggest that short and long-distance vision are controlled by two separate systems).

Third, they turn to the *not-the-liver* fallacy (Bedford, 1997), pointing out that everything that is *not* the function of the process or system under consideration (e.g., analytical reasoning) does not necessarily have to be a unitary system. Formulating the fallacy, Bedford (1997) invoked the image of an 18th century doctor who isolated the liver and decided that since when it is removed, the body is still able to circulate blood, absorb

nutrients, and more, there must be another organ that fulfils those functions, which he called “not-the-liver”. By this logic, the fact that the failure to engage in controlled analytic reasoning leads to erroneous but predictable answers does not necessarily mean that one system is responsible for such answers. Besides, Keren and Schul (2009) warn that the seemingly coherent structure of dual-process models may offer a false sense of understanding due to the use of poorly defined theoretical constructs, as outlined in their arguments above.

Accounts such as Stanovich and West’s (2000) dual-process theory do not make a clear distinction between implicit and automatic reasoning, which are often referred to interchangeably. While it is recognised that System 1/Type 1 processes rely on knowledge acquired both through implicit learning and that which was learnt explicitly and through practice and experience became automated (Evans, 2008; Stanovich & West, 2000), it misses the vital distinction between the two (Osman, 2004).

Decisions made with implicit knowledge are open to biases, such as, for example, the availability heuristic, which favours information based on the ease of retrieval (Tversky & Kahneman, 1974). On the other hand, skills acquired through explicit learning and repetition can lead to highly accurate automatic responses based on pattern recognition in situations comparable to those that the person has previously experienced, also referred to as expert intuition (Klein, 2015). This will be discussed in more detail in section 2.1.3.1.

2.1.2.7 From group-level to individual-level

The work described above has re-evaluated rationality as a skill that can be acquired and improved rather than an inherent human quality and allowed for the creation of tools that measure decision-making competence of individuals (Bruine de Bruin et al., 2007; Finucane & Gullion, 2010; Parker & Fischhoff, 2005) and training targeted at

improving the quality of decisions (Jacobson et al., 2012; Kavathatzopoulos, 1994; Nota & Soresi, 2004; Sellier et al., 2019).

As the preceding discussion shows, JDM research has disputed the notion that people are rational agents that are always able to choose logically and observe normative decision-making rules. The idea that people do not all approach decision making in the same way, and that they are susceptible to a range of decision-making biases and errors, paved the way for research into the study of individual differences in decision making.

Descriptive theories of decision making, such as bounded rationality (H. A. Simon, 1972) and prospect theory (Kahneman & Tversky, 1979), made steps towards predicting how people in general tend to behave in the real world. Traditional JDM research, such as that by Tversky and Kahneman (1986), usually reports general trends, for example, that 72% of the participants selected the sure thing in the gain frame, while only 36% did in the loss frame. While highlighting broad patterns of human behaviour and often providing an answer to the question of *why* people tend to act in a certain way, it usually does not focus on *who* behaves in such a way.

JDM and individual differences in decision making tend to be quite disconnected areas of research. The idea that people have distinct approaches to decision making, often referred to as decision-making styles, started receiving attention from scholars around the 1970s (e.g., Driver & Mock, 1975; Harren, 1979), approximately at the same as the popularity of heuristic and biases research began to rise.

Scott and Bruce (1995) defined a decision-making style as “the learned, habitual response pattern exhibited by an individual when confronted with a decision situation”; they specify that a decision-making style is not a personality trait, but rather a “habit-based propensity to react in a certain way in a specific decision context” (p. 820). Supported by previously mentioned debiasing research, as well as the person-situation interaction perspective (Terborg, 1981) that will be discussed in more detail in Chapter

3, this suggests that decision-making styles are not immutable characteristics of an individual but rather can be trained and depend on the situation in which a decision is taking place.

Decision-making style research has been influenced by the study of cognitive styles. Individual differences in information gathering and processing, which play an important role in the consideration of cognitive styles, are also central to decision-making style research (Scott & Bruce, 1995). That is, in line with the normative theories of decision making, someone who spends time gathering information about the problem and possible solutions, makes an effort to understand the implications of that information, and carefully evaluates alternatives before choosing one that is perceived to be the most likely to help them achieve a specified goal, is conceptualised as a rational decision-maker.

It is important to reiterate that an approach to decision making is situation-specific (Scott & Bruce, 1995). That is, when considering a significant decision, an individual may dedicate more time to information gathering and the evaluation of alternatives—and that may not be indicative of how they usually behave when faced with a trivial choice. Moreover, one's decision-making approach can be influenced by many external and internal factors, such as how stressful one's environment is and what kind of emotions the decision maker is experiencing at the time of choice, which will be discussed in more detail in Chapters 3 and 4.

The obvious difficulty in this kind of research is that it typically relies on self-reported questionnaires (e.g., Hamilton et al., 2016; Mann et al., 1997; Scott & Bruce, 1995). Previously in this chapter, it was explained that the definition of rationality in economic theory and in the everyday vernacular often differs and that people may not realise when they act in a way which is contrary to that predicted by theories of classical rationality. Therefore, they may not be equipped to answer questions pertaining to their decision-making rationality in a way that reflects their real behaviour. Moreover, when

asked how much thought they put into decisions, participants may be tempted to give socially desirable responses.

Some instruments have been created to overcome the problem of measuring decision-making rationality that focus directly on performance on the kinds of decision-making tasks that JDM research considers to be indicative of the rational decision-making skill. The Adult Decision-Making Competence (A-DMC) index (Bruine de Bruin et al., 2007), based on an earlier decision-making competence measure designed for youth (Parker & Fischhoff, 2005), has received particular attention. It examines such dimensions of rational decision making as resistance to framing effect, resistance to sunk costs, the ability to make a decision within specified parameters, consistency in risk perception when the same problem is presented in different ways, under- and overconfidence, recognising social norms, and the ability to ignore irrelevant information in the form of whether a gamble is single-stage or two-stage.

Another tool, measuring decision-making competence of older adults, focuses on normative decision making in three domains that older adults are likely to face choices in: health, finance, and nutrition (Finucane & Gullion, 2010). It is comprised of comprehension questions about decision problems and tasks designed to measure the ability to make decisions based on what choice characteristics are considered important by the respondent. The measure also included the Cognitive Reflection Test tasks previously discussed in this chapter (Frederick, 2005).

While these measures capture the ability to apply normative decision-making rules in specific domains and specific types of tasks, they have certain disadvantages. There is nothing to indicate that the types of tasks used in the respective indices, and no other types, are the ones that capture the rational decision-making skill best. Demands on participants' time mean that the questionnaires cannot be too lengthy, thus making researchers prioritise which types of tasks from the previous studies should be included. Besides, internal consistency has been an issue in designing decision-

making competence questionnaires (Finucane & Gullion, 2010; Parker & Fischhoff, 2005), indicating that different processes may be used when solving different problems of the same type, which has implications for their generalisability.

In addition, correlations between the different types of tasks in these indices also range from no correlation at all (for example, between resistance to framing and resistance to sunk cost in the A-DMC index) to moderate (such as between applying decision rules and consistency in risk perception in the A-DMC index or between comprehension and cognitive reflection in the measure of decision-making competence for older adults), and anything in between (Bruine de Bruin et al., 2007; Finucane & Gullion, 2010). This suggests that performance on one type of task is not indicative of how rationally someone will approach another task, casting down on whether a comprehensive index of rational decision making is realistic.

With that in mind, until a reliable instrument to measure rational decision making is available (and advances are being made, such as the development of the Comprehensive Assessment of Rational Thinking (CART) measure by Stanovich and colleagues (2016; Stanovich et al., 2016)), it may be safest to focus on the domains and types of task most pertinent to the area of investigation and to bear in mind the limited generalisability of such tasks.

2.1.3 Intuitive decision making

2.1.3.1 Intuitive decision making and pattern recognition

An area of research which, unlike decision-making rationality, has mostly been dedicated to the study of individuals rather than groups, is intuitive decision making. Intuition is concerned with the use of tacit knowledge and decisions based on intuitive judgments are rapid and difficult to articulate (Okoli et al., 2016; H. A. Simon, 1987).

The proponents of the heuristics and biases approach, which usually sees decision making that does not involve cognitive reflection and deliberation as suboptimal (Toplak et al., 2011; Tversky & Kahneman, 1974), and the school of Naturalistic Decision Making (NDM), which promotes expert intuition as an effective decision making tool (Klein, 2015; Lipshitz & Strauss, 1997), view intuitive decision making from two contrasting perspectives. However, they tend to agree that intuition reliant on pattern recognition and extensive prior experience with similar situations can sometimes yield better results than time-consuming deliberation (Kahneman & Klein, 2009).

Consequently, the effectiveness of using intuition is to a large extent context-dependent, with “gut feeling” judgments in situations where one has expertise often bringing superior outcomes. At the same time, in accordance with the heuristics and biases school of thought, overreliance on unhelpful cognitive shortcuts while lacking information about the subject frequently results in less-than-optimal decisions.

Successful intuitive decision making depends on prior experience and subsequent pattern recognition (Chase & Simon, 1973; Klein et al., 2010). Cued recall is a major feature: when facing a situation whose characteristics are similar to those already experienced, intuitive responses rely on tacit knowledge. According to Klein (1997; Klein et al., 2010), the main factor that differentiates experts from novices is how many options they initially consider. Using an interview technique called cognitive task analysis, in which a participant is guided through the reconstruction of an event in question, researchers in the NDM tradition have discovered that rather than weighing multiple options against each other on different dimensions, experts usually come up with just one scenario and run a mental simulation of how it would unfold, after which they implement, adjust, or reject it (Klein et al., 2010). De Groot (1978) referred to this method as “progressive deepening”—a term that Klein and colleagues (2010) have adopted. If a course of action is rejected, the process is repeated with the next option that comes to mind.

In this case, the process is sequential rather than concurrent, as normative decision-making techniques would recommend. Such intuitive decisions are fast and non-analytical, but rely on automatic rather than implicit reasoning, as discussed in a previous section. Klein (1993) refers to this rapid mode of decision making as the recognition-primed decision (RPD) model. Unlike methods in the normative decision-making tradition, the RPD model emphases situational assessment rather than the evaluation of available options. It is also crucial to recognise aspects of the situations in which such type of decision making can be effective: the PRD model primarily deals with problems in ambiguous settings and under time pressure (Orasanu & Connolly, 1993).

H. A. Simon's (1976) notion of procedural rationality, discussed in a previous section, is also important. To remind the reader, procedural rationality is concerned with the cognitive processes that the decision maker uses to arrive at a decision. Such processes do not have to be explicit: Simon referred to the extensive knowledge of patterns that allows expert chess players to quickly select the next move. While this process may be subconscious and almost instantaneous, it relies on a lot of practice and subsequent recognition of patterns stored in long-term memory. In this way, intuitive decision making supported by experience and pattern recognition may be procedurally rational.

There are a number of important caveats to the interpretation of NDM research. First, while pattern-recognition-backed rapid decision making may be useful, it requires extensive practice and expertise and cannot be achieved by novices. Therefore, individual qualities of the decision maker need to be taken into consideration. Second, much of this research relies on an interview technique designed to assist people in reconstructing the decision situation in order to trace back their thinking process. However, memory is fallible (Howe & Knott, 2015) and there is a risk that the interviewee may misremember the situation or reconstruct it erroneously. If a decision maker happens to make a choice that turns out well by chance, during the interview,

hindsight bias (“I knew it all along”) may interfere with their ability to recognise the role of chance in that decision. Last but not least, this line of research is often informed by anecdotal accounts, which need to be taken critically.

Nevertheless, expect pattern-recognition-based judgment has obvious advantages in terms of speed, especially in high-pressure situations where there is no time for deliberation. In situation such as chess playing (where time pressure is lower than, for example, that which firefighters working in a burning building experience), it also distinguishes experts from novices, although this kind of environment is much more controlled and predictable.

It is important to note that intuition and rationality are not necessarily mutually exclusive. Instead, they may complement each other. While many decisions require deliberation, not every step in the process of problem solving may be based on conscious information gathering and explicit evaluation of alternatives: instead, experts with substantial experience often make intuitive leaps in reasoning that novices cannot afford due to the lack of necessary expertise and patterns stored in their long-term memory (H. A. Simon, 1987). Simon suggested that the nature of the problem at hand should determine the exact mix of rationality and intuition to be employed.

The research presented in this chapter adopts the definition of intuitive decision making rooted in recognition-primed responses (Klein, 1993). The distinction between rapid judgments based on pattern recognition and those grounded in heuristics will be discussed in more detail in the next section.

2.1.3.2 Suboptimal rapid decision making

Expert judgement has serious limitations. It has long been noted that experts are often outperformed by statistical models (Camerer & Johnson, 1991; Dawes et al., 1989; Meehl, 1959). Dawes *et al.* (1989) argued that even when experts have access to more

information than well-developed statistical models for diagnosing and predicting behaviour, they often perform worse than the models: that is, as long as the necessary quality controls are in place and the models are setting-specific and are periodically re-evaluated in light of new evidence. They added that even in situations when models perform just as well as experts, but do not outperform them, it may be prudent to outsource judgments to models in order to save time and effort. In addition, statistical models are explicit, leave a clear audit trail, and allow an informed discussion about the decision and its strengths and weaknesses (Dawes et al., 1989). On the contrary, the process of expert intuition is opaque and difficult, if not impossible, to verbalise (Okoli et al., 2016).

The evidence that not even experts can consistently (or at all) perform better than statistical models raises an important question of whether the intuition of novices can be trusted at all. While intuitive judgments based on pattern recognition can be a useful decision-making approach in specific situations (as has been briefly discussed above and will be elaborated on in section 2.1.4.4), non-expert rapid decisions are likely to yield inferior results due to their proneness to heuristics and biases and insufficient experience.

Having discussed in some detail the extensive theory and research on how decisions should be, and are, made, the next section will deal with the application of decision-making research to an organisational domain in which decision-making quality is of practical relevance: the career outcomes of individuals. First, career outcomes will be defined.

2.1.4 Decision making and career outcomes

2.1.4.1 Approaches to defining career success

The main focus of the research presented in this thesis is the relationship between career outcomes and decision making. “Career outcomes” and “career success” will be used interchangeably. Defining career success is one of the most contentious topics in organisational research (Gunz & Heslin, 2005; Spurk et al., 2019). While moving up the organisational hierarchy and getting higher pay is considered to be evidence of success by many people, others give low priority to status and income and emphasise such things as work-life balance, a stimulating work environment, developing relationships through their job, and making a contribution to society (Dyke & Murphy, 2006).

For this reason, the notion is often divided into so-called “subjective” and “objective” career success (Ng et al., 2005), sometimes also referred to as “intrinsic” and “extrinsic” (Judge et al., 1999). The former uses self-reports and can be described as career satisfaction. The latter relies on measures such as hierarchical status (Aquino & Douglas, 2003), the scope of responsibility and authority that the individual has within their organisation (Abele & Spurk, 2009), the number of promotions (Clark & Plano Clark, 2019), occupational status (Judge et al., 1999), and income (Gelissen & de Graaf, 2006; Schneer & Reitman, 1993). It can be referred to as “career progression”. When people are asked to self-rank tangible career outcomes, such as income or hierarchical status, in relation to peers (such as in the study by Clark & Plano Clark, 2019), the term “objective” career success can be misleading since it relies on the individual’s self-perception of career outcomes and on social comparison, which are inherently subjective measures. In that case, “extrinsic” success may be a more accurate description.

Most researchers examining career outcomes tend to rely on such objective/extrinsic measures as salary, the number of promotions, hierarchical status in the organisation,

and level of authority. For example, Aquino and Douglas (2003) measured hierarchical status by asking participants if they were in a non-managerial position, line managers, middle managers, or senior/executive managers. On the other hand, Abele and Spurk (2009), in addition to capturing monthly salary, measured hierarchical status by asking participants if they had permission to delegate work, project responsibility, and/or an official leadership position. This could also be viewed as a measure of authority to make a distinction from a more conventional understanding of organisational hierarchy (e.g., junior/mid-level/senior).

Poon (2004) employed monthly salary as an objective indicator of career success, in addition to measuring career satisfaction. Similarly, Reitman and Schneer (2005) used yearly salary plus bonus and career satisfaction as objective and subjective measures respectively. In a longitudinal two-year study, Gelissen and de Graaf (2006) captured monthly income adjusted for inflation and socio-economic status mobility. Guan *et al.* (2014) measured job level relative to the number of levels within the company and annual salary.

Taking a more thorough approach, Gu and Su (2016) used a whole battery of success measures which included hierarchical position, material success (wealth, property, and earning capacity), social reputation, knowledge and skills, network connections, and health and well-being, as well as more the intrinsic measures of pride in achievement, job satisfaction, sense of self-worth, commitment, having fulfilling relationships, and having moral satisfaction.

Clark and Plano Clark (2019) measured self-reported salary as well as perception of own salary by asking people to rank their earnings in relation to those of their peers. In addition, they collected data about self-ranked promotions and leadership compared to peers. By doing so, they were able to avoid the problem of comparing salaries and hierarchical status across companies and career types which may not be equivalent.

Many of the studies described above included measures of subjective/intrinsic career success in addition to objective/extrinsic ones. The case for doing so also finds support in qualitative research. The definitions of success obtained by Dyke and Murphy (2006) covered such aspects as high monetary rewards, producing good quality work, having good work-live balance, maintaining good relationships with others, being key players in the industry, and being able to fulfil one's potential. They also observed a marked difference between men and women in their sample, with women being more likely to place more weight on work-life balance and men on material success.

Overall, this indicates that relying only on objective/extrinsic measures, such as hierarchical status and income, may overlook those whose definition of being successful in their jobs does not rest solely on climbing up the career ladder. This is further supported by the fact that the correlation between objective and subjective measures of career success tends to be quite low. A meta-analysis of 12 studies with 8,701 total participants revealed a correlation of .22, $p < .05$, between promotions and career satisfaction, while in the same report a meta-analysis of 23 studies with 10,903 total participants showed that salary and career satisfaction correlated at .30, $p < .05$ (Ng et al., 2005).

Intrinsic career success may be less tangible than such indicators of career outcomes as salaries and promotions, but it is also significant. For example, career satisfaction is positively associated with motivation (Lounsbury et al., 2003) and thought to be related to performance across many different domains (Cerasoli et al., 2014). Besides, career satisfaction has been found to be positively correlated with organisational commitment and negatively with turnover intentions (Joo & Park, 2010), so it is important to individual employees and organisations alike.

In this research, both extrinsic and intrinsic career outcomes are considered in order to mitigate the blind spots left by the two constructs when examined separately. The

definitions and measurement of extrinsic and intrinsic career outcomes will explained in more detail in the *Method* section of Study 1.

The next few sections will discuss how different approaches to decision making are likely to relate to career outcomes and introduce the hypotheses that will be tested in the two empirical studies reported in this chapter.

2.1.4.2 Rationality and career outcomes

2.1.4.2.1 Rationality in organisations

In recent years, interest in JDM research within I/O Psychology has grown as researchers have begun to recognise the importance of efficient and unbiased decision making to different aspects of organisational performance (Highhouse, 2001; Zhang & Highhouse, 2018). Such research has covered various areas, such as framing effect on reaction to personnel selection strategies (Gamliel & Peer, 2009), decoy effect on hiring decisions (Slaughter et al., 1999), and the effects of various heuristics and biases in such areas as performance appraisal (Belle et al., 2017) and judgements made by employees (Kang & Park, 2019).

It often goes unnoticed how many decisions people make at work every day. While the importance of giving thorough consideration to significant issues is obvious, small and trivial choices can also have a substantial influence on one's overall performance when they accumulate. For example, a series of poor decisions, such as underestimating the time necessary to complete the journey to work, using untested software for a presentation, and producing a low-quality report due to reliance unverified sources may be enough to create an unfavourable impression of one's professional competence. Therefore, the ability to make effective decisions has to be a considerable factor in career success.

This ability includes such skills as goal setting, information gathering, generation and evaluation of alternatives, and mental simulation of decision scenarios (Dean & Sharfman, 1993; Hamilton et al., 2016; Klein, 1993; Scott & Bruce, 1995). Possessing such skills allows one to take advantage of the opportunities that may not be obvious to others, to see dangers early, and thus to be able to mitigate risks. All of this is likely to be beneficial to one's career. While some employees may come into the workplace already possessing these skills, others may benefit from training designed to promote more efficient decision making.

At the moment, decision making abilities are generally not considered as a separate construct in selection and promotion decisions. On the other hand, intelligence testing has been a popular recruitment tool, thought to be predictive of future performance (Robertson & Smith, 2001; Searle, 2009). However, authors such as Stanovich (2016) consider intelligence and rationality to be two distinct constructs: specifically, that it is possible for people to be intelligent *and* irrational. Therefore, measuring an individual's decision making rationality may offer the ability to predict their behaviour and outcomes over and above intelligence (Stanovich et al., 2016).

In an organisational setting, such testing at the recruitment stage may help to identify those candidates who are likely to make analytical, systematic decisions in their job role. Besides, unlike *g*, it is thought that decision-making abilities can be improved (Fischhoff, 1982; Sellier et al., 2019; van Brussel et al., 2020). In this way, training interventions targeted at correcting biased thinking and introducing decision-making tools may increase the quality of decisions of existing staff and potentially enhance their career prospects as a result. At this moment, the contribution of decision-making approach to career outcomes is an unexplored topic, but it may offer a valuable insight into an employee's or job candidate's personal profile.

The higher one rises in the organisational hierarchy, the more important the ability to make efficient decisions should become because the scope of decisions increases with

responsibility. However, although the question of decisiveness in leadership (which will be discussed in more detail in Chapter 3) has received considerable attention in literature (e.g., Bernheim & Bodoh-Creed, 2020; Brodbeck et al., 2000; Hogan & Kaiser, 2005; A. F. Simon, 2006), the topic of individual differences in decision-making rationality and whether decision-making rationality differentiates between employees with high and low career outcomes has remained unexamined. Existing research into individual differences in *career* decision-making strategies and subsequent career outcomes suggests it may be fruitful area, with a rational approach to career decision making associated with better person-job fit (Singh & Greenhaus, 2004).

Specifically, predictions from prospect theory about how people respond to potential gains and losses are helpful in the areas of I/O Psychology where the ability to influence other people's judgments plays an important role, such as leadership and recruitment. As such, research has shown that people are more accepting of recruitment strategies presented to them when they are framed positively: that is, in terms of applicants accepted rather than rejected based on a certain parameter (Gamliel & Peer, 2009).

The findings of framing effect research, informed by prospect theory, may also guide the development of programmes to help employees resist the influence of framing by mentally swapping negative for positive frames and vice versa. People have consistently shown a more risk-seeking behaviour in the domain of losses than gains (Cao et al., 2017; Fagley & Miller, 1990; Tversky & Kahneman, 1986). The message "launching a new product before the end of the year may help the company to avoid losing its market share" is identical in meaning to "launching a new product before the end of the year may help the company to retain its market share", however, where the launch of the product is perceived as risky, the former phrasing may come across as more persuasive since the decision is thought to be in the domain of losses. Helping employees to recognise such potential decision traps may lead to more systematic decisions, to a lesser extent affected by persuasion techniques.

Another common fallacy important to organisational decision making is the sunk cost fallacy, or the tendency to commit to an action because some investment (e.g., of time, money, or effort) has already been made, even if an alternative course of action might lead to a better outcome (Arkes & Blumer, 1985). Prospect theory also aids the understanding of this tendency. When some initial investment has already been made, on the one hand, people consider dropping the project to be a loss and are therefore more risk-seeking, and on the other hand, additional losses do not result in dramatic decreases in subjective utility, as illustrated by the convex shape of the prospect theory value function in the loss domain. On the contrary, new investments are viewed from the perspective of potential gains, where people tend to be more risk-averse (Arkes & Blumer, 1985).

A meta-analysis of 100 studies published between 1976 and 2013 showed the influence of sunk costs on economic decision making, with most studies exhibiting weak to moderate effect (Roth et al., 2015). The authors distinguish between *utilisation* and *progress* decisions. *Utilisation* means making a choice between two alternatives, one of which entails a sunk cost. An example of it in the business domain may be going to a trade fair because the tickets have already been purchased whereas investing that time in some other activity might be more productive and economically efficient. *Progress* refers to escalation of commitment, for example, continuing to invest in a project. Roth *et al.* (2015) suggested that the tendency to succumb to sunk costs in progress decisions is particularly important to consider in managerial decision making and that educating employees on decision quality can reduce the negative impact of sunk costs. They also recommend creating barriers to escalation of commitment, which would require decision makers to justify further investment, or distributing responsibility for the decision to multiple employees.

The conjunction fallacy, or the tendency to judge complex events as more probable than their constituent parts (Yates & Carlson, 1986), is another issue that may be important to consider in organisational decision making, especially when seeking

advice. The conjunction fallacy is an example of the representativeness heuristic. Tversky and Kahneman (1983) described representativeness as “an assessment of the degree of correspondence between … an outcome and a model” (p. 295).

Consider a manager who tasks two employees with forecasting the outcome of opening a new store in a particular location. After analysing the demand for the company’s products and the characteristics of the location, one employee concludes that there is a 25% chance the investment will have paid off within one year, a 55% chance it will have paid off within two years, and a 20% chance the store will remain unprofitable for over two years (scenario 1). Another employee concludes that there is an 80% chance that within two years another store operating in the same area will close due to competition since they sell inferior products at higher prices and the investment will pay off (scenario 2).

Note that the latter scenario is a conjunction of two events: a pay-off of the investment within two years and a closure of a competitor’s store. While it may sound like a more plausible scenario due the provision of a causal explanation (the investment will pay off because the reduced competition will increase demand), “the investment will pay off within two years” (scenario 1) is more probable than “the investment will pay off within two years *and* a competitor’s store will close” (scenario 2). Meanwhile, both employees provide the probability of 80%.

Judging scenario 2 as more credible is an example of the representativeness heuristic, which causes people to overestimate the probability of an event that seems to be more characteristic of its kind. This includes detailed narrations from which causal explanations can be drawn. A more accurate representation of scenario 2 would rely on conditional rather than joint probability: *if* a competitor store closes down, *then* the probability of the investment paying off within two years is 80%: that still leaves the chance the condition will be fulfilled unknown.

A manager making a decision about whose forecast to rely on (which may also lead to judgement about the employees' skills and promotability) needs to be able to recognise when an ostensibly plausible story is used as an instrument of persuasion and a more modest prediction is likely to be more trustworthy. That often does not happen because a detailed story may appear to offer a reasonable causal explanation and thus be more attractive (Highhouse, 2001).

This issue is closely related to the problem of confusing confidence with competence: people who appear to be sure of their judgment tend to be perceived as more skilled (C. Anderson et al., 2012; Belmi et al., 2020). Since true competence may take a long time to show, in making judgments about ability, observers tend to rely on superficial "competence cues", such as outspokenness, the manner of delivery, and relaxed demeanour, and often overestimate the competence of those individuals who come across as more confident in their decisions and proposals (C. Anderson et al., 2012).

Hence, overconfidence, which often manifests as excessive certainty in one's judgments (commonly referred to in overconfidence literature as *overprecision*), may lead to a societal and professional advantage of being viewed as competent and trustworthy (Belmi et al., 2020). That is to say, the ability to not only estimate the likelihood of potential outcomes analytically but also to recognise when predictions supplied by others are likely to be prone to overconfidence or misunderstanding of the difference between joint and conditional probabilities is a helpful skill in organisational decision making.

Kahneman and Frederick (2002) suggest that flawed judgments influenced by the representativeness heuristic are caused by the tendency to mentally substitute a difficult question with an easier one (a phenomenon they call *attribute substitution*). In the example above, the manager making judgements about the value of the two predictions may substitute the difficult question of "whose analysis is more trustworthy?" with an easier one: "which of these sounds like a more plausible story?",

which would trigger a mental representation of conditions facilitating a successful opening of a store and hence make the more detailed story filled with causal explanations seem more plausible.

While the conjunction fallacy is a common example, the representativeness heuristic encompasses a whole range of systematic errors of judgment. Among them are base rate neglect, insensitivity to sample size, insensitivity to predictability, and the illusion of validity (Tversky & Kahneman, 1974), all of which may negatively affect the quality of organisational decision making. For example, the illusion of validity is based on perceived similarity of the person or event in question to the mental model. Highhouse (2001) has warned that it is an important factor contributing to the "glass ceiling" preventing women from reaching executive positions at work (which also extends to other groups underrepresented in top-level positions). Unconscious biases training has been offered by many organisations to address this problem, but it has been criticised for often overlooking issues such as intersectionality and complex power dynamics (Steinfield et al., 2019) and being used instead of, rather than in addition to, rigorous anti-discrimination policies (Williamson & Foley, 2018).

2.1.4.2.2 Links to career outcomes

Considering the discussion so far, it appears to be reasonable that the ability to make rational and systematic decisions should be an important factor in career outcomes, such as one's position in the organisational hierarchy and how much authority one has in the workplace (referred to as extrinsic career outcomes). This leads to the first hypothesis:

H2.1. Self-reported decision-making rationality is positively associated with extrinsic career outcomes.

An important point to consider is that asking people to evaluate their own rationality can be problematic. As previously discussed, the notion of traditional economic rationality and the way it is usually understood in everyday life can differ (Arrow, 1986). Consequently, people may overestimate their own rationality and not realise when they make decisions that do not conform to the rules of classical rationality.

This explanation is supported by much of the research in the field of JDM, which has shown that people often break the rules of normative decision making without realising it (e.g. Arkes & Blumer, 1985; Stanovich, 2016; Tversky & Kahneman, 1974). Indeed, previous research has demonstrated that there is a weak correlation between performance on decision-making competence tasks and self-reported rationality (Bruine de Bruin et al., 2007). What is more, asking people how rationally they approach making choices is open to the possibility that participants will provide a socially desirable response, thus potentially distorting the data (van de Mortel, 2008).

Considering these limitations on self-reports of decision-making rationality, it is useful to also measure performance on decision-making tasks, which may produce a more objective assessment of rational decision making than self-reports. Despite the limitations of using self-reports, it is expected that self-reported and task performance measures will be at least somewhat correlated.

H2.2a. There is a positive relationship between self-reported decision-making rationality and decision-making rationality measured through task performance.

H2.2b. Albeit the relationship is positive, the effect size is small to medium.

Performance on decision-making tasks is expected to measure how well one is able to resists heuristics and biases and other decision fallacies that may lead to suboptimal decisions. The preceding discussion in this chapter suggests that such an ability is likely to lead to better quality decisions and is important in the organisational setting.

Over time, such a decision-making skill is expected to translate into better career outcomes.

H2.3. Decision-making rationality measured through task performance is positively associated with extrinsic career outcomes.

What is more, since people potentially overestimate their decision-making rationality when completing self-reported measures, whether consciously or unconsciously, task performance is expected to be a better predictor of extrinsic career outcomes.

H2.4. Self-reported decision-making rationality does not predict extrinsic career outcomes over and above decision-making rationality measured through task performance.

As for intrinsic career outcomes, or career satisfaction, the limited existing research shows that a rational approach to career decision making is associated with better person-job fit (Singh & Greenhaus, 2004), which in turn has been shown to be associated with career satisfaction (Sirén et al., 2021). While career decision making refers to a specific domain, which may not generalise to other choices, a rational approach to making important choices, characterised by sufficient information seeking and evaluation of available alternatives, is expected to help individuals reach their career goals. Therefore:

H2.5. Self-reported decision-making rationality is positively associated with intrinsic career outcomes.

H2.6. Decision-making rationality measured through task performance is positively associated with intrinsic career outcomes.

2.1.4.3 Decision confidence and career outcomes

Another important construct to consider in the discussion about the role of decision-making rationality in career outcomes is that of decision confidence. While decision-making rationality in itself may be an important predictor of career progression, the image that a person projects about their decision-making abilities may be influenced by how confident they appear to be about their decisions.

Research has suggested that individuals who project confidence have certain social advantages that help them attain higher status (C. Anderson et al., 2012; Belmi et al., 2020; Martin et al., 2017). Specifically, acting confidently can help people convince others that they are more competent than they actually are. That is because real confidence is difficult to establish, so people often rely on "competence cues" to make judgments about someone else's skill and expertise (C. Anderson et al., 2012). Such cues may include appearing calm and relaxed, speaking with certainty, and expressing ideas more often.

C. Anderson *et al.* (2012) found that overconfident people were indeed perceived as more competent and therefore found it easier to achieve higher status. As for the origins of overconfidence, it has been suggested that social class plays a significant role: specifically, that in middle and upper-class environments, such as prestigious schools and occupations, overt displays of confidence, even in the absence of actual skill and expertise, are actively encouraged (Belmi et al., 2020). Moreover, Belmi *et al.* (2020) argued that higher social class shapes the desire to achieve high social status, which is often aided by projecting confidence.

Similarly, Burks *et al.* (2013) suggested that overconfidence is a form of social signalling driven by the desire to shape other people's perceptions about oneself. They found that social potency, or one's inclination to occupy a dominant role in a social

group, is positively associated with overconfidence. In addition, they tested and rejected the hypothesis that overconfidence stems from incomplete information about one's own abilities and performance, providing further support to the idea that overt displays of confidence are often not meant to indicate real competence and instead may be used to create a misleadingly positive image of oneself. However, additional explanations for excessive confidence offered by other authors do include biased self-views that stem from focusing on one's own success and ignoring failure, inability to understand own incompetence, and having definitions of ability or success that differ from those that are widely accepted (C. Anderson et al., 2012; Kruger & Dunning, 1999).

Confident people often emerge as leaders in social groups and workplaces, however, competence cues that they project can often be misleading (C. Anderson et al., 2012; Belmi et al., 2020; Martin et al., 2017). Moreover, people who already have social advantage are more likely to be able to project confidence than those who do not (Belmi et al., 2020). Therefore, relying on false competence cues may not only lead to wrong decisions in such areas as recruitment and promotions, but also perpetuate existing inequalities. That is one of the reasons why assessment techniques that minimise biases which traditional unstructured hiring interviews are prone to are important (Belmi et al., 2020).

In addition, people who are more confident in their decisions may be looking for ways to rationalise the belief that their choices are predominantly good. Overestimating how rationally they approach decision making may be one of the ways of justifying such confidence. Therefore,

H2.7. Decision confidence is positively associated with self-reported decision-making rationality.

To summarise the discussion in this section, exhibiting confidence, even if it is not supported by actual skill and expertise, often confers a social advantage. Confident people display competence cues that can be used as a shorthand for confidence and help them achieve higher social status (C. Anderson et al., 2012; Belmi et al., 2020). Therefore, those who are confident in their decisions are likely to be more able to convince others of their decision making competence than those who are not. This may lead to advantages in recruitment interviews and bids for promotions. Consequently, it is suggested that:

H2.8. Decision confidence is positively associated with extrinsic career outcomes.

Moreover, as discussed earlier in this chapter, self-reporting decision rationality is prone to biases, such as overestimating one's own decision-making abilities, and is therefore expected to be associated with decision confidence. With that in mind, it is proposed that the relationship between self-reported decision-making rationality and extrinsic career outcomes that may transpire empirically is at least partially explained by decision confidence.

H2.9. The relationship between self-reported decision-making rationality and extrinsic career outcomes is mediated by decision confidence.

2.1.4.4 Intuition and career outcomes

The tools for rational decision making, and the skills to use them, can be of great help in structured environments and in solving well-defined quantitative problems; they are less helpful in contexts that are ambiguous and when decisions have to be made under time pressure (Orasanu & Connolly, 1993; H. A. Simon, 1987).

As discussed earlier in this chapter (section 2.1.3.1), experience, which allows decision makers to rely on a wide collection of patterns stored in long-term memory, is a pre-requisite for successful intuitive decision making. In the workplace setting, training and practical experience provide the knowledge necessary to make good intuitive judgements and rapidly identify the key features of the problem to be attended to (H. A. Simon, 1987).

Indeed, the speed with which experts can identify what needs to be done to solve the problem and how to do it is what often sets experts and non-experts apart (Dreyfus & Dreyfus, 2005). H. A. Simon (1987) suggested that pattern recognition and unconscious retrieval of the necessary information from the vast repertoire of patterns stored in long-term memory (the processes that often cannot be verbalised) constitute the mechanism behind successful rapid judgments by experts. It has been proposed that the cognitive architecture of experts, shaped by a long time of practice in a particular field, allows them to identify patterns, differentiate between situational cues, and retrieve the necessary information to decide on a course of action: these are the advantages that novices do not possess (Okoli et al., 2016).

Dreyfus and Dreyfus (2005) called intuitive judgment the “hallmark of expertise” and argued that it cannot be fully encapsulated by rule-based systems. They proposed a five-stage model of the acquisition of expertise. According to this model, at stage 1, the instructor has to break down the task into a set of simple features and supply the beginner with the rules that determine how to act based on these features. At stage 2, the learner has seen a number of examples and begins to recognise different aspects of a situation. At stage 3, competence is achieved and people learn which aspects of a situation to treat as important and which to ignore in order to deal with informational overload. Stage 4 is marked by proficiency, where experience results in more successful and fewer unsuccessful responses. A proficient performer can rapidly recognise the important aspects of a situation, but still has to deliberately decide how to solve it. Finally, at stage 5, a person achieves expertise. As an expert, they quickly

recognise not only what needs to be done in a particular situation, but also how to do it because they have a large repertoire of experiences in similar circumstances.

Another account, the theory of expert competence, provides a different perspective on expert intuition that is concerned with the necessary conditions for successful judgment (Shanteau, 1992). It proposes that competence is determined by five components. First, a person needs to have sufficient knowledge in the area. Second, they have to possess traits such as self-confidence, good communication skills, adaptability, and a sense of responsibility—the traits commonly associated with experts. Third, experts require strong cognitive skills in order to make difficult decisions. Fourth, they have to be able to use suitable decision strategies. Finally, the decision-making task has to have characteristics conducive to successful expert judgment.

These characteristics involve clear and static, rather than rapidly changing, features of the situations, judgments about things rather than about people's behaviour, relatively predictable and decomposable problems, anticipation of some error rather than flawless predictions (like in weather forecasts), repetitive tasks, and availability of feedback, objective analysis, and decision aids (Shanteau, 1992). This indicates that even if a worker has many years of experience in a particular area, the types of decisions that they have to make at work may not be conducive to the use of expert intuition. Instead, judgments based on explicit rational analysis of available evidence may have to be used. One such area is recruitment: attempts to predict a candidate's suitability for a job from unstructured interviews alone are generally met with little success, whereas such measures as aptitude and personality tests have been shown to be more effective (Highhouse, 2008).

It has also been suggested that statistical models and expert judgement can complement each other and should both guide decisions (Blattberg & Hoch, 1990). This account posits that both models and experts have unique advantages and, as the

other theories discussed in this chapter, assumes that intuition is based on valid tacit knowledge that stems from experience and automation of decision processes.

Blattberg and Hoch (1990) suggested that experts, who possess highly organised domain-specific knowledge, are better able to determine what questions to ask about a decision situation than to make accurate predictions. However, according to the authors, unlike models, experts can exhibit decision biases and overconfidence in their decisions; factors such as fatigue, boredom, and emotions can also influence their judgments. On the other hand, models are limited by the parameters set by the modellers, unable to deal with the variables that cannot be measured objectively, and generally cannot handle extremely rare events that can have substantial influence on predictions.

Such rare events are often referred to as “broken leg” cues. The term was coined by Meehl (1957) to describe cues that are highly diagnostic but so infrequent that they are usually not incorporated into statistical models due to the lack of available data. The example that Meehl provided, that gave the name to the phenomenon, was about a sociologist predicting whether a professor would go the cinema on a given night. The model that the sociologist builds may include such variables as age, introversion, academic speciality, and others. However, if the professor suddenly breaks a leg, that will generally override any positive prediction made by the model, no matter how accurate it would have been under normal circumstances. While the model may be blind to such diagnostic criteria, a human judge will instantly notice it and make a prediction accordingly.

It is generally impossible to anticipate everything, so there is always the risk that a “broken leg” event will render the predictions made by a statistical model, no matter how sophisticated, invalid. Expert knowledge may help to recognise such rare events, including more subtle cases of the “broken leg” cue that expertise is required to notice. Blattberg and Hoch (1990) proposed that a combination of statistical models and expert

insight can yield superior outcomes to using either in isolation if the unique advantages of both are capitalised on.

Research into intuition such as that within the NDM tradition usually examines instances of intuitive decision making using interviews (e.g., Klein et al., 2010). However, within the scope of the quantitative research presented in this thesis, an alternative had to be found. Although quantitative self-reported measures of intuitive decision making exist, by using such measures, it is difficult to discriminate between rapid decision making based on heuristics and biases and intuitive decision making backed by experience and pattern recognition. In lay terms, both could be referred to as “gut feeling”. Besides, the reasoning behind rapid intuitive judgments is usually impossible to articulate (Okoli et al., 2016). Consequently, participants completing self-reports may be unable to distinguish between the two. Previous research shows that a substantial correlation between intuitive and spontaneous (or impulsive) decision making exists (Dewberry et al., 2013; Scott & Bruce, 1995; Spicer & Sadler-Smith, 2005), suggesting that the difference between the two is not always clear.

The research on intuitive decision making discussed in this chapter mainly points towards the need for expertise before reliable judgments can be made since such judgments depend on an extensive arsenal of patterns stored in long-term memory. To acquire such an arsenal, practice over a substantial period of time is required. Therefore, it is anticipated that on its own, an intuitive approach to decision making is not predictive of career outcomes since highly intuitive novices are more likely to be guided by heuristics and biases rather than by helpful pattern recognition.

To accumulate enough experience to perform successful pattern-recognition-based judgments, one needs time. Young people who have only recently entered the workforce cannot be expected to possess the required arsenal of patterns to rely on. However, with time, such patterns can be expected to accumulate. Therefore, the mitigate some of the limitations of self-reports of intuitive decision making, age will be

used as a proxy for the time available to have accumulated experience. It is expected that intuitive decision making is associated with career outcomes, but not in younger workers who have not yet had the time to acquire experience. With that in mind, it is proposed that:

H2.10. Intuitive decision making is positively associated with extrinsic career outcomes, but this relationship is moderated by age.

On the on contrary, spontaneous decision making, characterised by impulsivity and lack of deliberation and reliance on experience, has been associated with low decision-making competence and poor decision outcomes in personal life (Bruine de Bruin et al., 2007). Such an approach, not backed by either rationality or experience-based intuition, is unlikely to translate into career success. Therefore:

H2.11. Spontaneous decision making is negatively associated with extrinsic career outcomes.

To test the hypotheses outlined in this chapter, two studies were conducted. Study 1 focuses on self-reports of rational, intuitive, and spontaneous decision making as well as decision confidence and their links with career outcomes. Study 2 expands on rational decision making as predictor of career outcomes and, in addition to self-reports, uses task performance measures to mitigate the limitations of assessing rationality through self-reports. It also captures decision confidence. A general discussion at the end of this chapter brings the two studies together.

2.2 Study 1

2.2.1 Method

In this observational study using cross-sectional data, decision making was measured through self-reports. Hypotheses H2.1, H2.5, H2.7, H2.8, H2.9, H2.10 and H2.11 were tested. It was pre-registered at https://osf.io/mbt45. Hypothesis H2.5 was exploratory and not pre-registered.

2.2.1.1 Participants

The participants were 266 people in full-time employment in the United Kingdom, recruited via invitations on social media (such as Twitter, Facebook, and LinkedIn) and an advertisement on a student forum at Birkbeck, University of London. An attempt was made at recruiting on a survey exchange platform, but it yielded only two observations. Twenty-one participants indicated that they owned the business where they worked and were excluded from the analysis due to the difficulty in comparing employment and self-employment career outcomes.

The mean age of the remaining 245 participants was 40.39 years (*SD* = 9.87). The gender makeup of the sample is as follows: 73.47% female, 25.71% male, and 0.41% other. In terms of ethnicity, 90.20% of participants were white, 3.67% from a mixed/multiple ethnic background, 2.04% Asian, 0.82% Black, 0.41% Arab, and 2.86% indicated their ethnicity as “Other”. The highest completed level of education, or equivalent, was as follows: 6.53% GCSE grades A*-C, 16.73% A-level, 35.92% Bachelor’s degree, 35.51% Master’s degree, 3.67% Doctoral degree. In terms of hierarchical status, 14.69% of the participants indicated they were in junior positions, 56.73% were mid-level, 28.57% senior. Participants came from a variety of industries, the most common being Education (12.24%), Healthcare (8.57%), Information

Technology (5.71%), Banking and Finance (4.49%), and Sales and Marketing (3.67%). On average, they had 19.05 years of work experience (*SD* = 10.30). Twelve (4.90%) participants reported that at the time of completion of this survey they were on paid furlough; an additional two participants (0.82%) reported they were on unpaid furlough.

2.2.1.2 Procedure

The survey was completed on the online survey platform Qualtrics. After reading the information sheet and completing the consent form (provided in Appendix I), but before starting the survey, the participants responded to the validation statement: “I work full-time in the UK or have recently been furloughed from a full-time job”. Only the participants who selected “yes” were progressed onto the next screen to answer the survey questions. Since the data collection was conducted during the COVID-19 pandemic (between July 2020 and March 2021), when the UK operated the Coronavirus Job Retention Scheme (HM Revenue & Customs, 2020), participants who reported to have been furloughed from a full-time job were also accepted.

Because of the pandemic, data collection was restricted to online avenues and the original plan to recruit participants working in the same industry by approaching companies at trade fairs in London had to be changed. On the one hand, it resulted in a disadvantage in that to make recruiting a sufficient number of participants realistic, the survey had to be opened up to people working in a variety of industries, which made career outcomes less comparable. For example, it is difficult to draw meaningful salary comparisons across different industries. On the other hand, not focusing on a specific industry allowed to examine the constructs of interest in a broader context. For this report, measures of career outcomes that did not capture data on salaries or managerial positions were used (since in some industries, such as academia, being in a managerial position is not an informative indicator of success), which will be explained in more detail in the following section.

The survey questions were viewed in blocks by topic: decision-making questions, career-related questions, and demographic questions. Questions within scales were randomised for each participant to reduce question order effects (Lasorsa, 2003). Only data from the participants who fully completed the survey was used, thus allowing them to withdraw at any point.

Median completion time was 9.52 minutes. Since it was a web-based survey that remained active for one week after opening, participants might have left the browser window open and returned to it after a break or completed it in more than one sitting. Consequently, mean completion time (28.15 minutes) and standard deviation (141.66 minutes) are not particularly meaningful in judging the length of time actively spent on the survey.

Data collection for this study was done in conjunction with that for Study 3 (reported in Chapter 3) and Study 4 (reported in Chapter 4). This research received ethical approval from the School of Business, Economics and Informatics Ethics Board at Birkbeck, University of London.

2.2.1.3 Materials

The *Rational*, *Intuitive*, and *Spontaneous* subscales of the *General Decision-Making Style (GDMS)* questionnaire (Scott & Bruce, 1995) and the *Confident* subscale of the *Decision Style Questionnaire* (Leykin & DeRubeis, 2010) were used to measure the approach to decision making. Example items include: *"I double-check my information sources to be sure I have the right facts before making decisions"* (Rational), *"When making decisions, I rely on my instincts"* (Intuitive), *"I generally make snap decisions"* (Spontaneous), *"I have faith in my decisions"* (Confident). Each subscale has 5 questions measured on a 5-point scale.

Extrinsic career outcomes were defined here as an employee's position in the organisational hierarchy and the level of authority that they have in the organisation. Intrinsic career outcomes were operationalised as career satisfaction. Since not everybody aspires to senior work roles, agreement between extrinsic and intrinsic career outcomes measures does not tend to be very high (Ng et al., 2005). Adopting a two-fold approach mitigates some of the blind spots in the two ways of measuring career outcomes.

As a measure of hierarchical status, participants were asked to classify their position at work: junior (1), mid-level (2), or senior (3). An additional option was "owner of the business". Participants who selected this fourth option were not included in data analysis due to the difficulty of comparing employment and self-employment outcomes. To determine the level of authority in the organisation, participants were asked if they had permission to delegate work, project responsibility, and/or an official leadership position (Abele & Spurk, 2009). For each affirmative answer, they received one point on a scale ranging from 0 to 3, with higher numbers indicating higher authority. These measures were chosen due to their relevance across different industries, in some of which having managerial responsibility may not be an informative indicator of career outcomes.

As a measure of intrinsic career success, participants were asked to complete the *Career Satisfaction Scale* (Greenhaus et al., 1990), measured on a 5-point Likert scale. The scale includes 5 questions. A sample item is: *"I am satisfied with the success I have achieved in my career".*

Not everybody strives for career progression. When testing the relationships between decision making and career outcomes, adjusting for professional aspirations may give a clearer idea of how much decision-making style contributes to climbing up the career ladder. Therefore, participants also completed the *Career Aspiration Scale* (O'Brien, 1996), consisting of 10 questions measured on a 5-point Likert scale. It includes items

such as: *"I hope to become a leader in my career field"*. Two questions were slightly adapted: the phrase *"When I am established in my career"* was removed from the wording to include people at more advanced career stages.

Composite scores were calculated for all scales (or, where relevant, subscales). Additionally, information about age, gender, ethnicity, the highest completed level of education, number of years of work experience, and industry was collected.

2.2.2 Results

Missing data constituted 0.35% in total. The highest percentage of missing data per variable was in the Education variable and made up 1.63% of responses. Apart from one question in the Career Satisfaction scale, where missing data constituted 1.22%, in all other variables under consideration it was under 1%.

Descriptive statistics, correlations between the variables, and internal consistency of the scales are presented in Table 2.1. As expected, there was a significant association between self-reported rational decision making and decision confidence, thus supporting Hypothesis 2.7. Contrary to the expectation, there were no zero-order correlations between self-reported rational, intuitive, or spontaneous decision making and any of the career outcomes measures. However, decision confidence was positively associated with hierarchical status, authority level, and career satisfaction alike.

Table 2.1

Descriptive Statistics and Correlations for Study 1 Variables

Variable	M	SD	1	2	3	4	5	6	7	8
1. Rational DM	4.16	0.56	(.69)							
2. Intuitive DM	3.62	0.75	-.14*	(.80)						
3. Spontaneous DM	2.74	0.76	-.43***	.40***	(.76)					
4. Confident DM	3.92	0.83	.13*	.22***	.08	(.85)				
5. Hierarchical status	—	—	.08	-.04	-.11	.29***	—			
6. Authority	—	—	.08	-.08	0	.32***	.56***	—		
7. Career satisfaction	3.62	1.00	.06	.03	.05	.37***	.30***	.25***	(.89)	
8. Career aspirations	2.57	0.87	.07	-.03	.06	.14*	.20**	.29***	.18**	(.81)

DM = decision making. *p < .05. **p < .01. ***p < .001. Cronbach's alphas are listed in the diagonal.

Below the results of the regression models run to test the hypotheses laid out in this chapter are reported. Where the control variables were included, only "male" and "female" gender categories were considered since the "other" category contained only one observation and was insufficient to provide meaningful information. It was coded as missing data for the ease of analysis. Unlike specified in the pre-registration document, years of work experience were not used in any of the analyses due to the high correlation with age, $r(243) = .87$, $p < .001$.

2.2.2.1 Self-reported rationality and confidence predicting extrinsic career outcomes

2.2.2.1.1 Hierarchical status as the outcome variable

First, a proportional odds logistic regression model was run in *R* version 4.0.4 using the *MASS* package (Venables & Ripley, 2002) with self-reported rational decision making as a predictor and hierarchical status as the outcome variable. At first, no control variables were entered. Self-reported rational decision making did not predict hierarchical status, $B = 0.27$, $SE = 0.22$, $OR = 1.31$ (95% CI [0.85, 2.05]), $p = .23$. The Brant test of parallel regression (Brant, 1990) was run using the *Brant* package

(Schlegel & Steenbergen, 2020) and it showed that the assumption was met. McFadden pseudo-R^2 (Veall & Zimmermann, 1996) equalled 0.

Next, age, gender, education level, and career aspirations were added as control variables to the model. Seven observations were omitted due to missing data. Self-reported rational decision making was still not a significant predictor of hierarchical status, B = 0.40, SE = 0.24, OR = 1.50 (95% CI [0.93, 2.43]), p = .10. Age (B = 0.11, SE = 0.02, OR = 1.12 (95% CI [1.08, 1.16]), p < .001) and career aspirations (B = 0.67, SE = 0.17, OR = 1.96 (95% CI [1.40, 2.76]), p < .001) were statistically significant. McFadden pseudo-R^2 increased to .14. The Brant test showed that the parallel regression assumption was met, although three combinations of independent and dependent variables did not occur. Generalised Variance Inflation Factors were calculated using the *vif* command in the *car* package. The highest GVIF value was 1.24, indicating no significant multicollinearity.

Predicted probabilities of hierarchical status depending on the value of the self-reported decision-making rationality variable, while fixing age and career aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are shown in Figure 2.1.

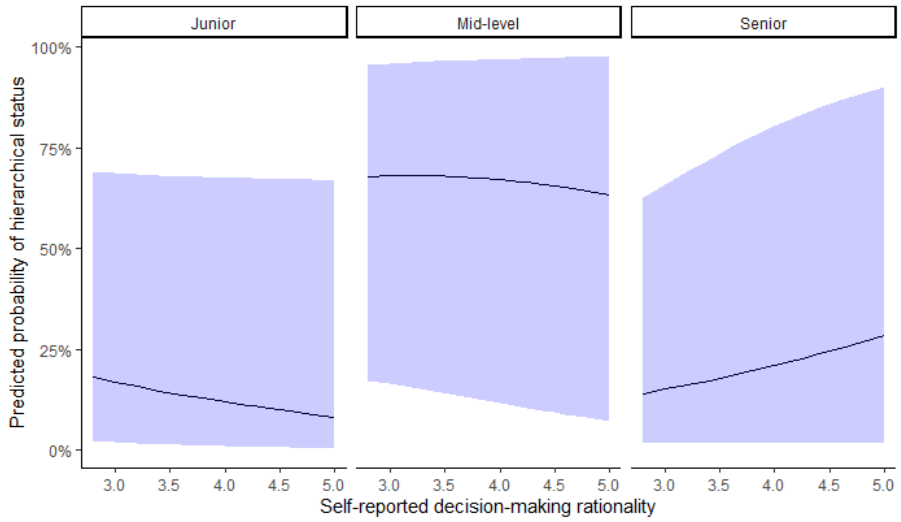

Figure 2.1. Self-reported rational decision making predicting hierarchical status while controlling for age, gender, education level, and career aspirations.

After that, decision confidence was added to the model. A total of eight observations were omitted due to missing data. Self-reported rational decision making was not a significant predictor of hierarchical status (*B* = 0.34, *SE* = 0.25, *OR* = 1.40 (95% CI [0.86, 2.28]), *p* = .17), but decision confidence was (*B* = 0.39, *SE* = 0.18, *OR* = 1.47 (95% CI [1.04, 2.10]), *p* < .05). Age and career aspirations were still statistically significant. McFadden pseudo-R^2 = .16. The Brant test showed that the parallel regression assumption was met, with a caveat that three combinations of independent and dependent variables did not occur. The highest GVIF value was 1.27.

Predicted probabilities of hierarchical status depending on the value of the decision confidence variable, while fixing self-reported rational decision making, age, and career aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are presented in Figure 2.2.

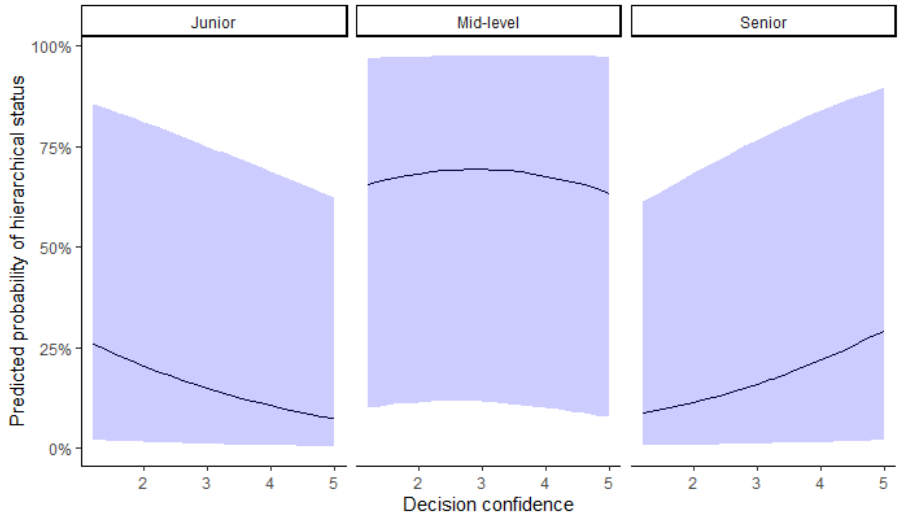

Figure 2.2. Decision confidence predicting hierarchical status while controlling for self-reported rational decision making, age, gender, education level, and career aspirations.

2.2.2.1.2 Authority level as the outcome variable

To test the relationship between self-reported rational decision making and authority level, a proportional odds logistic regression model was fitted. No control variables were entered at first. Self-reported rational decision making did not statistically significantly predict authority level, *B* = 0.25, *SE* = 0.20, *OR* = 1.28 (95% CI [0.86,

1.92]), p = .22. McFadden pseudo-R^2 = 0. The Brant test of parallel regression indicated that the assumption was met.

At the next step, age, gender, education level, and career aspirations were added as control variables. Seven observations were omitted due to missing data. Self-reported rational decision making was still not a significant predictor of authority level, B = 0.26, SE = 0.22, OR = 1.30 (95% CI [0.85, 2.00]), p = .23. Age (B = 0.05, SE = 0.01, OR = 1.05 (95% CI [1.02, 1.08]), p < .001), male gender (B = 0.66, SE = 0.29, OR = 1.95 (95% CI [1.11, 3.44]), p < .05), and career aspirations (B = 0.70, SE = 0.16, OR = 2.01 (95% CI [1.48, 2.75]), p < .001) were significant. Education level was significant between some categories, but the model including the education level variable did not explain statistically significantly more variance than a model without it (likelihood ratio $\chi^2(4) = 6.13$, p = .19). McFadden pseudo-R^2 = .07. The Brant test showed that the parallel regression assumption was met, but seven combinations of independent and dependent variables did not occur. The highest GVIF value was 1.20, indicating no significant multicollinearity.

Predicted probabilities of authority level depending on the value of the self-reported rational decision making variable, while fixing age at the mean, gender at female, education level at Bachelor's degree or equivalent, and career aspirations at the mean, are presented in Figure 2.3.

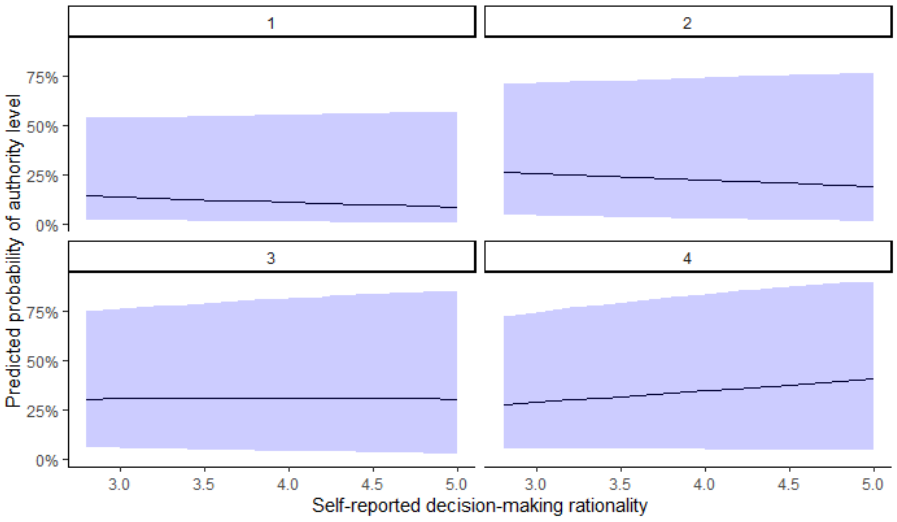

Figure 2.3. Self-reported rational decision making predicting authority level while controlling for age, gender, education level, and career aspirations.

Finally, decision confidence was added to the model. A total of eight observations were omitted due to missing data. Self-reported rational decision making was not a significant predictor of authority level (*B* = 0.13, *SE* = 0.22, *OR* = 1.13 (95% CI [0.73, 1.76]), *p* = .57), but decision confidence was (*B* = 0.57, *SE* = 0.16, *OR* = 1.76 (95% CI [1.30, 2.41]), *p* < .001). Age, gender, and career aspirations were still statistically significant predictors. McFadden pseudo-R^2 = .09. The Brant test indicated that the parallel regression assumption was met, although seven combinations of independent and dependent variables did not occur. The highest GVIF value was 1.24.

Predicted probabilities of authority level depending on the value of the decision confidence variable, while fixing self-reported decision-making rationality, age, and career aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are presented in Figure 2.4.

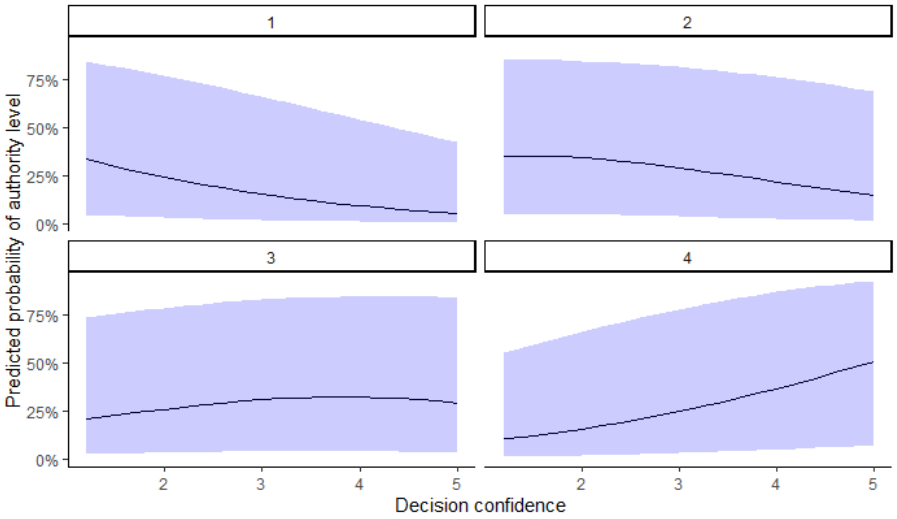

Figure 2.4. Decision confidence predicting authority level while controlling for self-reported rational decision making, age, gender, education level, and career aspirations.

To summarise, self-reported rational decision making was not a statistically significant predictor of extrinsic career outcomes, either measured as hierarchical status or as the level of authority. Decision confidence, on the other hand, predicted both measures of career outcomes over and above self-reported decision-making rationality, age, gender, education level, and career aspirations. Therefore, Hypothesis 2.1 was not supported and Hypothesis 2.8 was supported. Hypothesis 2.9 was not tested because due to the lack of a significant relationship between self-reported rational decision making and extrinsic career outcomes, a mediation model could not be built.

2.2.2.2 Self-reported rationality and confidence predicting intrinsic career outcomes

To test the relationship between self-reported rational decision making and career satisfaction, a linear regression model was fitted, first without entering the control variables. Two observations were omitted due to missing data. Self-reported rational decision making was not a significant predictor of career satisfaction, B = 0.11 (95% CI [-0.12, 0.33]), SE = 0.12, p = .35. The model did not account for a statistically

significant amount of variance in career satisfaction, R^2 = 0, *adj.* R^2 = 0, $F(1, 241)$ = 0.86, p = .35.

Next, the control variables of age, gender, education, and career aspirations were entered into the model. A total of nine observations were omitted due to missing data. The updated model accounted for approximately 10% of the variance in career satisfaction, R^2 = .10, *adj.* R^2 = .07, $F(8, 227)$ = 3.13, p < .01. Self-reported rational decision making was still not a significant predictor of career satisfaction, B = 0.07 (95% CI [-0.15, 0.30]), SE = 0.11, p = .51. The only statistically significant predictor was education level as the model including it explained more variance compared to a model without it, $F(4)$ = 3.74, p < .01. Model predictions for career satisfaction depending on the value of the self-reported rational decision making variable, while fixing age and career aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are shown in Figure 2.5. Hypothesis 2.5 was not supported.

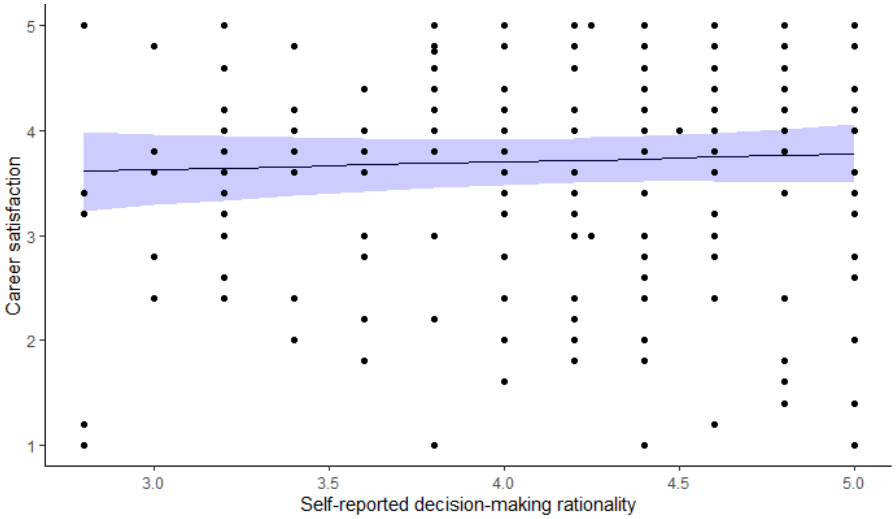

Figure 2.5. Self-reported rational decision making predicting career satisfaction while controlling for age, gender, education level, and career aspirations.

At the last step, since there was a zero-order correlation between decision confidence and career satisfaction, decision confidence was entered into the model. A total of ten

observations were omitted due to missing data. Self-reported rational decision making was still not a significant predictor of career satisfaction, *B* = -0.01 (95% CI [-0.23, 0.20]), *SE* = 0.11, *p* = .88, however, decision confidence was significant, *B* = 0.43 (95% CI [0.28, 0.59]), *SE* = 0.08, *p* < .001. For each point increase in decision confidence , career satisfaction increased by 0.43 points. Education level was also a statistically significant predictor and the model including it explained more variance compared to a model without it, *F*(4) = 3.59, *p* < .01.

The model accounted for approximately 21% of the variance in career satisfaction, R^2 = .21, *adj.* R^2 = .18, *F*(9, 225) = 6.57, *p* < .001. Model predictions for career satisfaction depending on the value of the decision confidence variable, while fixing self-reported rational decision making, age, and career aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are presented in Figure 2.6.

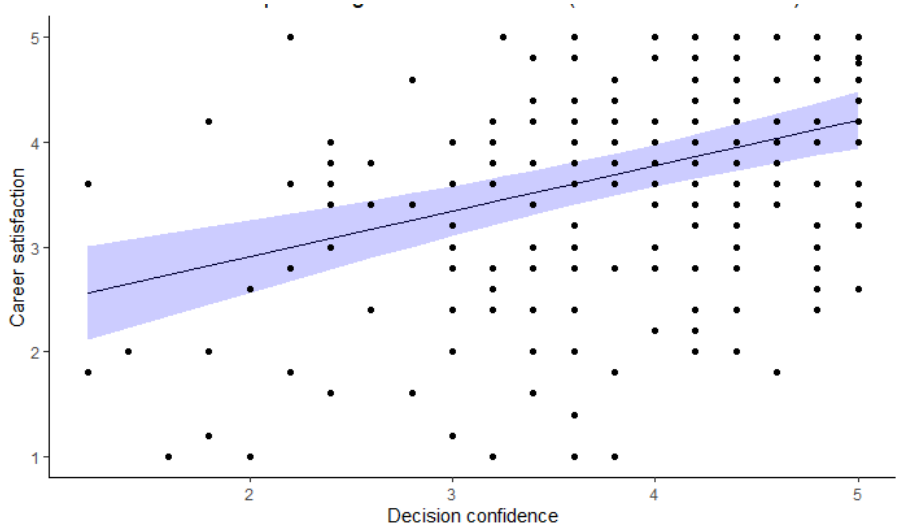

Figure 2.6. Decision confidence predicting career satisfaction while controlling for self-reported rational decision making, age, gender, education level, and career aspirations.

The model residuals were abnormally distributed, as shown in the quantile-comparison plot presented in Figure 2.7. The Shapiro-Wilk normality test was conducted to check the distribution of residuals and confirmed that they deviated from normality (*W* = 0.96, *p* < .001). Constant residual variance was checked using the non-constant variance score test (Breusch & Pagan, 1979) in the *car* package (Fox & Weisberg, 2019). No

heteroscedasticity was detected ($\chi^2(1) = 2.86$, $p = .09$). Autocorrelated errors were checked using the Durbin-Watson test in the *car* package, which showed that the residuals were independent (*D-W* = 2.00, p = .95). Linearity was assessed using partial-residual plots, which did not show serious deviations from linearity. The plots are available in Appendix III (Appendix Figure 1). The highest GVIF value was 1.23, indicating no significant multicollinearity. The Bonferroni Outlier Test (Fox & Weisberg, 2019) did not detect any residual outliers (Bonferroni *p* = .88). The largest Cook's distance was 0.13, below the recommended cut-off value of 1.

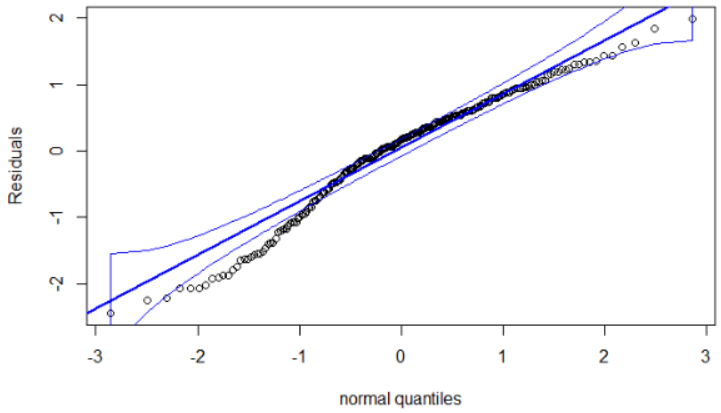

Figure 2.7. Career satisfaction, self-reported rational decision making, and decision confidence regression model diagnostics: Quantile-comparison plot.
Compares model residuals to theoretically expected quantiles.

2.2.2.3 Intuitive and spontaneous decision making predicting extrinsic career outcomes

2.2.2.3.1 Hierarchical status as the outcome variable

First, a proportional odds logistic regression model was fitted with intuitive decision making and age as a predictors, an interaction between intuitive decision making and age, and hierarchical status as the outcome variable. At this stage, no additional control variables were entered. One observation was omitted due to missing data. Intuitive decision making did not predict hierarchical status, *B* = 0.62, *SE* = 0.76, *OR* = 1.86 (95% CI [0.43, 8.32]), *p* = .41. Age was a significant predictor, *B* = 0.15, *SE* =

0.07, *OR* = 1.16 (95% CI [1.02, 1.34]), $p < .05$. McFadden pseudo-R^2 = .08. The interaction was not significant. The Brant test of parallel regression indicated that the assumption was met.

At the next step, gender, education level, and career aspirations were added as control variables. Seven observations were omitted due to missing data. Intuitive decision making not a significant predictor of hierarchical status, *B* = 0.56, *SE* = 0.81, *OR* = 1.75 (95% CI [0.36, 8.70]), $p = .49$. Age (*B* = 0.17, *SE* = 0.07, *OR* = 1.18 (95% CI [1.02, 1.38]), $p < .05$) and career aspirations (*B* = 0.66, *SE* = 0.17, *OR* = 1.94 (95% CI [1.39, 2.73]), $p < .001$) were statistically significant. The interaction between intuitive decision making and age was not significant.

McFadden pseudo-R^2 increased to .14. The Brant test showed that the parallel regression assumption was met, but three combinations of independent and dependent variables did not occur. Due to the interaction between two of the predictors in the model, the GVIF values of intuitive decision making, age, and the interaction term were all high (21.13, 24.78, and 44.97 respectively). When the interaction term was omitted, the highest GVIF value was 1.23, indicating no significant multicollinearity. The significance and non-significance of predictors did not change.

Predicted probabilities of hierarchical status depending on the value of the intuitive decision making variable, without interaction with age, while fixing age and career aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are shown in Figure 2.8.

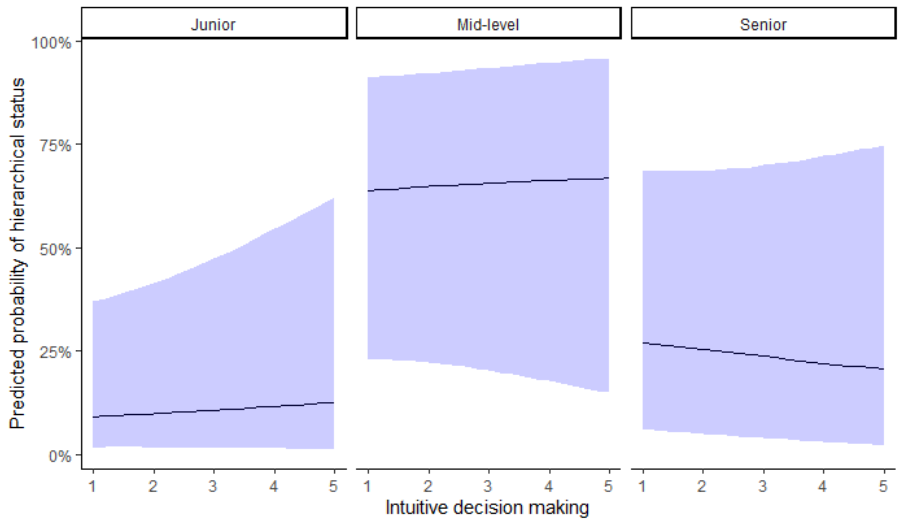

Figure 2.8. Intuitive decision making predicting hierarchical status while controlling for age, gender, education level, and career aspirations.

Following that, spontaneous decision making was added to the model. The interaction term between intuitive decision making and age was not used since it was not significant in the previous model. A total of seven observations were omitted due to missing data. Intuitive decision making was still not a significant predictor of hierarchical status (*B* = 0.09, *SE* = 0.20, *OR* = 1.09 (95% CI [0.74, 1.61]), *p* = .65), but spontaneous decision making was significant (*B* = -0.44, *SE* = 0.20, *OR* = 0.64 (95% CI [0.44, 0.94]), *p* < .05). Age and career aspirations were still statistically significant. McFadden pseudo-R^2 = .15. The Brant test showed that the parallel regression assumption was met, with a caveat that three combinations of independent and dependent variables did not occur. The highest GVIF value was 1.27.

Predicted probabilities of hierarchical status depending on the value of the spontaneous decision making variable, while fixing intuitive decision making, age, and career aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are displayed in Figure 2.9.

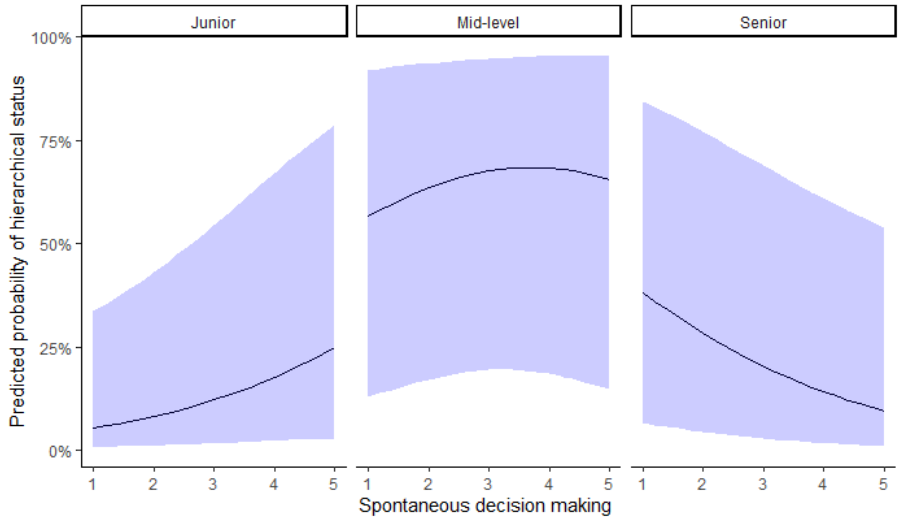

Figure 2.9. Spontaneous decision making predicting hierarchical status while controlling for intuitive decision making, age, gender, education level, and career aspirations.

2.2.2.3.2 Authority level as the outcome variable

To test the relationship between intuitive decision making and authority level, a proportional odds logistic regression model was run. Intuitive decision making, age, and the interaction between the two were used. No other control variables were entered at this stage. One observation was omitted due to missing data. Both intuitive decision making B = 1.95, SE = 0.70, OR = 7.02 (95% CI [1.81, 28.20]), p < .01, and age, B = 0.23, SE = 0.07, OR = 1.27 (95% CI [1.11, 1.44]), p < .001, as well as the interaction between them, B = -0.06, SE = 0.02, OR = 0.95 (95% CI [0.91, 0.98]), p < .01, were significant. McFadden pseudo-R^2 = .03. The Brant test of parallel regression indicated that the assumption was met.

To understand the relationship between intuitive decision making and authority level moderated by age, a plot was constructed. It is presented in Figure 2.10. For the moderating age variable, the mean value as well as one standard deviation below and above mean was used. As can be seen from the graph, the moderating effect of age was the strongest at the highest level of authority, with a highly intuitive approach to decision making being more beneficial for younger people and more detrimental for

older people. However, the confidence intervals were wide and overlapping, so no definitive conclusions could be made.

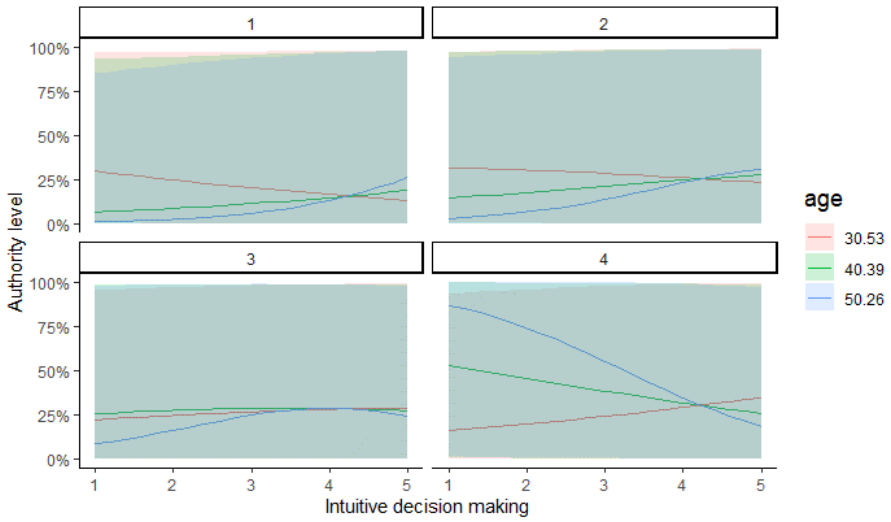

Figure 2.10. Intuitive decision making predicting authority level with age as a moderating variable.

Next, gender, education level, and career aspirations were added as additional control variables. Seven observations were omitted due to missing data. Intuitive decision making was still a significant predictor of authority level, *B* = 1.69, *SE* = 0.73, *OR* = 5.40 (95% CI [1.32, 22.75]), $p < .05$. Age (*B* = 0.22, *SE* = 0.07, *OR* = 1.24 (95% CI [1.09, 1.43]), $p < .01$), and career aspirations (*B* = 0.68, *SE* = 0.16, *OR* = 1.97 (95% CI [1.45, 2.70]), $p < .001$) as well as the interaction between intuitive decision making and age (*B* = -0.05, *SE* = 0.02, *OR* = 0.95 (95% CI [0.92, 0.99]), $p < .05$) were significant. Education level was significant between some categories, but the model including the education level variable did not explain statistically significantly more variance than a model without it (likelihood ratio $\chi^2(4) = 6.51$, $p = .16$).

McFadden pseudo-R^2 = .08. The Brant test showed that the parallel regression assumption was met, although seven combinations of independent and dependent variables did not occur. Due to the interaction term, the GVIF values for intuitive decision making, age, and the interaction were high (19.68, 30.60, and 51.36

respectively). When the interaction was excluded, the highest GVIF value was 1.19, indicating no significant multicollinearity between individual predictors.

Predicted probabilities of authority level depending on the value of the intuitive decision making variable, with age as a moderating variable (at the mean and one standard deviation above and below) while fixing gender at female, education level at Bachelor's degree or equivalent, and career aspirations at the mean, are presented in Figure 2.11. The graphs are similar to those in Figure 2.10, with wide confidence intervals.

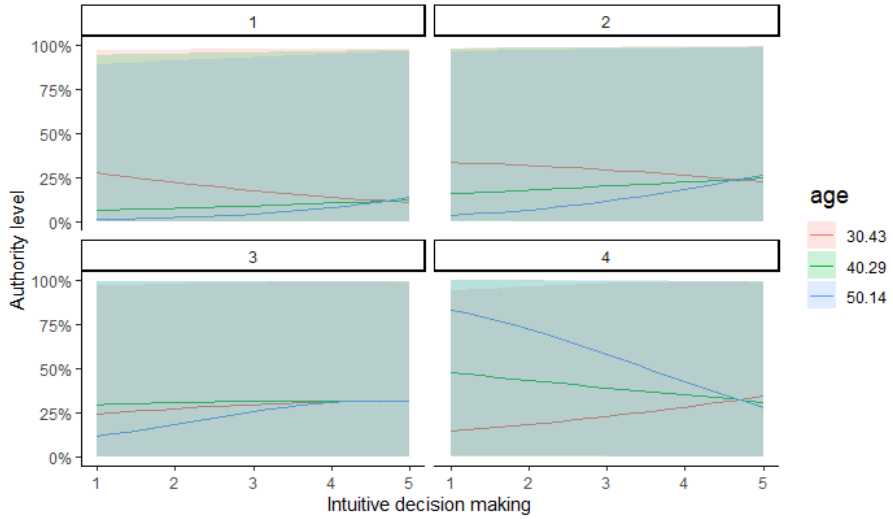

Figure 2.11. Intuitive decision making predicting authority level, with age as a moderating variable, while controlling for gender, education level, and career aspirations.

Lastly, spontaneous decision making was added to the model. A total of seven observations were omitted due to missing data. Intuitive decision making remained a significant predictor of authority level (*B* = 1.75, *SE* = 0.74, *OR* = 5.74 (95% CI [1.37, 24.73]), $p < .05$), however, spontaneous decision making was not significant (*B* = -0.08, *SE* = 0.18, *OR* = 0.92 (95% CI [0.65, 1.32]), $p = .66$). Age and career aspirations were still statistically significant predictors. The interaction between intuitive decision making and age remained significant.

McFadden pseudo-R^2 = .08, as in the previous model. The Brant test indicated that the parallel regression assumption was met, but seven combinations of independent and

dependent variables did not occur. As previously, in the model with the interaction term, the GVIFs for intuitive decision making, age, and the interaction between them were high, but the highest GVIF value when the interaction term was excluded was 1.27.

Predicted probabilities of authority level depending on the value of the spontaneous decision making variable, while fixing intuitive decision making, age, and career aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are presented in Figure 2.12.

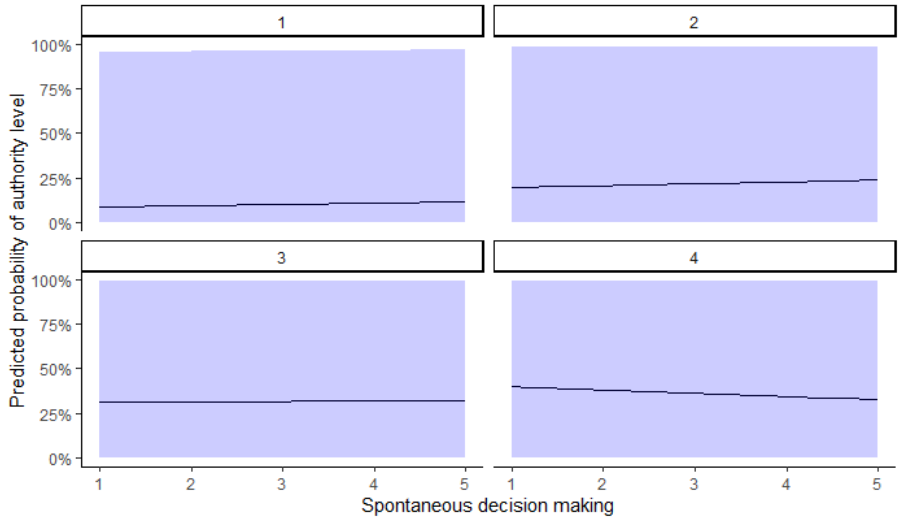

Figure 2.12. Spontaneous decision making predicting authority level while controlling for intuitive decision making, age, gender, education level, and career aspirations.

To summarise, when moderated for age, intuitive decision making was a statistically significant positive predictor of authority level, although the wide confidence intervals make it difficult to make conclusions about the effect of age as a moderator on the predictive power of intuitive decision making. Intuitive decision making was not associated with hierarchical status. Spontaneous decision making negatively predicted hierarchical status, but not authority level. Therefore, Hypotheses 2.10 and 2.11 were partially supported.

Finally, the outputs of the models integrating all decision making variables to predict career outcomes are reported.

2.2.2.4 All decision making variables predicting extrinsic career outcomes

2.2.2.4.1 Hierarchical status as the outcome variable

A proportional odds logistic regression model was fitted to predict hierarchical status using all the decision making variables (self-reported rational decision making, decision confidence, intuitive decision making, and spontaneous decision making) as well as the control variables of age, gender, education level, and career aspirations. Eight observations were omitted due to missing data. Out of all the decision making variables, decision confidence was the only statistically significant predictor of hierarchical status, $B = 0.47$, $SE = 0.19$, $OR = 1.60$ (95% CI [1.11, 2.32]), $p < .05$, although spontaneous decision making came close, $B = -0.42$, $SE = 0.22$, $OR = 0.66$ (95% CI [0.43, 1.00]), $p = .05$. Self-reported rational decision making, $B = 0.06$, $SE = 0.28$, $OR = 1.07$ (95% CI [0.62, 1.84]), $p = .82$, and intuitive decision making, $B = -0.06$, $SE = 0.20$, $OR = 0.94$ (95% CI [0.63, 1.41]), $p = .76$, were not significant.

In addition to that, age ($B = 0.10$, $SE = 0.02$, $OR = 1.11$ (95% CI [1.07, 1.15]), $p < .001$) and career aspirations ($B = 0.66$, $SE = 0.18$, $OR = 1.94$ (95% CI [1.37, 2.77]), $p < .001$), but not gender or education level, were statistically significant predictors of hierarchical status. McFadden pseudo-$R^2 = .17$. The Brant test showed that the parallel regression assumption was met, but three combinations of independent and dependent variables did not occur. Generalised Variance Inflation Factors were calculated using the *vif* command in the *car* package. The highest GVIF value was 1.49, indicating no significant multicollinearity.

Predicted probabilities of hierarchical status depending on the value of the decision confidence variable, while fixing the other decision making variables, age, and career

aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are presented in Figure 2.13.

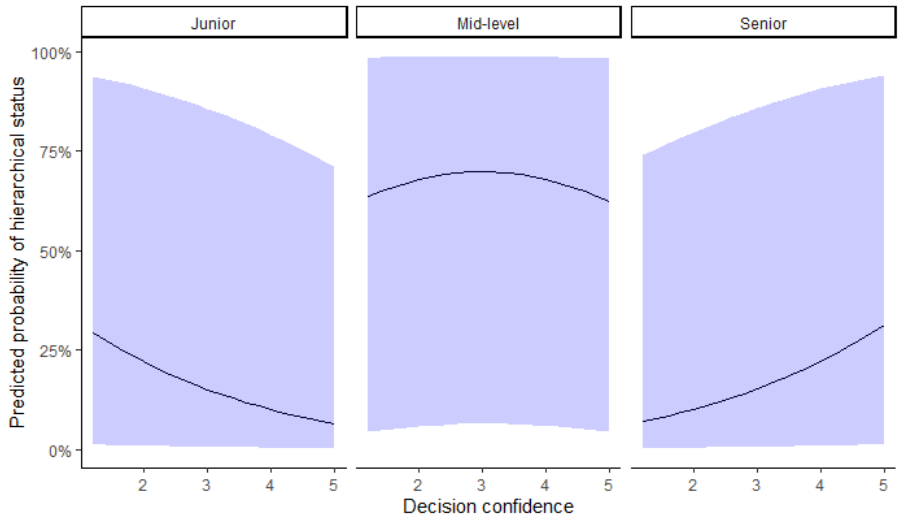

Figure 2.13. Decision confidence predicting hierarchical status while controlling for self-reported rational decision making, intuitive decision making, spontaneous decision making, age, gender, education level, and career aspirations.

2.2.2.4.2 Authority level as the outcome variable

Next, a proportional odds logistic regression model was fitted to predict authority level using all the decision making variables (self-reported rational decision making, decision confidence, intuitive decision making, and spontaneous decision making) as well as the control variables of age, gender, education level, and career aspirations. Eight observations were omitted due to missing data. Again, decision confidence was the only statistically significant decision making-related predictor, B = 0.66, SE = 0.17, OR = 1.93 (95% CI [1.39, 2.68]), p < .001. Self-reported rational decision making, B = 0.07, SE = 0.25, OR = 1.07 (95% CI [0.65, 1.74]), p = .79, intuitive decision making, B = -0.32, SE = 0.19, OR = 0.73 (95% CI [0.50, 1.05]), p = .10, and spontaneous decision making, B = 0.02, SE = 0.20, OR = 1.02 (95% CI [0.69, 1.50]), p = .92, were not significant.

Age (B = .04, SE = 0.01, OR = 1.04 (95% CI [1.01, 1.07]), p < .05) and career aspirations (B = 0.64, SE = 0.16, OR = 1.89 (95% CI [1.39, 2.60]), p < .001), but not gender or education level, were statistically significant predictors of authority level.

McFadden pseudo-R^2 = .09. The Brant test showed that the parallel regression assumption was met, although seven combinations of independent and dependent variables did not occur. Generalised Variance Inflation Factors were calculated using the *vif* command in the *car* package. The highest GVIF value was 1.49.

Predicted probabilities of authority level depending on the value of the decision confidence variable, while fixing the other decision making variables, age, and career aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are presented in Figure 2.14.

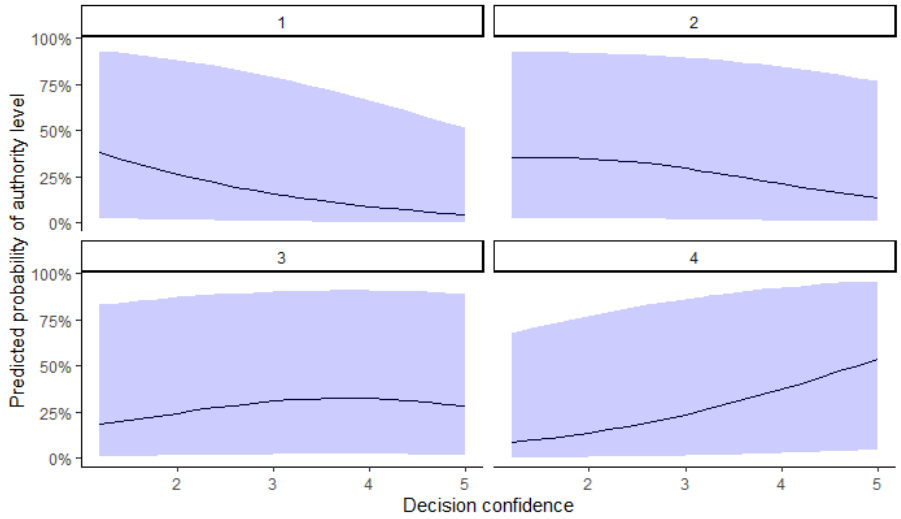

Figure 2.14. Decision confidence predicting hierarchical status while controlling for self-reported decision-making rationality, intuitive decision-making, spontaneous decision-making, age, gender, education level, and career aspirations.

To summarise, decision confidence was the single strongest decision making predictor of extrinsic career outcomes. It positively predicted both hierarchical status and authority level after controlling for the other decision making variables and for the demographic variables. Self-reported rational decision making, intuitive decision making, and spontaneous decision making were not significant when controlling for the other decision making variables and demographic variables.

2.2.2.5 All decision making variables predicting intrinsic career outcomes

Lastly, a linear regression model was run to predict career satisfaction using all the decision making variables (self-reported rational decision making, decision confidence, intuitive decision making, and spontaneous decision making) and the control variables of age, gender, education level, and career aspirations. Ten observations were omitted due to missing data. Decision confidence was the only significant decision-making-related predictor of career satisfaction, $B = 0.44$ (95% CI [0.28, 0.61]), $SE = 0.08$, $p < .001$. For each point increase in decision confidence, career satisfaction increased by 0.44 points. The model accounted for approximately 21% of the variance in career satisfaction, $R^2 = .21$, $adj.\ R^2 = .17$, $F(11, 223) = 5.43$, $p < .001$.

Self-reported rational decision making, $B = 0.01$ (95% CI [-0.23, 0.25]), $SE = 0.12$, $p = .94$, intuitive decision making, $B = -0.08$ (95% CI [-0.26, 0.11]), $SE = 0.09$, $p = .42$, and spontaneous decision making, $B = 0.07$ (95% CI [-0.12, 0.26]), $SE = 0.10$, $p = .48$ were not significant. The only other statistically significant predictor was education level as the model including it explained more variance compared to a model without it, $F(4) = 3.55$, $p < .01$.

Model predictions for career satisfaction depending on the value of the decision confidence variable, while fixing the other decision making variables, age, and career aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are shown in Figure 2.15.

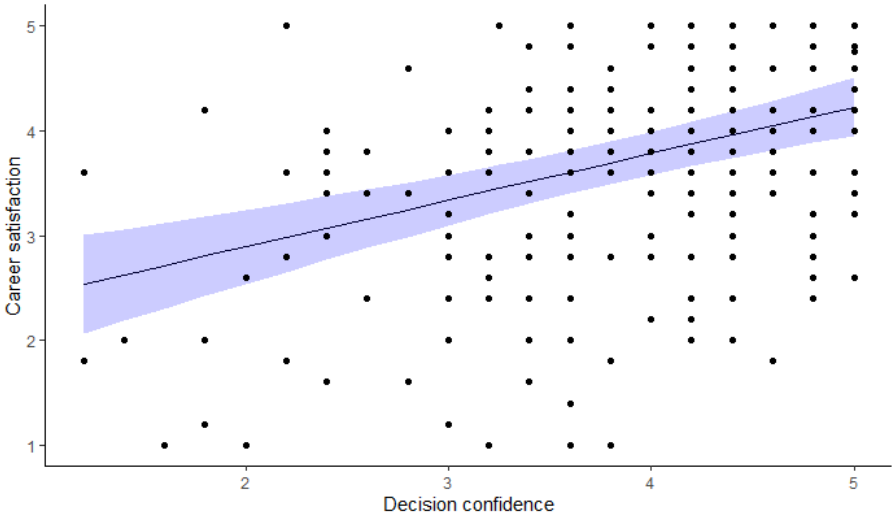

Figure 2.15. Decision confidence predicting career satisfaction while controlling for all other decision-making variables, age, gender, education level, and career aspirations.

The model residuals were abnormally distributed, as shown in the quantile-comparison plot presented in Figure 2.16. The Shapiro-Wilk normality test was conducted to check the distribution of residuals and confirmed that they deviated from normality (W = 0.96, p < .001). Constant residual variance was checked using the non-constant variance score test in the *car* package. No heteroscedasticity was detected ($\chi^2(1) = 2.75$, p = .10). Autocorrelated errors were checked using the Durbin-Watson test package, which showed that the residuals were independent (D-W = 2.03, p = .88). Linearity was assessed using partial-residual plots, which did not show serious deviations from linearity. The plots are available in Appendix III (Appendix Figure 2). The highest GVIF value was 1.52, indicating no significant multicollinearity. The Bonferroni Outlier Test did not detect any residual outliers (Bonferroni p = .98). The largest Cook's distance was 0.11.

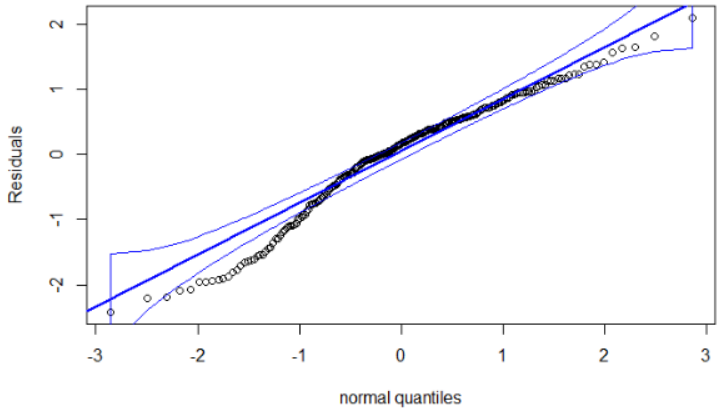

Figure 2.16. Career satisfaction and all decision making variables regression model diagnostics (with controls): Quantile-comparison plot.
Compares model residuals to theoretically expected quantiles.

2.2.3 Discussion

Overall, the study reported here demonstrated both self-reported rational and intuitive decision making to be poor indicators of career outcomes. To summarise, self-reported rational decision making did not predict any career outcomes measured in this study—extrinsic, operationalised as hierarchical status and authority level, or intrinsic, expressed as career satisfaction. Mixed results were found for intuitive and spontaneous decision making. While controlling for one another, intuitive decision making was positively associated with authority level, but not with hierarchical status. Conversely, spontaneous decision making was negatively associated with hierarchical status, but not with authority level. Decision confidence was the only decision-making variable that predicted all three career outcomes over and above rational, intuitive, and spontaneous decision making as well as age, gender, education level, and career aspirations.

The implications of self-reported rational decision making not being significantly associated with career outcomes will be discussed in more detail in the general discussion section at the end of this chapter, informed by the findings of both studies reported here. However, in terms of the results observed in this study, it is worth noting that capturing rational decision making through self-reports is difficult. The ways the

notion of rationality is understood in research and in everyday speech often differ (Arrow, 1986), so people may not realise when they break the rules of rationality. The vast research into deviations from normative rationality supports that notion (e.g., Arkes & Blumer, 1985; Stanovich, 2016; Tversky & Kahneman, 1974). Besides, when faced with questions about how much thought they put into making decisions, people may be tempted to give socially desirable responses that may not reflect their actual decision making. The left-skewed distribution of the self-reported rational decision making variable (M = 4.16, SD = 0.56, as shown in Table 2.1) indicates that most participants' responses to the questions about how rationally they approach decisions cluster towards the higher end of the scale. It will be attempted to mitigate this measurement issue in Study 2 reported below, where performance on decision-making tasks is also measured.

In measuring the intuitive approach to decision making, the distinction between expert judgment reliant on pattern recognition and the use of unhelpful cognitive shortcuts is a major problem, partly due to the ambiguity of the term "intuition". While in research it is usually understood as expert judgment supported by experience (Chase & Simon, 1973; Klein, 1993), in everyday speech, intuition often means unsubstantiated "gut feeling".

In the NDM school, successful intuitive decision making is usually assessed using interviews (Klein et al., 2010). Within the scope of this quantitative research, a self-reported measure of intuitive decision making was employed instead. The kind of intuition that is associated with good decision making only develops with experience. Therefore, age was used as a proxy since time is needed to accumulate experience. In predicting authority level, which was significantly associated with intuitive decision making, the interaction between intuitive decision making and age was significant.

Plotting the relationships between the three variables (Figure 2.11) showed that reliance on intuitive decision making made little difference at the lower authority levels.

However, at the highest level, the oldest age group was the one that benefited from a highly intuitive approach to decision making the least, with the lowest scores on intuitive decision making associated with the highest probability of occupying the highest authority level for that age group. The reverse was observed for the youngest group. That was an unexpected finding, since efficient intuitive decision making was expected to be dependent on experience, which the youngest group had had the least time to accumulate.

In a sample collected from a variety of industries, which means that participants' responsibilities at work, as well as expectations of them, differ substantially, it is difficult to speculate about what might have led to such a result. It is possible that young people who have already achieved significant authority in the workplace possess qualities that make them stand out from others, such as efficient information gathering and processing skills which allow them to absorb a lot of information relevant to their occupation and speed up their decision-making processes. As a result, the intuitive decisions that young people who have reached positions of high authority at work make may be better informed, giving them an advantage over others. It is also possible that in the subsample of participants that occupied the highest authority level, it so happened that the younger people were in jobs conducive to efficient intuitive judgments, whereas the older people were not.

However, it is important to note that the confidence intervals for the different age groups were wide and overlapping, so definitive conclusions could not be drawn. Besides, age is not a perfect proxy for experience. In research focused on specific industries and with more homogenous samples than here, experience may be measured more directly by asking participants how much time they have spent in a specific role or how many hours of experience of performing a specific task, in training and/or practice, they have.

Not all types of rapid decision making are beneficial. It has previously been discussed in this chapter that people are prone to many unhelpful heuristics and biases that often result in a poor quality of decisions (Tversky & Kahneman, 1974). Because of the vagueness of the definition of intuition in everyday speech, which to many people may simply mean a “gut instinct”, making a distinction between impulsive, or spontaneous, decisions based on heuristics and biases and expert judgments supported by a large arsenal of patterns is difficult.

It becomes even more problematic when it comes to asking people to self-report their approach to decision making. That is likely to be part of the reason for the less-than-perfect discriminant validity of the existing widely-used intuitive and spontaneous decision making scales, which were also used in this research (Scott & Bruce, 1995), as previous studies have shown a substantial correlation between the two (Dewberry et al., 2013; Scott & Bruce, 1995; Spicer & Sadler-Smith, 2005). It presents a measurement problem since it is difficult to established whether a rapid judgment was based on pattern recognition or on unhelpful biases.

Nevertheless, the notion of spontaneity implies rapid, non-analytical, impulsive decisions much more strongly than intuition. The fact that spontaneous decision making was more strongly negatively correlated with rational decision making than intuitive decision making was (as shown in Table 2.1) suggests that participants were at least to some extent able to make a distinction between intuitive and impulsive, spontaneous decision making. Hence, where intuitive decision making was a significant predictor of career outcomes, that relationship was positive, while in the case of spontaneous decision making, it was negative, as expected. Overall, this study provided some initial evidence for the relationship between intuitive and spontaneous decision making on the one hand and career outcomes on the other in a general sample of full-time workers.

This study has a number of other limitations. Due to the COVID-19 pandemic, data collection was restricted to online avenues. The original plan to recruit participants working in the same industry at trade fairs had to be abolished and inclusion criteria had to be expanded to include people working in different industries to achieve a larger sample size. Online recruitment also meant that the majority of the sample in this study were social media users, so it may not be representative of the general population of the United Kingdom. In addition to that, women, white people, and university degree holders are overrepresented here compared to the UK working age population averages (Office for National Statistics, 2012, 2018, 2020), limiting the generalisability of the results.

In the next study, the relationships between rational decision making and career outcomes will be examined more closely, employing both self-reports and decision-making task performance measures. In addition, the measure of decision confidence will be used. The findings of both Study 1 and Study 2 in relation to rational decision making and decision confidence as predictors of career outcomes will be discussed in the general discussion section at the end of this chapter.

2.3 Study 2

2.3.1 Method

This observational study using cross-sectional data expanded on the findings of Study 1 in relation to rational decision making and career success. In addition to a self-reported measure, rational decision making was assessed through task performance. Hypotheses 2.1, 2.2a, 2.2b, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, and 2.9 were tested. It is pre-registered at https://osf.io/c6kdh. Hypotheses 2.5 and 2.6 were exploratory and not pre-registered.

2.3.1.1 Participants

The participants were 138 people in full-time employment in the United Kingdom. They were recruited via invitations on social media (such as Twitter, Facebook, and LinkedIn) and an advertisement on a student forum at Birkbeck, University of London. Data from the 14 participants who failed to complete more than two out of the five decision-making tasks within the same scale was not used. An additional 10 participants indicated they owned the business for which they worked and were excluded from the analysis due to the difficulty in comparing employment and self-employment career outcomes.

The mean age of the 114 participants in the final sample was 39.99 years (SD = 10.88). The gender makeup of the sample is as follows: 78.07% female, 20.18% male, and 0.88% other. In terms of ethnicity, 90.35% of participants were white, 2.63% were from a mixed/multiple ethnic background, 1.75% were Asian, 0.88% were Black, 0.88% were Arab, and 2.63% indicated their ethnicity as “Other”. The highest completed level of education, or equivalent, was as follows: 8.77% GCSE grades A*-C, 16.67% A-level, 37.72% Bachelor’s degree, 29.82% Master’s degree, 5.26% Doctoral degree. In terms of hierarchical status, 18.42% of the participants indicated they were in junior positions, 52.63% occupied mid-level positions, 28.95% were in senior positions. Participants came from different industries, the most common being Education (13.16%), Healthcare (11.40%), Business and Finance (9.65%), Public Sector (7.02%), Retail and Hospitality (6.14%), and Charity sector (6.14%). On average, they had 19.03 years of work experience (SD = 11.91). Five (4.39%) participants reported that at the time of completion of this survey they were on paid furlough.

2.3.1.2 Procedure

The questionnaire was administered via the online survey platform Qualtrics. After reading the information sheet and completing the consent form (available in Appendix I), but before starting the survey, the participants responded to the validation statement: “I work full-time in the UK or have recently been furloughed from a full-time job”. Only the participants who selected “yes” were progressed onto the next screen to answer the survey questions.

The survey questions were viewed in blocks by topic: self-reported decision-making questions, career-related questions, demographic questions, framing effect questions (positive frame), sunk cost questions (investment scenarios), conjunction fallacy questions, framing effect questions (negative frame), sunk cost questions (non-investment scenarios). Questions within scales were randomised for each participant to reduce question order effects (Lasorsa, 2003). Only data from the participants who fully completed the survey was used, thus allowing them to withdraw at any point.

The median completion time was 22.03 minutes. Upon completion, participants were offered to enter a draw to win one of two £20 Amazon vouchers. Data collection was carried out between January and June 2021.

2.3.1.3 Materials

As in Study 1, participants were asked to complete the *Rational* subscale of the *General Decision-Making Style (GDMS)* questionnaire (Scott & Bruce, 1995), and the *Confident* subscale of the *Decision Style Questionnaire* (Leykin & DeRubeis, 2010).

In addition, decision-making rationality was measured as performance on decision-making tasks. A battery of such tasks, adapted from previous research, was constructed for this study. It included three subscales: *Framing Effect, Sunk Cost*

Fallacy, and *Conjunction Fallacy*. The tasks were selected based on their prior use in research, with pertinence to professional, rather than personal, decision making prioritised where possible.

Resistance to the framing effect was measured using five tasks adapted from Fischhoff (1983), Bazerman (1984), Fagley and Kruger (1986) via Fagley and Miller (1990), Roszkowski and Snelbecker (1990), and Jou, Shanteau, and Harris (1996). All participants were presented with both positively and negatively framed scenarios, separated by other tasks, and asked to indicate the strength of their preference for one of the two options on a 7-point scale. The absolute difference in the scores between the positively and negatively framed versions of the same task was calculated. The scores were then reverse-coded so that higher scores indicated higher resistance to the framing effect. For example, if a participant selected a 5 in the positively framed version of the task and a 6 in the negatively framed version of the same task, the absolute difference was 1. It was then reverse-coded so that the participant's score on the resistance to framing effect task was 5 on a scale ranging from 0 to 6. A sample task, adapted from Bazerman (1984), is as follows:

> A large car manufacturer has recently been hit with a number of economic difficulties and it appears as if three plants need to be closed and 6,000 employees laid off. The vice-president of production has been exploring alternative ways to avoid this crisis and has developed two plans.
>
> *Positive frame:*
>
> *Plan A:* This plan will save 1 of the 3 plants and 2,000 jobs.
>
> *Plan B:* This plan has a 1/3 probability of saving all 3 plants and all 6,000 jobs, but has a 2/3 probability of saving no plants and no jobs.
>
> Which plan would you select?
>
> *Negative frame:*
>
> *Plan A:* This plan will result in the loss of 2 of the 3 plants and 4,000 jobs.
>
> *Plan B:* This plan has a 2/3 probability of resulting in the loss of all 3 plants and all 6,000 jobs, but has a 1/3 probability of losing no plants and no jobs.

Which plan would you select?

Resistance to the sunk cost fallacy was measured by five tasks borrowed from Frisch (1993), Arkes and Blumer (1985), and Tan and Yates (1995). All participants were presented with both investment and non-investment versions of each task, separated by other tasks, and asked to indicate on a 7-point scale whether they would engage (or continue engaging) in various activities. In the investment scenarios, participants were asked to imagine that they have already made an investment in a certain activity or enterprise. In the non-investment scenarios, that condition was absent. As with the framing effect tasks, the absolute difference in the scores in the two versions of the same task was calculated and reverse-coded, with higher scores indicating higher resistance to the sunk cost fallacy. The following sample task was adapted form Arkes and Blumer (1985):

Investment scenario:

As the president of an airline company, you have invested 10 million dollars of the company's money into a research project. The purpose was to build a plane that would not be detected by conventional radar, in other words, a radar-blank plane. When the project is 90% completed, another firm begins marketing a plane that cannot be detected by radar. Also, it is apparent that their plane is much faster and far more economical than the plane your company is building.

How likely are you to invest the last 10% of the research funds to finish your radar-blank plane?

Non-investment scenario:

As president of an airline company, you have received a suggestion from one of your employees. The suggestion is to use the last 1 million dollars of your research funds to develop a plane that would not be detected by conventional radar, in other words, a radar-blank plane. However, another firm has just begun marketing a plane that cannot be detected by radar. Also, it is apparent that their plane is much faster and far more economical than the plane your company could build.

How likely are you to invest the last million dollars of your research funds to build the radar-blank plane proposed by your employee?

To measure the conjunction fallacy, participants were presented with descriptions of hypothetical people or events and asked to rank a number of statements about the

subject from the most likely to the least likely. If conjunctions (A&B) were ranked as less probable than their constituents (A and B), participants received 1 point, indicating resistance to the conjunction fallacy. If conjunctions were ranked as more probable than their constituents, participants received 0 points per task. The tasks were adapted from Tversky and Kahneman (1983). A sample task is included below:

> Consider a regular six-sided die with four green faces and two red faces. The die will be rolled 20 times and the sequence of greens (G) and reds (R) will be recorded. Imagine that you are asked to select one sequence, from a set of three, to win a prize if the sequence you chose appears on successive rolls of the die. Please rank the following sequences in the order of preference by assigning a number to each (1 – most likely to bet on, 3 – least likely to bet on).
>
> A. RGRRR
> B. GRGRRR
> C. GRRRRR

The full list of the framing effect, sunk cost fallacy, and conjunction fallacy tasks is available in Appendix II.

Career outcomes were measured in the same way as in Study 1. Information about career aspirations was not collected in this study due to the length of the questionnaire as it would result in additional demand on participants' time and therefore hinder recruitment. The same demographic information as in Study 1 was collected. Composite scores were indicates for each scale (or, where relevant, subscale).

2.3.2 Results

Missing data constituted 0.28% in total. Education and one of the conjunction fallacy task variables each had 1.75% of missing data. All other variables had less than 1% of missing responses.

Descriptive statistics, correlations between the variables, and internal consistency of the scales are presented in Table 2.2. Apart from decision confidence, which was associated with hierarchical status and authority, no other variables related to decision

making were statistically significantly associated with career outcomes variables. Moreover, self-reported rational decision-making variable had non-significant relationships with all three decision-making task variables with effect sizes close to zero. Hypotheses 2.2a and 2.2b were therefore not supported.

As in Study 1, Hypothesis 2.7 found support as there was a significant association between self-reported rational decision making and decision confidence. Resistance to the framing effect was significantly positively associated with both resistance to the sunk cost fallacy and resistance to the conjunction fallacy, however, the relationship between resistance to the sunk cost fallacy and resistance to the conjunction fallacy was not significant.

It is important to note that internal consistency of the decision-making task variables was poor, indicating that responses to one decision-making task were not good predictors of how participants responded to other tasks of the same kind. The same issue was encountered in constructing rational decision-making competence scales in other research (Finucane & Gullion, 2010; Parker & Fischhoff, 2005).

Table 2.2

Descriptive Statistics and Correlations for Study 2 Variables

Variable	M	SD	1	2	3	4	5	6	7	8
1. Rational DM	4.13	0.54	(.65)							
2. Confident DM	3.98	0.73	.23*	(.82)						
3. Framing effect	4.87	0.89	-.03	0	(.58)					
4. Sunk cost fallacy	4.92	0.80	.04	.11	.24*	(.42)				
5. Conjunction fallacy	0.29	0.26	-.03	.09	.25**	.10	(.52)			
6. Hierarchical status	—	—	.01	.24*	-.10	.03	-.07	—		
7. Authority	—	—	.12	.28**	.05	.05	.09	.58***	—	
8. Career satisfaction	3.76	0.92	.06	.15	-.04	-.12	-.06	.12	.23*	(.89)

DM = decision making. *p < .05. **p < .01. ***p < .001. Cronbach's alphas are listed in the diagonal.

In the following sections, the results of a series of regression models will be reported. Where the control variables were included, only "male" and "female" gender categories were considered since the "other" category contained only one observation. It was coded as missing data. Unlike specified in the pre-registration document, years of work experience were not used as a control variable due to the high correlation with age, $r(113) = .92$, $p < .001$. Five observations were omitted from all the models containing control variables and an additional observation was omitted from the models containing decision-making task variables due to missing data.

2.3.2.1 Decision-making rationality and confidence predicting extrinsic career outcomes

2.3.2.1.1 Hierarchical status as the outcome variable

First, a proportional odds logistic regression model was run in *R* version 4.1.2 using the *MASS* package with self-reported decision-making rationality as a predictor and hierarchical status as the outcome variable. At that point, no control variables or other decision making variables were entered. Self-reported rational decision making did not predict hierarchical status, $B = 0.06$, $SE = 0.35$, $OR = 1.06$ (95% CI [0.53, 2.12]), p =

.87. The Brant test of parallel regression showed that the assumption was met. McFadden pseudo-R^2 was 0 in this model.

At the next stage, age, gender, and education level were added as control variables to the model described above. Self-reported rational decision making was still not a significant predictor of hierarchical status, B = 0.55, SE = 0.40, OR = 1.74 (95% CI [0.80, 3.87]), p = .16. Age (B = 0.09, SE = 0.02, OR = 1.09 (95% CI [1.05, 1.14]), p < .001) was statistically significant. In addition, the model containing the education level variable explained statistically significantly more variance than the model with education level omitted, likelihood ratio $\chi^2(4) = 14.97$, $p < .01$. McFadden pseudo-R^2 rose to .18. The Brant test showed that the parallel regression assumption was met, with a caveat that 6 combinations of independent and dependent variables did not occur. Generalised Variance Inflation Factors were calculated using the *vif* command in the *car* package. The highest GVIF value was 1.14, indicating no significant multicollinearity.

Next, the decision-making task variables (resistance to the framing effect, sunk cost fallacy, and conjunction fallacy) were entered. Self-reported rational decision making was not a statistically significant predictor of hierarchical status, B = 0.54, SE = 0.40, OR = 1.72 (95% CI [0.79, 3.82]), p = .18, and neither was resistance to the framing effect, B = -0.46, SE = 0.27, OR = 0.63 (95% CI [0.37, 1.06]), p = .09, to the sunk cost fallacy, B = 0.05, SE = 0.26, OR = 1.05 (95% CI [0.63, 1.75]), p = .85, or to the conjunction fallacy, B = 0.50, SE = 0.82, OR = 1.65 (95% CI [0.33, 8.45]), p = .54. Age and education level were still significant. In this model, McFadden pseudo-R^2 = .19. The parallel regression assumption held, but 6 combinations of variables did not occur. The highest GVIF = 1.35.

Predicted probabilities of hierarchical status depending on the value of the self-reported decision-making rationality variable, while fixing decision-making task variables and

age at the means, gender at female, and education level at Bachelor's degree or equivalent, are shown in Figure 2.17.

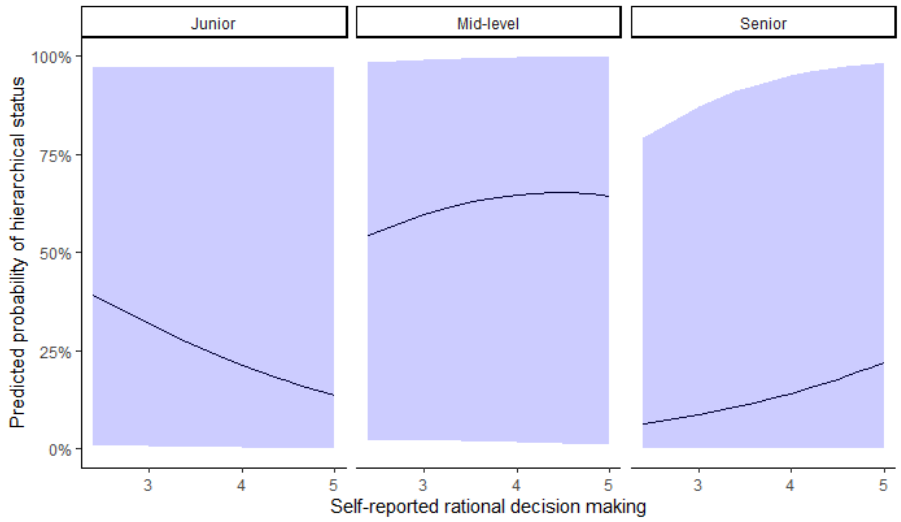

Figure 2.17. Self-reported decision-making rationality predicting hierarchical status while controlling for decision-making task variables and age, gender, and education level.

Finally, decision confidence was added to the regression model, while keeping self-reported and task performance rational decision making, age, gender, and education level variables. Decision confidence was the only statistically significant predictor out of all the decision making variables, $B = 0.70$, $SE = 0.30$, $OR = 2.01$ (95% CI [1.13, 3.66]), $p < .05$. Age and education level were still significant. McFadden pseudo-$R^2 = 0.21$, an increase from the previous model. As previously, the Brant test showed that the parallel regression assumption was met, with 6 combinations of variables not occurring. The GVIF values ranged from 1.09 to 1.43.

Predicted probabilities of hierarchical status depending on the value of the decision confidence variable, while fixing self-reported decision-making rationality, decision-making task variables, and age at the means, gender at female, and education level at Bachelor's degree or equivalent, are shown in Figure 2.19.

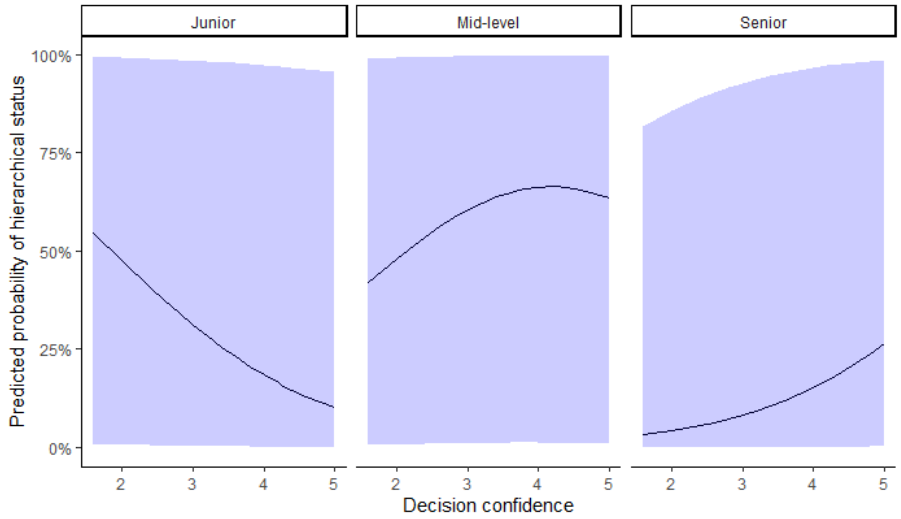

Figure 2.18. Decision confidence predicting hierarchical status while controlling for self-reported decision-making rationality, decision-making task variables, age, gender, and education level.

2.3.2.1.2 Authority level as the outcome variable

To test the relationship between self-reported rational decision making and authority level, a proportional odds logistic regression model was fitted. No control variables were entered at first. Self-reported rational decision making did not statistically significantly predict authority level, B = 0.42, SE = 0.34, OR = 1.53 (95% CI [0.79, 2.99]), p = .21. McFadden pseudo-R^2 = 0. The Brant test of parallel regression showed that the assumption was met.

Then, age, gender, and education level were added as control variables to the model. In this model, self-reported decision-making rationality was a significant predictor of authority level, B = 0.80, SE = 0.36, OR = 2.22 (95% CI [1.10, 4.57]), p < .05. Age was also a significant predictor (B = 0.04, SE = 0.02, OR = 1.04 (95% CI [1.01, 1.08]), p < .05). The education level variable was significant between some categories, but the model including education level did not explain statistically significantly more variance than a model without it (likelihood ratio $\chi^2(4) = 8.90$, p = .06). McFadden pseudo-R^2 = .06. The Brant test showed that the parallel regression assumption was met, although 9 combinations of independent and dependent variables did not occur. The highest GVIF value was 1.22, indicating no significant multicollinearity.

After that, the decision-making task variables (resistance to the framing effect, resistance to the sunk cost fallacy, and resistance to the conjunction fallacy) were added. Self-reported decision-making rationality was still a significant predictor, *B* = 0.84, *SE* = 0.37, *OR* = 2.32 (95% CI [1.13, 4.89]), $p < .05$. Resistance to the framing effect, *B* = -0.01, *SE* = 0.24, *OR* = 0.99 (95% CI [0.62, 1.57]), *p* = .96, resistance to the sunk cost fallacy, *B* = 0.16, *SE* = 0.24, *OR* = 1.17 (95% CI [0.74, 1.87]), *p* = .51, and resistance to the conjunction fallacy, *B* = 1.07, *SE* = 0.77, *OR* = 2.91 (95% CI [0.66, 13.51]), *p* = .16, were not significant predictors. Age was still a significant predictor. McFadden pseudo-R^2 = .07. The parallel regression assumption held, but 9 combinations of variables did not occur. The highest GVIF = 1.45.

Predicted probabilities of the authority level depending on the value of the self-reported rational decision making variable, while fixing decision-making task variables and age at the means, gender at female, and education level at Bachelor's degree or equivalent, are shown in Figure 2.19.

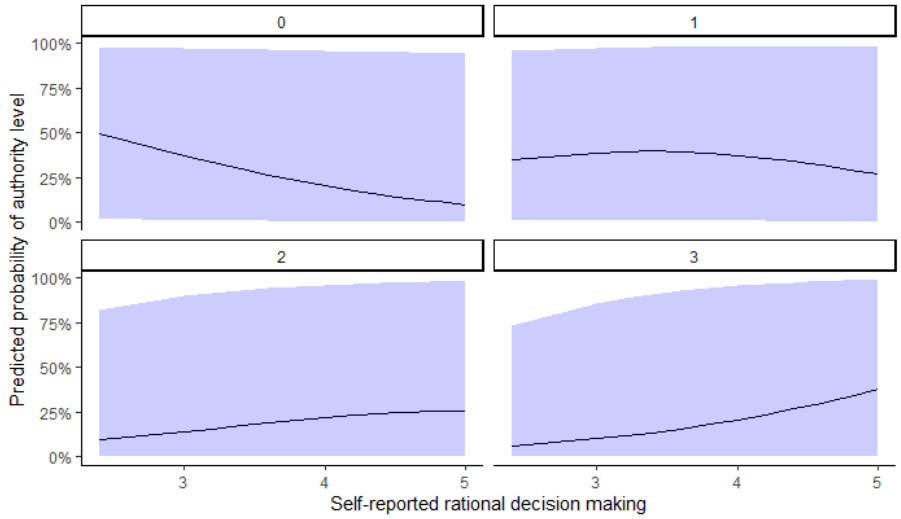

Figure 2.19. Self-reported decision-making rationality predicting authority level while controlling for decision-making task variables and age, gender, and education level.

As the last step, decision confidence was added to the model, while keeping self-reported and task performance rational decision making, age, gender, and education

level variables. Decision confidence was now the only statistically significant predictor out of all the decision making variables, *B* = 0.73, *SE* = 0.29, *OR* = 2.07 (95% CI [1.19, 3.69]), $p < .05$. Predictive ability of self-reported decision-making rationality was reduced and became non-significant, *B* = 0.64, *SE* = 0.38, *OR* = 1.90 (95% CI [0.91, 4.04]), $p = .09$. Both age and education level variables were still significant. McFadden pseudo-R^2 = .10, an increase from the model not containing decision confidence. The Brant test showed that the parallel regression assumption was met, with 9 combinations of variables not occurring. The GVIF values ranged from 1.12 to 1.51.

Predicted probabilities of authority level depending on the value of the decision confidence variable, while fixing self-reported decision-making rationality, decision-making task variables, and age at the means, gender at female, and education level at Bachelor's degree or equivalent, are presented in Figure 2.20.

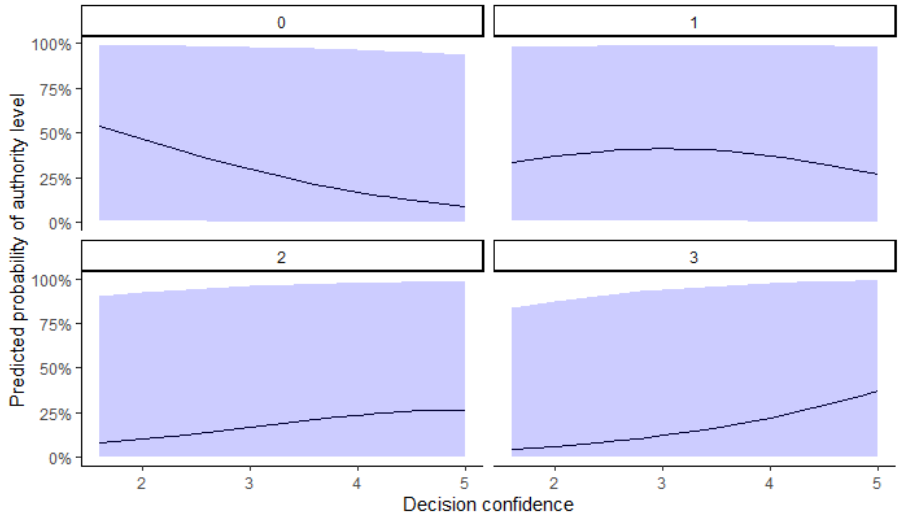

Figure 2.20. Decision confidence predicting authority level while controlling for self-reported decision-making rationality, decision-making task variables, age, gender, and education level.

To summarise, self-reported rational decision making was a statistically significant predictor of authority level, but not hierarchical status, and only after introducing the control variables. It ceased being significant when decision confidence was entered in the model. None of the measures of decision-making task performance significantly predicted career outcomes. Decision confidence was a significant predictor of both

hierarchical status and authority level over and above all the decision-making rationality variables.

Therefore, Hypothesis 2.1 found only partial and weak support, Hypotheses 2.3 and 2.4 were not supported, and Hypothesis 2.8 was supported. As in Study 1, Hypothesis 2.9 was not tested because a mediation model could not be built due to the lack of a significant relationship between self-reported decision-making rationality and extrinsic career outcomes (in the case of authority level, without controlling for the demographic variables).

2.3.2.2 Self-reported decision-making rationality predicting intrinsic career outcomes

To test the relationship between self-reported decision-making rationality and career satisfaction, a linear regression model was fitted, first without entering the control variables. Self-reported decision-making rationality was not a significant predictor of career satisfaction, B = 0.11 (95% CI [-0.22, 0.43]), SE = 0.16, p = .52. The model did not account for a significant amount of the variance in career satisfaction, R^2 = 0, *adj.* R^2 = 0, $F(1, 112) = 0.43$, p = .51.

Next, the control variables of age, gender, and education level, were entered into the model. The updated model did not account for a statistically significant amount of variance in career satisfaction, R^2 = .07, *adj.* R^2 = 0, $F(7, 101) = 1.05$, p = .40. None of the predictors was statistically significant while controlling for the others, including self-reported decision-making rationality, B = 0.15 (95% CI [-0.19, 0.50]), SE = 0.17, p = .38.

At the next step, the decision-making task variables were entered into the model. The updated model still did not account for a significant amount of variance in career satisfaction, R^2 = .10, *adj.* R^2 = 0, $F(10, 97) = 1.02$, p = .43. Neither self-reported

rational decision making, *B* = 0.16 (95% CI [-0.19, 0.51]), *SE* = 0.18, *p* = .37, nor resistance to the framing effect, *B* = -0.07 (95% CI [-0.31, 0.16]), *SE* = 0.12, *p* = .52, to the sunk cost fallacy, *B* = -0.14 (95% CI [-0.38, 0.10]), *SE* = 0.12, *p* = .24, or to conjunction fallacy, *B* = -0.19 (95% CI [-0.95, 0.58]), *SE* = 0.39, *p* = .63, was a significant predictor of career satisfaction. The education level variable was significant between some categories, but dropping it did not significantly decrease model fit, *F*(4) = 1.70, *p* = .16.

Predicted probabilities of career satisfaction depending on the value of the self-reported decision-making rationality variable, while fixing decision-making task variables and age at the means, gender at female, and education level at Bachelor's degree or equivalent, are presented in Figure 2.21.

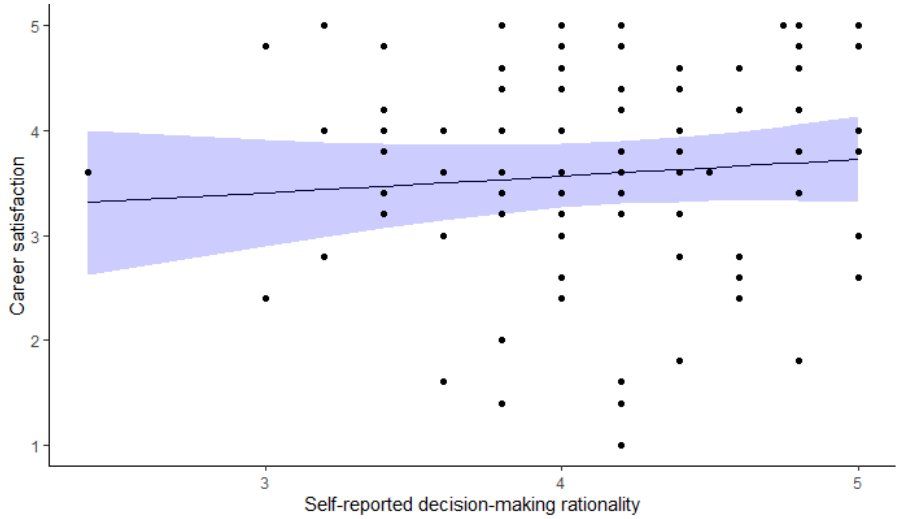

Figure 2.21. Self-reported decision-making rationality predicting career satisfaction while controlling for decision-making task variables and age, gender, and education level.

Lastly, decision confidence was added to the model since in Study 1 it was a significant predictor of career satisfaction over and above all the other measures of decision making. None of the predictors, including decision confidence, *B* = 0.20 (95% CI [-0.06, 0.46]), *SE* = 0.13, *p* = .13, was significant and the model did not account for a

significant amount of variance in career satisfaction, R^2 = .12, *adj.* R^2 = .01, $F(11, 96)$ = 1.15, p = .34. Predicted probabilities of career satisfaction depending on the value of the decision confidence variable, while fixing self-reported decision-making rationality, decision-making task variables, and age at the means, gender at female, and education level at Bachelor's degree or equivalent, are presented in Figure 2.22.

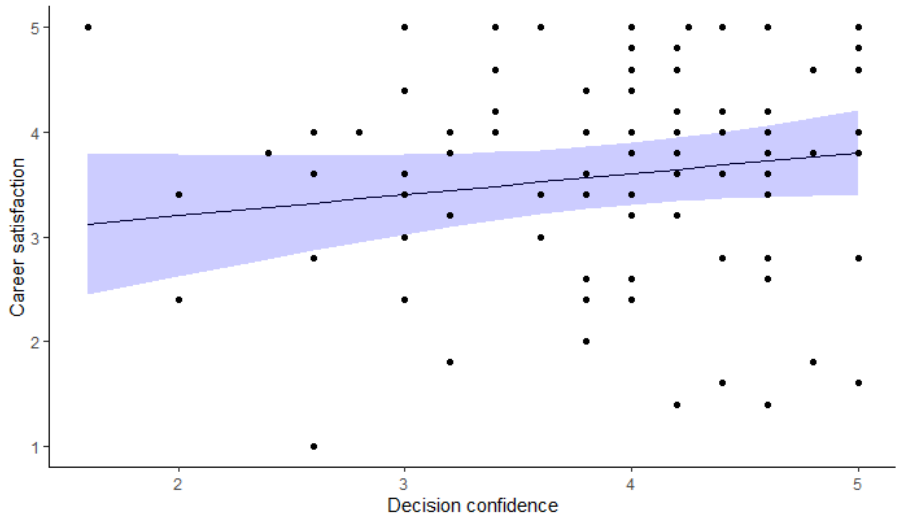

Figure 2.22. Decision confidence predicting career satisfaction while controlling for self-reported decision-making rationality, decision-making task variables, age, gender, and education level.

The distribution of the residuals was skewed, as shown in the quantile-comparison plot presented in Figure 2.23. The Shapiro-Wilk normality test confirmed that they deviated from normality (W = 0.95, p < .001). Constant residual variance was checked using the non-constant variance score test. It did not detect heteroscedasticity ($\chi^2(1)$ = 1.18, p = .28). Autocorrelated errors were checked using the Durbin-Watson test, which showed that the residuals were independent (*D-W* = 2.23, p = .26). Linearity was assessed using partial-residual plots, which did not show serious deviations from linearity. The plots are available in Appendix III (Appendix Figure 3). The highest GVIF value was 1.42, indicating no significant multicollinearity. The Bonferroni Outlier Test did not detect any residual outliers (Bonferroni p = .73). The largest Cook's distance was 0.11.

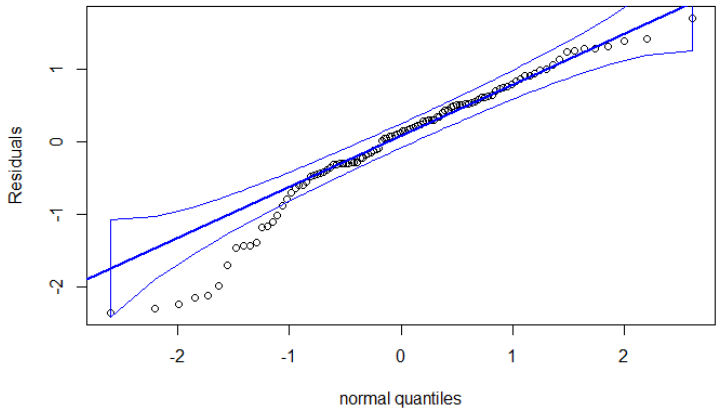

Figure 2.23. Self-reported decision-making rationality, task performance, decision confidence, and career satisfaction regression model diagnostics (with control variables): Quantile-comparison plot.
Compares the residuals to theoretically expected quantiles.

In summary, none of the measures in this study statistically significantly predicted career satisfaction. Therefore, Hypotheses 2.5 and 2.6 were not confirmed.

2.3.1 Discussion

To summarise the findings of this study, rational decision making, both measured as self-reports and as task performance, was a poor predictor of career outcomes. There was a significant positive association between self-reported rational decision making and authority level, but not hierarchical status, and only when the control variables were added to the model (but not when controlling for decision confidence as well). Performance on decision-making tasks did not significantly predict career outcomes at all. Career satisfaction was not predicted by either type of decision-making rationality measures.

However, like in Study 1, decision confidence was positively associated with both hierarchical status and authority level, even after controlling for self-reported and task performance rational decision making measures, age, gender, and education level. Unlike in Study 1, it did not predict career satisfaction in this smaller sample.

The reasoning behind including task performance measures to this study in addition to the self-reported measure of decision-making rationality was that, as discussed previously in this chapter, collecting rationality self-reports is fraught with difficulties. People may have a different understanding of what rationality is to how the term is usually understood in research and may overestimate their rationality or give socially desirable responses. Like in Study 1, the distribution of the self-reported rational decision making variable was left skewed (M = 4.13, SD = 0.54), indicating that the majority of participants reported making decisions rationally.

The types of task performance measures were selected based on their relevance to the kinds of decisions that people are likely to face at work. For example, the framing effect can be used as a persuasion technique and it is important to be able to counteract its effects. Resistance to the sunk costs fallacy is important in deciding when to stop pursuing a project or investment that is unlikely to pay off, while the time, money, and effort spent on it can used more efficiently. Resistance to the conjunction fallacy helps to disregard irrelevant information that is being used to present a plausible story or make a person or event look more representative of a kind. There are more types of decision-making tasks that could be used, such as those measuring overconfidence and hindsight bias, among others, but the limits on the length of the questionnaire did not allow for the their incorporation.

Internal consistency of decision-making task measures is a recurring problem in research (Finucane & Gullion, 2010; Parker & Fischhoff, 2005), which was also observed here. The low internal consistency of the scales measuring decision-making task performance suggests that the way people respond to one task does not necessarily generalise to other similar tasks. That may in part be because people have different levels of knowledge in different areas. While they may be able to adjust their responses in areas where they have expertise, they may be more easily influenced by such methods as changing the framing of the problem in contexts where they do not have sufficient knowledge. In terms of sunk costs, whether a decision is made in the

personal or professional domain and whether it affects only the decision maker or other people as well is likely to make a difference. In more complex conjunction fallacy tasks, the image of better representativeness of a kind that conjunctions offer may be more tempting and the irrelevant information more difficult to untangle and disregard.

Therefore, future research examining the relationship between decision-making rationality and career outcomes may focus on a specific industry and construct decision-making vignettes that reflect the kinds of tasks participants are likely to be engaged in at work to measure rational decision making performance. For example, in the area of medical decisions, many such vignettes already exists (e.g., Fagley & Miller, 1987; McNeil et al., 1982; Tversky & Kahneman, 1983). While participants' responses to such vignettes may not generalise to how they approach decisions in other domains, such vignettes may be more predictive of career outcomes in their specific industry than tasks covering a broader range of topics.

The sample size of this study was limited since it targeted a population of adults working full-time, who already have many demands on their time. Since data collection happened during the COVID-19 pandemic, it had to be restricted to online avenues, which meant that the sample was composed mostly of social media users. The same limitations on the generalisability of the findings due to the sample composition as in Study 1 apply here, as a consequence of logistic and financial constraints of recruitment.

The findings of both Study 1 and Study 2 concerning rational decision making and decision confidence as predictors of career outcomes will be discussed in the general discussion section below.

2.4 General discussion

The main and most consistent finding in this chapter is that decision confidence appears to predict career outcomes better than both rationality and intuition, which was an unexpected discovery. Indeed, neither rational nor intuitive decision making consistently predicted any career outcomes.

To summarise, in Study 1, intuitive decision making was significantly positively associated with authority level, but not with hierarchical status, while self-reported rational decision making was not associated with any career outcomes variables. In Study 2, self-reported rational decision making was significantly positively associated with authority level, but not hierarchical status, and only after introducing the control variables and before adding decision confidence to the model. Performance on decision-making tasks did not significantly predict career outcomes.

At the same time, decision confidence was a consistent positive predictor of both hierarchical status and authority level in both studies. Indeed, after controlling for decision confidence, none of the other decision-making related variables were significant. Decision confidence was also positively associated with career satisfaction in Study 1, but not in the smaller Study 2.

While projecting confidence in one's decisions was expected to confer career advantages, the lack of association between rational decision making and career outcomes is surprising. The importance of efficient decision making at work seems to be obvious. The abilities to source important information and understand it sufficiently well to act upon it, to think through the possible outcomes of different courses of action and estimate how likely they are to happen, and to choose the option that has the best chance of fulfilling the desired goal, should be at the core of successful decision making, in personal and professional life alike.

On the other hand, overreliance on simple heuristics and the tendency to fall for unhelpful (or potentially harmful) biases not only increases the chances of making a suboptimal decision, but also leaves one defenceless against other people's persuasion techniques. In the long run, one would expect that such suboptimal decisions would accumulate and negatively affect performance, thus resulting in poorer career outcomes.

However, in the two studies reported in this chapter, no convincing evidence was found that decision-making rationality, at least operationalised the way it was, predicted career outcomes. Self-reported rational decision making was positively associated with authority level, but only in the smaller-sample Study 2 and only after the control variables were introduced.

The evidence for the importance of intuitive decision making is just as inconclusive: while it was significantly associated with authority level, no such relationship was detected between intuitive decision making and hierarchical status. One the one hand, the way authority was measured in this study was more directly related to the scope of responsibilities in the workplace than hierarchical status was, so this may suggest that the ability to make intuitive decisions is important in positions that involve more responsibility, which does not necessarily depend on one's position in the organisational hierarchy.

On the other hand, the interaction with age did not work as expected: while at the lower levels of responsibility not much difference for the different age groups was observed, at the highest level, high reliance on intuition appeared to be the most beneficial for the youngest age group and the least beneficial for the oldest age group. This is counter to the expectation that the more time employees have had to acquire experience, the more efficient their intuitive decision making becomes. However, the confidence intervals for the different age groups were wide and overlapping, so no definitive conclusions could be made.

More research is needed to investigate the relationship between intuitive decision making and career outcomes, potentially employing a different method of capturing instances of using pattern-recognition-based expert intuition versus the reliance on heuristics and biases for rapid decisions. Measuring how much one uses their intuition without relying on self-reports is challenging, while self-reports are fraught with problems, such as misunderstanding the difference between expert and non-expert intuition and the inability to recognise it when intuitive decision making is backed by pattern recognition and when it relies on unhelpful heuristics. After all, one of the features of intuitive decision making is that the reasoning behind it is obscure and difficult to articulate (Okoli et al., 2016).

Besides, in different lines of work there is different scope for intuitive decision making. Where the decision context is ambiguous and time pressure is high, rapid expert decision making may be more efficient (Orasanu & Connolly, 1993). In situations that allow enough time for careful deliberation and require an audit trail, intuitive judgement is not as useful and may be fraught with biases.

For example, in personnel selection, it has long been known that unstructured interviews underperform objective selection methods, such as aptitude and personality tests (Highhouse, 2008). Intuitive judgments in personnel selection are likely to be influenced by various types of irrelevant information, such as how similar to other people who occupy the same position the candidate appears (representativeness heuristic), contributing to the glass ceiling effect (Highhouse, 1997; Marlowe et al., 1996), and how confident the candidate appears, which will be discussed in more detail later in this section.

Consequently, high reliance on intuitive decision making may only be beneficial in certain jobs, so focusing on specific industries may be fruitful. Shanteau (1992) has suggested that soil judges, unlike court judges, often exercise successful expert judgment due to the nature of their work that inherently requires a much smaller

arsenal of patterns than when dealing with human behaviour. Shanteau's (1992) model for identifying contexts in which expert judgment is likely and unlikely to be successful, which was discussed earlier in this chapter (section 2.1.4.4), may guide the development of future research into the links between intuitive decision making and career outcomes.

In contrast to rational and intuitive decision making, in both studies reported in this chapter decision confidence was a significant positive predictor of both hierarchical status and authority level and in Study 1 it was also positively associated with career satisfaction. It is no secret that projecting confidence often confers social advantages. Confidence is frequently mistaken for competence. As discussed in the introduction to this chapter (sections 2.1.4.2.1 and 2.1.4.3), competence is difficult to observe and measure, so as a proxy, people often rely on so-called "competence cues", or behaviour that is associated with competence (C. Anderson et al., 2012). Such cues typically include projecting an image of confidence: speaking up often, acting in a calm and relaxed manner, expressing trust in one's own ideas and judgements etc. As a result, people who act in a confident manner are often perceived as competent, even if it is not backed by actual talent and skill (Belmi et al., 2020). This research used a cross-sectional design, so it is impossible to determine whether it is confidence that helps people achieve better career outcomes or high rank that makes people more confident in their decisions. Anderson *et al.* (2012) suggest that this relationship may be bi-directional.

The important question raised by the finding that rational decision making is not associated with career outcomes, but decision confidence is, is how hiring and promotion decisions are made. Unstructured interviews that are reliant on the interviewer's judgments of the candidate are known to be open to biases and to underperform objective assessment techniques (Highhouse, 2008; Levashina et al., 2014). The use of unstructured interviews has also been criticised for perpetuating inequality, where people who come from more privileged backgrounds are better able

to behave confidently and project the right competence cues (Belmi et al., 2020). As a result, they have better chances of being hired than someone who does not behave as confidently, even if the level of actual competence of the two candidates is the same. This highlights the need for objective mechanisms in hiring and promotion decisions that do not disadvantage people on the basis of their appearance and background.

Building on the finding that decision confidence is predictive of career outcomes, future research may investigate how well such confidence is linked to competence in the workplace. The weak association between self-reported decision-making rationality and decision confidence as well as no significant associations between decision-making task performance and decision confidence that were observed in the studies reported in this chapter, suggest that at least in the decision-making domain, such a link may be weak. Future research may study how objective measures of performance in the workplace are linked to decision confidence and compare that with how performance is subjectively evaluated. That may add to the body of evidence in favour of objective mechanisms to drive hiring and promotion decisions.

3 Avoidant and dependent decision making as predictors of career outcomes

3.1 Literature review

3.1.1 Introduction

In the previous chapter, rational and intuitive decision making as well as decision confidence were examined in the context of career outcomes. To remind the reader, neither rational nor intuitive decision making predicted any career outcomes investigated in the study (hierarchical status, authority level, or career satisfaction) when decision confidence was controlled for. Conversely, decision confidence was a significant predictor of hierarchical status and authority level in two studies and of career satisfaction in one study after controlling for the other decision making and demographic variables.

In this chapter, the focus is on another aspect of decision making that is concerned with behaviours people may exhibit when they are faced with making choices. Specifically, the links between the avoidance of decisions and dependence on other people in making them on the one hand and career outcomes on the other hand are investigated.

In difficult decision situations, avoidance and increased reliance on support from others are common behaviours (Janis & Mann, 1976; Scott & Bruce, 1995). However, most of the attention they have received so far in organisational research has been concerned with the way people in leadership positions approach decisions. For example, the postponement of difficult decisions has been described as a common mistake that managers make, particularly in situations in which all the available alternatives have potential negative consequences (H. A. Simon, 1987). Yet very little is currently known about the links between such decision-making behaviours as avoidance and dependence on others on the one hand and career outcomes on the other. Some initial

evidence indicates that decisiveness can distinguish between top-level executives and non-executive employees (Wille et al., 2018). However, in reviewing the literature for this thesis, no published research that examined the differences in indecisive behaviour on a more granular level of employment was located. That is what the study presented in this chapter aims to do.

Understanding the links between avoidant and dependent decision making on the one hand and career outcomes on the other may bring a number of benefits. First, if these decision-making behaviours are associated with career outcomes, employees seeking career advancement could take steps to modify their approach to decision situations. Second, it may guide organisations in the development of initiatives aimed at improving staff decision quality. Finally, it may provide an additional recruitment tool to identify candidates who are likely to make proactive and independent choices in positions for which these behaviours are particularly desirable.

This chapter is structured in the following way. First, relevant research into the role of emotions in decision making will be discussed in order to situate decision avoidance and dependence within the broader decision-making literature. Then, the proposed theoretical links between decision avoidance and dependence on the one hand and career outcomes on the other hand will be explained. After that, the results of a study that examined the proposed relationships will be reported. Finally, a discussion of the implications of the findings of the study will be presented.

3.1.2 Avoidant and dependent decision making

3.1.2.1 The role of emotions in decision making

Before discussing decision avoidance and dependence, both of which fall outside the traditional rational models of decision making, some background will be provided to help situate the research into avoidant and dependent decision making in the broader

judgment and decision making context and facilitate the discussion about potential causes of such behaviours.

Most of the earlier theories of judgment and decision making were concerned with people's cognitive approach to decisions. Such theories are sometimes referred to as *consequentialist*, meaning that people assess the consequences of different decision alternatives available to them and make choices based on such assessments (Loewenstein et al., 2001). However, the consequentialist perspective does not take into consideration the full emotional influences on decision making and cannot predict in what situations people may stray away from what is considered the rational approach to decisions. Behaviours such as decision avoidance and dependence on others in decision making therefore do not fit into the picture presented by consequentialist theories.

It is important to note that consequentialist theories such as the Expected Utility (EU) theory and its variations, briefly discussed in the previous chapter (section 2.1.2.1), do allow the incorporation of the decision maker's individual preferences by assigning different weights, or utilities, to different outcomes, thus capturing the individual's risk seeking or risk aversion (Schoemaker, 1982). Recording different attitudes to risk allows such models to implicitly acknowledge the decision maker's anticipated emotions: for example, high risk aversion may signal that the individual perceives the probability of a negative decision outcome as high and expects to experience regret. Some theorists explicitly included regret about potential outcomes into their models of decision making (Bell, 1982; Loomes & Sugden, 1982). However, models based on the EU theory still miss an important component, which is the decision maker's current affective state.

The contribution of such scholars as Janis and Mann (1977), Forgas (1995), Lerner and Keltner (2000), and Loewenstein *et al.* (2001), who drew attention to the importance of considering the decision maker's present as well as anticipated

emotions, is two-fold. First, they examined the influence of the decision maker's emotional response to the decision situation rather than only to the anticipated consequences of the decision. Second, they documented the importance of emotions unrelated to the decision situation that may influence choice. Normative models of decision making covered neither perspective since they focused on the cognitive, rather than emotional, decision processes. Both these points will be covered in turn.

3.1.2.1.1 Risk as feelings

Loewenstein *et al.* (2001) proposed that choice is influenced by two kinds of emotions: *anticipated* and *anticipatory*. Anticipated emotions are those that the decision maker expects to experience as a result of making a decision. They may include anticipated happiness or regret about how the decision may turn out and can be incorporated in the individual's utility function by assigning different weights, or utilities, to different decision outcomes.

A poignant example of it is given by Mullin *et al.* (2008) in a case study they named *Mhairi's dilemma*: in it, a ten-year-old girl called Mhairi, with the help from her father, used a decision tree to make a choice about whether to go to a close family friend's funeral. The case study focuses on Mhairi's anticipated emotions: on the one hand, she considered the anticipated regret about staying at home and missing the opportunity to say goodbye; on the other hand, there was the anticipated regret about breaking down in public and the subsequent embarrassment and upset. While the study dedicates much attention to the decision maker's anticipated emotions, the model used to make the choice fails to document the change in Mhairi's emotional state during the choice process: the availability of the decision tool and the support from her parent significantly calmed her down, thus potentially affecting her judgments about the utilities of potential decision outcomes.

Such concurrent emotional states were discussed by Loewenstein *et al.* (2001) in their risk-as-feelings perspective on decision making. In that perspective, special attention is dedicated to *anticipatory* emotions—those emotions experienced in response to the decision situation. Anticipatory emotions may include anxiety about having to make a decision or anger about the decision maker's perceived inability to achieve the desired outcome, or even excitement about making a choice. Normative models of decision making posit that such emotions are irrelevant to the decision and should thus have no bearing on it, as reflected by the inability to incorporate anticipatory emotions into traditional choice models and by the assumed stable individual preferences unaffected by emotional states. Such unrealistically stable preferences expected from decision makers by normative theories were criticised by the early pioneer of descriptive models of choice, Herbert Simon, almost three quarters of a century ago (H. A. Simon, 1955), however, substantial progress in the field of emotions in decision making required another few decades.

One such development was the introduction of the risk-as-feelings hypothesis by Loewenstein and colleagues (2001): they argued that contemporary models of decision making, even those incorporating anticipated emotions, were incomplete without a consideration for the decision maker's present affective states. Thus, they expanded the existing models to take into account both anticipated emotional consequences and current affective states, which they argued influenced cognitive evaluations of potential decisions outcomes—and might alter choices. In their risk-as-feelings model, anticipated emotions have the ability to influence anticipatory emotions: for example, high anticipated regret may make the decision maker feel more anxious. Such anxiety, in turn, may exacerbate perception of risk, as has been shown in studies such as that by Butler and Mathews (1987), and thus feed back into anticipated regret. The risk-as-feelings model allows cognitive and emotional evaluations of decision alternatives to be conflicting, while both are assumed to influence the outcome of the decision process. Importantly, Loewenstein *et al.* (2001) referred to such an outcome as *behaviour* rather

than *decision* to incorporate acts that cannot be classified as choices: for example, panic responses.

3.1.2.1.2 Incidental affect

Turning to the decision makers' emotional states that are not directly caused by the decision situation, or incidental affect (Lerner & Keltner, 2000), their importance has been pointed out by such scholars as Isen and colleagues (1988), Lerner and Keltner (2000), and Forgas and George (2001). A substantial influence on that line of research came from the earlier work that explored how affective states could change people's judgements of their overall happiness and life satisfaction and discovered that people who were in a happier mood were more likely to judge their life satisfaction in general as higher (Schwarz & Clore, 1983). In other words, people used information about their current emotional states to make judgements about unrelated subjects. This came to be known as the affect-as-information (Clore et al., 2001), or mood-as-information (Schwarz & Clore, 2003), model.

An alternative, motivational, explanation is offered by Isen and colleagues. In a series of experiments (Isen & Geva, 1987; Isen & Patrick, 1983), they investigated the role of affect on people's decisions to gamble and found that people in happier emotional states, induced by the researches and unrelated to the decision tasks, preferred to avoid gambles that could potentially upset them: that is, that they were less willing to take a high-risk bet. However, in contrast to the risk-as-feelings perspective discussed above, the authors explained it from the point of view of anticipated, rather than anticipatory, emotions. In their point of view, people in happy emotional states were less willing to take risks because they were motivated to maintain their present happy emotional state: positive affect made them more averse to losses (Isen et al., 1988). That hypothesis easily fits into both the risk-as-feelings perspective (Loewenstein et al., 2001) and regret theory (Loomes & Sugden, 1982) to paint a fuller picture of the

emotional processes driving decisions: while current positive affective states increase anticipated regret, which is now influenced by potential loss of a happy emotional state *as well as* potential loss in the gamble, it is anticipated regret that is likely to induce risk aversion.

3.1.2.1.3 The Affect Infusion Model

Another account of how anticipatory emotions exert cognitive influence on judgment is offered by the Affect Infusion Model (AIM; Forgas, 1995; Forgas & George, 2001). The AIM proposes that affective states impact decision makers' responses by priming them as to what kind of information they attend to, including what information they retrieve from memory, and how they cognitively approach the decision making situation. The authors make a distinction between moods and emotions, whereby moods are longer-lasting and less intense affective states than emotions and do not have as clear antecedents; both are included in the definition of affect (Forgas & George, 2001). In the AIM, affect can influence the thinking process in three ways (Forgas, 1995). Firstly, both positive and negative affective states may take up an individual's cognitive capacity, thus making them less able to deal with the decision situation. Second, affect may influence the individual's cognitive strategy: the author suggests that positive affective states are likely to lead the individual to more heuristic, less careful thinking by signalling that the situation is favourable, whereas negative affective states elicit more caution and result in more careful and deliberate thinking. Thirdly, as previously suggested by Isen *et al.* (1988), both positive and negative affective states may exert motivation effects: decision makers may be motivated to either maintain or improve their emotional states.

3.1.2.1.4 The appraisal-tendency approach

However, as pointed out by Bodenhausen *et al.* (1994), not all moods of the same valence are equal: for example, while both anger and sadness are classified as negative moods, they can exert different and often conflicting effect on judgments. Because of that, it is important to look beyond the valence of the emotion (i.e. whether it is positive or negative). One such model came from Lerner and Keltner (2000), who focused on what they referred to as *incidental affect*: moods and emotions that are, unlike *integral affect,* irrelevant to the decision but may still exert influence on it by impacting the decision maker's appraisal of the decision situation and their subsequent choices, much like in the AIM described above. However, unlike the AIM, Lerner and Keltner's appraisal-tendency approach to studying emotional influences on choice distinguishes between different emotions of the same valence.

To discuss that approach, it is helpful to first examine Smith and Ellsworth's (1985) earlier work into cognitive appraisals and emotions. They proposed that situations can be evaluated across six distinct dimensions: *pleasantness, anticipated effort, certainty* (how predictable the situation is), *attentional activity* (how much attention the situation requires or how much attention one wants to dedicate to it), *responsibility* (whether one is responsible for the situation) and *control* (how much agency one has in the situation). The position of the situation along those dimensions would allow to predict what kind of emotion one experiences in response. For example, according to this model, fear is marked by high *unpleasantness*, high *anticipated effort*, very low *certainty*, medium *attention*, medium *responsibility*, and low *control* over the situation; while anger is characterised by high *unpleasantness,* high *anticipated effort*, relatively high *certainty*, medium *attention*, relatively low *responsibility* and relatively high *control*. In that way, Smith and Ellsworth (1985) demonstrated how emotions can be explained by cognitive appraisals of the situation.

Lerner and Keltner (2000) borrowed from Smith and Ellsworth's (1985) theory to argue that emotions cause people to evaluate potential outcomes of decisions similarly to the

cognitive appraisal of the situation that led to the emotion. Therefore, they predicted that emotions of the same valence, such as fear and anger, would result in different risk perception. While fear, which is characterised by low certainty and low situational control, would increase risk perceptions, anger, with opposite appraisals along these two dimensions, would do the reverse. As a result of such different perceptions of risk, decision makers would be likely to make different choices. The authors proposed that both dispositional and momentary emotions effect judgments. To test this hypothesis, they conducted a study in which they measured the participants' dispositional anger and fear as well as how angry and fearful they felt at the time of the study and asked them to complete a risk perception questionnaire. Dispositional fear and dispositional anger resulted in opposite risk perceptions: more fearful people perceived risks as higher whereas angrier people perceived risks as lower.

However, it is unclear from the study how current emotional states were related to risk perceptions. While state fear was positively related to dispositional fear, the differences in state anger between people with high and low dispositional anger were not significant. While dispositional emotions studied in the Lerner and Keltner (2000) study, unlike state emotions, do not stem from cognitive appraisals of a given situation but rather may indicate how an individual is likely to appraise a situation, they may give an indication as to their risk appraisals as well. This is supported by such research as that of Butler and Matthews (1987), who found that people who ranked higher in trait anxiety evaluated negative events as more likely to happen to them than the low-trait-anxiety group, while the opposite was observed for positive events.

Turning to the effect of state emotions, using the same cognitive appraisal framework as Lerner and Keltner (2000), Lu *et al.* (2013) induced anger and fear in their participants using vigniettes and asked them to rate their perception of risk in different situations related to driving. It was found that participants in the fear condition had higher risk perception than those in the anger condition, supporting the hypothesis that anger and fear, while both negative in valence, result in different risk appraisal. In three

subsequent studies, in addition to the basic fear- and anger-induction groups, the authors included two more groups in which they invited participants to reappraise the vigniettes along the dimensions of certainty, control, and responsibility, as suggested by Smith and Ellsworth (1985). For example, in the certainty condition, after reading the fear-inducing vigniette, participants were reassured that help was coming to the character, while after reading the anger-inducing vigniette, they were told that the situation was more unpredictable than transpired from the initial text (Lu et al., 2013). It was found that after reappraising the vigniettes, the difference between anger and fear groups disappeared in the certainty and control conditions and diminished in the responsibility condition, supporting Smith and Ellsworth's (1985) cognitive appraisal framework and its interpretation in relation to risk peception by Lerner and Keltner (2000).

3.1.2.1.5 Defensive avoidance

This section will be closed by briefly discussing the work by Janis and Mann, whose research has had a long-lasting influence on the literature on avoidant and dependent decision making. Making decisions is often stressful and worry-inducing. As discussed above, having to make a decision may in itself cause individuals to experience strong emotions, such as anxiety, and feelings anticipated in response to the decision outcome may exacerbate them (Loewenstein et al., 2001). Stress and anxiety, in turn, may impede an individual's ability to approach the decision in a rational way (Forgas, 1995; Janis & Mann, 1976). In their model of decision making under stress, Janis and Mann (1976) view decisional stress as a result of anticipated emotions: if the decision maker is worried about the negative outcomes of the decision, which they view as a form of loss (e.g., of social relationships, material goods, reputation, or self-esteem), then they are likely to experience stress about having to make a decision. The authors propose that in such conditions decision makers follow one of the five coping strategies: *unconflicted adherence* (information about risks is ignored and the status

quo is upheld), *unconflicted change* (uncritically adopting the most salient or strongly recommended action), *defensive avoidance* (procrastination, shifting the responsibility onto another person or people, or selective inattention to important information), *hypervigilance* (a panic response aimed at escaping the decision situation as soon as possible by choosing the first available course of action), and *vigilance* (a thorough information search and critical appraisal of information prior to making a decision).

In Janis and Mann's (1976) model, the strategy that the decision maker selects depends on three variables: awareness of serious risks of taking or not taking action, the perceived probability of finding an optimal solution to the problem, and time for deliberation. If inaction does not involve serious risks, then the decision maker is likely to choose *unconflicted adherence*. If retaining the status quo is risky but change is perceived as safe, then the model predicts *unconflicted change*. Perceiving both taking action and not taking action as risky and judging the probability of finding a better solution as low then results in high stress and *defensive avoidance*. If the decision maker thinks that both taking action and not taking action is risky but a better solution can be found, two alternative coping strategies are left: having insufficient time to study the decision problem and come up with a course of action is predicted to result in high stress and hypervigilance, while the availability of time leads to moderate stress and vigilance. In this chapter, *defensive avoidance* is of particular interest.

To reiterate, defensive avoidance is thought to stem from high estimation of risk of both acting and not acting as well as the perceived inability to find a better solution. The authors propose that such avoidance can manifest in three different ways (Janis & Mann, 1976, 1977). First, the decision maker may put off the decision indefinitely, guided by the wishful believe that such *procrastination* will not result in a worse outcome. Second, they may engage in *buck-passing*, or shifting the responsibility for the decision onto another person. Individuals who adopt that kind of behaviour may rationalise that another person is capable of making a better decision than themselves. The third form of avoidance was described as *bolstering*, during which the decision

maker takes the easiest course of action to escape the decision situation sooner and distorts its pros and cons in an attempt to justify their choice.

A recurring theme in the theories discussed in this section is the effect of mood and emotions on risk perception and the effect of risk perception on choice. The findings linking affect to risk perception are important to judgment and decision making literature because decision making under uncertainty largely relies on the subjective perception of risk and the willingness to take it (Lejuez et al., 2002; Slovic et al., 1977). Therefore, people who perceive risks as higher may be less willing to make a decision out of fear of negative consequences and may be more reliant on others for decision making. This links directly to the main focus of this chapter: decision avoidance and dependence on other people in making decisions.

In the following sections, the definitions and potential antecedents of avoidant and dependent decision making will be discussed in turn.

3.1.2.2 Decision avoidance

Previous literature used different definitions of decision avoidance. As discussed above, Janis and Mann (1976, 1977) saw procrastination, buck-passing, and bolstering as forms of decision avoidant behaviour. A more recent review by C. J. Anderson (2003) identified three forms of decision avoidance that had received attention in the literature: adhering to status quo, taking no action, and deferring choice. Each of these forms will be discussed in turn before laying out the definition of decision avoidance adopted in this research.

One of the types of avoidant behaviour is *status quo bias*. As noted by Samuelson and Zeckhauser (1988), people tend to have an inflated preference for status quo that models which do not account for such a bias fail to predict. In other words, when an option is already in place, even if an individual is free to make their own choice, they

tend to adhere to the existing option. This finding has been widely utilised in behavioural science, especially in programmes such as automatically enrolling people in pension (Benartzi & Thaler, 2007) and organ donation (E. J. Johnson & Goldstein, 2003) plans. The second type is *inaction*, or *omission:* a bias towards not taking any action at all. Scholars such as Ritov and Baron (1992) argued that status quo bias at least partly stems from omission bias. However, these two behaviours may manifest differently in that people may fail to take action to prevent change, thus losing the status quo (C. J. Anderson, 2003). An experiment by Schweitzer (1994) demonstrated that the status quo and the omission biases may occur independently. The third type of decision avoidance that C. J. Anderson (2003) uncovered is *choice deferral*, or the postponement of choice, which is consistent with Janis and Mann's (1976) procrastination phenomenon. However, unlike Janis and Mann (1976), C. J. Anderson (2003) argued that decision avoidance is distinct from procrastination in that procrastination implies the individual's intention to act, even if their behaviour is to the contrary, whereas decision avoidance may be consistent with one's intentions.

Here, decision avoidance is defined as choice deferral, which appears in both Janis and Mann's (1976) and C. J. Anderson's (2003) classifications of decision avoidant behaviour. That is done for the following reason. It can be argued that it is impossible to completely avoid making decisions since 'choosing not to choose' can be considered a decision in itself (Dhar, 1996). However, of the avoidant tactics described above, only choice deferral does not resolve the decision situation, even in a suboptimal way, and implies the intention to revisit the decision later, at which point one of the other strategies may be used. Thus, choice deferral is a more unambiguous example of decision avoidance. It may be followed, but not preceded, by the other decision avoidant tactics.

Dewberry *et al.* (2013) conceptualised decision avoidance as a component of decision-making behaviour distinct from cognitive decision-making styles and concerned with the regulation of choice. Decision avoidance, or the tendency to postpone choice, is

sometimes conceptualised as an individual decision-making style, or a habitual response to decision situations (Scott & Bruce, 1995), whereas other researchers have drawn attention to situational factors that are likely to result in decision avoidance in people in general (see C. J. Anderson, 2003, for review). Following the person-situation interaction perspective (Terborg, 1981), here it is assumed that while some people may be more predisposed to respond to a decision situation in an avoidant way, the context in which the decision takes place is likely to influence the level of avoidance, as has been shown with proactive personality and proactive behaviour (McCormick et al., 2019).

Previous research has identified several factors that may contribute to decision avoidance. Firstly, people may avoid decisions because they need more time to evaluate the existing alternatives or seek new ones. Tversky and Shafir (1992) found that people were more likely to delay choice when it was difficult to decide which of the available options was better: that is, when they felt particularly conflicted about making a decision. Delaying choice may be a rational strategy if it allows more time to consider the decision and choose optimally.

Secondly, as discussed in the previous section, people may delay decisions because they are worried about negative outcomes, for example, when the decision may lead to losses of material goods, reputation, or self-esteem or negatively affect relationships with other people (Janis & Mann, 1976)—in other words, when they anticipate regretting their decision (Beattie et al., 1994; Simonson, 1992). Anticipated regret is thought to play a large role in determining choice, as shown by work such as regret theory that incorporates anticipated regret and anticipated rejoicing into the model of decision making (Loomes & Sugden, 1982). It is also closely linked to anticipated blame. It has been shown that people are less likely to be blamed, and to expect to be blamed, for harm caused by omission than for harm caused by commission: in other words, they are likely to feel more responsible for the negative outcomes that result from their action rather than inaction (Spranca et al., 1991). Therefore, when the

decision maker believes they will be judged by others on their choices and punished for negative outcomes, they are more likely to try to avoid making decisions (Tetlock & Boettger, 1994). Furthermore, anticipated regret is thought to increase with responsibility (Zeelenberg et al., 1998). In the management structure context, this is likely to translate into anticipated blame because the more responsibility an individual holds, the more likely they are to expect to be blamed for negative outcomes. In this way, decision avoidance may be a consequence of anticipated regret and blame avoidance.

Thirdly, thinking about a decision can cause the decision maker to feel anxious. In the previous section, the effects of anticipated and anticipatory emotions on choice were discussed. As a reminder, anticipatory emotions refer to present reactions to the decision situation (Loewenstein et al., 2001). Such negative emotions may be triggered by uncertainty about the outcomes but also by the difficulty of the decision, making people more likely to prolong their search for the optimal solution to the decision problem (Luce, 1998). Importantly, there is evidence that decision avoidance is positively associated with trait (Umeh & Omari-Asor, 2011) and decision-related (Dewberry et al., 2013) anxiety. In turn, anxiety may cause negative appraisals of potential decision outcomes and result in increased anticipated regret and blame. For example, Butler and Mathews (1987) found that people with high anxiety tended to estimate the probability of negative events happening, and especially happening to them, to be greater than those with low anxiety. Furthermore, people who exhibit high decision anxiety tend to have low confidence in their decisions, and such low confidence has also been linked to decision avoidance (Dhar, 1996; Leykin & DeRubeis, 2010).

To summarise, choice difficulty, anxiety (both trait and decision-related), low decision confidence, anticipated regret, and anticipated blame are thought to be the main factors contributing to decision avoidance. While some individuals may be more

predisposed to reacting to decisions in an avoidant way, understanding these potential causes of decision avoidant behaviour is important for mitigating it.

3.1.2.3 Dependent decision making

A second decision-making behaviour considered in this chapter, closely related to decision avoidance and also marked by indecisiveness, is dependence on other people in making choices. Conceptually, researchers have thought it to be either an example (Janis & Mann, 1976) or a consequence (Dewberry et al., 2013) of decision avoidance. Since decision avoidance is defined as the deferral of choice in this research, dependent decision making is viewed as a distinct but related behaviour. Dependent decision making may manifest in relegating choice to others, or "buck-passing", (Janis & Mann, 1976) or seeking assistance and reassurance from others (Scott & Bruce, 1995). Since in an organisational setting it is often impossible to completely shift the responsibility for a decision that falls within one's professional remit onto other people, here dependent decision making is referred to as the latter.

In the model proposed by Dewberry and colleagues (2013), dependent decision making is thought to stem from the desire to avoid making a decision by oneself, especially in situations when it still needs to be made. This position is supported by Steffel and Williams (2018), who proposed that people choose to delegate their decision-making powers to others for three main reasons. First, they may want to avoid the effort of choosing: for example, when the decision is perceived as minor and spending time and effort on it is not considered worthwhile. Second, people may not possess, or consider themselves to possess, the necessary expertise to make a choice, so they may prefer to delegate the decision to an expert. Third, they may want to avoid the responsibility for the decision by delegating it to someone else, especially when anticipated regret is high. Delegating to avoid responsibility and subsequent blame is considered to be even more appealing when the consequences of the

decision will affect other people and not only the decision makers themselves (Steffel et al., 2016).

Delegating or engaging others in decision making may be an adaptive strategy, as in the first two examples above. Focusing on the second reason for delegation described by Steffel and Williams (2018), previous research found a link between subjective selection difficulty and delegation to a fictitious authority thought to be experienced in risk analysis (Tetlock & Boettger, 1994). Even though participants were told that the authority did not have any more information specific to the decision problem than was available to them, they were still likely to perceive the authority as more skilled in making high-stake decisions than themselves, which may explain their desire to delegate. Moreover, relying on other people's advice may reflect a willingness to engage in collective decision making, which in many situations may be advantageous (Spicer & Sadler-Smith, 2005).

However, high dependence on others in making choices may have negative consequences. Overreliance on others' opinions could prevent people from making choices that help them to fulfil their goals (Harren, 1979). As with decision avoidance, adverse situational factors may increase the likelihood that individuals who are generally more reliant on others in their decision making will exhibit highly dependent behaviour. Much previous research on this topic has noted a link between decision avoidance and high dependence on others in making decisions (Dewberry et al., 2013; Scott & Bruce, 1995; Spicer & Sadler-Smith, 2005), suggesting that the same negative appraisals that are thought to lead to decision avoidance might give rise to dependent decision making. As discussed in the previous section, both anticipated and anticipatory emotions are likely to play a significant role in such appraisals. For example, the tendency to depend on others for decision making has been found to be associated with trait (Umeh & Omari-Asor, 2011) and decision-related (Dewberry et al., 2013; Leykin & DeRubeis, 2010) anxiety. Seeking advice and reassurance from others

may help to relieve some of the stress caused by the decision situation and spread the responsibility for negative outcomes.

It has been proposed that engagement in dependent decision making strategies is characterised by approach to rather than avoidance of choice situations, albeit with a lack of confidence in own decision-making skills (Phillips et al., 1984). However, such approach behaviour is likely to be motivated by the wish to resolve the decision situation as soon as possible while avoiding the need to engage in independent decision making. Such a desire to finalise the decision by any means, even by giving up choice autonomy, is consistent with research on intolerance of uncertainty in anxiety. It was discussed earlier in this chapter that anxious people are more likely to exhibit dependent decision making than their non-anxious counterparts (Dewberry et al., 2013; Leykin & DeRubeis, 2010; Umeh & Omari-Asor, 2011). People with heightened anxiety have been found to exhibit intolerance of uncertainty (Carleton et al., 2012), which is characterised by negatively reacting to situations with uncertain outcomes on the emotional, cognitive, and behavioural level (Berenbaum et al., 2008). Uncertainty over the decision situation may exacerbate the decision maker's existing worry, thus motivating them to finalise the decision quickly and by any means possible. A dependent decision making strategy allows one to avoid making an autonomous choice (and thus having to accept full responsibility for the outcome), while also eliminating the source of anxiety that having to make a decision may become. It has been observed that anxious people are more likely not only to seek advice from others, but also to follow that advice, regardless of its quality (Gino et al., 2012). This impaired ability to discern between good and bad advice potentially suggests that the quality of decisions made by anxious, dependent individuals may be inferior to their non-anxious counterparts.

3.1.3 Avoidant and dependent decision making in the context of career outcomes

3.1.3.1 Career outcomes

In the previous chapter, the definitions of extrinsic and intrinsic career outcomes were laid out. To remind the reader, typically, previous research distinguished between *extrinsic* and *intrinsic* career outcomes (Judge et al., 1999; Seibert et al., 2001), also sometimes referred to as *objective* and *subjective* (Ng et al., 2005; Seibert et al., 1999). *Extrinsic,* or *objective,* career outcomes refer to observable measures, such as salaries, promotions, or status in the organisation, while *intrinsic,* or *subjective,* outcomes are the employee's personal judgments about their career, usually operationalised as career satisfaction (Judge et al., 1999). Since a meta-analysis by Ng *et al.* (2005) showed a relatively low correlation between the two measures, both perspectives are considered in this study.

When predicting career outcomes, it is important to control for the variables that are commonly associated with them, such as age, gender, and education level (Ng et al., 2005). Moreover, since not everyone may desire to achieve high positions in the workplace, in this research, career aspirations will also be accounted for to further isolate the link between decision avoidance and dependence and career outcomes.

To hypothesise about the relationships between avoidant and dependent decision making on the one hand, and career outcomes on the other, two existing lines of research are drawn from: decisiveness in leadership positions and proactivity as a predictor of career outcomes, which will be discussed in turn below.

3.1.3.2 Decisiveness and leadership

Even though the relationship between avoidant and dependent decision making on the one hand, and career outcomes on the other, has not received much attention in previous research, indecisiveness, which underpins both these constructs, has long been of interest to researchers of leadership. Such scholars often see it as detrimental to becoming a successful leader (A. F. Simon, 2006), while the ability to make prompt decisions in times of crisis has been named as one of the qualities of good leaders (Hogan & Kaiser, 2005). In a large multinational European study that asked over 6,000 middle-level managers about what characteristics they thought successful business leaders should have, decisiveness was named as an important positive trait across all cultural contexts (Brodbeck et al., 2000).

Those who make decisions without delay are often perceived as more talented leaders capable of handling complex and rapidly changing situations. Leaders who decide quickly may appear to be more knowledgeable and/or have good information-processing skills, enabling them to act without investing much time in studying the situation; or they may be perceived as having strong convictions and moral compasses that guide their decisions (Bernheim & Bodoh-Creed, 2020). At the same time, it has been argued that those leaders who vacillate between different courses of action too often and for too long may find it difficult to retain their positions (A. F. Simon, 2006).

At the moment, data about the ability of decisive behaviour to predict career outcome is scarce. Some initial quantitative evidence suggesting that decisiveness may distinguish between top-level executives and non-executive employees comes from Wille *et al.* (2018). Although it was not the focus of the research, the authors collected data on self-reported decisiveness of 577 top-level executives and 52,139 non-executive employees in Europe. The questions they asked, which came from the Business Attitudes Questionnaire (BAQ; Bogaert et al., 2008), tapped into decision avoidance: hesitancy over decisions and the need for time to make a choice were anchored at the

low end of the scale while the ability to make decisions and draw conclusions quickly was at the high end. The study showed that top-level executives were more likely to be decisive than the general population of employees and those results were more pronounced for women than men (d = 0.57 vs. d = 0.28). However, there is high variation in levels of seniority and responsibility in the non-top-level executive population, which was not the focus of the research by Wille *et al.* (2018), so it remains to be examined whether decisive behaviour is just as successful at distinguishing between career outcomes at a more granular level.

It has been proposed that decisiveness may not only distinguish between top-level executives and other employees but also that it is a quality of those executives who are particularly successful in their jobs. Kelman *et al.* (2017) have suggested that it is decisiveness and not necessarily vigorous information gathering that distinguishes outstanding executives from the rest. To come to that conclusion, they interviewed twenty heads of subcabinet-level United States federal government organisations, ten of whom were chosen due to their outstanding record in improving organisational performance and the other ten selected at random as a comparison group. They were primarily interested in what Janis (1989) called 'vigilant problem-solving', or the process of making decisions through sourcing diverse knowledge and opinions and critically examining the costs and benefits of different courses of action. Both the 'outstanding' and the comparison groups revealed that they relied on multiple sources of information, encouraged subordinates to state their views, even if they disagreed with the leaders, and were able to give examples of changing their opinions after new information was introduced. In other words, there was little evidence of differences in how thoroughly the two groups approached decision making. However, the 'outstanding' executives appeared to be more decisive than the comparison group, spontaneously bringing up their preference for decisiveness during interviews and naming decisiveness as an important leadership quality in their positions. When asked to situate themselves on a 10-point decisiveness scale, the 'outstanding' group scored over a point higher (6.8 vs.

5.7 for the comparison group), but the sample size of the study was too small to extrapolate from that quantitative information. Nevertheless, it is important to note that Kelman *et al.* (2017) focused on government organisations, where the decision making process may significantly differ from private sector. As the authors noted, on the one hand, government structures may be more conducive to vigilant problem-solving methods, thus explaining high similarities between the two groups; on the other hand, for government employees, the punishment for poor decisions is often of higher magnitude than the reward for decisions that turn out well, which may give rise to a culture of stagnation and thus allow more decisive leaders to stand out. However, when decisiveness is viewed through the lens of risk taking, with decisive people being more likely to make risky choices on the basis of less information than their more cautious counterparts, it is possible that a high number of decisive people would be present in a sample of failing executives, reflecting the potential bimodal nature of the relationship between decisiveness and executive success (Kelman et al., 2017). In other words, decisive executives who enjoy professional success may owe at least some of it to luck.

That suggestion raises the question of the link between success and competence, or the lack thereof. A theoretical explanation for the existence of such a link in the absense of knowledge and skill superior to those of less decisive counterparts is offered by research into confidence. If it is true that more decisive people have higher chances of progressing to senior level jobs than their more decision avoidant counterparts, one of the reasons for it may be the impression they create in the eyes of those who make promotion decisions. In the previous chapter it was discussed that decision confidence is associated with career outcomes more strongly than decision-making rationality, suggesting potential conflation of confidence with competence. It has been shown that people who avoid decisions and who are highly dependent on others in making them, unsurprisingly, tend to be less confident in their choices (Leykin & DeRubeis, 2010). If decisive people project confidence in their decisions, it may

contribute to creating the image of skill and competence, thus increasing their chances of climbing up the career ladder (C. Anderson et al., 2012). Indeed, the literature on charismatic leadership, that has been popular in organisational psychology over the past few decades, maintained that a leader who is able to motivate and inspire should project self-confidence in order to reassure followers (Babcock-Roberson & Strickland, 2010; Shamir et al., 1993). Such display of confidence, even unsubstantiated by knowledge and skill, has been linked to social and career advantages (C. Anderson et al., 2012; Belmi et al., 2020).

Bernheim and Bodoh-Creed (2020) proposed a model that explains why people may favour leaders who make decisions quickly in the absence of special information gathering and processing skills that would set them apart from their slower counterparts. Specifically, they examined voter preferences and argued that political candidates who make decisions more rapidly signal that they have distinct policy preferences and a strong moral compass, which are viewed favourably by voters. In other words, consistent with charismatic leadership literature, voters prefer leaders who know their preferences and show confidence in their choices.

In an organisational context, a leader's decisiveness may be at odds with the principles of participative decision making, since generating opinions and re-evaluating alternatives on the basis of new information takes time. With that in mind, it is important to understand how different stakeholders, including those making promotion decisions, view the relative importance of decisiveness and participative decision making. A study by Aramovich and Blankenship (2020) has shed some light on the issue. In that study, most leaders judged as effective by direct reports, peers, and supervisors were found to score high on both perceived decisiveness and perceived participative behaviour. However, direct reports rated them as more effective when their perceived participative behaviour was higher than their decisiveness, whereas the opposite trend was detected for supervisors: they deemed leaders to be more effective when their decisiveness was higher than participative behaviour. This is important because

supervisors' opinions are likely to have more bearing on one's career than those of subordinates.

Despite the strong positive relationship between perceived participative behaviour and perceived effectiveness for direct reports, Aramovich and Blankenship (2020) found that direct reports, just like peers and supervisors, judged the leaders' who they perceived as decisive to be effective. That suggests that decisiveness is valued as an important leadership quality by colleagues at each level in the organisational hierarchy. Indeed, reflecting that, deciding effectively is often grouped together with leadership capabilities (Bartram, 2005; Kurz & Bartram, 2008).

Turning to the practical implications of indecisive leadership, some research has found it to be associated with negative outcomes for the subordinates. For example, one study observed that managerial decisiveness was negatively linked to both employee stress and their turnover intentions (Mulki et al., 2012). The authors suggested that indecisive leadership diminished employees' confidence in their managers and created a climate of uncertainty, which led to stress and the desire to seek a new job. They also argued that decisive leadership is conducive to organisational change because managers who appear confident in their decisions are able to also instil such confidence in employees, as suggested by theories of charismatic leadership (Conger & Kanungo, 1987). Another study found a positive relationship between managers' indecisiveness as perceived by the employees and employees' role ambiguity and turnover intentions (Caemmerer et al., 2021). It was proposed that managerial indecisiveness diminished staff's confidence in the manager's ability to lead and created role ambiguity, which in turn led to increased turnover intentions. Despite the emerging evidence that there is a link between managerial indecisiveness and poor outcomes for employees, it is unclear whether this link exists because indecisiveness leads to poor performance by managers or because the cultural expectations of managers, discussed previously in this section, are not met. Either way, research

seems to point to the ability to make timely decisions with confidence as an important characteristic for leaders.

Despite the apparent importance of decisiveness in leadership positions and some initial evidence that it may distinguish between top-level executives and non-executive employees (Wille et al., 2018), there is little or no empirical evidence that this characteristic can predict career outcomes at a more fine-grained level. It is surprising considering the abundance of literature about decisiveness in leadership.

In the next section, another line of research, into proactivity and career outcomes, will be reviewed and its relevance to the constructs of interest in this chapter, avoidant and dependent decision making, will be explained.

3.1.3.3 Proactivity and career outcomes

Another line of research drawn from to discuss the proposed relationships between avoidant and dependent decision making on the one hand and career outcomes on the other is proactivity. Proactivity is defined as an individual disposition towards taking action to influence one's environment, whether it is physical, social, professional, or some other kind of environment (Bateman & Crant, 1993). According to the authors, such influence can take different shapes, such as purposefully looking for opportunities, taking initiative, and engaging in behaviours that are believed to bring about desired change. Proactive people challenge the status quo instead of accepting the circumstances they are unhappy with (Crant, 2000).

Proactivity and indecision are closely linked since taking action requires making a multitude of decisions: to look for new opportunities, to choose the best course of action, and to act upon it. Unsurprisingly, indecisive people have been found to be less proactive (Jenkins & Jeske, 2017). In that study, the scale from Jones (1989) was used, which included questions such as: *"I am an indecisive person; I delay deciding*

and have difficulty making up my mind" and *"I feel relieved if someone else makes a decision for me",* thus tapping into both avoidant and dependent decision making—the constructs of interest in this chapter.

Taking the person-situation interaction perspective that posits that behaviour is affected by a continuous interaction between the personality, abilities, and motivations of the individual and the features of the situation (Terborg, 1981), Seibert and colleagues (1999) suggested that proactive people are capable of achieving higher career outcomes through actively shaping their work environment. In a study with 496 employees, most of whom were men, they found that proactive personality was associated with both objective measures of career success, which they operationalised as salary and promotions, and subjective career success, measured as career satisfaction. A later meta-analysis of 313 correlations from 107 studies by Fuller and Marler (2009) found proactivity to be positively related to job performance, salary, promotions, career satisfaction, job satisfaction, and perceived career success.

Proactivity is thought to result in greater career success because proactive people are more likely to plan their careers, understand their current environment and anticipate changes, seek sponsorship and career support, and deliberately select, initiate, and impact their work context (Seibert et al., 1999). In other words, they are more likely to craft their jobs to better suit their needs and goals. Additionally, it is suggested that proactive people are more likely to create situations in which they can achieve high job performance (Crant, 1995), thus increasing their chances of workplace recognition and promotion. Furthermore, proactivity may help newcomers to quickly integrate into the organisation by acquiring the necessary knowledge about its structure, thus giving them a head start compared to other people joining at the same time (Fuller & Marler, 2009).

Proactively approaching difficult and uncertain situations has often been discussed as necessary for organisational success and individual career outcomes (Fuller & Marler,

2009; A. M. Grant et al., 2009; McCormick et al., 2019) and it requires individuals to make decisions about their actions. At the same time, there is a dearth of research into the links between employees' decision-making behaviour and their career outcomes. Bearing in mind the increasing importance of proactive behaviour in the workplace (Seibert et al., 2001) in the current climate marked by growing competition and the switch from traditional to protean careers (Sullivan & Baruch, 2009), avoidance of decisions and excessive reliance on other people in making them may become barriers to career progression.

While these two dimensions of decision making are currently understudied in organisational research, inferences can be drawn from the extensive literature on proactivity, which individuals who exhibit avoidant and dependent decision making tend to lack (Jenkins & Jeske, 2017). Since in organisations the scope of decisions and the responsibility for them tend to increase with seniority (Ireland & Miller, 2004), passive and indecisive employees may miss out on promotions to roles requiring autonomy and the ability to make high-stake decisions, especially in fields that value independence and innovation.

In the next sections, the links between avoidant and dependent decision making on the one hand and extrinsic and intrinsic career outcomes on the other will be discussed in more depth and the hypotheses to be tested in the empirical study reported in this chapter will be set out.

3.1.3.4 Decision avoidance and extrinsic career outcomes

Previously in this chapter (section 3.1.3.2), it was discussed that leadership is often associated with decisiveness (Brodbeck et al., 2000; Kelman et al., 2017; A. F. Simon, 2006), so decision avoidance may hinder progression to positions of authority in the workplace. That may be both due to the practical implications of putting off important

decisions and also the perception it creates in the eyes of the people who make promotion decisions. Indecisiveness may signal the inability to take initiative and deal with difficult situations (Bernheim & Bodoh-Creed, 2020) and become a barrier to career progression. Reflecting that, Kelman *et al.* (2017) suggested that decisiveness was a major factor in executives' success and Wille *et al.* (2018) found that it distinguished people in top-level executive positions from the rest of the workforce.

It was also noted that indecisive behaviour, including decision avoidance, is marked by the lack of proactivity (Jenkins & Jeske, 2017), which has been found to be an important factor in both intrinsic and extrinsic career success (Fuller & Marler, 2009). Behaving proactively (for example, seeking out opportunities to be noticed by superiors, taking on new projects, and crafting one's work context) requires people to make many decisions, starting from whether or not to engage in behaviours above and beyond what is required by their contractual obligations. Employees who seek to avoid decisions are therefore less likely to exhibit proactive behaviour and reap its benefits.

Research also suggests that decision avoidance is associated with lesser decision making competence and worse decision outcomes (Bruine de Bruin et al., 2007), which may translate into poorer job performance and, in turn, negatively affect career progression. However, no studies that examined decision-making competence and decision outcomes in relation to decision avoidance in an organisational setting were found during the literature search for this review.

As discussed in section 3.1.2.2, decision avoidance may be caused by the desire to avoid responsibility for negative decision outcomes (Tetlock & Boettger, 1994). Higher-level jobs normally involve increased responsibility, so decision avoidant individuals may be less likely to seek promotion to such positions, thus self-selecting themselves out of the pool of candidates for higher authority jobs. In addition, applying for a new higher-level job or a promotion is a decision in itself and highly decision avoidant people may fail to act on such opportunities.

To summarise, decision avoidance may hinder career progression in three ways. First, not making timely decisions may result in poorer decision outcomes, potentially affecting job performance. Second, high avoidance of decisions may create the impression incongruent with the image of a successful leader in the consciousness of people who make promotion decisions. Third, decision avoidant people may self-select themselves out of the pool of candidates for higher-level jobs by failing to apply for such jobs.

This leads to the first hypothesis of this chapter:

H3.1. Decision avoidance is negatively associated with extrinsic career outcomes.

3.1.3.5 Decision avoidance and intrinsic career outcomes

As previously discussed, although extrinsic career outcomes tend to be positively associated with intrinsic career outcomes, this correlation is typically not strong (Ng et al., 2005). This may be because not everyone seeks promotions and authority in the workplace. Some people may define career success as making an important contribution to society, building meaningful relationships with colleagues, and having work-life balance (Dyke & Murphy, 2006). These factors do not tend to be reflected in typical measures of extrinsic career outcomes. Therefore, some people may be happy in lower-level jobs, while others are not satisfied with their high-level positions. With that in mind, the potential relationship between decision avoidance and extrinsic career outcomes may not readily translate into the relationship between decision avoidance and intrinsic career outcomes. However, there are alternative grounds to suggest that this link exists, as shown by research into proactivity.

As discussed above, indecisive people tend to be less proactive (Jenkins & Jeske, 2017). Proactivity refers to behaviours which help people recognise and make the best of the opportunities available to them and shape their environment to better suit their

needs and goals (Bateman & Crant, 1993). Proactivity has been found to be associated with greater career satisfaction (Fuller & Marler, 2009). This is at least in part because proactive people are more likely to craft their work environment and influence the conditions in which they work (Seibert et al., 1999). Meanwhile, decision avoidant individuals tend to have a more external locus of control (Scott & Bruce, 1995) and are therefore less likely to attempt to adapt their working conditions to better suit their needs. Decision avoidance may also have an indirect long-term impact on career satisfaction caused by suboptimal choices and behaviours in one's professional life since career success aggregates over time (Seibert et al., 1999).

Besides, above it was discussed that decision avoidant people may self-select themselves out of applying for higher-level jobs, which may be both out of the desire to avoid the responsibility for high-stake decision making that such jobs entail and due to failing to make a choice to apply for such jobs. Therefore, people who are not satisfied with lower-level positions but do not take action to improve their situation at work may feel stagnation and be less satisfied with their careers.

It is therefore proposed that,

H3.2. Decision avoidance is negatively associated with intrinsic career outcomes.

3.1.3.6 Dependent decision making and extrinsic career outcomes

Previously in this chapter (section 3.1.3.2) it was discussed that leaders are expected to be knowledgeable about their areas of work and possess good information processing skills that allow them to proactively make decisions (Bernheim & Bodoh-Creed, 2020). Conversely, frequent consultation and high reliance on other people's input may create the impression that the individual lacks the skills necessary to deal with emerging problems effectively and in a timely manner, thus jeopardising their prospects of being promoted to positions of authority. Moreover, employees who do not

seek responsibility and decision-making powers may not pursue such positions in the first place. Besides, it has been found that dependent decision making is associated with high decision anxiety and low decision confidence (Dewberry et al., 2013; Leykin & DeRubeis, 2010). Such uncertainty and lack of confidence are likely to result in an image incongruent with leadership. At the same time, Wille *et al.* (2018) suggest that people in top-level executive positions are more likely than those in the general employed population to exhibit decisiveness and autonomy—two characteristics that highly dependent decision makers lack. Expanding on this finding, it is proposed that,

H3.3. Dependent decision making is negatively associated with extrinsic career outcomes.

3.1.3.7 Dependent decision making and intrinsic career outcomes

High dependence on others' opinions in making important choices instead of acting on one's own preferences may indicate a high need for social approval and prevent personal goal fulfilment (Harren, 1979). Such a need for external validation is often associated with low self-worth (Park et al., 2004). Individuals who exhibit dependent decision making also tend to have an external locus of control (Scott & Bruce, 1995). In turn, low self-worth and an external locus of control may cause workers to forgo opportunities due to pessimistic appraisals of potential outcomes.

Career success is aggregated over a long time (Seibert et al., 1999) and one's career path is influenced by a series of decisions. Such decisions may include what areas to pursue for education and training, whether to move away from one's hometown, which jobs to apply for, whether to accept or reject a job offer, whether to apply for promotions etc. Following a decision-making strategy that prioritises other people's opinions over one's personal preferences may thus result in landing a less desirable career. Therefore, the following hypothesis is proposed:

H3.4. Dependent decision making is negatively associated with intrinsic career outcomes.

3.2 Study 3

3.2.1 Method

The hypotheses outlined in this chapter were tested in an observational study using cross-sectional data. It was pre-registered at osf.io/bsnha. Hypotheses 3.2 and 3.4 are exploratory and were not pre-registered.

3.2.1.1 Participants

The sample used in this study was also used for Study 1 of this thesis. To remind the reader, it consisted of 266 participants in full-time employment in the United Kingdom, who were recruited via invitations on social media (such as Twitter, Facebook, and LinkedIn) and an advertisement on a student forum at Birkbeck, University of London. Twenty-one participants reported owning the business where they worked and were therefore excluded from the analysis due to the difficulty in comparing employment and self-employment career outcomes.

The mean age of the remaining 245 participants was 40.39 years (*SD* = 9.87). The gender makeup of the sample was as follows: 73.47% female, 25.71% male, and 0.41% other. In terms of ethnicity, 90.20% of participants were white, 3.67% from a mixed/multiple ethnic background, 2.04% Asian, 0.82% Black, 0.41% Arab, and 2.86% indicated their ethnicity as “Other”. The highest completed level of education, or equivalent, was as follows: 6.53% GCSE grades A*-C, 16.73% A-level, 35.92%

Bachelor's degree, 35.51% Master's degree, 3.67% Doctoral degree. In terms of hierarchical status, 14.69% of the participants indicated they were in junior positions, 56.73% were mid-level, 28.57% senior. Participants came from a variety of industries, the most common being Education (12.24%), Healthcare (8.57%), Information Technology (5.71%), Banking and Finance (4.49%), and Sales and Marketing (3.67%). On average, they had 19.05 years of work experience (*SD* = 10.30). Twelve (4.90%) participants reported that at the time of completion of this survey they were on paid furlough; an additional two participants (0.82%) reported they were on unpaid furlough.

3.2.1.2 Materials and procedure

Data collection for this study was done in conjunction with that for Study 1 (reported in Chapter 2) and Study 4 (reported in Chapter 4). The procedure for data collection is explained in Chapter 2, Study 1.

Tendencies to avoid decisions and to depend on others in making them were measured using the *Avoidant* and *Dependent* subscales of the *General Decision-Making Style (GDMS)* questionnaire (Scott & Bruce, 1995), which is one of the most popular tools for measuring decision-making styles available (Spicer & Sadler-Smith, 2005; Thunholm, 2004). Both consist of 5 questions and are measured on a 5-point Likert scale. Example items are: *"I avoid making important decisions until the pressure is on"* (*Avoidant* subscale); *"I often need the assistance of other people when making important decisions"* (*Dependent* subscale).

As explained in the *Method* section of Study 1 (reported in Chapter 2), extrinsic career outcomes were defined here as an employee's position in the organisational hierarchy and the level of authority that they have in the organisation. Intrinsic career outcomes were operationalised as career satisfaction. Agreement between extrinsic and intrinsic career outcomes measures does not tend to be very high (Ng et al., 2005), so a two-

fold approach to measuring career outcomes was adopted here, considering both extrinsic and intrinsic career outcomes.

As a measure of hierarchical status, participants were asked to classify their position at work: junior (1), mid-level (2), or senior (3). An additional option was “owner of the business”. Participants who selected this fourth option were not included in data analysis due to the difficulty of comparing employment and self-employment outcomes. To determine the authority level, participants were asked if they had permission to delegate work, project responsibility, and/or an official leadership position (Abele & Spurk, 2009). For each affirmative answer, they received one point on a scale ranging from 0 to 3, with higher numbers indicating higher authority. These measures were chosen due to their relevance across different industries, in some of which having managerial responsibility may not be an informative indicator of career outcomes.

As a measure of intrinsic career success, participants were asked to complete the *Career Satisfaction Scale* (Greenhaus et al., 1990), measured on a 5-point Likert scale. The scale consists of 5 questions. A sample item is: *“I am satisfied with the success I have achieved in my career”.*

Participants also completed the *Career Aspiration Scale* (O’Brien, 1996), consisting of 10 questions measured on a five-point Likert scale. It includes items such as: *“I hope to become a leader in my career field”*. Two questions were slightly adapted: the phrase *“When I am established in my career”* was removed from the wording to include people at more advanced career stages. Composite scores were calculated for all scales (or, where relevant, subscales) used in this study.

3.2.2 Results

Missing data constituted 0.41% in total. The highest percentage of missing data per variable was in the education variable and made up 1.63% of responses. Apart from

one question in the *Career Satisfaction* scale, where missing data constituted 1.22%, in all other variables under consideration it was under 1%.

Descriptive statistics, correlations between the variables, and internal consistency of the scales are presented in Table 3.1. Apart from dependent decision making, which had no significant correlations with any variables apart from decision avoidance, all remaining variables were correlated with each other as expected.

Table 3.1
Descriptive Statistics and Correlations for Study 3 Variables

Variable	M	SD	1	2	3	4	5	6
1. Decision avoidance	2.47	0.92	(.83)					
2. Decision dependence	3.50	0.79	.32***	(.75)				
3. Hierarchical status	—	—	-.15*	-.11	—			
4. Authority	—	—	-.27***	-.07	.56***	—		
5. Career satisfaction	3.62	1.00	-.26***	-.04	.30***	.25***	(.89)	
6. Career aspirations	2.57	0.87	-.15*	.10	.20**	.29***	.18**	(.81)

*$p < .05$. **$p < .01$. ***$p < .001$. Cronbach's alphas are listed in the diagonal.

Below the results of the regression models run to test the hypotheses laid out in this chapter are reported. Where the control variables were included, only "male" and "female" gender categories were considered since the "other" category contained only one observation and was insufficient to provide meaningful information. It was coded as missing data. Unlike specified in the pre-registration document, years of work experience were not used as a control variable due to the high correlation with age, $r(243) = .87$, $p < .001$.

3.2.2.1 Decision avoidance predicting extrinsic career outcomes

3.2.2.1.1 Hierarchical status as the outcome variable

First, a proportional odds logistic regression model was run in *R* version 4.0.4 using the *MASS* package (Venables & Ripley, 2002) with decision avoidance as a predictor and hierarchical status as the outcome variable. At that point, no control variables were entered. Decision avoidance was a significant predictor of hierarchical status, B = -0.32, SE = 0.14, OR = 0.72 (95% CI [0.55, 0.95]), $p < .05$. McFadden pseudo-R^2 (Veall & Zimmermann, 1996) was calculated and it equalled .01. The Brant test of parallel regression (Brant, 1990) was run using the *Brant* package (Schlegel & Steenbergen, 2020) and it showed that the assumption was met.

Then, predicted probabilities of hierarchical status depending on the value of the decision avoidance variable were calculated using the *ggeffects* package (Lüdecke, 2018). The plot demonstrating the predictions, constructed in *ggplot2* (Wickham, 2009), is shown in Figure 3.1.

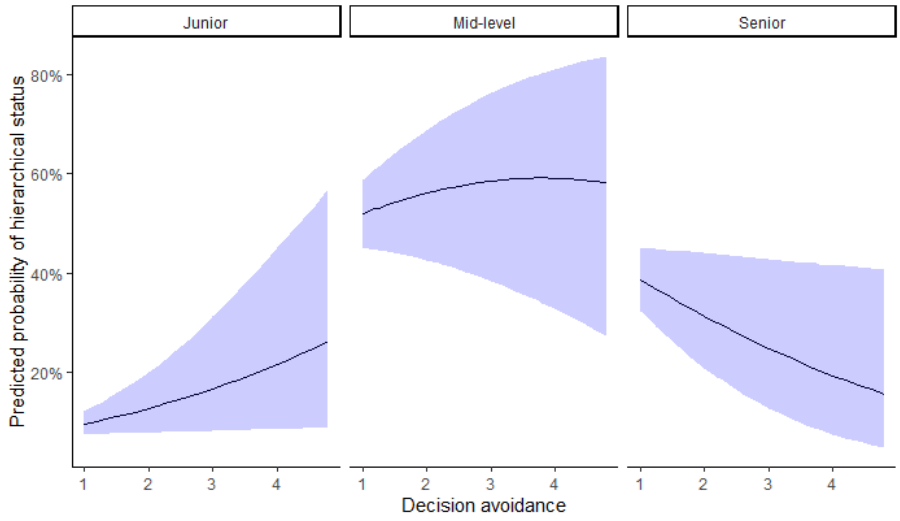

Figure 3.1. Decision avoidance predicting hierchical status (no control variables).

Following that, age, gender, education level, and career aspirations were added as control variables to the model described above. Seven observations were omitted due to missing data. Decision avoidance stopped being a significant predictor of hierarchical status, B = -0.27, SE = 0.15, OR = 0.76 (95% CI [0.56, 1.02]), p = .07. Age (B = 0.11, SE = 0.02, OR = 1.11 (95% CI [1.08, 1.15]), p < .001) and career aspirations (B = 0.61, SE = 0.17, OR = 1.85 (95% CI [1.32, 2.62]), p < .001) were statistically significant. McFadden pseudo-R^2 = .14. The Brant test showed that the parallel regression assumption was met, with a caveat that 3 combinations of independent and dependent variables did not occur. Generalised Variance Inflation Factors were calculated using the *vif* command in the *car* package. The highest GVIF value was 1.27, indicating no significant multicollinearity.

Predicted probabilities of hierarchical status depending on the value of the decision avoidance variable, while fixing age at the mean, gender at female, education level at Bachelor's degree or equivalent, and career aspirations at the mean, are shown in Figure 3.2.

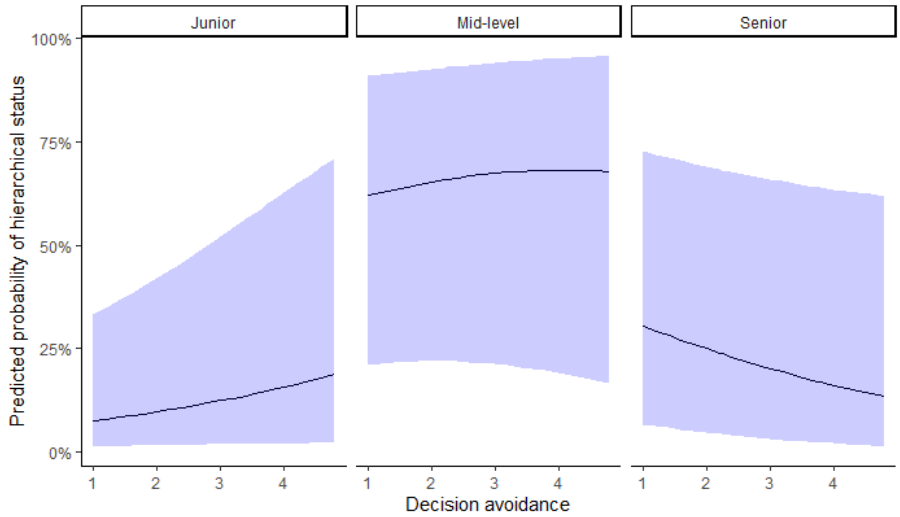

Figure 3.2. Decision avoidance predicting hierarchical status while controlling for age, gender, education level, and career aspirations.

3.2.2.1.2 Authority level as the outcome variable

To test the relationship between decision avoidance and authority level, a proportional odds logistic regression model was fitted. As previously, no control variables were entered at first. Decision avoidance was a significant predictor of authority level, *B* = -0.54, *SE* = 0.13, *OR* = 0.58 (95% CI [0.45, 0.75]), *p* < .001. McFadden pseudo-R^2 = .02. The Brant test of parallel regression showed that the assumption was met.

Predicted probabilities of authority level depending on the value of the decision avoidance variable were calculated. The plot showing the predictions is available in Figure 3.3.

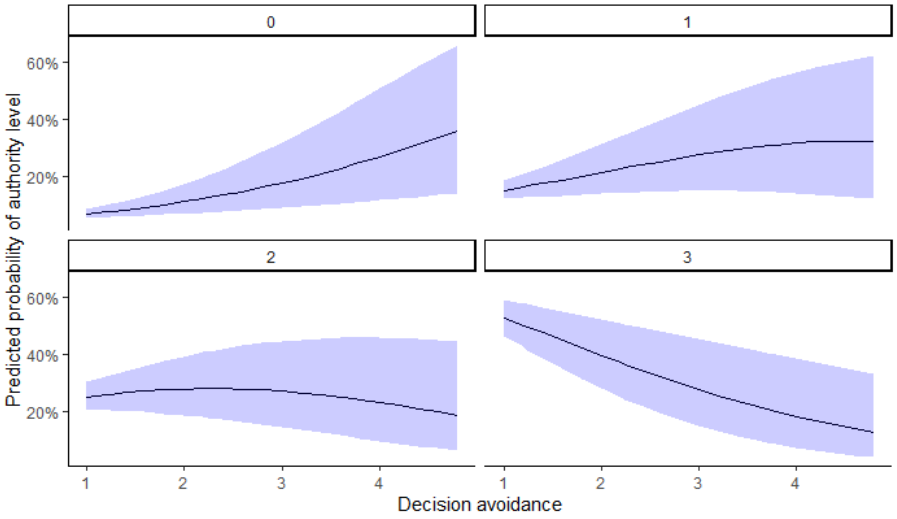

Figure 3.3. Decision avoidance predicting authority level (no control variables).

Then, age, gender, education level, and career aspirations were added as control variables to the model. Seven observations were omitted due to missing data. Decision avoidance was still a significant predictor of authority level, *B* = -0.52, *SE* = 0.14, *OR* = 0.59 (95% CI [0.45, 0.78]), *p* < .001. Age, *B* = 0.04, *SE* = 0.01, *OR* = 1.05 (95% CI [1.02, 1.07]), *p* < .001, male gender, *B* = 0.74, *SE* = 0.30, *OR* = 2.09 (95% CI [1.18, 3.77]), *p* < .05, and career aspirations, *B* = 0.62, *SE* = 0.16, *OR* = 1.85 (95% CI [1.36, 2.55]), *p* < .001, were significant. Education level was significant between some

categories, but the model including education level did not explain statistically significantly more variance than a model without it (likelihood ratio $\chi^2(4) = 7.37$, $p = .12$). McFadden pseudo-$R^2 = .09$. The Brant test showed that the parallel regression assumption was met, with a caveat that 7 combinations of independent and dependent variables did not occur. The highest GVIF value was 1.22, indicating no significant multicollinearity.

Predicted probabilities of authority level depending on the value of the decision avoidance variable, while fixing age at the mean, gender at female, education level at Bachelor's degree or equivalent, and career aspirations at the mean, are shown in Figure 3.4.

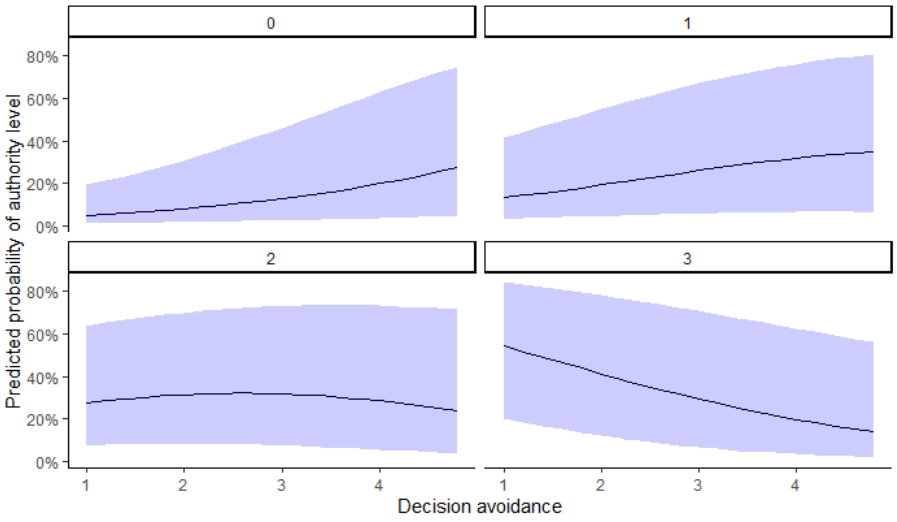

Figure 3.4. Decision avoidance predicting authority level while controlling for age, gender, education, and career aspirations.

To summarise, decision avoidance was a statistically significant predictor of hierarchical status, but not after the control variables were added. It statistically significantly predicted authority level even after controlling for age, gender, education level, and career aspirations. Therefore, Hypothesis 3.1 was partially supported.

3.2.2.2 Decision avoidance predicting intrinsic career outcomes

To test the relationship between decision avoidance and career satisfaction, a linear regression model was fitted, first without entering the control variables. Two observations were omitted due to missing data. Decision avoidance was a significant predictor of career satisfaction, B = -0.29 (95% CI [-0.42, -0.15]), SE = 0.07, p < .001. For each point increase in decision avoidance, career satisfaction decreased by 0.29 points. The model accounted for approximately 7% of the variance, R^2 = .07, *adj.* R^2 = .06, $F(1, 241) = 17.96$, p < .001. The model predictions are displayed in Figure 3.5.

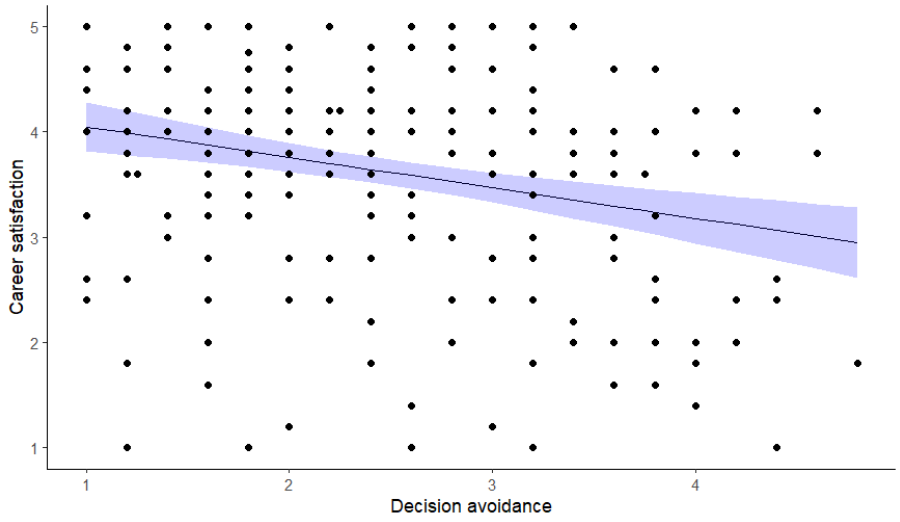

Figure 3.5. Decision avoidance predicting career satisfaction (no control variables).

The model residuals were slightly abnormally distributed, as shown in the quantile-comparison plot presented in Figure 3.6. The Shapiro-Wilk normality test was conducted to check the distribution of residuals and confirmed that they deviated from normality (W = 0.95, p < .001). Constant residual variance was checked using the non-constant variance score test (Breusch & Pagan, 1979) in the *car* package (Fox & Weisberg, 2019). No heteroscedasticity was detected ($\chi^2(1) = 0.63$, p = .43). Autocorrelated errors were checked using the Durbin-Watson test in the *car* package,

which showed that the residuals were independent (*D-W* = 1.98, p = .86). Linearity was assessed using a partial-residual plot presented in Figure 3.7. The Bonferroni Outlier Test (Fox & Weisberg, 2019) did not detect any residual outliers (Bonferroni *p* = .44). The largest Cook's distance was 0.06, below the recommended cut-off value of 1.

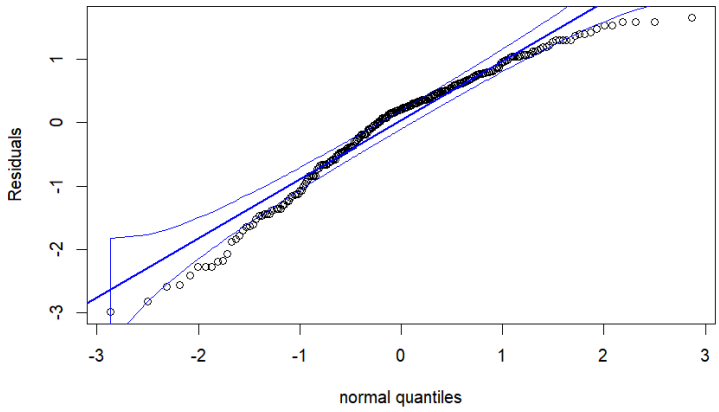

Figure 3.6. Decision avoidance and career satisfaction regression model diagnostics (without control variables): Quantile-comparison plot.
Compares model residuals to theoretically expected quantiles.

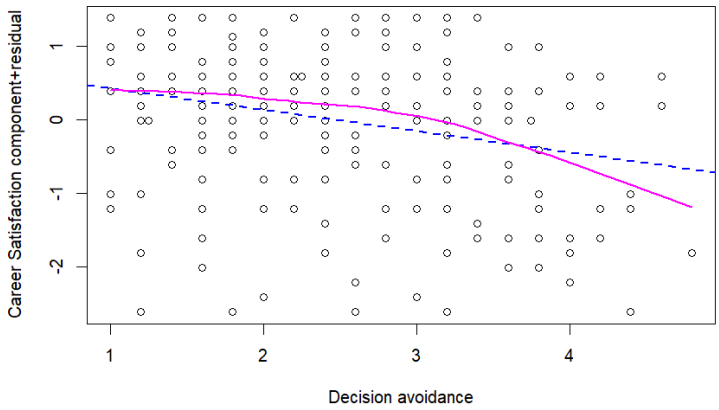

Figure 3.7. Decision avoidance and career satisfaction regression model diagnostics (without control variables): Partial-residual plot.
Model predictions are in the dashed blue line. Regression curve is in magenta.

Next, the control variables of age, gender, education, and career aspirations were entered into the model. Nine observations were omitted due to missing data. The updated model accounted for approximately 16% of the variance in career satisfaction,

R^2 = .16, *adj.* R^2 = .13, $F(8, 227) = 6.35$, $p < .001$. Avoidant decision making was a significant predictor of career satisfaction, B = -0.29 (95% CI [-0.43, -0.15]), SE = 0.07, $p < .001$. Since heteroskedasticity was detected in this model (see below), heteroskedastic-consistent standard errors (Astivia & Zumbo, 2019) were calculated using the *estimatr* package (Blair et al., 2022). For each point increase in decision avoidance, career satisfaction decreased by 0.29 points. The only other statistically significant predictor was education level as the model including it explained more variance compared to a model without it, $F(4) = 4.42$, $p < .01$. Model predictions for career satisfaction depending on the value of the decision avoidance variable, while fixing age at the mean, gender at female, education level at Bachelor's degree or equivalent, and career aspirations at the mean, are shown in Figure 3.8.

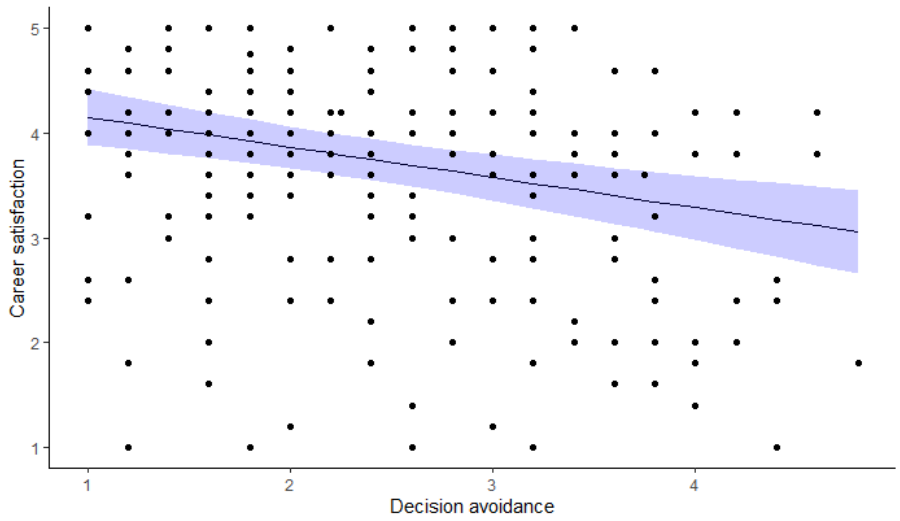

Figure 3.8. Decision avoidance predicting career satisfaction while controlling for age, gender, education level, and career aspirations.

The distribution of the residuals was skewed, as shown in the quantile-comparison plot presented in Figure 3.9. The Shapiro-Wilk normality test confirmed that they deviated from normality (W = 0.96, $p < .001$). Constant residual variance was checked using the non-constant variance score test. It detected slight heteroscedasticity between the fitted values and the predicted outcome ($\chi^2(1) = 4.00$, $p < .05$), which was addressed

by calculating heteroskedastic-consistent standard errors. A residual plot was constructed to examine the relationships between the residuals and the fitted values further. It is presented in Figure 3.10. Autocorrelated errors were checked using the Durbin-Watson test, which showed that the residuals were independent (*D-W* = 1.91, *p* = .52). Linearity was assessed using partial-residual plots, which did not show serious deviations from linearity. The plots are available in Appendix III (Appendix Figure 4). The highest GVIF value was 1.23, indicating no significant multicollinearity. The Bonferroni Outlier Test did not detect any residual outliers as there were no Studentized residuals with Bonferroni $p < .05$. The largest Cook's distance was 0.13.

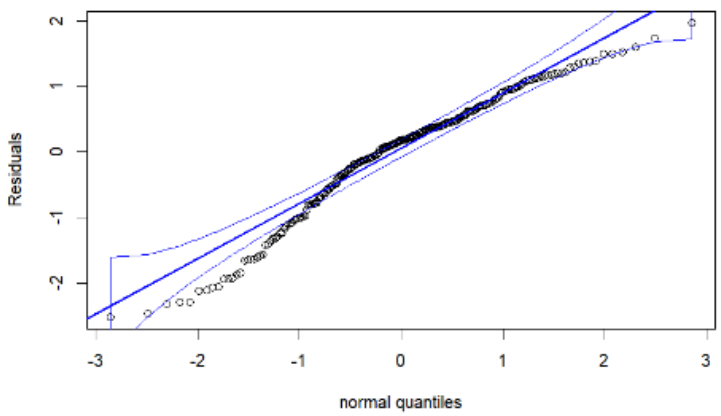

Figure 3.9. Decision avoidance and career satisfaction regression diagnostics (with control variables): Quantile-comparison plot.
Compares model residuals to theoretically expected quantiles.

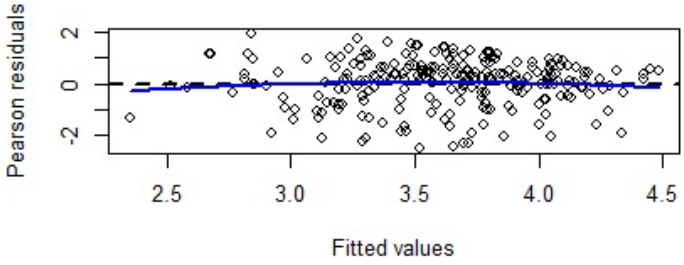

Figure 3.10. Decision avoidance and career satisfaction regression diagnostics (with control variables): Residual plot.
Shows relationships between residuals and predicted outcome.

Based on the two models reported above, Hypothesis 3.2 is supported.

3.2.2.3 Dependent decision making predicting extrinsic career outcomes

3.2.2.3.1 Hierarchical status as the outcome variable

The relationship between dependent decision making and hierarchical status was tested using a proportional odds logistic regression model. At first, no control variables were entered. Dependent decision making was not a statistically significant predictor of hierarchical status, B = -0.30, SE = 0.16, OR = 0.74 (95% CI [0.54, 1.01]), p = .06. McFadden pseudo-R^2 = .01. The Brant test of parallel regression showed that the assumption was met.

Predicted probabilities of hierarchical status depending on the value of the dependent decision making variable were calculated. The plot showing the predictions is available in Figure 3.11.

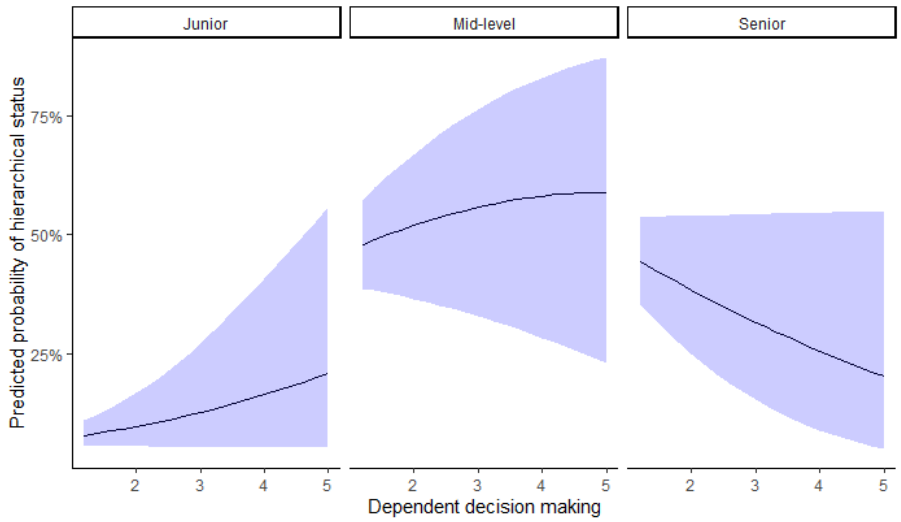

Figure 3.11. Dependent decision making predicting hierarchical status (no control variables).

After that, age, gender, education level, and career aspirations were added as control variables to the model. Seven observations were omitted due to missing data. Dependent decision making was not a significant predictor of hierarchical status, B = -

0.19, *SE* = 0.18, *OR* = 0.83 (95% CI [0.58, 1.18]), *p* = .30. In this model, hierarchical status was predicted by age. *B* = 0.10, *SE* = .02, *OR* = 1.11 (95% CI [1.08, 1.15]), *p* < .001. and career aspirations. *B* = 0.67, *SE* = 0.17, *OR* = 1.96 (95% CI [1.40, 2.76]), *p* < .001. McFadden pseudo-R^2 = .14. The Brant test showed that the parallel regression assumption was met, although three combinations of independent and dependent variables did not occur. The highest GVIF value was 1.24, indicating no significant multicollinearity.

Predicted probabilities of hierarchical status depending on the value of the dependent decision making variable, while fixing age at the mean, gender at female, education level at Bachelor's degree or equivalent, and career aspirations at the mean, are shown in Figure 3.12.

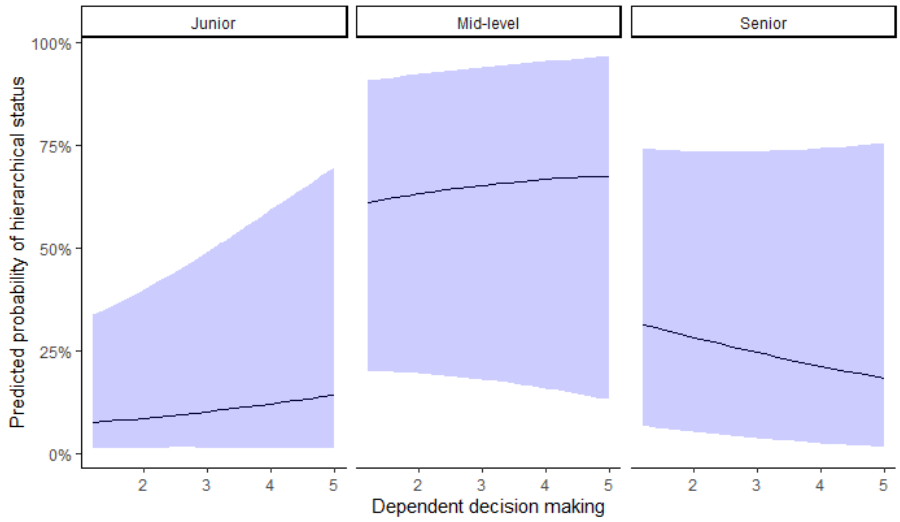

Figure 3.12. Dependent decision making predicting hierarchical status while controlling for age, gender, education level, and career aspirations.

3.2.2.3.2 Authority level as the outcome variable

The relationship between dependent decision making and authority level was tested using a proportional odds logistic regression model. No control variables were entered at first. Dependent decision making avoidance was not a significant predictor of authority level, *B* = -0.17, *SE* = 0.15, *OR* = 0.84 (95% CI [0.63, 1.13]), *p* = .24.

McFadden pseudo-R^2 = 0. The Brant test of parallel regression showed that the assumption was met.

Predicted probabilities of authority level depending on the value of the dependent decision making variable were calculated. The plot showing the predictions is available in Figure 3.13.

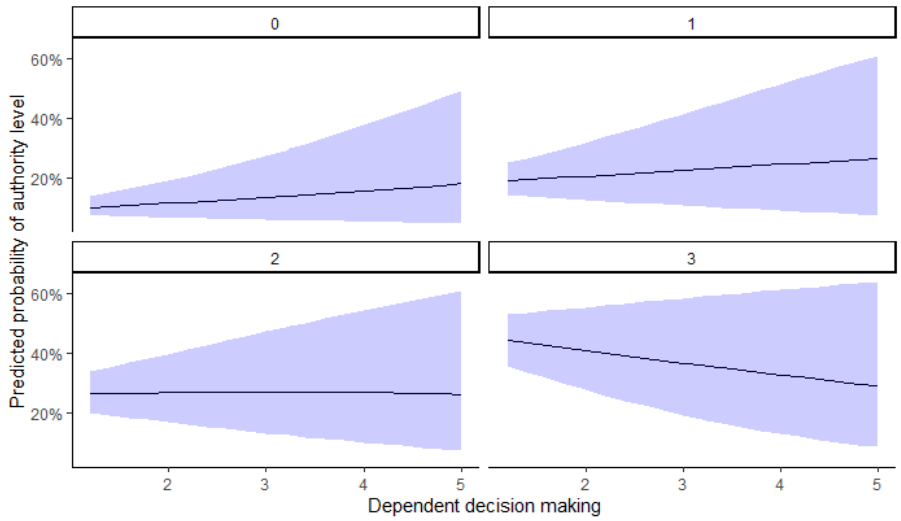

Figure 3.13. Dependent decision making predicting authority level (no control variables).

Following that, age, gender, education level, and career aspirations were added as control variables to the model. Seven observations were omitted due to missing data. Dependent decision making was not a significant predictor of authority level, B = -0.08, SE = 0.17, OR = 0.92 (95% CI [0.66, 1.28]), p = .62. Age, B = 0.05, SE = 0.01, OR = 1.05 (95% CI [1.02, 1.08]), p < .001, male gender, B = 0.64, SE = 0.29, OR = 1.89 (95% CI [1.08, 3.36]), p < .05, and career aspirations, B = 0.71, SE = 0.16, OR = 2.03 (95% CI [1.50, 2.78]), p < .001, were significant predictors. Education level was significant between some categories, but the model including education level did not explain statistically significantly more variance than a model without it (likelihood ratio $\chi^2(4) = 6.38$, p = .17). McFadden pseudo-R^2 = .06. The Brant test showed that the parallel regression assumption was met, although 7 combinations of independent and

dependent variables did not occur. The highest GVIF value was 1.21, indicating no significant multicollinearity.

Predicted probabilities of authority level depending on the value of the dependent decision making variable, while fixing age at the mean, gender at female, education level at Bachelor's degree or equivalent, and career aspirations at the mean, are shown in Figure 3.14.

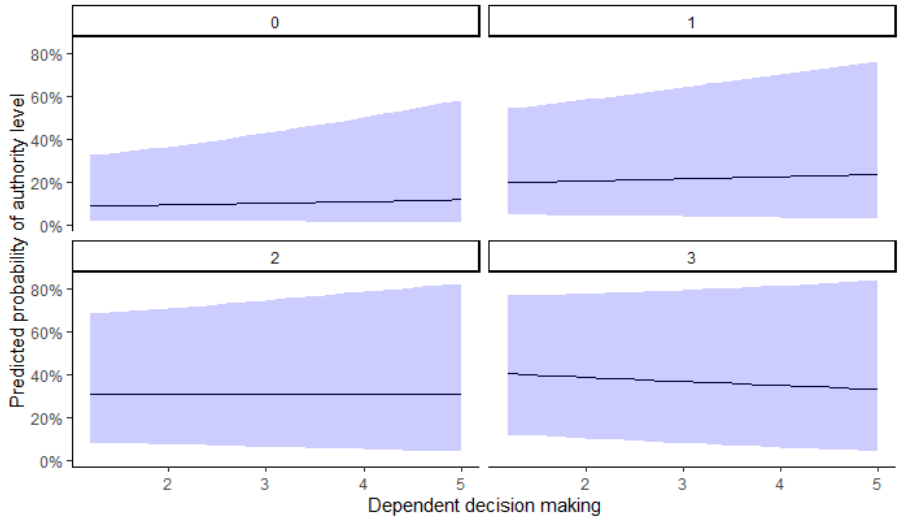

Figure 3.14. Dependent decision making predicting authority level while controlling for age, gender, education level, and career aspirations.

To summarise, dependent decision making did not predict either hierarchical status or authority level, even without controlling for demographic variables and career aspirations. Thus, Hypothesis 3.3 was not supported.

3.2.2.4 Dependent decision making predicting intrinsic career outcomes

To test the relationship between dependent decision making and career satisfaction, a linear regression model was fitted, first without entering the control variables. Two observations were omitted due to missing data. Dependent decision making was not a

significant predictor of career satisfaction, *B* = -0.05 (95% CI [-0.21, 0.11]), *SE* = 0.08, *p* < .56. The model did not account for a significant amount of variance, R^2 = 0, *adj.* R^2 = 0, *F*(1, 241) = 0.35, *p* = .56. The model predictions are displayed in Figure 3.15.

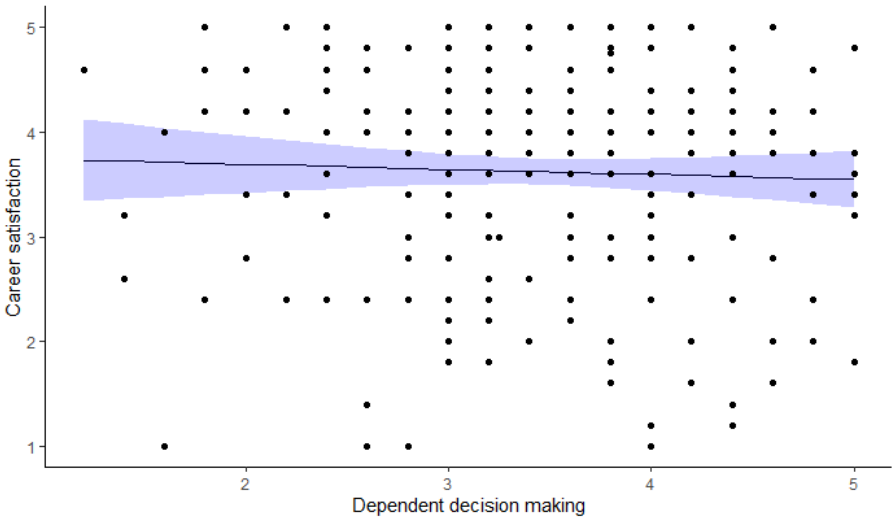

Figure 3.15. Dependent decision making predicting career satisfaction (no control variables).

The model residuals were abnormally distributed, as shown in the quantile-comparison plot presented in Figure 3.16. The Shapiro-Wilk normality test was conducted to check the distribution of residuals and confirmed that they deviated from normality (*W* = 0.93, *p* < .001). Constant residual variance was checked using the non-constant variance score test. No heteroscedasticity was detected ($\chi^2(1) = 0$, *p* = .96). Autocorrelated errors were checked using the Durbin-Watson test, which showed that the residuals were independent (*D-W* = 1.99, *p* = .98). Linearity was assessed using a partial-residual plot presented in Figure 3.17. The Bonferroni Outlier Test did not detect any residual outliers as there were no Studentized residuals with Bonferroni *p* < .05. The largest Cook's distance was 0.11.

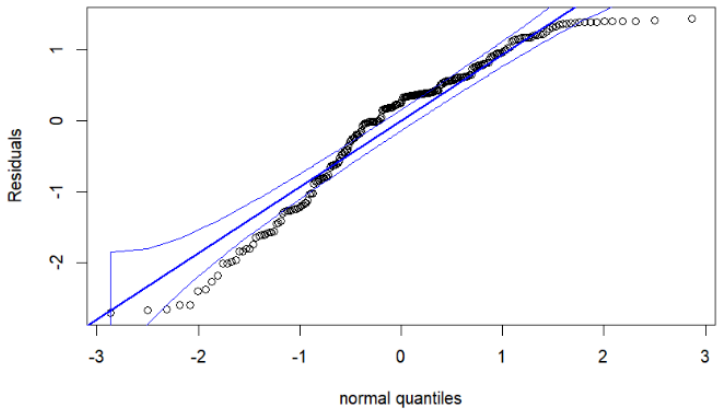

Figure 3.16. Dependent decision making and career satisfaction regression model diagnostics (no control variables): Quantile-comparison plot.
Compares model residuals to theoretically expected quantiles.

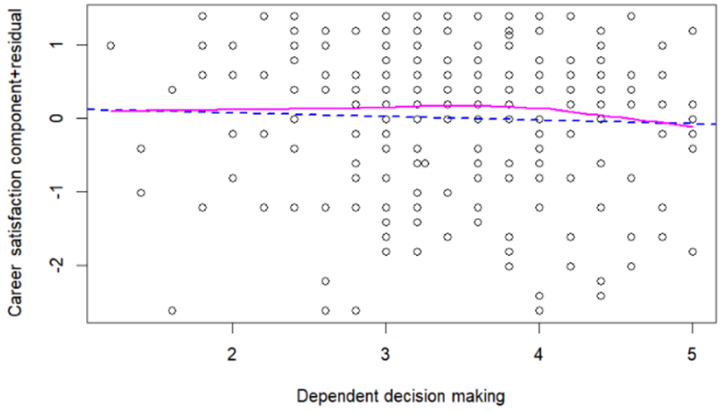

Figure 3.17. Dependent decision making and career satisfaction regression model diagnostics (no control variables): Partial-residual plot.
Model predictions are in the dashed blue line. Regression curve is in magenta.

Following that, the control variables of age, gender, education, and career aspirations were entered into the model. Nine observations were omitted due to missing data. Dependent decision making was not a significant predictor of career satisfaction, B = -0.09 (95% CI [-0.28, 0.10]), SE = 0.10, p = .36. The updated model accounted for approximately 10% of the variance in career satisfaction, R^2 = .10, *adj.* R^2 = .07, $F(8, 227) = 3.10$, $p < .01$. The only statistically significant predictor was education level as the model including it explained more variance compared to a model without it, $F(4) = 4.08$, $p < .01$. Model predictions for career satisfaction depending on the value of the dependent decision making variable, while fixing age at the mean, gender at female,

education level at Bachelor's degree or equivalent, and career aspirations at the mean, are shown in Figure 3.18.

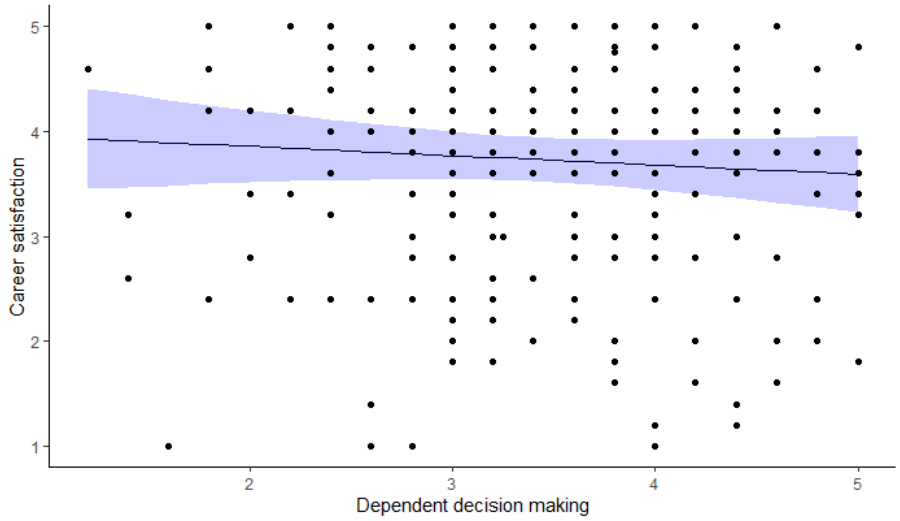

Figure 3.18. Dependent decision making predicting career satisfaction while controlling for age, gender, education level, and career aspirations.

The distribution of the residuals was skewed, as shown in the quantile-comparison plot presented in Figure 3.19. The Shapiro-Wilk normality test confirmed that they deviated from normality ($W = 0.95$, $p < .001$). Constant residual variance was checked using the non-constant variance score test. It detected slight heteroscedasticity between the fitted values and the predicted outcome ($\chi^2(1) = 4.62$, $p < .05$), addressed by calculating heteroskedastic-consistent standard errors. A residual plot was constructed to examine the relationships between the residuals and fitted values further. It is presented in Figure 3.20. Autocorrelated errors were checked using the Durbin-Watson test, which showed that the residuals were independent ($D\text{-}W = 1.94$, $p = .58$). Linearity was assessed using partial-residual plots, which did not show serious deviations from linearity. The plots are available in Appendix III (Appendix Figure 5). The highest GVIF value was 1.22, indicating no significant multicollinearity. The Bonferroni Outlier Test did not detect any residual outliers (Bonferroni $p = .50$). The largest Cook's distance was 0.16.

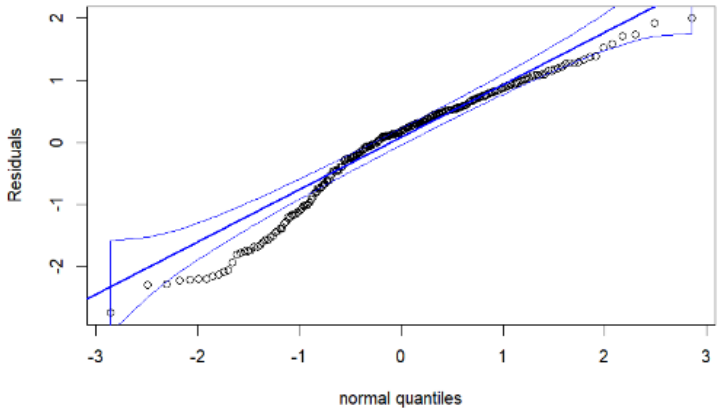

Figure 3.19. Dependent decision making and career satisfaction regression model diagnostics (with control variables): Quantile-comparison plot.
Compares model residuals to theoretically expected quantiles.

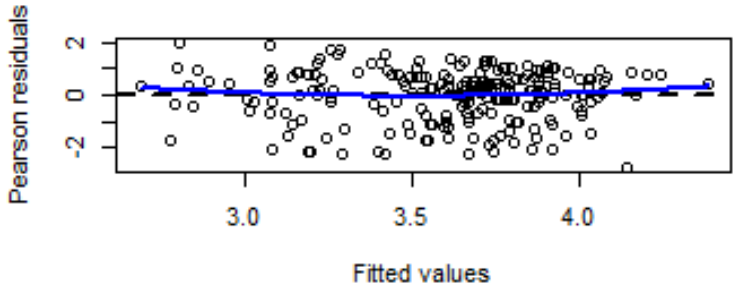

Figure 3.20. Dependent decision making and career satisfaction regression model diagnostics (with control variables): Residual plots.
Showing relationships between residuals and predicted outcome**.**

Based on the two models reported above, Hypothesis 3.4 is not supported.

3.2.2.5 Integrated models

To test whether controlling for dependent decision making made a difference to the predictive power of decision avoidance, another two models were run with authority level and with career satisfaction as outcomes respectively. Both models included age, gender, education level, and career aspirations as control variables.

3.2.2.5.1 Authority level as the outcome variable

Seven observations were omitted due to missing data. Decision avoidance was still a significant predictor of authority level, B = -0.57, SE = 0.15, OR = 0.56 (95% CI [0.42, 0.75]), $p < .001$, and dependent decision making was not, B = 0.16, SE = 0.18, OR = 1.18 (95% CI [0.83, 1.68]), $p = .36$. Age, B = 0.05, SE = 0.01, OR = 1.05 (95% CI [1.02, 1.08]), $p < .001$, male gender, B = 0.78, SE = 0.30, OR = 2.19 (95% CI [1.22, 3.99]), $p < .01$, and career aspirations, B = 0.60, SE = 0.16, OR = 1.83 (95% CI [1.34, 2.52]), $p < .001$, were significant. Education level was significant between some categories, but the model including education level did not explain statistically significantly more variance than a model without it (likelihood ratio $\chi^2(4) = 6.93$, $p = .14$). McFadden pseudo-R^2 = .09. The Brant test showed that the parallel regression assumption was met, with a caveat that 7 combinations of independent and dependent variables did not occur. The highest GVIF value was 1.29, indicating no significant multicollinearity.

Predicted probabilities of authority level depending on the value of the decision avoidance variable, while fixing dependent decision making, age, and career satisfaction at the mean, gender at female, and education level at Bachelor's degree or equivalent, are shown in Figure 3.21.

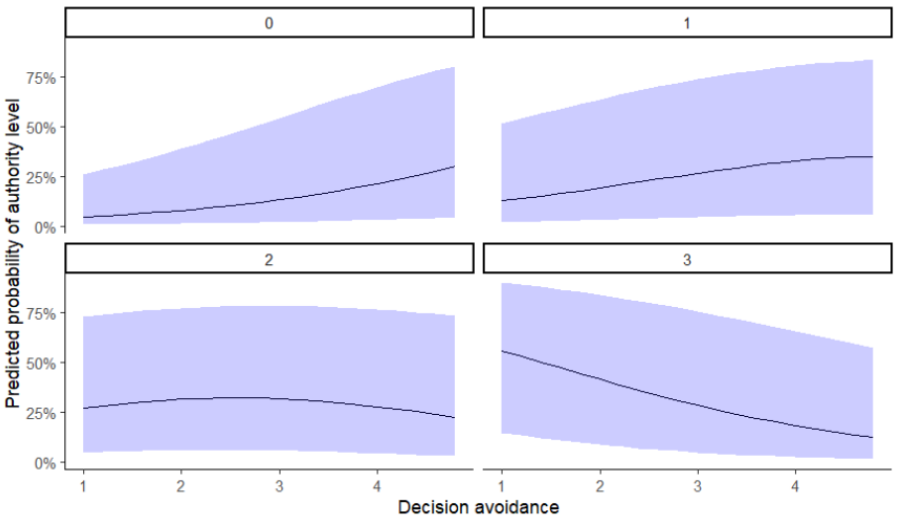

Figure 3.21. Decision avoidance predicting authority level while controlling for dependent decision making, age, gender, education level, and career aspirations.

This model provides further support for Hypothesis 3.1.

3.2.2.5.2 Career satisfaction as the outcome variable

Nine observations were omitted due to missing data. Decision avoidance was still a significant predictor of career satisfaction, B = -0.30 (95% CI [-0.44, -0.16]), SE = 0.07, p < .001, while dependent decision making was not, B = 0.04 (95% CI [-0.14, 0.21]), SE = 0.09, p = .67. The model accounted for approximately 16% of the variance in career satisfaction, R^2 = .16, *adj.* R^2 = .13, $F(9, 226) = 4.92$, p < .001. The only other statistically significant predictor was education level as the model including it explained more variance compared to a model without it, $F(4) = 4.19$, p < .01. Model predictions for career satisfaction depending on the value of the avoidant decision making variable, while fixing dependent decision making, age, and career aspirations at the mean, gender at female, and education level at Bachelor's degree or equivalent, are shown in Figure 3.22.

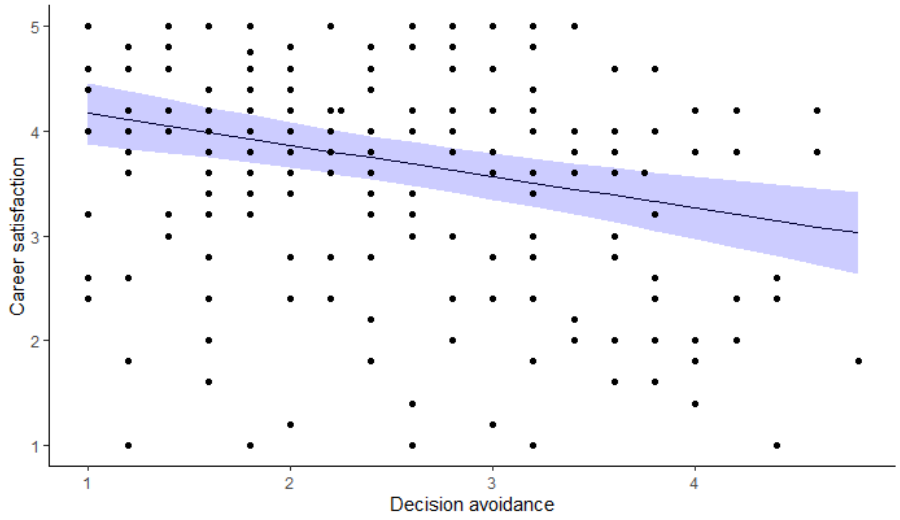

Figure 3.22. Decision avoidance predicting career satisfaction while controlling for dependent decision making, age, gender, education level, and career aspirations.

The distribution of the residuals was skewed, as shown in the quantile-comparison plot presented in Figure 3.23. The Shapiro-Wilk normality test confirmed that they deviated from normality (W = 0.96, p < .001). Constant residual variance was checked using the non-constant variance score test. It did not detect significant heteroscedasticity ($\chi^2(1)$ = 3.74, p = .05). Autocorrelated errors were checked using the Durbin-Watson test, which showed that the residuals were independent (D-W = 1.91, p = .51). Linearity was assessed using partial-residual plots, which did not show serious deviations from linearity. The plots are available in Appendix III (Appendix Figure 6). The highest GVIF value was 1.29, indicating no significant multicollinearity. The Bonferroni Outlier Test did not detect any residual outliers as there were no Studentized residuals with Bonferroni p < .05. The largest Cook's distance was 0.12.

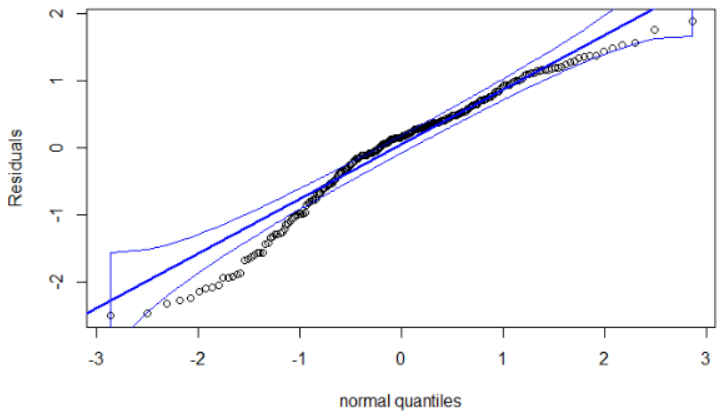

Figure 3.23. Decision avoidance, dependent decision making, and career satisfaction regression model diagnostics (with control variables): Quantile-comparison plot.
Compares model residuals to theoretically expected quantiles.

Thus, further support for Hypothesis 3.2 is provided.

3.2.2.6 Agreement between the extrinsic career outcomes measures

To measure the agreement between the hierarchical status and authority level measures, a chi-square test was conducted. It showed a significant relationship between the two measures, χ^2 (6, 245) = 111.04, p < .001. This relationship is illustrated in the balloon plot in Figure 3.24. Area is proportionate to frequency. However, as can be seen from the table, there is still variation. For example, a few participants in senior positions reported low levels of authority, while a some respondents occupying junior positions had high authority levels.

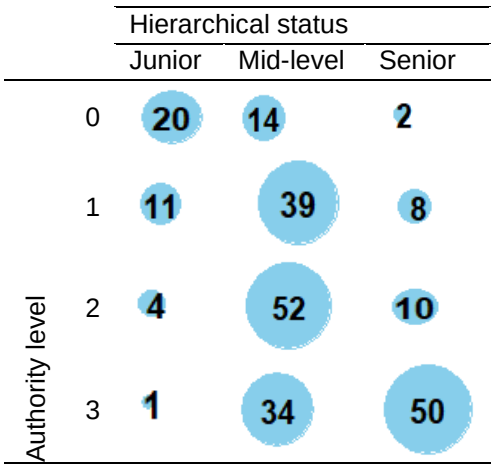

Figure 3.24. A balloon plot showing the relationship between the hierarchical status and authority level variables

3.3 Discussion

3.3.1 Avoidant and dependent decision making in the organisational context

3.3.1.1 Overview

Decision avoidance and increased reliance on other people for making decisions are common responses to difficult decision situations (Janis & Mann, 1976; Scott & Bruce, 1995), but they are understudied in organisational research. The construct of decisiveness has received some attention in the leadership literature, which shows it as an important attribute of a successful leader (Aramovich & Blankenship, 2020; Bernheim & Bodoh-Creed, 2020; Brodbeck et al., 2000). However, the only other study attempting to predict career outcomes from decisive behaviour found during the literature search for this chapter examined the differences in decisiveness between top-level executives and other employees (Wille et al., 2018).

Here, a more granular approach was taken and career outcomes were examined from two different perspectives. Hierarchical status and authority level were used to measure extrinsic career outcomes. Participants were also asked to complete a career satisfaction questionnaire as a measure of intrinsic career outcomes. Moreover, the

study presented in this chapter examined two behaviours marked by indecisiveness: decision avoidance and dependence on other people in making decisions. Both these behaviours fall outside the remit of traditional normative theories of decision making, which view people as rational agents that act in a way that maximises the utility of decision outcomes (H. A. Simon, 1955). They are not usually covered by descriptive theories, such as the heuristics and biases approach (Stanovich & West, 1998; Tversky & Kahneman, 1974), either: such theories aim to document how people decide, not how they fail to decide. One of the first major attempts to acknowledge decision avoidance and dependence on other people in making choices, referred to as "buck-passing", came from Janis and Mann (1976, 1977). They proposed that in stressful situations in which both acting and failing to act are perceived as risky and the probability of finding a more optimal solution is thought to be low, people are likely to resort to what is referred to as *defensive avoidance.* It may manifest in putting off the decision or shifting the responsibility for it on to someone else: the two constructs of interest in this chapter.

In the work context, Janis and Mann's (1976) model suggests that organisational culture in which mistakes are punishable, achievements are not recognised, and the level of support is low, stressful decision situations are likely to lead employees to suboptimal approaches to decision making, such as avoidance and overreliance on others. Such behaviours may hinder progress and create unnecessary barriers to change.

First, avoiding decisions may result in missed opportunities because people who are reluctant to change the status quo are more likely not to recognise opportunities and less likely to act on them (Bateman & Crant, 1993). Any decision may be construed in terms of risk and uncertainty that it entails and people are unlikely to take a risk if they think that the pay-off will not be worth it (Figner & Weber, 2011). Consequently, in an organisation where punishments for mistakes are high and rewards for achievements

are low, employees may be unwilling to take initiative and play an active role in decision making in case the decision fails to bring about a positive outcome.

Second, workers who are reluctant to make decisions due to being worried about potential negative outcomes may attempt to escape some or all of the responsibility for the decision by enlisting others in the decision-making process (Dewberry et al., 2013). Soliciting advice and reassurance thus allows to diffuse responsibility, but high reliance on others in making decisions may instil a culture of unnecessary consultation and slow down the workflow. It has been suggested that people are especially likely to delegate decisions that affect other people out of the desire to avoid responsibility and blame if the outcome is suboptimal (Steffel et al., 2016). This is especially relevant in the work context where decisions that people make tend not to be personal but rather affect the organisation in one way or another. In addition to the negative effects the avoidance of decisions may cause in organisations, it may have personal consequences for decision-avoidant employees.

3.3.1.2 Findings of this study

The results of the study reported in this chapter show that decision avoidance can predict how much authority an employee has in the workplace and how satisfied they are with their career over and above demographic factors, such as age, gender, and the level of education as well as career aspirations. After the control variables were added, decision avoidance stopped being a statistically significant predictor of hierarchical status.

As demonstrated earlier in the chapter, in this sample, the association between hierarchical status and the level of authority was significant but not perfect and many participants who reported occupying mid-level positions in their organisations also stated they wielded significant authority in the workplace. Specifically, authority was measured as being permitted to delegate work, having project responsibility, and

occupying an official leadership position (Abele & Spurk, 2009). The first two questions are particularly important since they allow to differentiate employees who do not occupy managerial positions but still have significant responsibility in the workplace. These results suggest that positions below senior may still involve substantial authority. In turn, authority entails decision-making power. For example, even without being in a senior managerial position, employees with project responsibility and delegating powers have to regularly exercise their decision making. As a result, the measure of authority might be a better indicator of decision-making powers than hierarchical status. In addition, in this research, participants came from a variety of industries and hierarchical status across different industries may not be directly comparable. On the contrary, the authority measure is less ambiguous since it asks about specific powers and responsibilities. Consequently, decision avoidance in this study was a better predictor of having authority in the workplace than of hierarchical status.

Moreover, decision avoidance was positively associated with intrinsic career outcomes, operationalised as career satisfaction. Based on the previous research into the links between decisiveness and proactivity (Jenkins & Jeske, 2017), it is suggested that decision avoidant individuals are less likely to exhibit proactivity in crafting their jobs and work environment to better suit their needs and desires, which leads to less satisfaction with their careers. A possible explanation for this is that taking action to influence one's career path and work environment requires making many decisions with uncertain outcomes, such as changing jobs, applying for promotions, and proposing new initiatives. If so, employees who tend to avoid making decisions unless necessary are more likely to miss out on opportunities to better their work context.

Because of the cross-sectional design of this study, it is not possible to make conclusions about the causal nature of the relationship between decision avoidance and career outcomes. One option is that decision avoidant people make less progress to positions of authority and are less satisfied with their careers because of their indecisiveness and the missed opportunities that it causes. Another option is that this

relationship has the opposite direction. When it comes to authority in the workplace, it is possible that occupying a position that involves a lot of authority causes people to be more decisive so that they can cope with the demands of the job better. As for career satisfaction, people content with their careers may have a more positive outlook, be more confident in their decisions, and therefore be less decision avoidant. A third alternative is that this relationship is bi-directional: while decision avoidance hinders progression to positions of authority and prevents people from achieving satisfaction with their careers, failing to reach higher career outcomes also diminishes people's trust in their decisions and therefore makes them more decision avoidant. A longitudinal research design of long enough duration to capture significant changes in the participants' career journeys would shed more light on this relationship.

Contrary to the expectations, no relationships were detected between dependent decision making and either extrinsic or intrinsic career outcomes. There are a number of potential explanations for the lack of such links. First, relying on other people's advice may signify a willingness to engage others in decision making and recognition of limitations to one's knowledge. These may be viewed as desirable characteristics regardless of seniority and result in better quality decisions, which in turn may lead to better performance and bring higher career success. At the same time, such positive effects of consulting others before making decisions may be counteracted by the lack of independence which is increasingly required the higher one climbs the career ladder. Besides, the higher position one occupies, the fewer people are available to give advice since the structure of the organisational hierarchy tends to shrink towards the top. Second, the ability to rely on others for decision-making advice may indicate a supportive work environment, which, in turn, can contribute to career satisfaction (Ng & Feldman, 2014). Therefore, even if an employee fails to achieve personal goals for career advancement, the negative effects on career satisfaction may be mitigated by a welcoming environment in the organisation in which they work.

3.3.1.3 Implications for research and practice

There is a surprising lack of prior literature investigating the relationships between indecisive behaviour and career outcomes. Perhaps one of the reasons why indecisiveness has received relatively little attention in organisational research, especially outside the remit of leadership literature, is because people do not necessarily realise how many decisions they make in their professional capacity every day. Decision making at work is often associated with high stake choices that are the responsibility of managers. However, upon closer examination, it becomes apparent that every employee makes a large number of decisions on a daily basis. Some of the choices may appear trivial, but they may affect the speed of the workflow, the well-being of colleagues, and other higher-stake decisions. For example, hesitating about informing the supervisor about a problem and putting it off until it is impossible to ignore any longer may result in missed opportunities to mitigate the negative consequences of the problem. Consulting a large number of colleagues before committing to a course of action for the sole reason of receiving reassurance from them not only slows down the workflow of the project in question, but also places additional demands on the colleagues' time that could be used more productively.

Consequently, to improve the quality and efficiency of decision making at work, equipping staff with rational decision-making tools may not be sufficient. Before staff can apply their rational decision-making skills, they have to commit to making a decision in the first place. While no evidence for the relationship between dependent decision making and individual career outcomes was found, both avoidance of decisions and high dependence on others in making them may negatively affect organisations due to the reasons outlined above. Finding ways to mitigate such indecisive behaviours in staff may therefore be beneficial for both individual employees and organisations.

3.3.2 Limitations

This study has a number of limitations. First, a convenience sample recruited via online invitations, mainly on social media networks, was used. Women, white people, and university degree holders are overrepresented here compared to UK working age population averages (Office for National Statistics, 2012, 2018, 2020), so caution should be taken when interpreting the results.

Decision avoidance and dependence were measured through self-reports. Adding colleague and/or manager ratings may improve understanding of how one's decision making is viewed by others, especially those who make promotion decisions. Instead of using a self-reported questionnaire, future studies may measure decision avoidance and dependence on others by presenting participants with vignettes containing decision-making scenarios and asking them to indicate what decision, if any, they would make. As for the self-reported measures, future researchers may examine the possibility of developing a measure of dependent decision making that more clearly separates helpful advice seeking from a maladaptive inability to make decisions without approval from others than the *Dependent* subscale of the GDMS (Scott & Bruce, 1995) does.

In addition, in some industries there may be better indicators of extrinsic career outcomes than hierarchical status and authority level. Originally, data collection for this study was planned through approaching organisations at trade fairs to ensure that participants came from the same industry or a small number of industries to facilitate the interpretation of results. However, the COVID-19 pandemic restricted recruitment to online avenues. Focusing future studies on individual industries, with industry-specific career outcome measures, may provide a more fine-grained understanding of how decision making is linked to career outcomes.

Finally, future research may examine proactive behaviour and job performance as mediators of the relationship between decision avoidance and career outcomes.

3.3.3 Conclusion

To summarise, in the study reported in this chapter, a negative relationship between decision avoidance and authority in the workplace, and decision avoidance and career satisfaction, was detected. Hierarchical status was not associated with decision avoidance after controlling for demographic variables and career aspirations and dependent decision making was not associated with any of the career outcome variables. While no causal assumptions can be drawn due to the cross-sectional design of this study, existing research on decisiveness in leadership (Bernheim & Bodoh-Creed, 2020; Brodbeck et al., 2000; A. F. Simon, 2006; Wille et al., 2018) suggests that people who avoid making decisions may find it difficult to be promoted to positions in which high-stake decision making is expected and to stay in such positions.

Viewing these findings from the person-situation interaction perspective (Terborg, 1981), it is suggested that even in employees generally predisposed to avoidant decision making, such behaviour may be mitigated to help them improve their career outcomes. Previous studies have linked decision avoidance to low decision confidence (Leykin & DeRubeis, 2010), anticipated blame (Tetlock & Boettger, 1994), and anxiety (Dewberry et al., 2013; Umeh & Omari-Asor, 2011). Some of these factors may be addressed in an organisational setting, which may result in improved career prospects and satisfaction in employees. For example, there is much evidence that poor psychosocial work environment is associated with an increase in anxiety (Andrea et al., 2009; Murcia et al., 2013). Therefore, making improvements to the work environment targeted at reducing work-related anxiety and the culture of blame may positively affect employees' decision-making abilities. Furthermore, staff who avoid making decisions due to low confidence in their correctness might benefit from training aimed at introducing strategies for rational decision making and raising awareness of common decision-making biases.

In the next chapter, some of the potential reasons behind avoidant and dependent decision making will be explored in the workplace context, with a view to providing organisations with ideas on how to mitigate such behaviours through improving employee well-being.

4 Avoidant and dependent decision making and the psychosocial work environment

4.1 Literature review

4.1.1 Introduction

In the previous chapter, the constructs of avoidant and dependent decision making were introduced and the results of a study investigating their relationships with career outcomes were reported. The findings indicated that avoidant decision making was negatively associated with the level of authority in the organisation and with career satisfaction, but not with hierarchical status. Dependent decision making was not associated with any of the career outcome variables.

In this chapter, organisational factors associated with these two decision-making behaviours are explored, with a view to providing organisations with information to help them improve staff decision making. Drawing from the previous research that demonstrated the links between avoidant and dependent decision making and anxiety (Dewberry et al., 2013; Umeh & Omari-Asor, 2011) and between anxiety and the psychosocial work environment (Andrea et al., 2009; Murcia et al., 2013), this chapter examines how these four constructs relate to each other.

First, the discussion about the relationships between anxiety and decision making briefly reviewed in the previous chapter is expanded on. Then, an overview of research linking the psychosocial work environment and employee well-being, with a focus on anxiety, is provided. Following that, a conceptual model of the relationships between the variables of interest is proposed and the results of a study investigating these relationships are reported. The chapter closes with a discussion about how these findings fit into current research into avoidant and dependent decision making and well-being in the workplace.

4.1.2 The links between anxiety and avoidant and dependent decision making

4.1.2.1 Potential antecedents of avoidant and dependent decision making

Here, the discussion about decision avoidance and dependence started in the previous chapter (see 3.1.2.2 and 3.1.2.3) is expanded on. In Chapter 3, the definitions of these two decision-making behaviours adopted in this research were provided and some of their potential causes proposed in the existing literature were discussed. To remind the reader, decision avoidance is understood here as the deferral of choice, while dependent decision making is defined as seeking assistance and approval from others before committing to a decision.

Avoidant and dependent decision making are sometimes conceptualised as individual decision-making styles, a habitual responses to decision situations (Scott & Bruce, 1995). However, a number of factors have been suggested to increase their incidence. In the previous chapter, it was discussed that choice difficulty (Tversky & Shafir, 1992), decision-related anxiety (Dewberry et al., 2013), low decision confidence (Leykin & DeRubeis, 2010), anticipated regret (Beattie et al., 1994), and anticipated blame (Tetlock & Boettger, 1994) are connected to increased incidence of decision avoidance. High dependence on others in making decisions is often thought to stem from the desire to avoid taking full responsibility for the decision, especially in situations when it still has to be made (Dewberry et al., 2013; Steffel & Williams, 2018) and has also been linked to decision anxiety and low decision confidence (Leykin & DeRubeis, 2010) as well as blame avoidance (Tetlock & Boettger, 1994). While anxiety and lack of confidence are personal rather than situational factors, in a stressful and hostile environment they are more likely to manifest due to the lack of protective factors that may help to mitigate them. Therefore, following the person-situation interaction perspective (Terborg, 1981), it is suggested that both personal and situational characteristics are likely to influence the incidence of avoidant and dependent decision making. A similar pattern has been observed in another, related line of research briefly

discussed in the previous chapter: the relationship between proactive personality and proactive behaviour was moderated by situational context—in that case, transformational leadership (McCormick et al., 2019). More specifically, while in low transformational leadership conditions there was a significant association between proactive personality and proactive behaviour, under high transformational leadership, that association was not significant and participants scored high on proactive behaviour regardless of their proactive personality score. Therefore, taking into consideration the previous research into the antecedents of avoidant and dependent decision making, it is suggested that the incidence of such behaviours may be reduced even in employees highly susceptible to them by manipulating organisational factors linked to their increase.

In this chapter, the focus is on a number of aspects of psychosocial work environment, which will be explained in more detail in a later section. It is suggested that increased anxiety is the link between poor psychosocial work environment and avoidant and dependent decision making. Below, it is explained why such a link should exist by first expanding on the discussion about the relationships between anxiety and decision making and then introducing the concept of psychosocial work environment and discussing how it relates to employee well-being and specifically to anxiety.

4.1.2.2 Anxiety and risk perception

The relationship between anxiety and decision avoidance has long been of interest to researchers. As outlined in section 3.1.2.1.1 of this thesis, research into emotional processes in decision making distinguishes between anticipated and anticipatory emotions, with the former referring to how the decision maker expects to feel in response to the outcome of the decision, while the latter captures the emotions experienced in response to having to make a decision (Loewenstein et al., 2001). In addition, authors such as Lerner *et al.* (2000) discriminate between integral and

incidental affect, whereby integral emotions are relevant to the decision and incidental ones should have no bearing on it according to the models of rational decision making. For example, an angry emotional state which the decision maker is in at the time when the decision problem is presented to them may affect their risk perception and consequently the choice they make, even though rationally it should not. Anxiety may be either an anticipatory emotion as a response to the decision situation or an incidental one, having no relation to the decision but still affecting the way the decision maker approaches it. As such, previous research found links between self-reports of decision avoidance and both trait (Umeh & Omari-Asor, 2011) and decision-related (Dewberry et al., 2013) anxiety.

To facilitate the discussion about the potential reasons for the relationship between anxiety and decision avoidance, the concept of risk avoidance needs to be introduced. Decisions are usually made in the conditions of uncertainty. One rarely knows the outcomes of different courses of action for sure and has to choose based on their assessment of probability that a certain event will occur and the utility (or disutility) they expect to draw from such an event, as is succinctly summarised by models such as those under the Subjective Expected Utility umbrella (Fishburn, 1981), discussed in more detail in Chapter 2. Therefore, an important skill for successful decision making is analysing risks and potential benefits of different decision options and being able to learn from previous decision making experience (Lorian & Grisham, 2010). As a simple everyday example, when deciding where to eat lunch, one may have to choose between a chain shop and an independent café, with the former being expected to provide a predictable mediocre experience and the latter having a roughly equal chance of being either very satisfying or very unsatisfying. In this example, the decision is likely to depend on the decision maker's willingness to take a higher risk in return for higher reward—tasty food and a pleasant atmosphere. The assessment of the probability of an outcome can be framed in terms of risk perception: for example, one may judge the risk of being disappointed as 50%. In addition to individual differences in

the tendency to take risks, which is thought to be associated with sensation seeking propensities (Bornovalova et al., 2009; Horvath & Zuckerman, 1993), risk perceptions in relation to the same event may differ between individuals as well as within individuals depending on the circumstances of the decision.

Below, existing research into the links between anxiety and risk perception is discussed, in an attempt to explain the mechanism through which anxiety may cause people to be more risk and, subsequently, decision avoidant.

A frequently cited study by Butler and Mathews (1987) found that both state and trait anxiety were associated with higher assessments of the probability of negative events. They surveyed a group of 62 undergraduate students, half of whom expected to sit a major examination, twice, 4 weeks apart. In the case of the group sitting exams, the second survey happened the day before it and the students reported feeling significantly much more anxious than at Time 1. In both groups, students who scored high on trait anxiety rated hypothetical negative events, both exam-related and non-exam-related, as more likely to happen, and especially more likely to happen to them rather than to other people, than the low-trait-anxiety group. On the contrary, when it came to positive events, the high-trait-anxiety group ranked the probability of such events happening to themselves as significantly lower than the low-trait-anxiety group, although the ratings of the probability of positive events happening to another person did not differ between the groups. In addition, at Time 2, the day before the exam, the examination group, in which the mean level of state anxiety was significantly higher than at Time 1, rated the probability of negative events related to the exam happening to them much higher than the non-examination group, suggesting that their risk perception was inflated along with the rise in state anxiety. It may be the case that the imminence of the exam caused their evaluations to differ significantly from the non-exam group, but there was no difference in the ratings of negative events happening to someone else between the exam and the non-exam group, which was also lower than the self-rating of the exam group. The risk estimates—and state anxiety levels—fell

again in the examination group a week after the exam but before the results were released. In summary, in this study, trait anxiety was associated with a global increase in ratings of the probability of negative events, whether related to the exam or not, whereas proximity of the exam was linked to an increase in both state anxiety and perception of risk of exam-related negative events. Following researchers of anxiety such as Beck (e.g. Beck & Clark, 1988), Butler and Mathews (1987) suggested that individuals with high trait anxiety have readily available cognitive schemata containing a wide range of information about potential threats, which affects their global perception of risk, while proximity of a specific threatening event makes information about that event more accessible, increasing local risk perceptions in individuals even with low trait anxiety. The limitations of that study are a small sample size and the large number of statistical tests in the absence of adjustment for multiple comparisons, meaning that some of the significant results might have happened by chance.

The previous chapter (section 3.1.2.1.4) provided an overview of research by authors such as Lerner and Keltner (2000) and Lu *et al.* (2013), who found that fear, both trait and experimentally induced state, was associated with increased risk perceptions. A note on the distinction between anxiety and fear is warranted. Although the terms are often used interchangeably and their conceptualisation is not always discussed, some of the accepted definitions posit that fear is experienced in response to a specific stimulus, while anxiety cannot be traced back to a definite catalyst; in addition, anxiety can be conceptualised as a negative emotion experienced in anticipation of an adverse event, or pre-encounter defence, while fear is a response to such an event, or post-encounter defence (Perusini & Fanselow, 2015). However, some research has used scales designed to measure anxiety to capture participants' fear (e.g., Lerner & Keltner, 2000), so both the definitions and operationalisations are often mixed up. When applied to models such as risk-as-feelings, which distinguish between anticipatory and anticipated emotions (Loewenstein et al., 2001), the pre- and post-encounter defence distinction is particularly helpful if the outcome of the decision, but not the decision

itself, is viewed as the adverse event. Using the other definition, in which anxiety does not have a specific stimulus whereas fear does, anticipatory fear may be a better suited term than anticipatory anxiety to describe the emotion experienced in response to the decision situation. The research reported in this chapter is focused on anxiety as incidental affect—an emotion not pertaining to the decision or triggered by it but still affecting choice (Lerner & Keltner, 2000)—so either definition is acceptable.

Considering the above, a methodological limitation of some studies in the line of research that investigates the relationships between emotions and risk perception is that the distinction between fear and anxiety is not always made. For example, Lerner and Keltner (2000) used a questionnaire intended for anxiety to assess fear. The study by Lu *et al.* (2013), however, presented participants with vignettes designed to elicit emotional response to an event that had happened to the main character of the vignette, in line with the definition of fear previously discussed, in which, unlike anxiety, fear is experienced in response to a specific adverse event (Perusini & Fanselow, 2015). Borrowing from Smith and Ellsworth's (1985) cognitive appraisal theory of emotions, it can be specified that such an event has to be characterised by high uncertainty and anticipated effort and low pleasantness of and control over the situation. However, the Lu *et al*. (2013) study was built upon Lerner and Keltner's (2000) previous findings. So while some research focuses specifically on fear, some caution needs to be applied in its interpretation. In the example of fear and anxiety, while the terms are often used interchangeably both in research and in everyday language, the conceptual difference between them may be important. For example, it has been demonstrated that a poor psychosocial work environment is associated with elevated anxiety (Andrea et al., 2009; Murcia et al., 2013), as will be discussed in more detail in a later section. Beck's cognitive theory of anxiety (Beck & Clark, 1988) would suggest that adverse environmental factors trigger individuals' maladaptive cognitive schemas, which provide biased information about potential threats and impede subsequent information processing, resulting in anxiety. However, fear may be

activated by a specific workplace event: for example, an employee may feel elevated fear in a meeting about redundancies if they anticipate that they may be on the list. While both fear and anxiety may result in biased risk perception and thus affect decision making, in this research, anxiety is the focus since the primary construct of interest is incidental affect in relation to decision making, which conceptually results from being exposed to adverse environmental factors at work.

4.1.2.3 Anxiety and decision avoidance

4.1.2.3.1 Survey research

More information about the relationship between anxiety and decision making comes from survey and laboratory research, which examined the links between anxiety, risk appraisals, and risk taking. Of note is a study by Maner and Schmidt (2006), which was one of the first empirical attempts to explain how anxiety is related to choices people make. Using a sample of 171 undergraduate psychology students (common in psychology research, but presenting significant generalisability limitations), they found that individuals with high trait anxiety had higher appraisals of the likelihood of negative events, as Butler and Mathews (1987) previously had, and also that they were less inclined to make risky decisions. Moreover, high-trait-anxious participants rated the intensity of potential negative outcomes as more severe. In that sample, perceptions of severity of negative outcomes, but not their perceived likelihood, mediated the relationship between trait anxiety and risk taking. This suggests that highly anxious people may be unwilling to make risky choices in order to avoid potential distress and this links directly into regret theory (Loomes & Sugden, 1982) and the anticipated emotions part of the risk-as-feelings model (Loewenstein et al., 2001). The authors made a distinction between perceptions of likelihood and severity of negative outcomes as components of risk perception, which in that sample were completely independent of one another ($r = 0$, $p > .05$). To measure perceptions of likelihood of negative events happening to them, participants were presented with a number of statements, such as

"I tripped and broke a bone" and asked to indicate how likely that event was to happen to them compared to other students similar to them. In order to capture perceived severity, they were asked to indicate how severe or disruptive the consequences of such an event would be. This presents some interesting methodological issues.

First, the previously discussed study by Butler and Mathews (1987) found that highly anxious people rated negative events more likely to happen to themselves than to others. However, the Butler and Mathews study asked the participants to rate the probabilities (a) in relation to oneself and one other hypothetical person rather than a group of people, and (b) as two separate items rather than to rate the probability of an event happening to oneself relative to the probability of it happening to others. Such differences in measurement of the likelihood of negative events between the two studies make a comparison difficult. To begin with, asking participants to make predictions for one person or for a group of people may result in very different estimates, at least to some extent driven by what kind of person they imagine based on the provided cues and what kind of information they have available in relation to the kind of person they constructed (for example, the Butler and Mathews study referred to the hypothetical person in one of the questions as Sam and participants might already have stereotypes associated with that name). In addition, while asking participants to rank probabilities in paired but separate questionnaire items may potentially prompt them to consider themselves in relation to others, instructing them to do so directly ensures that. In other words, while answering separate questions, participants may not realise how much more negative their self-directed predictions are in comparison to predictions made for another person, while in the Maner and Schmidt study they are directly faced with that comparison and are asked to rate the difference from the referent, in that case a group of similar students, instead of providing an independent rating. This may potentially correct some of the negativity bias associated with anxiety, however it follows from the results Maner and Schmidt obtained that highly anxious

people still make more pessimistic predictions in relation to themselves than people with low anxiety.

Second, to assess severity, the Maner and Schmidt study presented participants with a number of statement and asked them to respond how severe or distressing the consequences of such events would be. In that framing, participants were not explicitly asked to think about the risks of the actions they decide to take or not to take. Rather, they were prompted to imagine that the situation had already happened and to assess their response to its consequences. Risk taking was measured in that study with a separate questionnaire, so there was no direct link between the questions in which participants were asked to predict how likely they were to engage in different behaviours and how risky, whether in terms of likelihood or in terms of severity, the consequences of such behaviours were. The fact that their responses on the perceived control scale, where they indicated how much control they thought to have had over the outcomes, was not associated with the perceived likelihood scale indicates that at least some of the events presented in the questionnaire might have been perceived as outside of the participants' control and therefore not caused by their actions. That potentially limits the validity of the perceived severity questionnaire in assessing risk perception as a tool for understanding risk-taking behaviour. Nevertheless, the interplay between the likelihood and severity of risks is an important component to consider when responding to potential risks. Neither a highly likely event that is not dangerous, nor a highly dangerous but extremely unlikely one require much risk mitigation, so it is important to consider the whole context in which decisions take place (Notebaert et al., 2016).

Some other research also looked at the links between anxiety and risky decision making. For example, Mitte (2007) found that trait anxiety was associated with selecting safer options when presented with vignettes across different domains, such as financial, health, and social. Interestingly, in that study, perceived psychological cost was associated with trait anxiety, but perceived probability of the negative event

stipulated in the vignettes happening to oneself was not. However, perceived probability was a significant predictor of risk taking (r = -.39, p < .001) and the difference in perceived probability of a negative event happening to oneself and others was associated with anxiety, with more anxious people rating negative events as more likely to happen to themselves than others, as shown by Butler and Mathews (1987) previously. In interpreting the results of this study, it is important to note that the whole sample of 160 students exhibited a preference for the safer options, with an average of 2.4 risky choices across 8 scenarios (SD = 1.32). Such risk aversion may indicate that the vignettes presented situations in which the majority of participants considered the risk to outweigh the benefits. Coupled with the finding that risk perception was associated with risk taking, this may suggest that the scenarios were too risky for everyone to meaningfully distinguish between risk perception in anxious versus non-anxious participants. It is also interesting to note that in this study participants were asked to give probabilities of negative events in percentages. In a follow-up study published in the same paper (Mitte, 2007), the author added a verbal probability estimate (i.e. “not at all likely’’ to ‘‘extremely likely’’) in addition to percentages and found that verbal probabilities, but not probabilities expressed in percentages, were associated with trait anxiety. This suggests that anxious people may be able to calibrate probabilities of negative events better when they are asked to think about them in terms of numerical values. The magnitudes of the correlations between verbal versus numerical probabilities and risk taking were approximately the same (r = -.36 vs r = -.39, p < .001). The author proposed that the question about numerical probabilities prompted participants to engage in more analytical thinking, thus mitigating some of the effects of anxiety on information processing. However, potential differences in the interpretation of different verbal labels between anxious and non-anxious participants were rejected as in the first study participants were asked to express probabilities in percentages based on verbal labels and no differences linked to anxiety were detected. As in Study 1, Mitte (2007) again found an association between anxiety and perceived psychological cost. However, this follow-up study (N = 123) did not detect a significant

relationship between anxiety and risk taking. Therefore, no mediation analysis could be conducted.

4.1.2.3.2 Laboratory research

While many studies relied on participants' self-reports and vignettes to measure risk taking, some have used laboratory simulators. Of such, the Balloon Analogue Risk Task (BART; Lejuez et al., 2002) and the Iowa Gambling Task (IGT; Bechara et al., 1994) are particularly popular. In the BART, participants are presented with a simulated balloon and a pump on a computer screen and are invited to pump it as much as they want to accumulate money until they either collect the money and move to the next trial or until the balloon bursts, causing them to lose all money earned on that trial; each balloon has individual capacity not disclosed to the participant (Lejuez et al., 2002). In the IGT, participants are asked to choose cards from four decks varying in losses and gains associated with each draw, where drawing from some decks is more or less advantageous in the long run since the decks have different frequency and magnitude of punishment; participants are allowed to switch between the decks as often as they want (Bechara et al., 1994).

A study with a non-clinical sample of undergraduate students (N = 138) using the BART found risk avoidance to be significantly associated with social anxiety (r = -.20, p < .05), however, no significant relationship was detected with trait anxiety (r = -.22, p = .05) or worry (r = -.21, p = .05) in a follow-up (N = 97) despite similar effect sizes—probably due to the relatively small sample size (Maner et al., 2007). These findings were supported later in another study, which also added a self-reported measure of risk taking (Lorian & Grisham, 2010). The sample size was quite small (N = 55), but the authors observed substantial effect sizes: r = -.43, p < .001 between the BART and the social anxiety score and r = .43, p < .001 between the BART and the self-reported measure of risk taking. The relationship between social anxiety and risk-taking self-

reports was somewhat weaker (r = -.35, p < .01), but still significant. The risk-averse performance of anxious participants on the BART suggests their heightened sensitivity to losses. Such sensitivity was also observed in a study using the IGT in a sample of 27 students meeting the Generalized Anxiety Disorder (GAD) criteria and 20 control participants, whereby anxious participants learned to avoid the decks that led to long-term losses significantly faster than controls in the absence of difference in response time (Mueller et al., 2010). In that study, anxious participants also preferred frequent small losses to infrequent large ones. The authors suggested that this provides evidence for long-term oriented decision making and aversion to unpredictable long-term losses in the presence of anxiety. As for the suggestion that anxious people are more averse to losses than non-anxious people, a laboratory study designed to distinguish between loss aversion and risk aversion suggested that it may not be the case. In that study, a sample of individuals with unmedicated anxiety meeting GAD criteria (N = 29) and control participants (N = 26) were asked to choose between two sets of options: (a) a sure option of £0 or a gamble involving a potential gain and a potential loss, (b) a sure gain option or a gamble involving a chance of winning a higher amount and a chance of not winning anything: safe choices on the first set were thought to be driven by both risk and loss aversion, while only risk aversion was assumed to contribute to safe choices on the second set (Charpentier et al., 2017). The authors detected no correlation between loss and risk aversion across participants, suggesting that they are driven by separate processes. The anxious group was found to be significantly more risk-averse than controls, but there were no differences in loss aversion.

Interestingly, anxious people were found to better calibrate their danger mitigation response according to severity and likelihood of such danger. In a laboratory study by Notebaert *et al.* (2016), high- (N = 39) and low-trait-anxious (N = 37) undergraduate students were informed of the likelihood and loudness of a noise they would hear through the headphones and offered to invest a virtual coin to avoid that noise, at the

cost of not being able to do it on the next trial. Highly anxious participants were found to be more sensitive to the interaction between likelihood and severity and tended to invest in mitigating danger when the overall magnitude of the adverse event was higher than in the case of low-anxious participants. This provides further evidence for the suggestion that anxious individuals are more likely to engage in future-oriented decision making in an attempt to minimise severe adverse events (Mueller et al., 2010). However, Notebaert *et al.* (2016) used a non-clinical sample and suggested that decision making may be impaired in individuals with more severe anxiety, potentially meaning a U-shaped distribution. Similarly to the above, a study by Kirsch and Windmann (2009) explored how anxiety may influence decision making in a beneficial way by making people more cautious. The authors considered anxiety to be an adaptive and protective choice-regulating mechanism. They referred to the work of Damasio (1994), who studied how conditions that pathologically reduce anxiety, such as brain damage, cause individuals to become more impulsive and disrupt their abilities to plan ahead and adhere to a course of action that is more likely to translate into long-term success rather than bring instant gratification. Participants were a sample of anxious adults (N = 30). The authors found that there was no correlation between most measures of anxiety, worry, or depression and performance on the IGT, however, intolerance of uncertainty was positively associated with the IGT score, as well as one of the used measures of worry. Such inconsistency in correlations between the different measures of anxiety and worry and performance may be due to the small sample. However, all correlations became significant after controlling for gender since males had significantly higher total IGT scores. In contrast, in a much smaller study, with 8 participants in each the high- and low-trait-anxiety groups (over 1 SD above or below average in the initial pool of 112 candidates), highly anxious participants exhibited worse performance on the IGT than the controls (Miu et al., 2008). The authors suggested that high anxiety disrupted their ability to discriminate between advantageous and disadvantageous choices. However, the small sample size limited the generalisability of the findings.

Some of the more recent studies have used newer laboratory techniques to study the relationship between anxiety and decision making. To quantify avoidance under stress, Mkrtchian *et al.* (2017) developed an experiment whereby a group of highly anxious participants (*N* = 43) and a control group (*N* = 58) completed a "go/no-go" task in a safe condition and under stress induced by threat of shock. In the task, participants could make ("go") or withhold ("no-go") a response to win a reward or to avoid losing. While both groups reported experiencing greater anxiety in the stress condition, the anxious group exhibited greater avoidance bias measured in "no-go" responses, especially under stress. The authors suggested that individuals with high levels of anxiety tended to inhibit actions more than healthy controls when faced with a potential negative outcome. They proposed that in a laboratory setting, the unlearning of avoidance may be facilitated by increasing the probability of reward in the "go" condition relative to the "no-go" condition, but since it is highly challenging to do so in the real world, the pattern of avoidant behaviour, once learned, may persist. From the decision making perspective, however, in this study it is difficult to determine whether the "no-go" choice was a conscious decision to withhold an action or a failure to make a decision all together which resulted in the lack of action: authors such as C. J. Anderson (2003) would class both as examples of decision-avoidant behaviour.

Learning from negative experience was further investigated in another study (Aylward et al., 2019), in which individuals with unmedicated mood and anxiety symptoms (*N* = 44) and control participants (*N* = 88) were asked to choose between four slot-machines with fluctuating and uncertain outcomes. Positive feedback from the slot-machines was given in the form of a happy face and negative feedback was a fearful face. Reward rates changed throughout the trial so the most rewarding machine could become the least rewarding one. In one condition, stress was induced by randomly administering electric shocks to participants that were not dependent on their performance. In both stress and no-stress experimental conditions, individuals with mood and anxiety symptoms displayed greater punishment-learning rates and their decision making was

more heavily influenced by recent negative experiences, i.e. they were more likely to avoid the slot-machine that recently gave them negative feedback and switched from such machines faster than controls. The authors did not find differences between the two groups in punishment sensitivity and suggested that anxious individuals did not overweight punishments but rather learned from bad experiences faster and unlearned at a slower rate. As a result, they were more likely to overestimate the probability of a negative outcome and engage in risk-avoidant behaviour more often. The authors noted that such a tendency would translate into less adaptive behaviour in the long run since the avoidance of risk and uncertainty in anxious individuals would prevent them from updating information and integrating it into their decision making. A parallel can be drawn with availability heuristic proposed by Tversky and Kahneman (1974), who argued that probability judgments are influenced by the ease with which people retrieve information from memory: for example, perception of risk of flying may increase right after a report of a plane crash and then gradually return to the base level. In highly anxious individuals, it appears that stabilisation of risk perception may be impaired.

The studies discussed above relied on participants unaltered emotional state. Other research, such as that by Raghunathan and Pham (1999) induced affective states in participants instead to investigate how anxiety and sadness influenced decision making in laboratory gambling tasks and in mock job selection. Participants were allocated to one of three conditions: sadness, anxiety, or a neutral mood state, and presented with vignettes designed to induce the desired emotional state. In two different experiments, they were then asked to either choose between two gambles of equal expected return, one offering a higher pay-off at a lower probability, the other a lower pay-off at a higher probability, or to choose between two jobs, one offering a higher salary and lower job security, the other a lower salary and a higher job security. In both cases, anxious individuals chose the less risky option with a lower pay-off, and sad individuals the more rewarding choice which entailed more risk, with neutral-state participants falling between these two categories. Besides, in the job selection experiments, anxious

individuals rated job security as more important than salary and sad individuals salary as more important than job security. The authors suggested that anxious individuals attended to the implicit goal of reducing uncertainty, whereas sad individuals focused on the implicit goal of reward replacement, or compensating for their sad mood. In the final experiment, the authors discovered that affective states only affected personal decision making and ceased to be important when participants were asked to make decisions on behalf of someone else, which has potential implications for decision making in the workplace.

4.1.2.3.3 Safety bias and intolerance of uncertainty

As suggested by this review of the literature, anxious people tend to prefer safer options even if such options are not always optimal. Lorian and Grisham (2010) referred to this phenomenon as safety bias. It manifests in an excessive desire to engage in risk mitigation, however, such behaviour can be costly in terms of time, effort, and resources and needs to be calibrated to achieve optimal outcomes and make sure it does not interfere with other activities (Notebaert et al., 2016; O'Donovan et al., 2013). Risk mitigation can be active and passive: active strategies include taking deliberate actions to reduce risks, whereas passive ones take form of the avoidance of taking potential risks (Notebaert et al., 2016). Some researchers have suggested that inflated perceptions of risk and subsequent excessive risk mitigation may contribute to the development and maintenance of anxiety (Lorian & Grisham, 2010; Maner & Schmidt, 2006), thus making this relationship bi-directional and trapping anxious people in a feedback loop: while anxiety interferes with cognitive processing and results in heightened risk perceptions, such risk perceptions and the lack of updated learning because of high risk avoidance exacerbates anxiety.

To make sense of the relationship between anxiety and risk avoidance, the concept of *intolerance of uncertainty*, which is thought to be an important feature of anxiety

(Charpentier et al., 2017), is helpful. It has been observed that anxious people tend to interpret ambiguous stimuli as more threatening than non-anxious people (Hartley & Phelps, 2012; Mathews & MacLeod, 2005). Research into intolerance of uncertainty builds on this finding and suggests that anxious people negatively respond to ambiguity about the future and perceive any probability of a negative event as much more threatening and unacceptable than non-anxious people, irrespective of what the probability is; thus uncertainty about the outcomes of an event may elicit a strong negative emotional response in anxious people (Carleton et al., 2012). Such intolerance may cause people to engage in risk mitigation strategies and subsequently lead to risk avoidance (Notebaert et al., 2016).

There is an additional step that separates risk avoidance and decision avoidance, the phenomenon of interest in this chapter. While high risk avoidance may result in safety bias (Lorian & Grisham, 2010) and cause individuals to select a safer option, decision avoidance, which for the purpose of this research is defined as the deferral of choice, stalls decision making instead. In the previous chapter (section 3.1.2.2), potential causes of decision avoidance were discussed. Existing research has linked decision avoidance to anxiety (Dewberry et al., 2013; Leykin & DeRubeis, 2010; Umeh & Omari-Asor, 2011), meaning that it shares a theoretical antecedent with risk avoidance (the predominantly correlational research in this field does not allow to draw causal conclusions). Research has also linked anxiety to higher risk perception (Butler & Mathews, 1987; Mitte, 2007). In studies like that by Mitte (2007) participants were presented with a safe and a risky option and asked to select one. For example, in one of the vignettes, participants were told that they were planning to go on holiday to a country where an infectious disease was spreading and could either go ahead with the holiday or cancel their plans.

However, in real life, decisions are often not as clearcut and often there is no option perceived as completely safe. For example, one may have to decide between investing money into developing a new product, which may result in a loss, or in marketing an

existing one which is currently not profitable, which may also lead to losses. The passive alternative would be to do nothing, but it is even more likely to lead to the same negative outcome. Highly risk averse people in such a scenario would face a situation from which there is no easy escape. Then, models like that of Janis and Mann (1976), discussed in the previous chapter (section 3.1.2.1.5), can help to predict their actions. To remind the reader, the model posits that individuals exhibit one of five decision-making behaviours depending on the specifics of the decision problem: unconflicted adherence, unconflicted change, defensive avoidance, hypervigilance, or vigilance (Janis & Mann, 1976). According to this model, defensive avoidance, which may be expressed as procrastination, shifting the responsibility for the decision onto another person, or rationalising and selectively attending to the benefits of an irrationally attractive option, is a response to a situation in which the decision maker perceives both acting and not acting as risky and thinks they will not be able to find a better solution. In this way, high risk avoidance may turn into decision avoidance, which is defined here as choice deferral, when no safe option is available. Such lack of action is reminiscent of a freeze response to a threatening situation in which both fight and flight are perceived to be ineffective (Schmidt et al., 2008).

To summarise the above discussion, anxiety is associated with an inflated perception of risk of negative decision outcomes. In turn, such high risk appraisals are likely to lead to the desire to engage in risk mitigation and thus influence decision making. As a result, an individual may choose to avoid making a decision altogether to escape the negative consequences of the decision outcome and the negative emotions associated with them. From this follows the first set of hypotheses of this chapter:

H4.1a. Anxiety is positively associated with decision avoidance.

H4.1b. Risk perception is positively associated with decision avoidance.

H4.1c. The relationship between anxiety and decision avoidance is mediated by risk perception.

4.1.2.4 Anxiety and dependent decision making

The Janis and Mann (1976) model proposed that in addition to choice deferral, defensive avoidance may result in what they referred to as buck-passing, or reliance on other people for decision making. In the previous chapter (section 3.1.2.3), it was also discussed that increased dependence on others in decision making may stem from the desire to avoid having to make the decision by oneself (Dewberry et al., 2013; Steffel & Williams, 2018). Dependent decision makers have been found to be more prone to avoiding decisions than those who self-report less dependence (Leykin & DeRubeis, 2010; Scott & Bruce, 1995). However, instead of deferring choice, they escape the decision situation by delegating their decision-making powers to others. Just as with choice deferral, referring decisions to others may be a rational strategy—for example, when the decision maker does not have sufficient knowledge about the subject or when their resources could be used more efficiently if the decision is outsourced to another person (Steffel & Williams, 2018). Consulting other people before making a choice may also reflect a desire to cooperate with others by including them in the decision making process (Spicer & Sadler-Smith, 2005). However, dependent decision making has also been conceptualised as passive, denoting high need for social approval, and unlikely to result in personal goal-fulfilment (Harren, 1979). In an organisational context, needlessly high dependence on others in making decisions is likely to result in unnecessary consultation and increased workload.

Since much of the previous research has shown a link between avoidant and dependent decision making (Dewberry et al., 2013; Scott & Bruce, 1995; Spicer & Sadler-Smith, 2005), the factors that underlie decision avoidance may also be relevant to dependence on others in making decisions. For example, like decision avoidance, dependent decision making has been found to be associated with trait (Umeh & Omari-Asor, 2011) and decision-specific (Dewberry et al., 2013) anxiety. Consequently, seeking other people's input may enable decision makers to share at least some of the

responsibility and alleviate the stress caused by the decision situation. However, anxious people have been found to be more likely not only to seek advice, but also to follow that advice irrespective of its quality (Gino et al., 2012). This suggests a reduced ability to distinguish between good and bad advice, which may lead to a worse quality of decisions.

One of the main reasons for delegating decision-making powers is thought to be the desire to avoid or diminish responsibility for negative outcomes, especially when individuals believe that they are likely to regret their choices (Steffel & Williams, 2018). This link may mean that dependent decision makers perceive the risks of negative decision outcomes as high and as such try to avoid the responsibility and blame.

The relationships between decision avoidance, dependent decision making, and risk perception are summarised in the next set of hypotheses:

H4.2a. Decision avoidance is positively associated with dependence on others in making decisions.

H4.2b. Risk perception is positively associated with dependence on others in making decisions.

H4.2c. The relationship between risk perception and dependence on others in making decisions is mediated by decision avoidance.

4.1.3 Psychosocial work environment and employee well-being

4.1.3.1 An overview of prominent psychosocial work environment theories

A core construct of interest in this chapter is that of psychosocial work environment. It is typically defined as how work is organised, designed, and managed (Cox et al., 2000). At the moment, the association between psychosocial work environment and avoidant and dependent decision making is unclear, but there is evidence for the

relationship between psychosocial work environment and anxiety as well as between anxiety and, as discussed in this chapter and the previous chapter, both avoidant and dependent decision making.

It has long been suggested that an adverse environment at work contributes to poor health, both mental and physical (Karasek, 1979; Siegrist, 1996) and, since people having the worst working conditions are usually the ones who find it the most difficult to leave, it results in increased health inequality (Siegrist et al., 2004). Previous research demonstrated that poor psychosocial work environment is associated with poor well-being of employees and high incidence of anxiety (Andrea et al., 2009; Murcia et al., 2013). There are a number of potential mechanisms that have been proposed as an explanation for the negative effect of poor psychosocial work environment on well-being. This topic has been of interest to researchers for the past few decades but the interplay between psychosocial work environment and well-being is so highly complex that it is difficult to distil.

Specific work stress models have been proposed highlighting some of the core elements of the psychosocial work environment and their relationships with employee well-being. It has been suggested that a successful model includes the following information: sociological information about the work environment, psychological information describing personal characteristics of employees relevant to the job, and biological information describing short- and long-term consequences for employee well-being (Siegrist, 1996). Below an overview of some of the most influential theories offering an explanation for the links between work environment and well-being is provided.

4.1.3.1.1 The Job Demand–Control model

One of the earliest and most highly cited models is the Job Demand–Control (JDC) model of Karasek (1979), which distinguished between two individual-level elements of

the job context: job demands and the extent of discretion that the employee has in meeting these demands, also referred to as decision latitude. The main concept in the model is that of psychological strain that the author considered to be the result of a combination of high job demands and low decision latitude rather than any one single factor of the work environment. Karasek (1979) argued that to minimise psychological strain, job demands and decision latitude should be highly correlated, i.e. in high pressure jobs employees should be able to exhibit a lot of discretion over their work process, whereas jobs where employees have low control should be less demanding.

In two large samples of employees, from the US and Sweden respectively, the author found that it was mostly the participants with high job demands and low decision latitude that reported exhaustion, insomnia, trouble getting up in the morning, anxiety, and depression (Karasek, 1979). One of the samples was longitudinal, spanning six years between 1968 and 1974, and suggested that there was a causal relationship between job characteristics according to the JDC model and mental strain. The author argued that it was not the requirement to make decisions but rather the constraints on decision making that resulted in poor mental health outcomes, thus affecting workers at all levels of the organisational hierarchy, and suggested that job design strategies should focus on employees in the most oppressive jobs characterised by high demands and low discretion.

4.1.3.1.2 The Job Demand-Control-Support model

Later, Johnson and Hall (1988) expanded the JDC model to include the construct of support. The resulting Job Demand-Control-Support (JDCS) model uses an additional social support variable aimed at further explaining the mechanism through which a poor work environment may negatively affect well-being (J. v Johnson & Hall, 1988). The authors found that workers with the lowest levels of social support had the highest prevalence of cardiovascular disease at each level of job strain. A review by Häusser *et*

al. (2010) found evidence for the additive effects of social support on psychological well-being. Since the more complex a model, the more difficult it is to support it, only the reviewed studies that used sufficiently large samples consistently found support for such additive effects. Besides, the authors found that longitudinal studies generally suggested a unidirectional relationship whereby the dimensions of the JDC and JDCS models influenced psychological well-being. However, only weak support was found in the review for the buffer hypothesis that suggests that control reduces the negative effects of job demands on well-being.

4.1.3.1.3 Job Demands-Resources model

Another development was the Job Demands-Resources (JD-R) model, which was proposed to challenge the view assumed in a significant proportion of the research at the time that working with people was intrinsic to burnout, partly because the research had mainly been conducted within occupations that entailed frequent contact with other people (Demerouti et al., 2001). The authors extrapolated from the stressors documented in people-facing jobs that are also found in occupations that do not involve a high degree of human interaction. Stress is defined there as “a disruption of the equilibrium of the cognitive-emotional-environmental system by external factors”; such external factors, that are referred to as stressors, have “the potential to exert a negative influence on most people in most situations” (Demerouti et al., 2001, p. 501). Since the literature generally showed inconsistent support for the buffer hypothesis in the JDC(S) model (Häusser et al., 2010), Bakker and Demerouti (2007) suggested that job resources may buffer the negative impact of high job demands on well-being more successfully than decision latitude.

In the JD-R model, job demands refer to the aspects of the job, which may be physical, social, or organisational, that involve mental or physical effort; job resources, also referred to as health-protecting factors, are the aspects of the job that assist in

achieving work goals, reduce job demands, and/or stimulate personal growth (Demerouti et al., 2001). The model focuses on external (organisational and social) rather than internal (personal) resources. Organisational resources refer to job security and rewards, control over one's work process, potential for personal growth and development, participative decision making, and task variety; social resources include various support networks, such as colleagues, family, and peers (Bakker & Demerouti, 2007; Demerouti et al., 2001).

The JD-R model states that burnout, characterised by energy depletion and loss of motivation, develops when job demands are high and job resources to help to cope with them are low, regardless of the type of occupation (Demerouti et al., 2001). It is a two-fold process in which high job demands lead to exhaustion and a lack of resources results in withdrawal behaviour through the inability to effectively meet the job demands. It is an overarching model that can be applied to different job settings, each of which may have its own specific risk factors for occupational stress (Bakker & Demerouti, 2007).

The authors conceptualise the reduction in motivation and withdrawal from the job resulting from the lack of external resources necessary to cope with the workload as a self-protection mechanism preventing potential frustration about failing to obtain work-related goals in the future (Demerouti et al., 2001). A recent meta-analysis of 74 longitudinal studies using the JD-R model found that job resources positively predicted work engagement and negatively predicted burnout, and that job demands positively predicted burnout, but did not predict work engagement (Lesener et al., 2019).

4.1.3.1.4 The effort-reward imbalance model

The effort-reward imbalance (ERI) model (Siegrist, 1996; Siegrist et al., 2004) is another popular theory. Siegrist *et al.* (2004) posited that an interaction between personal and structural factors results in either health promoting or health adverse

outcomes. Personal factors include cognition, emotions, and behaviour, while structural factors are the context in which the person works. Work is seen as a kind of social contract that should be based on reciprocity: effort spent by an employee should be rewarded by money as well as the feeling of esteem, opportunities to develop their career, and job security (Siegrist et al., 2004). Money, esteem, and status are seen as "transmitter systems" used to convey rewards to workers in exchange for their labour (Siegrist, 1996, p. 29). However, the authors recognise that perfectly symmetrical contracts where workers received rewards equivalent to invested effort are rare and those employees who come from disadvantaged backgrounds often experience the worst asymmetry whereby their work is not properly rewarded (Siegrist et al., 2004). The ERI model assumes that an imbalance between effort and reward violates expectations of reciprocity and leads to emotional distress and impairs self-regulation, which may result in poor health outcomes in the long-term (Siegrist, 1996; Siegrist et al., 2004). Moreover, the model includes the notion of overcommitment to one's job and proposes that it increases the negative health impact of effort-reward imbalance since it increases the gap between efforts invested and gains received (Siegrist et al., 2004).

Van Vegchel *et al.* (2005) conducted a review of 45 empirical studies investigating the ERI model. They found a combination of high effort and low reward, as predicted by the model, to be linked to poor health outcomes in employees. That included psychological well-being, with 16 studies measuring psychosomatic symptoms (defined for the purpose of the review as physical symptoms routed in mental health issues) and seven studies investigating job-related well-being, such as burnout, motivation, and job satisfaction. Most studies reviewed by Van Vegchel et al. (2005) found a link between high-effort–low-reward working conditions and poor employee well-being, characterised by an increase in psychosomatic symptoms. Five out of seven studies found a positive relationship between ERI and poor job-related well-being, with employees working in high-effort–low-reward conditions having higher risk of burnout, depersonalisation, and low job satisfaction.

4.1.3.1.5 Organisational justice

Finally, the concept of organisational justice is worth attention. Elovainio *et al.* (2002) suggested that workers are affected not only by the fairness of rewards for their efforts, like the ERI model proposed, but also by the justice of the procedures through which rewards are distributed among staff. Besides, researchers such as Ndjaboué *et al.* (2012) maintain that since the development of models such as JDCS described above, the world of work has undergone substantial changes and that the dimension of job control does not hold as much significance in the context of short-term contracts, job insecurity, and forced occupational mobility as it did for the kinds of jobs Karasek (1979) and Johnson and Hall (1988) examined. Instead, they argue, the conditions of the modern labour market place more importance on occupational equity.

Organisational justice reflects the level of fairness with which employees are treated (Moorman, 1991). It refers to the rules and social norms accepted in organisations, with particular emphasis on equity and distributions of resources and benefits (called distributive justice) and processes that govern their distribution (procedural justice) as well as relationships within the organisation (interactional justice), which in turn consists of two components: relational justice, or respect towards employees, and informational justice, or the level of transparency about managerial decisions (Ndjaboué et al., 2012). The concept of organisational justice builds on equity theory, which proposes that people compare themselves to another person, or a referent, when making judgments about whether they are being treated fairly; in this way, if another person occupying the same position and making the same effort is being paid more, the employee in question is likely to perceive themselves to be treated unfairly even if without a reference point they might have been satisfied with their pay (Adams, 1965). Their job performance may also decrease in response to such perceived inequity (Moorman, 1991).

In the Organisational Justice (OJ) model, employees' input may take the form of effort they make, time they invest, skills they bring to the organisation, loyalty they exhibit to their employer, and other qualities; in return, they expect equitable output, such as salary and bonuses, secure employment, recognition for their achievements, opportunities for growth and good reputation (Ndjaboué et al., 2012). The processes through which such output is distributed is also an important consideration (Moorman, 1991). Unlike the JDC and ERI models, the OJ model focuses on interpersonal comparisons rather than individual factors, thus situating employees in the broader context of their social environment at work; it is an important perspective to take because employees may judge their compensation as fair when only their own input is considered but change their opinion when they find out that someone else is rewarded significantly more or less for the same effort (Ndjaboué et al., 2012).

In a systematic review of prospective studies into the links between organisational justice and mental health, Ndjaboué *et al.* (2012) found that relational justice had a significant effect on employee's mental health and on sickness absence, even in studies that controlled for the ERI and JDCS factors. Procedural justice also had a significant effect on depressive symptoms as well as sickness absenteeism, although not all studies observed that relationship. Most of the studies investigating procedural justice also controlled for either the JDCS or ERI model. The authors also found that distributive justice negatively predicted depressive symptoms and sickness absenteeism. Overall, Ndjaboué *et al.* (2012) concluded that various components of organisational justice were associated with poor mental health outcomes in most studies, although procedural and relational justice were assessed more frequently than distributive justice.

4.1.3.2 Comprehensive measurement of the psychosocial work environment

The research described above focused on specific aspects of the work environment to build simple, parsimonious, and relatively easily testable models. However, work environment is complex and multifaceted and cannot be meaningfully summarised by a small number of variables (Bakker & Demerouti, 2007). In the past two decades, international effort has been made to create a comprehensive tool aimed at measuring many important characteristics of the psychosocial work environment to paint a fuller picture of the context in which people work, resulting in the Copenhagen Psychosocial Questionnaire (COPSOQ), currently in its third version (Llorens et al., 2019).

The first version of the questionnaire covered quantitative and cognitive psychological job demands, decision latitude, skill discretion, social support, conflicts at work, and job insecurity and was tested in a sample of 5,940 Danish day and shift workers in a variety of occupations, including academics, healthcare workers, service workers, and people occupying manual jobs (Bøggild et al., 2001). Since then, the questionnaire has undergone significant developments and now consists of over 40 subscales comprehensively measuring different aspects of psychosocial work environment, such as job demands, decision latitude, recognition for achievements, job security, sense of community at work, trust and justice, negative acts at work, for example incidence of bullying and harassment, workers' health, and others; most of the scales consist of core, middle, and long version items to suit different research and practical needs (Llorens et al., 2019).

The questionnaire incorporates the theories discussed previously in this chapter, such as Job Demand-Control-Support, Effort-Reward Imbalance, Job Demands-Resources and Organisational Justice as well as other aspects of the psychosocial work environment that previous research deemed to be important. The third version of COPSOQ was developed in response to the rapidly changing technological and economic situation that has been affecting workplaces, such as growing

computerisation and an increase in precarious work, as well as the developments in organisational psychology theory (Burr et al., 2019).

4.1.3.3 Poor psychosocial work environment and mental health

Psychosocial work environment is an important factor that affects employee well-being. Much of the previous research, using various methods of measuring aspects of psychosocial work environment, has argued that there is a significant link between working in adverse conditions and mental health outcomes. An overview of some of that research is provided below, with a view to bringing together the concepts of poor psychosocial work environment, anxiety, and maladaptive decision making later in this chapter.

Nieuwenhuijsen *et al.* (2010) conducted a systematic review of seven prospective studies investigating the links between psychosocial work environment and stress-related disorders in employees. They argued that recent trends, such as faster work pace, growing skills demands, and increased use of information and communication technology have all added to the demands on workers. Only studies with a prospective design were included to avoid the risk of overreporting negative working conditions by people already experiencing poor mental health. The review concluded that there was evidence for the relationships between stress-related disorders and high job demands, low job control, low level of support from colleagues, low supervisor support, job insecurity, emotional demands, lack of procedural and relational justice, and effort-reward imbalance, although some of these relationships were stronger for men than for women. Repetitive work was not a risk factor for stress-related disorders in this review.

In addition, a meta-analysis of 11 studies into the links between the psychosocial work environment and mental health difficulties found a modest association between low decision authority as well as decision latitude (defined as a combination of decision authority and skills discretion) and common mental health disorders, which typically

included anxiety and depression (Stansfeld & Candy, 2006). In this review, high psychological job demands, job strain, poor interpersonal work relationships, effort-reward imbalance, and job insecurity were also risk factors for poor mental health outcomes. Some cross-sectional (Murcia et al., 2013) and prospective (Andrea et al., 2009) studies investigated the relationships between psychosocial work environment and anxiety specifically and found a significant association between anxiety and such aspects of the work environment as high psychological job demands, low decision latitude, low social support, high emotional demands, job insecurity, low rewards, role conflict, and ethical conflict.

Overall, available evidence shows a significant link between various aspects of the psychosocial work environment and employee mental health, and anxiety in particular. In turn, anxiety has been suggested as an important factor in decision making. As discussed in section 4.1.2.3 of this chapter, existing research has linked anxiety to increased risk perceptions as well as risk, and subsequently decision, avoidance.

4.1.4 Psychosocial work environment, anxiety, and decision making

In this chapter, the focus is on the links between psychosocial work environment and avoidant and dependent decision making as well as on potential mediators of the relationships between them. As discussed in the previous section, psychosocial work environment refers to the context in which work is carried out. It includes factors such as the demands of the job, recognition that employees receive, the level of trust and support in the workplace, job security, and control over own work (Burr et al., 2019). A poor psychosocial work environment has been linked to a variety of negative mental health outcomes, including anxiety (Andrea et al., 2009; Murcia et al., 2013; Stansfeld & Candy, 2006). Anxious and fearful individuals are prone to heightened risk appraisals and thus to judging negative events as more likely to happen (Butler & Mathews, 1987; Lerner & Keltner, 2000). In a stressful, insecure, and unsupportive work environment,

such negative appraisals by employees are likely to be higher due to increased anxiety. This leads to the next set of hypotheses.

H4.3a. Having a poor psychosocial work environment is positively associated with anxiety.

H4.3b. Having a poor psychosocial work environment is positively associated with risk perception.

H4.3c. The relationship between poor psychosocial work environment and risk perception is mediated by anxiety.

Some of the factors psychosocial work environment encompasses, such as the quality of interpersonal relationships, norms adopted in the organisation, and managerial styles and processes, are important for the feeling of psychological safety in the workplace (Kahn, 1990). Psychological safety describes the extent to which employees consider themselves to be able to take interpersonal risks, such as suggesting new ways of performing tasks at work with a view to improving existing processes and taking initiative on new projects (Edmondson & Lei, 2014), without fear of backlash, such as suffering negative consequences for their reputation or career (Kahn, 1990). In this way, psychological safety is an important factor that enables employees to make proactive and independent decisions.

Previously in this chapter (section 4.1.2.3), the links between anxiety, risk perception, and decision avoidance were discussed. Now, drawing from the diathesis-stress model of anxiety, these constructs are linked to the psychosocial work environment. The diathesis-stress model states that stress activates people's predispositions to experiencing mental health issues and causes such issues to manifest themselves (Monroe & Simons, 1991). In accordance with it, anxiety-prone individuals are thought to exhibit higher maladaptive avoidance during periods of environmental stress

(Mkrtchian et al., 2017), so they may be less willing to make decisions out of fear of negative outcomes under stressful working conditions. Moreover, if all courses of action are perceived as risky, which is more likely under high anxiety (Butler & Mathews, 1987), it may also lead employees to avoid decision making (Janis & Mann, 1976). In this way, a poor psychosocial work environment can result in increased decision avoidance in employees through heightened anxiety. Therefore, the following set of hypotheses is proposed:

H4.4a. Poor psychosocial work environment is associated with increased decision avoidance.

H4.4b. The relationship between poor psychosocial work environment and decision avoidance is mediated by anxiety.

The relationship between psychosocial work environment and dependent decision making is also explored. Since dependent decision making is thought to stem from anxiety and the desire to avoid decisions (Dewberry et al., 2013), it is examined whether poor psychosocial work environment, which is hypothesised to be related to both anxiety and decision avoidance, is also linked to increased dependence on others in making decisions. Since people who exhibit high dependence on others in decision making may often do so because of the desire to avoid the responsibility (and consequently the backlash) for negative outcomes (Steffel & Williams, 2018), it is predicted that in a poor and unsupportive work environment dependent decision making will increase.

H4.5a. Poor psychosocial work environment is associated with increased dependence on other people in making decisions.

H4.5b. The relationship between poor psychosocial work environment and dependence on other people in making decisions is mediated by anxiety and decision avoidance.

The relationships proposed in the hypotheses presented in this chapter are summarised in the conceptual model in Figure 4.1.

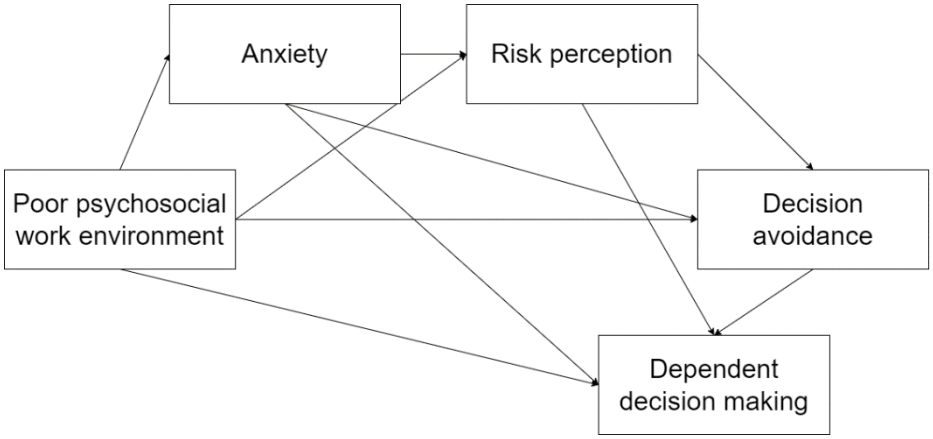

Figure 4.1. A conceptual model for Study 4.

4.2 Study 4

4.2.1 Method

The relationships between psychosocial work environment, work-related anxiety, risk perception, and avoidant and dependent decision making were investigated in an observational study using cross-sectional data. It was pre-registered at https://osf.io/f8beh. Hypotheses 4.5a and 4.5b were exploratory and not pre-registered.

4.2.1.1 Participants

The participants were 266 people in full-time employment in the United Kingdom, recruited via invitations on social media (such as Twitter, Facebook, and LinkedIn) and an advertisement on a student forum at Birkbeck, University of London. Participants completed the survey in two parts on average 11 days apart as part of a larger data

collection effort, which also included Studies 1 and 3 reported in the previous chapters of this thesis.

Of the 220 people who completed part one and consented to be emailed a follow-up survey, 142 completed part two (35.45% attrition rate). There were 122 observations in the final sample after removing duplicate responses (n=1), responses to parts one and two that could not be matched due to the participants not providing an email address (n=2) or providing a different email address to part one (n=2), participants who completed parts one and two over a month apart (n=4), participants who reported being on furlough (n=7), and participants who reported owning the business they worked for (n=4).

The majority of participants were female (71.31%), with 27.87% male, and 0.82% other. The mean age was 39.92 years (*SD* = 10.06). In terms of ethnicity, 90.16% of participants were White, 4.10% from a mixed or multiple ethnic background, 2.46% Asian, and 3.28% other. The highest completed level of education or equivalent was as follows: 7.38% GCSE grades A*-C, 18.03% A-level, 32.79% Bachelor's degree, 36.07% Master's degree, 4.92% Doctoral degree. In terms of hierarchical status, 15.57% reported being in junior positions at work, 53.28% in mid-level positions, and 31.15% in senior positions. On average, participants had 18.59 years of work experience (*SD* = 10.38). The most common industries the participants worked in were Education (12.30%), Healthcare (5.74%), Information Technology (5.74%), Sales and Marketing (4.92%), and Banking and Finance (4.10%).

4.2.1.2 Materials and procedure

The survey was completed on the online survey platform Qualtrics. After completion of the survey, one participant was randomly drawn to receive a £10 Amazon voucher. Decision-making approach was measured using the *Avoidant* and *Dependent*

subscales of the *General Decision-making style (GDMS)* questionnaire (Scott & Bruce, 1995). Each subscale has 5 questions measured on a 5-point scale. Example items are: *"I put off making many decisions because thinking about them makes me uneasy"* (*Avoidant* subscale); *"I like to have someone to steer me in the right direction when I am faced with important decisions"* (*Dependent* subscale).

The decision-making questionnaire as well as demographic questions were administered in part one. The scales described below were included in part two. Psychosocial work environment was measured by the *Recognition, Meaning of Work, Job Insecurity, Insecurity over Working Conditions, Horizontal Trust, Vertical Trust, Organisational Justice,* and *Sense of Community at Work* subscales of the *Copenhagen Psychosocial Questionnaire* (COPSOQ III, Llorens et al., 2019). Some of the example items are: *"Is your work recognised and appreciated by the management?"* (*Recognition* subscale), *"Do you feel that the work you do is important?"* (*Meaning of Work* subscale), *"Are you worried about becoming unemployed?"* (*Job Insecurity* subscale), *"Are you worried about a decrease in your salary (reduction, variable pay being introduced ...)?"* (*Insecurity over Working Conditions* subscale), *"Do the employees in general trust each other?"* (*Horizontal Trust* subscale), *"Can the employees trust the information that comes from the management?"* (*Vertical Trust* subscale), *"Are conflicts resolved in a fair way?"* (*Organisational Justice* subscale), *"Is there good co-operation between the colleagues at work?"* (*Sense of Community at Work* subscale). Middle to long versions of each subscale were used. The number of items within a subscale ranged from 1 (*Horizontal Trust* subscale) to 4 (*Insecurity over Working Conditions* subscale), with most subscales having 3 items. The scores were recoded so that higher scores on the 100-point scale indicated poorer psychosocial work environment.

The *State* version of the *State-Trait Inventory for Cognitive and Somatic Anxiety* (STICSA, Ree et al., 2008) was used to measure state anxiety on a 5-point scale. Example items include: *"I think the worst will happen"* (*Cognitive* subscale), *"My heart*

beats fast" (*Somatic* subscale). The *Cognitive* subscale includes 10 questions, while the *Somatic* subscale consists of 11 questions. The instructions were modified to refer to how participants had felt over the past 2 weeks when they had been at work. The most popular measure for measuring trait anxiety in research tends to be the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1983), however, it is not freely available to researchers. The STICSA was chosen as a free alternative measuring the same constructs as the STAI. It has been found to have good internal consistency as measured by Cronbach's alphas (.92 for *State* total, .88 for both *State Cognitive* and *State Somatic* subscales) and convergent validity measured by the association with the STAI-State and another measure of anxiety, $r \geq .65$ (Grös et al., 2007).

Risk perception was measured on a 7-point scale by the *Ethical, Financial,* and *Social* subscales of the *Domain-Specific Risk-Taking (DOSPERT)* scale since they were deemed to be the most relevant to the workplace out of the total of the five subscales of the DOSPERT, which also include recreational and health & safety risks (Blais & Weber, 2006). Participants were asked to indicate how risky they found certain activities, for example, *"Investing 10% of your annual income in a moderate growth mutual fund"* (*Financial* subscale), "*Taking some questionable deductions on your income tax return"* (*Ethical* subscale), *"Disagreeing with an authority figure on a major issue"* (*Social* subscale). Each subscale of the DOSPERT questionnaire consists of 6 items. Composite scores were calculated for all scales (and, where relevant, subscales) used in the study.

The survey questions were presented in blocks by topic: decision-making scales and demographic questions in part one and anxiety, risk perception, and psychosocial work environment scales in part two. Questions within scales were randomised for each participant to reduce question order effects (Lasorsa, 2003). Only data from the participants who fully completed the survey was used in order to allow them to withdraw at any point.

The survey was separated into two parts due to its length and subsequent demands on unpaid participants' time and attention in an attempt to reduce fatigue and maximise the chances of completion (Belmi et al., 2020). The decision about which of the measures to include in which part was dictated by the overall design of Studies 1, 3, and 4 of this thesis: the measures presented in part one were included in Studies 1 and 3, whereas those administered in part two were only used in Study 4 (the present study). An alternative to recruit two separate samples for Studies 1 and 3 and Study 4 had been considered but not adopted because of the financial and time constraints on recruitment. This resulted in 35% attrition rate between parts one and two, but ensured a larger sample for Studies 1 and 3.

Median completion time of the anxiety, risk perception, and psychosocial work environment measures (part two) was 9.73 minutes. Since the web-based survey allowed participants to take breaks and complete it in more than one sitting, the mean (20.39 minutes) and standard deviation (84.37 minutes) were not as meaningful in determining the length of time actively spent on the survey.

This research received ethical approval from the School of Business, Economics and Informatics Ethics Board at Birkbeck, University of London. Data collection was carried out between July 2020 and March 2021.

4.2.2 Results

Missing data constituted 0.32% in total. The highest percentages of missing data per variable were in three DOSPERT questions (1.64% each). In all other variables it was under 1%.

Descriptive statistics, correlations between the scales, and internal consistency of the scales are presented in Table 4.1. All variables except risk perception and dependent decision making correlated with each other as expected. There were significant positive

relationships between decision avoidance and dependent decision-making, poor psychosocial work environment, and anxiety as well as between anxiety and all other variables. Risk perception did not have a significant link with any variables apart from anxiety and no relationship was detected between dependent decision making and poor psychosocial work environment.

Table 4.1
Descriptive Statistics and Correlations for Study 4 Variables

Variable	M	SD	1	2	3	4	5
1. Avoidant DM	2.43	0.90	(.82)				
2. Dependent DM	3.48	0.78	.26**	(.75)			
3. Poor psych. work env.	32.18	14.00	.20*	-.01	(.89)		
4. Risk perception	4.12	0.82	-.02	.18	.08	(.84)	
5. Anxiety	1.60	0.50	.29**	.27**	.39***	.22*	(.92)

DM = decision making, Poor psych. work env. = poor psychosocial work environment.
*p < .05. **p < .01. ***p < .001. Cronbach's alphas are shown in the diagonal.

For more detail, Table 4.2 presents information on the correlations between decision avoidance, dependent decision making, and the subscales of the poor psychosocial work environment, anxiety, and risk perception questionnaires.

Table 4.2

Descriptive Statistics and Correlations for Study 4 Variables, including subscales

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Decision avoidance	2.43	.90	(.82)														
2. Decision dependence	3.48	.78	.26**	(.75)													
3. Recognition	34.00	22.18	.05	-.11	(.88)												
4. Meaning of work	30.33	23.45	.09	.09	.34***	(.82)											
5. Job insecurity	30.26	21.11	.17	.07	0	.14	(.61)										
6. Insecurity over work. cond.	25.87	19.00	.09	.04	.29**	.14	.55***	(.61)									
7. Horizontal trust	33.06	22.87	.19*	-.03	.54***	.25**	.12	.21*	NA								
8. Vertical trust	36.48	21.60	.21*	-.05	.74***	.30***	.13	.32***	.60***	(.78)							
9. Organisational justice	39.46	20.06	.16	-.02	.81***	.24**	.04	.30**	.61***	.74***	(.75)						
10. Sense of comm. at work	29.38	18.30	.20*	-.04	.50***	.27**	.25**	.40***	.50***	.60***	.48***	(.82)					
11. Ethical risk perception	4.59	1.14	-.13	.07	.02	0	.04	.02	-.11	-.08	.01	-.03	(.74)				
12. Financial risk perception	4.90	1.10	-.02	.14	.02	.01	.03	.06	-.04	-.12	.11	-.06	.45***	(.79)			
13. Social risk perception	2.86	0.94	.13	.21*	.11	.06	.26**	.24**	.14	.11	.15	.15	.38***	.36***	(.72)		
14. Cognitive anxiety	1.84	0.66	.32***	.29**	.19*	.18	.32***	.22*	.26**	.27**	.21*	.31***	.09	-.06	.43***	(.89)	
15. Somatic anxiety	1.38	0.45	.18*	.18*	.24**	.11	.16	.20*	.20*	.30***	.28**	.35***	.14	-.01	.41***	.65***	(.86)

Insecurity over work. cond. = Insecurity over working conditions, Sense of comm. at work = Sense of community at work. *$p < .05$. **$p < .01$. ***$p < .001$. Cronbach's alphas are shown in the diagonal.

4.2.2.1 Regression models

Before building mediation models, the relationships between the variables of interest were examined using linear regression in *R* 4.1.1 so that diagnostic tests could be performed.

4.2.2.1.1 Poor psychosocial work environment and anxiety

The relationship between poor psychosocial work environment and anxiety was tested using a linear regression model. Poor psychosocial work environment was a significant predictor of anxiety, $B = 0.014$ (95% CI [0.008, 0.020]), $SE = 0.003$, $p < .001$). Since heteroskedasticity was detected in this model (see below), heteroskedastic-consistent standard error (Astivia & Zumbo, 2019) was calculated using the *estimatr* package (Blair et al., 2022). Three decimal points are reported for clarity since psychosocial work environment was measured on a 100-point scale. For each point increase in poor psychosocial work environment anxiety increased by 0.014 points. The model accounted for approximately 15% of the variance, $R^2 = .15$, adj. $R^2 = .14$, $F(1, 120) = 19.59$, $p < .001$. The model predictions are displayed in Figure 4.2.

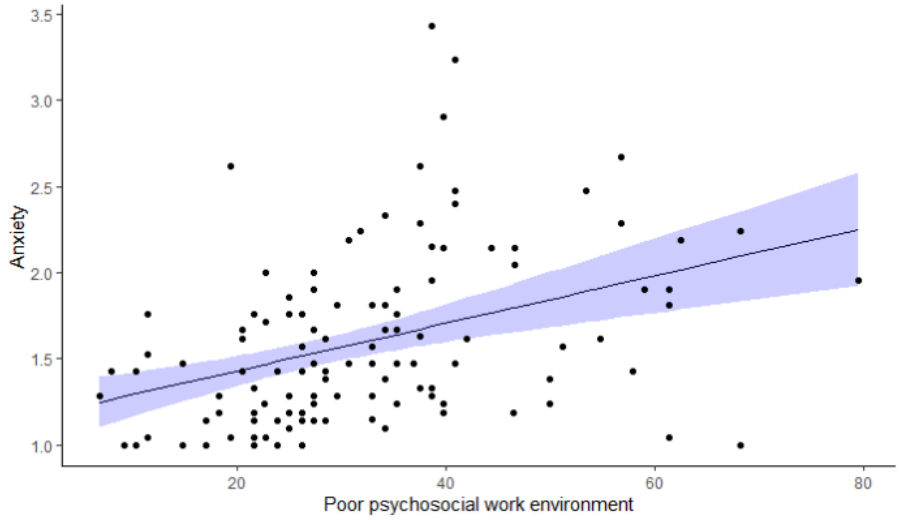

Figure 4.2. Poor psychosocial work environment predicting anxiety.

The model residuals were abnormally distributed, as demonstrated by the quantile-comparison plot presented in Figure 4.3. The Shapiro-Wilk normality test was conducted to check the distribution of residuals and confirmed that they deviated from normality ($W = 0.93$, $p < .001$). The Bonferroni Outlier Test (Fox & Weisberg, 2019) detected a residual outlier (Bonferroni $p < .05$), however, the largest Cook's distance was 0.2, below the recommended cut-off value of 1, and the removal of the outlier did not substantially change the results or the diagnostics, so it was decided to keep it. In this non-clinical sample, the anxiety variable was right-skewed, as expected, but neither square root nor logarithmic transformation substantially affected the regression assumptions, so they were not performed for this report. Constant residual variance was checked using the non-constant variance score test (Breusch & Pagan, 1979) in the *car* package (Fox & Weisberg, 2019). Some heteroscedasticity was detected between the fitted values and the predicted outcome ($\chi^2(1) = 9.54$, $p < .01$), addressed by calculating heteroskedastic-consistent standard error, as indicated above. Autocorrelated errors were checked using the Durbin-Watson test in the *car* package, which showed that the residuals were independent ($D\text{-}W = 2.14$, $p = .43$). Linearity was assessed using a partial-residual plot presented in Figure 3.7. Most data points were clustered towards the lower ends of both psychosocial work environment and anxiety

scales due to the specifics of these measures and the non-clinical sample, indicating that participants mostly experienced low anxiety and worked in a favourable work environment.

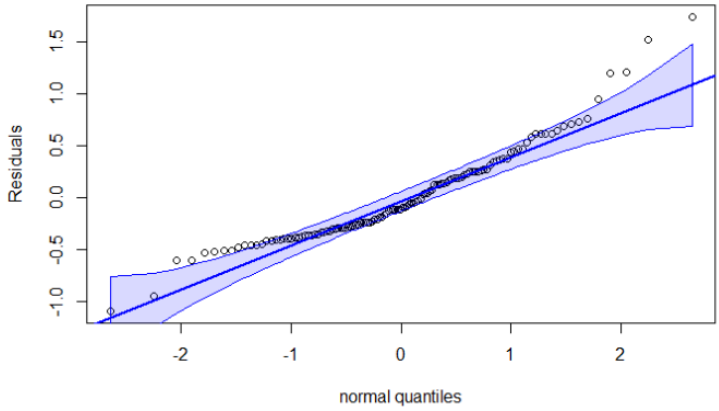

Figure 4.3. Psychosocial work environment and anxiety regression model diagnostics: Quantile-comparison plot. Compares model residuals to theoretically expected quantiles.

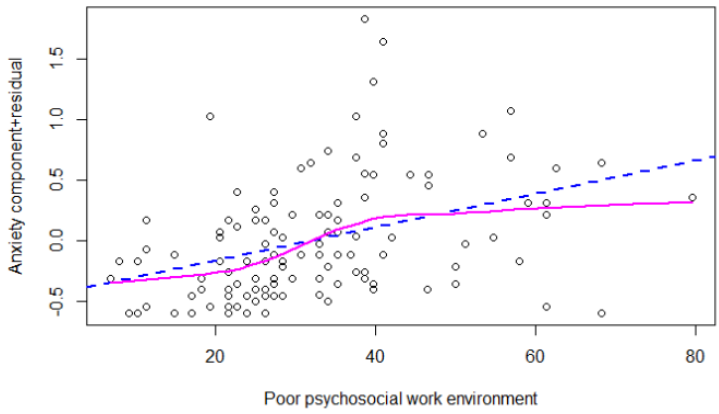

Figure 4.4. Psychosocial work environment and anxiety regression model diagnostics: Partial-residual plot. Model predictions are in the dashed blue line. Regression curve is in magenta.

Next, another linear regression was fitted to investigate the relationships of the subscales of the poor psychosocial work environment questionnaire and anxiety. Four observations were omitted due to missing data. None of the subscales statistically significantly predicted anxiety while controlling for the others. Three of the Variance Inflation Factors (VIFs) calculated using the *vif* command in the *car* package were

equal to or higher than 3, but under 4, while the other five were less than 2, indicating that there was no substantial multicollinearity that might have made it difficult to calculate regression coefficients while keeping the other predictors constant.

4.2.2.1.2 Poor psychosocial work environment and decision avoidance

The association between poor psychosocial work environment and decision avoidance was tested using linear regression. Poor psychosocial work environment was a significant predictor of decision avoidance, B = 0.013 (95% CI [0.001, 0.024]), SE = 0.006, $p < .05$. As previously, three decimal points are provided for clarity because poor psychosocial work environment was measured on a 100-point scale. For each point increase in poor psychosocial work environment, decision avoidance increased by 0.013 points. The model accounted for approximately 4% of the variance, R^2 = .04, adj. R^2 = .03, $F(1, 120) = 4.89$, $p < .05$. The model predictions are displayed in Figure 4.5.

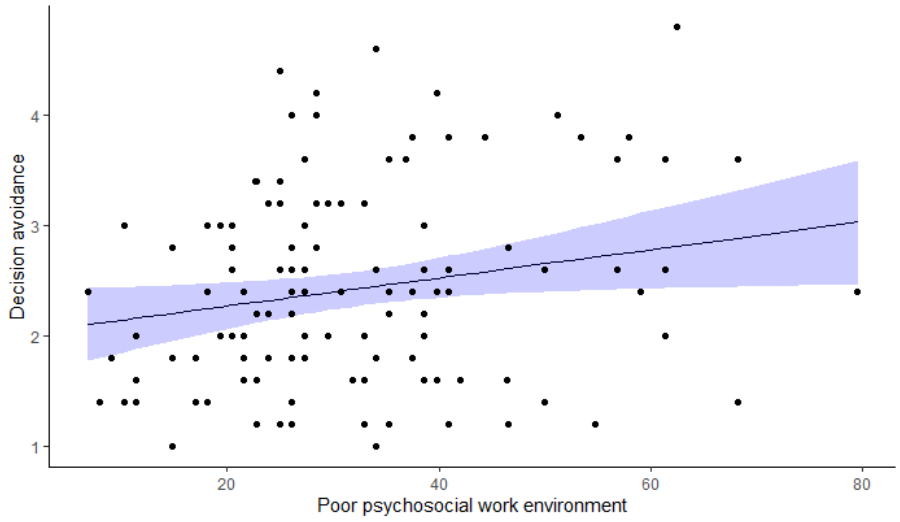

Figure 4.5. Poor psychosocial work environment predicting decision avoidance.

The residuals were slightly abnormally distributed, as shown by the quantile-comparison plot presented in Figure 4.6. The Shapiro-Wilk normality test was conducted to check the distribution of residuals and confirmed that they deviated from normality ($W = 0.97$, $p < .05$). No heteroscedasticity was detected ($\chi^2(1) = 3.59$, $p = .06$). The residuals were independent ($D\text{-}W = 1.92$, $p = .64$). Linearity was assessed using a partial-residual plot presented in Figure 4.7. The Bonferroni Outlier Test did not detect any residual outliers. The largest Cook's distance was 0.13.

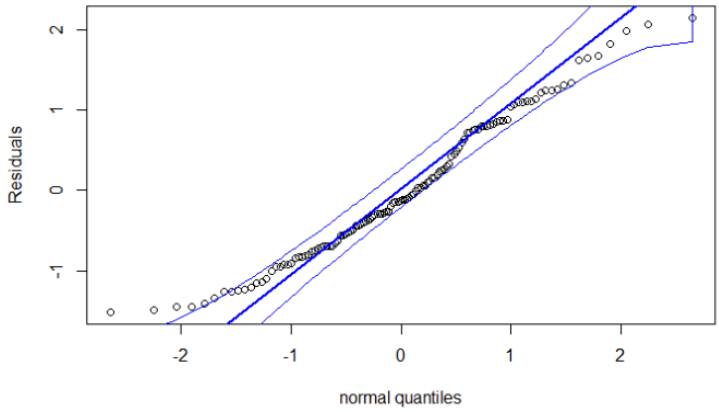

Figure 4.6. Poor psychosocial work environment and decision avoidance regression model diagnostics: Quantile-comparison plot.
Compares model residuals to theoretically expected quantiles.

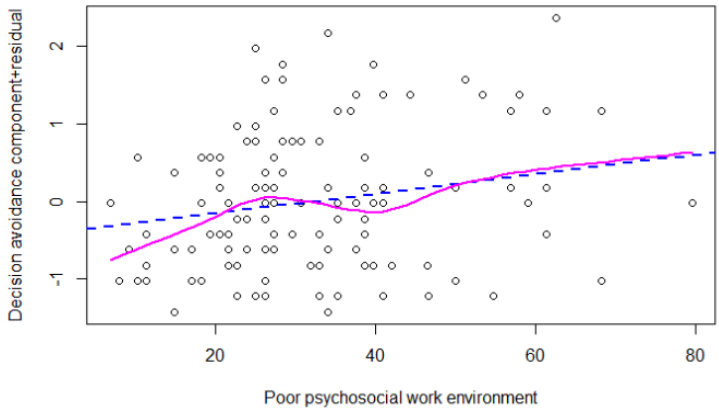

Figure 4.7. Poor psychosocial work environment and decision avoidance regression model diagnostics: Partial-residual plot.
Model predictions are in the dashed blue line. Regression curve is in magenta.

Following that, a linear regression was fitted to investigate the relationships of the subscales of the poor psychosocial work environment questionnaire and decision avoidance. Four observations were deleted due to missingness. None of the subscales statistically significantly predicted avoidant decision making while controlling for the others.

4.2.2.1.3 Anxiety and risk perception

To test the relationship between anxiety and risk perception, a linear regression model was fitted. One observation was deleted due to missingness. Anxiety was a statistically significant predictor of risk perception, $B = 0.36$ (95% CI [0.06, 0.65]), $SE = 0.15$, $p < .05$. For each point increase in anxiety, risk perception increased by 0.36 points. The model accounted for approximately 5% of the variance, $R^2 = .05$, adj. $R^2 = .04$, $F(1, 119) = 5.83$, $p < .05$. The model predictions are shown in Figure 4.11.

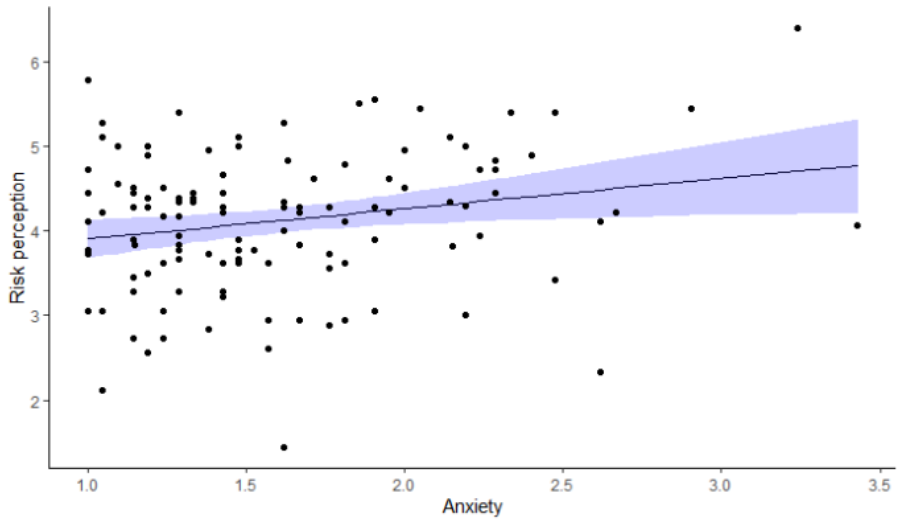

Figure 4.8. Anxiety predicting risk perception.

The residuals were normally distributed ($W = 0.99$, $p = .31$), as shown in Figure 4.9. No heteroscedasticity was detected ($\chi^2(1) = 0.96$, $p = .33$). The residuals were

independent (*D-W* = 1.80, *p* = .26). Linearity was assessed using a partial-residual plot presented in Figure 4.10. The Bonferroni Outlier Test did not detect any residual outliers. The largest Cook's distance was 0.26.

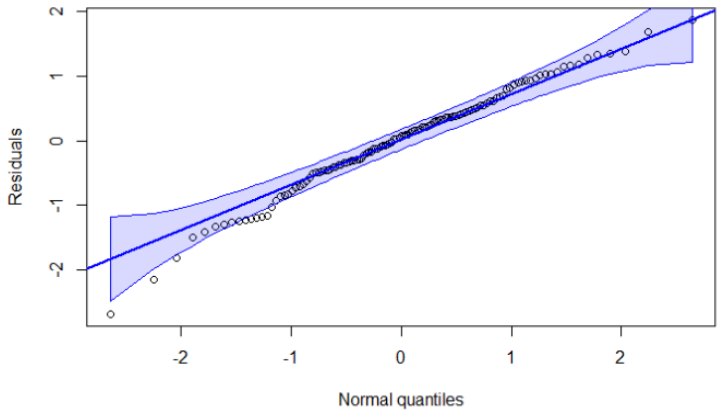

Figure 4.9. Anxiety and risk perception regression diagnostics: Quantile-comparison plot. Compares model residuals to theoretically expected quantiles.

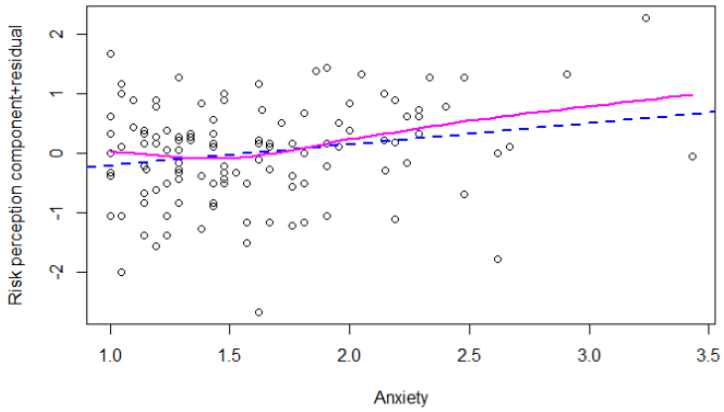

Figure 4.10. Anxiety and risk perception regression diagnostics: Partial-residual plot. Model predictions are in the dashed blue line. Regression curve is in magenta.

A linear regression was fitted to investigate the relationships between the subscales of the anxiety questionnaire and risk perception. One observation was deleted due to missingness. Neither cognitive nor somatic anxiety statistically significantly predicted risk perception while controlling for the other. Both VIFs were less than 2.

4.2.2.1.4 Anxiety and decision avoidance

To test the relationship between anxiety and decision avoidance, another linear regression model was fitted. Anxiety statistically significantly predicted decision avoidance, B = 0.52 (95% CI [0.21, 0.83]), SE = 0.16, $p < .01$. For each point increase in anxiety, decision avoidance increased by 0.52 points. The model accounted for approximately 8% of the variance, R^2 = .08, adj. R^2 = .07, $F(1, 120) = 10.77$, $p < .01$. The model predictions are shown in Figure 4.11.

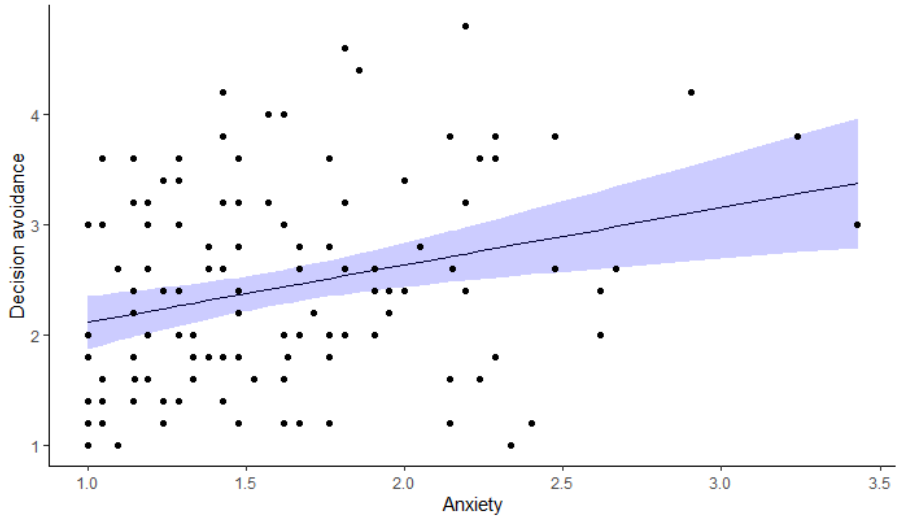

Figure 4.11. Anxiety predicting decision avoidance.

The residuals were slightly abnormally distributed, as shown by the quantile-comparison plot presented in Figure 4.12. The Shapiro-Wilk normality test was conducted to check the distribution of residuals and confirmed that they deviated from normality (W = 0.97, $p < .05$). No heteroscedasticity was detected ($\chi^2(1) = 1.36$, p = .24). The residuals were independent (D-W = 1.87, p = .41). Linearity was assessed using a partial-residual plot presented in Figure 4.13. The Bonferroni Outlier Test did not detect any residual outliers. The largest Cook's distance was 0.06.

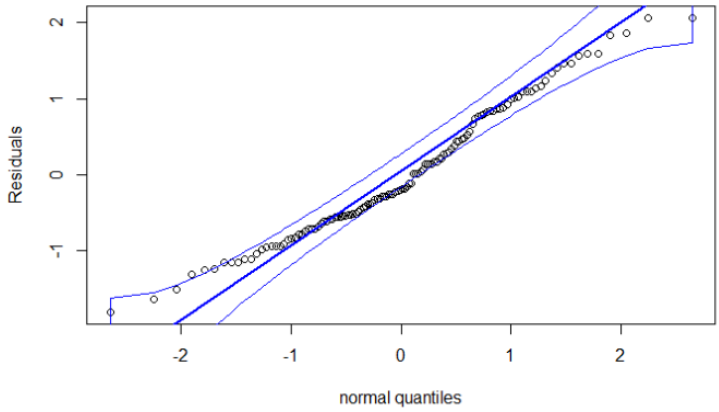

Figure 4.12. Anxiety and decision avoidance regression model diagnostics: Quantile-comparison plot. Compares model residuals to theoretically expected quantiles.

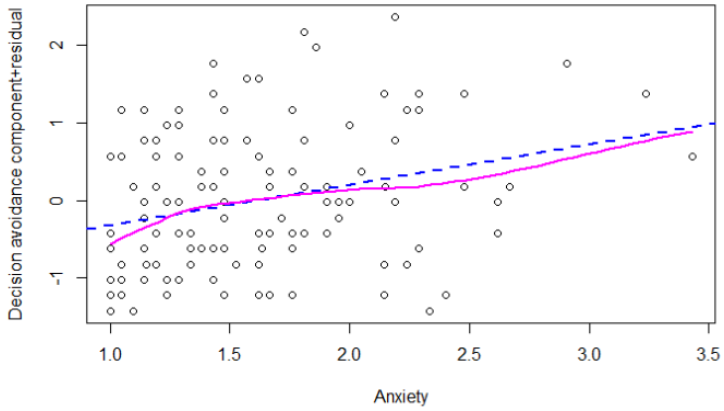

Figure 4.13. Anxiety and decision avoidance regression model diagnostics: Partial-residual plot. Model predictions are in the dashed blue line. Regression curve is in magenta.

As shown by a linear regression model in which cognitive and somatic anxiety were entered as predictors separately, despite a significant zero-order correlation between somatic anxiety and decision avoidance, as shown in Table 4.2, when controlled for cognitive anxiety, somatic anxiety was not a significant predictor of decision avoidance. Cognitive anxiety, on the other hand, showed an association with decision avoidance that remained significant, B = 0.50 (95% CI [0.19, 0.81]), SE = 0.16, p < .01. For each point increase in cognitive anxiety, decision avoidance increased by 0.50 points. The model accounted for approximately 11% of the variance, slightly more than the previous model that used composite anxiety scores as a predictor (R^2 = .11, adj. R^2 =

0.09, $F(2, 119) = 7.15$, $p < .01$). Apart from the slightly abnormally distributed residuals ($W = 0.98$, $p < .05$), the other model assumptions were met.

4.2.2.1.5 Risk perception and decision avoidance

A linear regression model showed no significant relationship between risk perception and decision avoidance, $B = -0.02$ (95% CI [-0.22, 0.18]), $SE = 0.10$, $p = .85$, as can also be seen from model predictions displayed in Figure 4.14. One observation was omitted due to missing data. There were no zero-order correlations between decision avoidance and the composite score of risk perception (Table 4.1) or the subscales (Table 4.2).

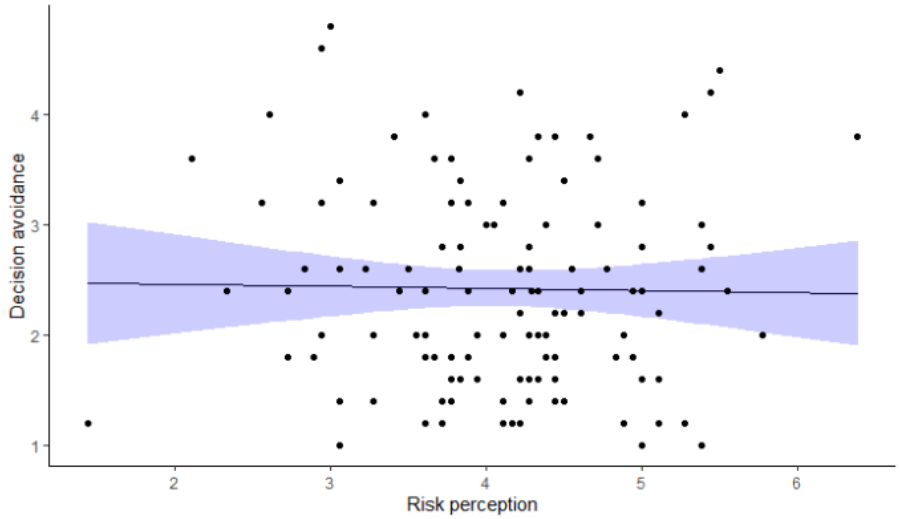

Figure 4.14. Risk perception predicting decision avoidance.

4.2.2.1.6 Decision avoidance and dependent decision making

The relationship between decision avoidance and dependent decision making was tested in a linear regression model, which showed that decision avoidance was a statistically significant predictor of dependent decision making, $B = 0.23$ (95% CI [0.08,

0.38]), *SE* = 0.07, *p* < .01. For each point increase in decision avoidance, dependent decision making increased by 0.23 points. The model accounted for approximately 7% of the variance, R^2 = .07, adj. R^2 = .06, *F*(1, 120) = 8.98, *p* < .01. The model predictions are shown in Figure 4.15.

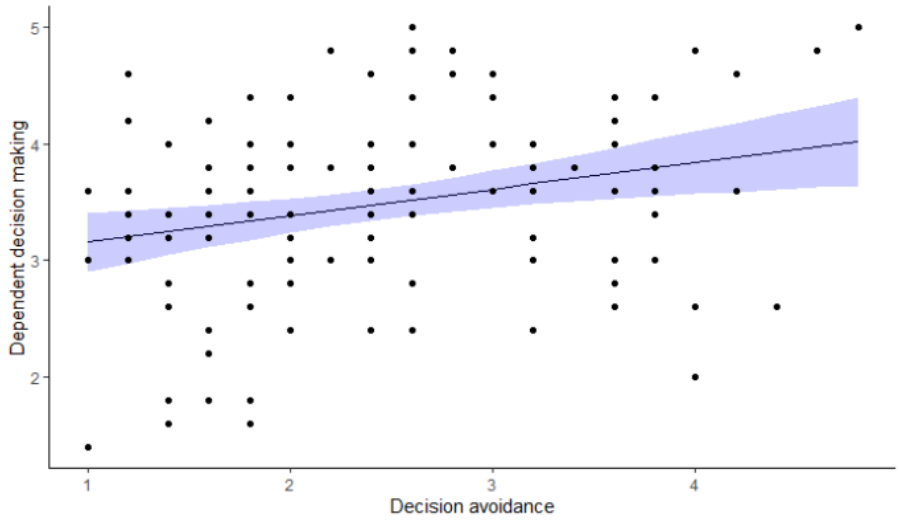

Figure 4.15. Decision avoidance predicting dependent decision making.

The residuals were normally distributed (*W* = 0.98, *p* = .06), as shown by the quantile-comparison plot presented in Figure 4.16. No heteroscedasticity was detected (χ^2(1) = 0.01, *p* = .92). The residuals were independent (*D-W* = 2.10, *p* = .56). Linearity was assessed using a partial-residual plot presented in Figure 4.17. The Bonferroni Outlier Test did not detect any residual outliers. The largest Cook's distance was 0.11.

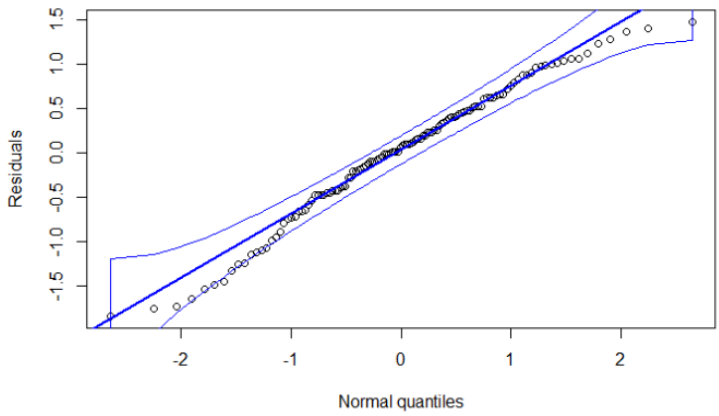

Figure 4.16. Decision avoidance and dependent decision making regression model diagnostics: Quantile-comparison plot.
Compares model residuals to theoretically expected quantiles.

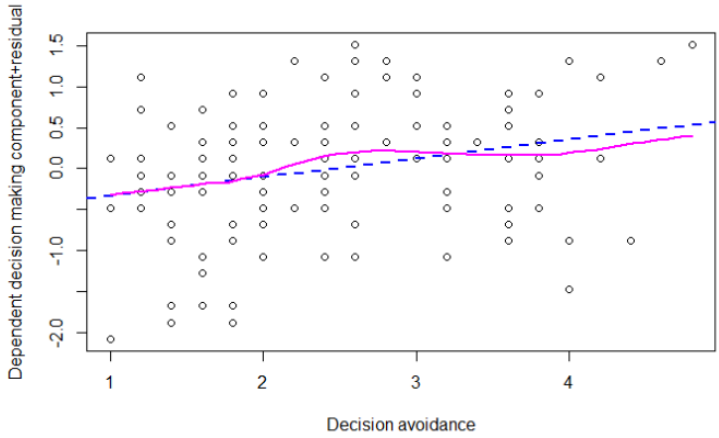

Figure 4.17. Decision avoidance and dependent decision making regression model diagnostics: Partial-residual plot. Predictions are in the dashed blue line. Regression curve is in magenta.

4.2.2.2 Mediation models

At the next step, mediation models were fitted using package *lavaan* 0.6-9. Composite scores were used rather than latent variables due to sample size limitations. Maximum likelihood estimation and bootstrapped standard errors with 1,000 bootstrap samples were used.

4.2.2.2.1 Serial mediation model of the relationships between poor psychosocial work environment, anxiety, risk perception, and decision avoidance

A serial mediation model was fitted to test the relationship between poor psychosocial work environment as an independent variable, anxiety and risk perception as mediators, and decision avoidance as a dependent variable. One observation was ommited due to missing data. As shown in Figure 4.18, the relationship between work environment and decision avoidance was fully mediated. The total effect of poor psychosocial work environment on decision avoidance was significant (β = .20, p < .05), but only the indirect path through work-related anxiety was significant (β = .10, p < .05). All coefficients are standardised. The model explained about 15% of the variance in work-related anxiety (R^2 = .15) and about 10% of the variance in decision avoidance (R^2 = .10), but only about 5% of the variance in risk perception (R^2 = .05). Risk perception did not have significant relationships with any of the variables. As such, hypotheses H4.1a, H4.3a, H4.4a, and H4.4b, but not H4.1b, H4.1c, H4.3b, and H4.3c, found support in the data.

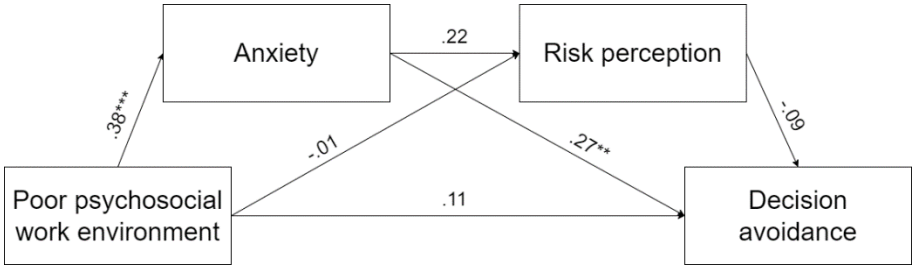

Figure 4.18. A mediation model examining the relationships between psychosocial work environment, anxiety, risk perception, and decision avoidance.
*p < .05. **p < .01. ***p < .001. Coefficients are standardised.

4.2.2.2.2 Mediation model of the relationships between risk perception, decision avoidance, and dependent decision making

Next, the relationship between risk perception, decision avoidance, and dependent decision making was examined. As shown in Figure 4.19, the relationship between risk

perception and dependent decision making was significant, but it was not mediated by decision avoidance due to the lack of a relationship between risk perception and decision avoidance. Decision avoidance was significantly associated with dependent decision making. The model explained about 10% of variance in dependent decision making (R^2 = .10), but no variance in decision avoidance. Thus, H4.2a and H4.2b, but not H4.2c, were supported. However, it is important to note that there was no significant zero-order correlation between risk perception and dependent decision making, as shown in Table 4.1, and the relationship found in the mediation model was just under the cut-off for determining significance (p = .047). One observation was ommited due to missing data.

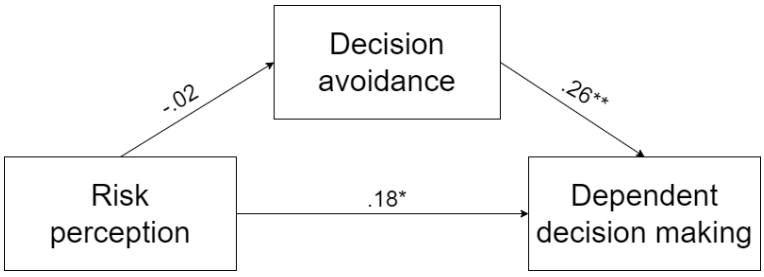

Figure 4.19. A mediation model examining the relationships risk perception, decision avoidance, and dependent decision making.
*p < .05. **p < .01. ***p < .001. Coefficients are standardised.

4.2.2.2.3 Serial mediation model of the relationships between poor psychosocial work environment, anxiety, decision avoidance, and dependent decision making

Based on the findings above and to test Hypotheses 4.5a and 4.5b, the first mediation model reported in this chapter (section 4.2.2.2.1) was extended to include dependent decision making. Since in the previous models risk perception was not significantly associated with poor psychosocial work environment, anxiety, or decision avoidance, unlike specified in the pre-registration document, it was not included in the following model, shown in Figure 4.20. Contrary to the expectations, the model showed a weak negative direct relationship between poor psychosocial work environment and dependent decision making just under the p-value cut-off (p = .043) despite there being

no zero-order correlation between the two variables (as shown in Table 4.1). However, the total relationship between these two variables was not significant (β = -.01, p = .87) due to the positive relationships that poor psychosocial work environment and dependent decision making had with the other variables in the model cancelling out the effect of the negative direct path. The relationship was not mediated and only the indirect path through work-related anxiety was significant (β = .10, p < .05). About 13% of the variance in dependent decision making was explained in this model (R^2 = .13). Thus, there was not sufficient evidence to support H4.5a and H4.5b.

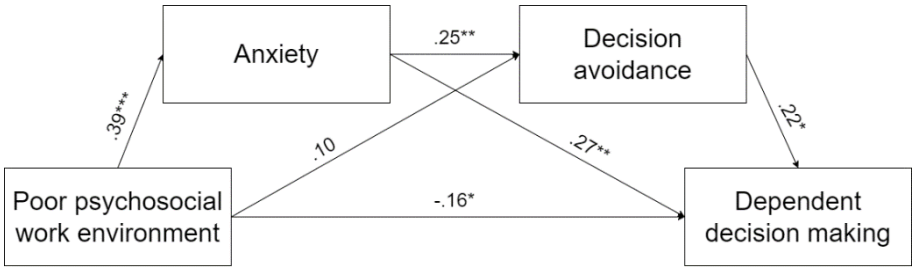

Figure 4.20. A mediation model examining the relationships between psychosocial work environment, anxiety, decision avoidance, and dependent decision making.
*p < .05. **p < .01. ***p < .001. Coefficients are standardised.

4.3 Discussion

4.3.1 Findings

4.3.1.1 Overview

In this chapter, a potential mechanism through which working conditions may be connected to avoidant and dependent decision-making behaviour was investigated. Specifically, the psychosocial work environment was considered, which included such aspects of the working life as recognition for one's contributions at work, organisational trust and justice, a sense of community in the workplace, job security, security of working conditions, and how meaningful one perceives their work to be. Previously in

this chapter (section 4.1.2), it was discussed that managerial style and processes, which include proper recognition for workers' contributions and fair treatment of all workers, as well as interpersonal relationships in the workplace, are important factors for psychological safety (Kahn, 1990), which creates the necessary conditions for employees to make proactive decisions (Edmondson & Lei, 2014). Insecure employment is a risk factor for anxiety (Andrea et al., 2009; Murcia et al., 2013), which has been linked to decision avoidance and dependence (Dewberry et al., 2013; Umeh & Omari-Asor, 2011). Employees' perception of the work that they do as meaningful has been linked to greater commitment and engagement as well as better management of organisational change (Cartwright & Holmes, 2006). This suggests that staff who consider their work to be important are more likely to be invested in it and make conscious effort to bring about positive change through their positions at work, which often involves proactivity in decision making.

As potential serial mediators of the relationship between the psychosocial work environment and avoidant and dependent decision making, anxiety and risk perception were proposed. Previous literature, discussed in the introductory section of this chapter, has linked anxiety to psychosocial work environment, increased risk perception, and both decision avoidance and dependence on others in making decisions. Specifically, it has been suggested that (a) poor psychosocial work environment is associated with increased anxiety (Andrea et al., 2009; Murcia et al., 2013); (b) anxiety and fear are associated with heightened risk perceptions (Butler & Mathews, 1987; Lerner & Keltner, 2000); (c) anxiety is associated with higher risk avoidance (Lorian & Grisham, 2010; Mitte, 2007) and decision avoidance as well as dependence on others in making decisions (Dewberry et al., 2013; Umeh & Omari-Asor, 2011); and (d) high risk perception is associated with less risk taking (Mitte, 2007). In addition, when risks of both acting and not acting are perceived as high and the individual does not consider finding a better, less risky, solution to be probable, they are likely to experience high stress and exhibit decision-avoidant behaviour, which

may manifest as deferral of choice or an attempt to push the responsibility for the decision onto other people, in addition to other maladaptive strategies (Janis & Mann, 1976).

With these prior findings in mind, a series of mediation models incorporating the five constructs of interest were tested in a sample of adults working full-time in the United Kingdom. In line with the previous findings, in this study significant direct links between poor psychosocial work environment and anxiety, as well as between anxiety and avoidant and dependent decision making, were detected. In addition, anxiety fully mediated the relationship between poor psychosocial work environment and decision avoidance, which was significant in total.

4.3.1.2 Poor psychosocial work environment, anxiety, and decision avoidance

Although the study reported in this chapter was cross-sectional and further longitudinal and/or experimental research is needed to gather evidence for causality, the findings reported here provide initial evidence for the links between the psychosocial work environment, anxiety, and decision avoidance. Individuals with anxiety often tend to avoid situations that are associated with fear and other negative emotions and, importantly, such avoidance may exacerbate anxiety (D. M. Grant et al., 2013). This is at least partly because the avoidance of situations that cause fear and discomfort prevents anxious people from updating their knowledge and, therefore, unlearning the links between such situations and negative experiences (Aylward et al., 2019). Part of it is due to judgments based on the availability heuristic (Tversky & Kahneman, 1974): because a negative outcome of a particular type of event is the most salient in the anxious person's memory, they are likely to overestimate the probability of another similar event having a negative outcome, too.

As an example of it happening in the workplace setting, an anxious employee who has experienced a backlash after deciding to make a suggestion in a meeting (e.g., in terms of a negative response from the manager) may be reluctant to do the same in the future due to the fear the negative experience would be repeated. That would prevent the employee from voicing their ideas, even though such ideas may be beneficial to the organisation. The kind of psychosocial work environment where employees feel safe to share their suggestions would help to avoid such situations. This ties into the concept of psychological safety, which refers to how people perceive the consequences of taking such interpersonal risks as volunteering information and knowledge to colleagues and superiors, making suggestions on how to improve organisational processes, and taking initiative to start new projects (Edmondson & Lei, 2014). In other words, the consequences of behaving proactively (Bateman & Crant, 1993). At the same time, such proactive behaviour is not only associated with better career outcomes (Fuller & Marler, 2009), but is also often required of employees (Newman et al., 2017).

As the results presented in this chapter showed, anxious employees are more likely to avoid making decisions, thus potentially missing opportunities for advancement and for crafting their work environment in a way that better suits their needs. Going back to the findings reported in Chapter 3 of this thesis, decision avoidant employees are also less likely to occupy positions of high authority in the workplace and to be satisfied with their careers. This supports the idea that, as with proactive behaviour (Bateman & Crant, 1993), proactive decision making (which is required to exhibit proactive behaviour since deciding to act is a choice) can help employees better craft their work context to achieve their goals.

The links between poor psychosocial work environment, anxiety, and decision avoidance are important because just as anxiety may lead to avoidance, avoidance may exacerbate anxiety (D. M. Grant et al., 2013) and prevent anxious individuals from updating their knowledge about potential outcomes of different events (Aylward et al.,

2019): continuing the example above, that voicing suggestions in meetings may be taken positively. Creating the kind of environment in which employees are encouraged to share ideas, try out new ways of doing things, and take initiative on new projects without fear of a backlash from superiors and colleagues may be beneficial for both organisations and individual employees. For the former, it may lead to improvements in organisational processes and new creative projects. For the latter, it may reduce anxiety about making proactive decisions and, as the results of Study 3 of this thesis suggest, potentially lead to better career outcomes.

4.3.1.3 Risk perception

Unexpectedly, risk perception was not significantly associated with any of the study variables apart from dependent decision making when tested in the mediation models, despite there being no zero-order correlation between risk perception and dependent decision making. In addition, in spite of a significant zero-order correlation between risk perception and anxiety, no such relationship was found when these variables were used in a mediation model. Such inconsistency across the two different relationships may indicate that the sample size was not sufficiently large to detect significant effect, which was a limitation caused by recruiting from a difficult-to-reach population in the context of a pandemic.

However, in this sample, the association between risk perception and decision avoidance was close to zero in effect size, suggesting that at least in this context, risk perception may not be part of the mechanism through which anxiety affects decision avoidance. This is an interesting finding, suggesting that there may be better mediators of this relationship or that this link may above all be direct and the avoidance response may be pre-cognitive. Earlier in this chapter (section 4.1.2.3.3), it was discussed that the avoidance response to situations in which both acting and not acting are thought to be risky (Janis & Mann, 1976) is reminiscent of freezing in threatening conditions in

which both fight and flight are judged as ineffective (Schmidt et al., 2008). While some form of risk assessment does take place in such circumstances (i.e., to decide whether the event in question is threatening or not), it may be pre-cognitive, situation-specific, and difficult to measure in survey research.

Studies of anxiety have suggested that anxious individuals have dominant cognitive schemata containing information about potential threats which interfere with adaptive information processing (Beck & Clark, 1988), thus making them perceive ambiguous events as unacceptably threatening (Carleton et al., 2012). Other information-processing biases in anxious people include selective attention to and enhanced memory for threatening information (Chen & Craske, 1998). In this way, while judgment about the danger of an event does enter the equation at some point between anxiety and decision avoidance, it may be more subtle and difficult to measure than self-reported risk perception questionnaires allow: people may not consciously process that they perceive a certain event as threatening. Moreover, the relationship between anxiety and risk perception may be two-way: while anxiety may cause people to perceive risks as higher, thinking about the dangers of potential events may also make people more anxious. Since this study used cross-sectional design, it was not possible to determine the direction of this effect.

Another potential measurement issue is that within the constraints of survey research conducted using existing validated self-reported measures, the relationship between risk perception and decision avoidance may not readily transpire. In future research, ensuring that both risk perception and decision avoidance measures refer to the same problem (for example, through constructing a questionnaire based on a series of vignettes outlining decision problems) may allow to capture the participants' thinking process better. Furthermore, adding a measure of intensity of negative outcomes in addition to their likelihood would shed more light on the relationship between risk perception and decision making. That is because neither catastrophic events with

miniscule probability, nor highly probable events that barely hold any significance usually require much risk mitigation (Notebaert et al., 2016).

4.3.1.4 Dependent decision making

While this study supported the previous findings that decision avoidance is associated with dependent decision making (Dewberry et al., 2013; Scott & Bruce, 1995; Spicer & Sadler-Smith, 2005), decision avoidance did not mediate the relationship between anxiety and dependent decision making, or between risk perception and dependent decision making. This suggests that the desire to avoid decisions may not be the only reason for high dependence on other people that anxious individuals and those who believe in high likelihood of negative outcomes may have. Other potential reasons may include low decision confidence, as suggested by Leykin and DeRubeis (2010), and the need for social approval (Harren, 1979). Besides, it has previously been proposed that dependent decision making is characterised by approach to rather than avoidance of a decision situation (Phillips et al., 1984), even though this kind of relatively proactive approach is likely to be motivated by the desire to escape the decision problem sooner with the help from other people.

4.3.2 Implications for research and practice

This research contributes to the organisational psychology and decision making literature by providing initial evidence for the links between poor psychosocial work environment, anxiety, and employee decision making. The effects of emotions on decision making have long been of interest to researchers (e.g., Forgas, 1995; Lerner & Keltner, 2000; Maner et al., 2007; Raghunathan & Pham, 1999), but to my

knowledge, this is the first study to examine potential emotional causes of avoidant and dependent decision making from the organisational perspective.

Avoidant and dependent decision making in employees should be an important consideration for organisations. At the individual level, as demonstrated in Study 3 reported in this thesis, decision avoidance is linked to poorer career outcomes, both in terms of the level of authority in the workplace and in terms of career satisfaction. Here, the person-situation interaction perspective is embraced (Terborg, 1981) and it is suggested that even in people predisposed to decision avoidance, such maladaptive decision-making behaviour may be mitigated. The findings of this research suggest that making improvements to the psychosocial work environment aimed at increasing employee well-being and specifically reducing anxiety may translate into a positive change in their decision-making approach. Adapting a more proactive method of making decisions at work may thus help employees improve their career prospects, but that is a question that longitudinal research is best suited to answer. In the time frame of this thesis, it was impossible to track employees for a long enough period.

At the organisational level, pervasive decision avoidance can lead to stagnation. At the same time, dependent decision making may instil the culture of excessive consultation and thus slow down the workflow and create unnecessary barriers to change. Therefore, decision making marked by avoidance and dependence on others can have an adverse impact on both employees and organisations. This is a question that may also be explored further in future research.

The results reported in this chapter suggest that fostering a favourable work environment that promotes mental well-being of employees may lead to more efficient decision making. Therefore, just as well-being activities should intervene at both the organisational and individual level (de Lange et al., 2020), efforts to improve decision making within the workplace should embrace a multilevel perspective. Specifically, at the organisational level, it is proposed that addressing work environment issues that

are likely to result in increased anxiety in employees may translate into less avoidant and dependent decision-making behaviour. This could draw on the growing literature on organisational interventions to improve psychosocial working conditions (Nielsen et al., 2010). In jobs where proactivity and independence are valued, that may lead to better performance and increased career prospects. Moreover, improved decision making by employees is likely to benefit organisations. Individual-level interventions may be targeted at equipping staff with decision-making tools to reduce decision anxiety and helping them carry out accurate risk assessments.

4.3.3 Limitations

While a mechanism of the relationships between the study variables was proposed, cross-sectional data was used, so assumptions about causality could not be made. Besides, this research relied on the participants' self-reports, which may be prone to biases. Future studies may use decision-making vignettes instead of self-assessments to measure avoidant and dependent decision making and ask participants about their risk perception in relation to the scenarios presented in the vignettes. Ideally, participants in future research should come from the same line of work so that the vignettes could be designed with their job responsibilities in mind. In that way, researchers may be able to trace the decision-making processes in relation to problems similar to those participants face at work.

The sample size in this study was limited by the fact that participants were recruited from a population of full-time workers, who typically already have high demands on their time. Data collection also happened during the COVID-19 pandemic, which restricted recruitment to online avenues. A convenience sample was used due to financial and logistic constraints on recruitment and the proportion of white, female, and university-educated people among the participants was higher than in the United

Kingdom working population (Office for National Statistics, 2012, 2018, 2020), so caution should be applied in generalising the results. A larger sample size in future research can help to examine the mechanism through which anxiety may affect decision making further.

Recruitment for this study was conducted as part of a larger data collection effort. Results from the same sample of workers were also reported in Studies 1 and 3 in this thesis. For those previous studies, it was important to phrase the decision-making questions in such a way as to measure participants' approach to making decisions in general rather than only in work-related situations. Future research into the links between work environment, anxiety, and decision making may look into rewording the decision-making questionnaire to prompt participants to thing about the kinds of decisions they are likely to make at work. The answers to such a questionnaire may be corroborated using decision-making tasks in the form of vignettes. While vignettes are likely to have limited generalisability outside the context in which they are used (for example, if they are developed with a particular line of work in mind), they may provide a better representation of employees' decision-making process in that specific context.

In the final chapter, a general discussion about the findings of the four studies reported this thesis in light of one another will be provided. The place of these findings within broader JDM and I/O Psychology literature, their implications for practice, and limitations as well as future research directions will be discussed.

5 General discussion

5.1 An overview of the findings

This thesis studied the relationships between different approaches to decision making and career outcomes. Specifically, it examined rational, intuitive, spontaneous, avoidant, and dependent decision making as well as decision confidence and their associations with hierarchical status, authority level, and career satisfaction in three pre-registered studies. In addition to that, expanding on the findings of one of the studies, it investigated the links between poor psychosocial work environment, anxiety, and avoidant and dependent decision making in another pre-registered study.

Decision making is understudied in the organisational context at the level of individuals and there is a dearth of research on the topic of the relationships between various approaches to decision making and career outcomes. The findings of this thesis provided some initial evidence for these relationships, which will be discussed below.

Building on the previous research into individual differences in decision making and the structure of decision-making styles (Dewberry et al., 2013), in this thesis, a two-fold approach to studying individual decision making was adopted. On the one hand, the cognitive dimension, comprised of rationality, intuition, and, as an extension, impulsivity or spontaneity, was examined. On the other hand, maladaptive behaviours that people may exhibit in decision-making situations, namely avoidance and dependence on others, were studied. In addition to that, decision confidence was considered because its importance has often been pointed out in previous decision-making research (Kruger & Dunning, 1999; Lichtenstein & Fischhoff, 1977) and because the widespread decision biases and the use of unhelpful heuristics indicate that people may not always realise when they act contrary to the rules of rational decision making, thus limiting their ability to critically evaluate their decision-making process.

Despite some attempts to wed the fields of JDM and I/O Psychology and the obvious importance of efficient decision making in the workplace (Highhouse, 2001; Zhang & Highhouse, 2018), little research exists that has applied the knowledge from JDM research in an organisational setting. While in some areas, most notably candidate selection, JDM concepts such as representativeness heuristic (Highhouse, 1997), framing effect (Gamliel & Peer, 2009), and decoy effect (Highhouse, 1996), have attracted the interest of researchers, the question of whether differences in decision-making approach may lead to different career outcomes remained unexplored. The research presented in this thesis was aimed to fill this gap. The findings of this work in light of the existing knowledge in the areas of JDM and I/O Psychology will be discussed below.

5.1.1 Rational decision making

Many of the findings in JDM research related to decision-making rationality seem to have direct relevance to decision making at work. For example, resistance to the framing effect appears to be important for accurate information processing and resistance to persuasion techniques. People tend to take more risk when they think about potential losses and less risk when they consider potential gains, so presenting the same problem in terms of risks or gains (e.g., “a 30% chance of failure” vs. “a 70% chance of success”) may elicit a different response (Tversky & Kahneman, 1986). Understanding that may allow people to counteract the effects of framing and make better informed choices. The importance of the sunk cost effect in economic decision making and ways of mitigating it have often been highlighted in research (Roth et al., 2015). Resistance to conjunction fallacy, and understanding of the differences between joint and conditional probability, are also required in order to correctly interpret available information.

The skills needed for rational choice include setting goals, finding reliable sources, critically assessing relevant information, evaluating and comparing different courses of action, making predictions about how different decisions may turn out, and choosing the alternative that is judged to be the most likely to achieve the desired goal. These skills seems to be important for efficient decision making at work.

However, in two studies reported in this thesis (Study 1 and Study 2), career outcomes were reliably predicted neither by self-reported rational decision making nor by performance on decision-making tasks measuring resistance to the framing effect, the sunk cost fallacy, and the conjunction fallacy. Self-reported decision-making rationality predicted only authority level, only in one out of the two samples in which it was examined, and only after introducing the control variables. Decision-making task performance was not significantly associated with any career outcome measures. Methodological limitations that might have contributed to this lack of association will be discussed in the Limitations section below. Taken at face value, these findings suggest that rational decision making is not as important to career outcomes as one might think.

Some scholars (Stanovich, 2016; Stanovich & West, 2008) suggested that cognitive ability and the ability to make decisions rationality are two different constructs and are often uncorrelated. Unlike decision-making rationality, cognitive ability is often used in assessing candidates for a job as it is believed to be predictive of future performance (Robertson & Smith, 2001; Searle, 2009). Good performance, in turn, is understandably linked to career progression: poorly performing workers are unlikely to rise up the career ladder. The low or absent correlations between cognitive ability scores and rationality observed in previous research (Stanovich & West, 2008) suggested that rational decision making may have predictive power over and above cognitive ability. However, the findings of this thesis did not observe any reliable association between rational decision making and career outcomes at all. This cast doubt on whether there is any benefit to assessing rational decision making in order to predict career outcomes.

In addition to that, previous research suggested that a rational approach to *career* decision making is associated with better person-job fit (Singh & Greenhaus, 2004), which, in turn, is linked to better career satisfaction (Sirén et al., 2021). However, no evidence was found in the studies presented in this thesis for the relationship between decision-making rationality and career satisfaction. Partly, it may be explained by luck: no matter how much thought is invested into making important choices influencing one's career path, such as what area to train in, which companies to apply to, or whether to stay with the current employer or change jobs, no one possesses complete information pertinent to the decision. One may make a sound choice based on the information available to them, only to find out that there is a hostile work environment in their new organisation, or that there will be a change of management which will have a detrimental effect on their job autonomy.

Importantly, a subjectively rational approach to the process of decision making does not always lead to high-quality decisions. A decision maker may have a specific goal in mind, seek information in a variety of sources, and invest effort into evaluating the different options in terms of potential outcomes. However, goals may change and the decision maker may not possess the skills necessary to critically evaluate sources, thus jeopardising the quality of the information they receive. The probabilities of potential outcomes may also be difficult or impossible to estimate. Therefore, even the most thorough decision-making process may lead to poor outcomes in the absence of important information and good information-seeking and processing skills.

To summarise, in the studies reported in this thesis, no consistent evidence was found for the relationship between rational decision making and career outcomes. However, more research is needed, which will be discussed in the Limitations and Future directions sections below.

5.1.2 Intuitive decision making

The findings regarding intuitive decision making were just as inconclusive as those concerned with rational decision making. Out of all the career outcomes measures used in this thesis, intuitive decision making was positively associated only with the level of authority in the organisation when tested in a regression model, although there was no zero-order correlation between the two variables.

Prior literature on intuitive decision making suggests that intuitive judgements may only be effective if they are based on experience and pattern recognition (Chase & Simon, 1973; Klein et al., 2010). However, it is difficult to distinguish expertise-based intuitive judgments from reliance on unhelpful heuristics because the process behind rapid judgments is difficult or often impossible to articulate (Okoli et al., 2016). However, the moderate correlation between intuitive and spontaneous (or impulsive) decision making observed in this thesis, as well as the stronger negative correlation between spontaneous and rational decision making than between intuitive and rational decision making, suggests that, at least to some degree, participants were able to distinguish between intuition and impulsivity.

Despite that, the evidence for the association between intuitive decision making and career outcomes in this work is weak. The sample in Study 1, in which intuitive decision making was examined, was recruited from the general population of full-time workers, not focusing on specific industries or jobs. This potentially points towards the significance of the domain in which intuitive judgments are made, as has been discussed in previous research (Orasanu & Connolly, 1993; Shanteau, 1992), and suggests that even if intuitive judgments are important in some occupations, they may not be universally useful.

Shanteau (1992) compiled a list of professions in which good expert judgments had been observed, which included weather forecasters, astronomers, livestock and soil judges, grain inspectors, and auditors, among others. The common characteristics

shared by these domains include focus on things rather than people, high predictability, repetitive tasks, the absence of rapidly changing situations, expectation of some error, availability of decision aids, and others. The kinds of decision situations that do not possess these characteristics are much less likely to allow for successful intuitive judgements even in the presence of extensive experience. That might explain why no convincing association was found between career outcomes in a general sample of employees and intuitive decision making: some jobs may not be conducive to the use of intuition. The implications of that will be discussed further in the Limitations section below.

5.1.3 Decision confidence

As discussed, on the cognitive dimension, the findings of the studies presented in this thesis were inconsistent and the evidence for the relationship between either rational or intuitive decision making and career outcomes was largely absent. However, much stronger evidence was found for the association between decision confidence and career outcomes. In both Study 1 and Study 2 decision confidence was associated with hierarchical status and level of authority. In the larger Study 1, it was also associated with career satisfaction. That raises some important questions.

Previous research has suggested that people who exhibit confidence enjoy social advantages that their less confident counterparts do not, even in the absence of actual talent and skill to substantiate that confidence (C. Anderson et al., 2012; Belmi et al., 2020). The weak association between self-reported rational decision making and decision confidence, and no association between performance on decision-making tasks and decision confidence, found in this thesis, indicate that decision confidence may not always be backed by the ability to make decisions rationally. However, unlike rational decision making, decision confidence was predictive of career outcomes. This suggests that how rationally decisions are made is not as important for career

outcomes as how confident one is in one's decisions: and, by extension, how much confidence in those decisions one is able to project.

Leadership research shows that successful leaders should not only exhibit confidence, but also inspire it in others (Babcock-Roberson & Strickland, 2010; Conger & Kanungo, 1987). An employee feeling, and acting, confident in their decision may have an easier task convincing others that the decision is right. That is particularly significant considering that a lot of success can be attributed to luck. In this way, in the case of a decision that leads to a positive outcome, if the decision maker exhibited confidence in it from the start, their skill in making decisions would appear to be a reasonable explanation for the success. On the other hand, when the decision outcome is negative and the decision maker doubted the correctness of their choice and anticipated a negative outcome, it is easy to imagine a scenario in which they might have made more effort and chosen better.

This, once again, links to the concept of competence cues: because actual competence is difficult to measure, as a proxy, people often use competence cues that manifest themselves in outwardly confident behaviour (C. Anderson et al., 2012). The findings of this thesis that (a) decision confidence is only weakly associated with self-reported rational decision making and is not at all significantly associated with performance on decision-making tasks, and (b) that decision confidence is positively associated with career outcomes but rational decision making is not, are in line with the suggestion that displaying confidence confers social advantages even when that confidence is not substantiated. Reliance on false competence cues seems to be an significant factor. In areas such as personnel selection, it is particularly important to consider how such cues may bias assessment.

Not all organisations employ recruitment practices whereby structured assessment techniques, such as aptitude or cognitive ability tests, are used to evaluate candidates, with many relying on unstructured interviews. Research shows that unstructured

interviews are prone to biases and underperform the use of structured assessment measures, especially when used alone (Highhouse, 2002; Levashina et al., 2014). In contexts in which judgments about people are made, experts tend to underperform statistical models due to the high complexity and variability of human behaviour (Shanteau, 1992). In personnel selection, in addition to the limited predictability of future performance of a candidate, interviewers may also be prone to various heuristics and biases.

Of particular importance is the representativeness heuristic, which may lead interviewers to favour those candidates who match their mental image of a professionally successful person. Previous research has highlighted the expectation of leaders to exhibit confidence (Babcock-Roberson & Strickland, 2010; Shamir et al., 1993). That can lead to candidates who act more confidently being perceived as more hireable for or capable of rising to leadership positions, even if they are not better equipped to handle the responsibilities of the job than those who show less confident behaviour.

Belmi *et al.* (2020) have warned that since it is people who come from privileged backgrounds who are more skilled at outward displays of confidence, reliance on unstructured interviews for hiring can perpetuate existing inequalities. Other mechanisms to assess a candidate's competence in a more objective manner may help to avoid unfairly rewarding those who are skilled at projecting false competence cues.

It is concerning that decision confidence, but not decision-making rationality, was predictive or career outcomes in the research presented in this thesis because these results suggest that the skill to make decisions rationality is not important for career progression or satisfaction, unlike being confident in the correctness of one's (not necessarily rational) choices. In the organisational setting, objective mechanisms to assess a candidate's suitability for the job and existing employees' job performance

may mitigate reliance on false competence cues and contribute to equalising opportunities for those who are not adept at projecting them.

5.1.4 Decision avoidance

The question of the relationship between decision avoidance and career outcomes was underexplored in research. Because of that, this work drew from existing knowledge about two related areas: the links between general proactivity and career outcomes as well as decisiveness in leadership. Previous studies showed a positive relationship between proactivity and job performance, salary, promotions, career satisfaction, job satisfaction, and perceived career success (Fuller & Marler, 2009). Unsurprisingly, proactivity is negatively associated with indecisiveness (Jenkins & Jeske, 2017) since behaving proactively requires one to make choices to do so. In addition, while decisiveness is understudied at non-executive levels of employment, leadership research points towards decisiveness being an important attribute of successful leaders (Brodbeck et al., 2000; Wille et al., 2018).

Building on these findings, Study 3 of this thesis found evidence for the negative association between decision avoidance and career outcomes. In that study, decision avoidance was associated with both hierarchical status (although that relationship stopped being significant after the control variables were introduced) and authority level as extrinsic career outcomes as well as with career satisfaction. These findings are linked to the existing research on general proactivity and career outcomes: proactivity requires making decisions to take action and decision avoidant people are therefore less likely to behave proactively. It may be the case that decision avoidance, or rather its opposite, proactive decision making, mediates the link between proactivity and career outcomes, which may be examined in future research.

Just as is the case with general proactivity (Seibert et al., 1999), proactive decision making may help people to make positive changes to their working life by seizing opportunities to grow professionally and change their work environment. Decision avoidance, on the other hand, may result in missed opportunities and stagnation. This might explain the association between decision avoidance and both extrinsic and intrinsic career outcomes found in Study 3 of this thesis.

Importantly, one's approach to decision making is not immutable. Rather, it is a habitual response to decision situations (Scott & Bruce, 1995). Therefore, it can be adapted to become more efficient. The potential malleability of the decision-making approach is particularly promising in the case of decision avoidance. Many situational factors have been identified in previous research that may potentially increase the avoidance of decisions, such as choice difficulty (Tversky & Shafir, 1992), trait (Umeh & Omari-Asor, 2011) and decision-related (Dewberry et al., 2013) anxiety, low decision confidence (Leykin & DeRubeis, 2010), and anticipated regret and anticipated blame (Beattie et al., 1994). This suggests that addressing these factors may have a positive effect on proactive decision making.

Indeed, Study 4 of this thesis found a link between decision avoidance and poor psychosocial work environment as well as work-related anxiety. In that study, anxiety mediated the relationship between poor psychosocial work environment and decision avoidance, suggesting a potential mechanism explaining how psychosocial work environment may influence decision avoidant behaviour, which may be tested in future experimental or longitudinal research.

Taking the person-situation interaction perspective (Terborg, 1981), it is expected that while some people may be more predisposed to exhibiting decision avoidance than others, situational factors, such as poor psychosocial work environment that results in increased anxiety in employees, may further exacerbate it. Therefore, making improvements to the work environment aimed at increasing employee well-being and

decreasing the incidence of anxiety may help to mitigate some of the decision avoidant behaviour in employees.

Furthermore, previous research shows that people are more likely to avoid decisions when they anticipate being blamed for negative outcomes (Tetlock & Boettger, 1994). This suggests that addressing blame culture in the workplace and creating an environment in which mistakes are not punishable but rather are considered to be learning opportunities, may result in less decision avoidance and more proactive decision making in employees.

Drawing from the findings of Study 3, which found decision avoidance to be negatively associated with the level of authority in the organisation and with career satisfaction, it is suggested that reducing decision avoidance may result in better career outcomes. In a work environment in which initiative is encouraged, mistakes are considered to be learning opportunities rather than punishable offenses, and employee well-being is nurtured, instead of avoiding decisions for fear of retribution for suboptimal outcomes, workers may adopt a more proactive approach to decision making. That, in turn, may help them shape their work context to better suit their needs and goals and create opportunities for positive change and career progression.

For example, in a stressful work environment, a decision avoidant employee may forego an opportunity to take on a new project that they may enjoy working on and that may make them stand out from the rest of the team out of fear of blame and punishment for potential negative outcomes and because of the mental strain already placed on them in their workplace. Addressing the psychosocial work environment as one of the potential root causes of decision avoidant behaviour may help to mitigate such behaviour in employees, but more research, and specifically longitudinal and experimental research, is needed to find evidence for causality.

5.1.5 Dependent decision making

The final construct that was examined in this thesis was that of dependent decision making. Dependent decision making is thought to at least partly stem from decision avoidance: those individuals who wish to escape the need to make a decision may delegate it to others (Dewberry et al., 2013). As in the previous research (Dewberry et al., 2013; Scott & Bruce, 1995; Spicer & Sadler-Smith, 2005), the work presented in this thesis observed a significant positive relationship between decision avoidance and dependent decision making.

However, no significant relationship was found between dependent decision making and any of the career outcomes measured in this thesis. While it was expected that dependent decision making would be negatively associated with both extrinsic career outcomes and career satisfaction, no such links were observed. A potential explanation for that is that dependent decision making may at least partly reflect the willingness to engage in collaborative decision making (Spicer & Sadler-Smith, 2005), which may be a desired behaviour at any career level and lead to better quality decisions. In this way, the positive effects of involving others in the decision-making process may counteract the lack of independence in making decisions. Focusing on the lack of the relationship between dependent decision making and career satisfaction, it may be the case that the ability to depend on other people in the workplace in making choices signals a supportive work environment, potentially offsetting some of the negative effects of over-relying on others for making important decisions instead of acting on one's own wishes.

5.2 Limitations

The studies presented in this thesis have a number of limitations. Firstly, they used convenience samples recruited online. That was partly due to the fact that data collection happened during the COVID-19 pandemic, restricting recruitment to online

avenues. Women, white people, and university degree holders were overrepresented compared to the United Kingdom working-age population composition (Office for National Statistics, 2012, 2018, 2020), limiting the generalisability of the findings.

The initial plan to focus on a small number of industries and to recruit participants at industry-specific trade fairs had to be suspended due to COVID-19. In order to recruit a large enough sample from a population of full-time workers, that is difficult to access due to the high demands placed on their time, recruitment had to be opened to people working in any industry. That made comparisons of extrinsic career outcomes more difficult. That is why measures that are not industry-specific were used. However, if participants are recruited from a particular industry instead of a broad population of workers, extrinsic career outcomes questions may be better tailored to the capture the career progression indicators most relevant to that industry. For example, that may be done by adjusting the number of positions in the organisational hierarchy at a more granular level or by measuring achievement reflective of career success in that industry.

Another limitation with the research reported in this thesis is the use of self-reports to measure decision-making approaches. The issue of assessing rational decision making was partly addressed in Study 2 (reported in Chapter 2), where in addition to self-reports, task performance measures were used. However, internal consistency is an issue in constructing batteries of decision-making tasks (Finucane & Gullion, 2010; Parker & Fischhoff, 2005), which was also observed in this research, limiting the validity of the measures. The low internal consistency may be indicative of participants approaching different decision-making scenarios within the same type of task differently. For example, they may be better able to resist unhelpful heuristics and biases if they are knowledgeable about the problem. In addition, whether the decision is made for oneself or affects others may have an influence. Future research might construct batteries of rational decision-making tasks that focus on the kinds of

scenarios that participants recruited from a particular industry or job are likely to face in their everyday working life.

Assessing pattern-recognition-backed intuitive decision making quantitatively is more complicated since intuitive judgments are quick and hard to articulate (Okoli et al., 2016), which makes them difficult to distinguish from rapid responses driven by heuristics and biases. In the NDM tradition, the use of intuitive expert judgements is usually assessed through interviews (Klein et al., 2010). In survey research focusing on specific occupations, experience in a skill central to that occupation may act as a moderator. However, in designing further research, it is important to note that successful intuitive expert judgments are constrained to areas where predictability is relatively high: those that deal with objects rather than people and where circumstances are relatively unchanging (Shanteau, 1992).

As for avoidant and dependent decision making, in addition to or instead of self-reports, they may be assessed through responses to decision-making tasks. Developing tasks targeting the kinds of decisions that workers are likely to make in everyday life and allowing response options such as to postpone making a decision and to seek help from a colleague or manager could serve as an alternative to self-reports.

Common method variance (CMV) is another potential limitation resulting from the design of the studies presented in this thesis. Measuring different constructs using the same method (i.e., self-reported questionnaires in the studies presented here) may introduce a bias whereby some of the observed relationship stems from the design of the study rather than from the constructs under consideration being actually related to each other (Podsakoff et al., 2012). CMV may arise from various reasons, such participants' individual tendencies in completing surveys, similarities in how different parts of the survey are structured or worded, and the fact that all measures are completed at the same time and in the same setting (Edwards, 2008).

While Study 2 presented in this thesis used both self-reports of decision-making rationality and task performance measures, the other three studies relied solely on self-reports, thus making CMV a potential limitation to interpreting the results. Future studies may thus benefit from assessing the core constructs using a variety of methods. For example, decision making may be measured both as self-reports and using vignettes presenting decision-making scenarios. Other-reports in the form of colleagues' or managers' assessments of employees' decision making may also be used. Other ways of dealing with CMV include addressing it after data are collected, for example, by introducing a general factor representing the source of CMV; however, controlling for it may result in reducing substantive variance in addition to method variance (Edwards, 2008).

All the self-reported measures used in the studies presented in this thesis had been validated in previous research and existing decision-making tasks were selected for use in Study 2. However, especially since not all of the measures employed in this work had previously been used together (e.g., to the best of my knowledge, Study 4 of this thesis was the first study to examine the relationships that decision avoidance and dependent decision making, measured through the GDMS, have with state anxiety, measured through the STICSA), it may be beneficial to examine whether the measures are separate and independent from each other. Confirmatory Factor Analysis may be used to establish that.

Finally, Study 4 presents a methodological limitation due to the scales used in it being administered in two parts, on average 11 days apart. The questionnaire was split because of its length, in order to reduce participant fatigue and improve completion rates. Since data for Study 4 was collected in conjunction with that for Studies 1 and 3 and attrition was expected between parts one and two of the survey, to ensure a sufficient sample size for Studies 1 and 3, the measures that were used in those studies were administered in part one. As a result, participants completed decision-making measures in part one and psychosocial work environment, anxiety, and risk

perception measures in part two. This presents a potential issue in that the temporal ordering of the measures in the survey did not match the theoretical ordering that was hypothesised in Study 4. However, the time tag between parts one and two was not great and no substantial changes in responses over that period were expected.

5.3 Future directions

5.3.1 Decision confidence

The most consistent finding of Study 1 and Study 2 was that decision confidence, unlike rational and intuitive decision making, consistently predicted extrinsic career outcomes. Indeed, decision confidence predicted extrinsic career outcomes after controlling for the other decision making variables as well as for demographic factors and career aspirations. If confidence in one's own decisions is not substantiated by rationality, as the low correlations between the confident and rational decision making variables found in this thesis suggests, this has implications for how hiring and promotion decisions are made.

It has been suggested that acting confidently confers social advantages because instead of assessing real competence, people often rely on the competence cues that confident people project (C. Anderson et al., 2012; Belmi et al., 2020). Belmi *et al.* (2020) have also raised concerns about judgments based on the façade of confidence perpetuating existing inequalities because people who come from privileged social backgrounds tend to be better at acting confidently, even in the lack of actual talent or skill. This supports the argument often made in hiring and selection literature in favour of using objective assessment measures instead of relying on unstructured interviews in candidate selection (Highhouse, 2008; Levashina et al., 2014).

Building on the findings of Studies 1 and 2, future research may examine the role of decision confidence in the workplace further: for example, by assessing whether candidates who report high confidence in their decisions have better chances of being selected when they apply for new jobs or for promotions within their existing organisations. Assessing their objective performance, knowledge, or skill and controlling for it would offer additional insight into the role of confidence in career success.

5.3.2 Rational decision making

The question of the role of rational decision making in career outcomes has remained largely unanswered in this thesis due to the inconsistent results across the two studies, the limitations of self-reports, and the low internal consistency of the decision-making task measures. Future research may focus on a specific industry and construct a battery of tasks assessing common decision-making heuristics and biases that imitate the kinds of decision-making problems that employees face in their daily working life.

While it may not generalise to other industries and decision-making domains, it may allow researchers to more reliably measure how well workers are able to apply rational decision-making skills to tackle problems at work and to resist unhelpful heuristics and biases. The use of such measures may shed better light on the relationship between rational decision making and career outcomes.

5.3.3 Work environment, anxiety, and decision avoidance

Study 4 of this thesis provided evidence for the relationship between poor psychosocial work environment, work-related anxiety, and decision avoidance. However, it was a correlational study, so the direction of this relationship could not be established. A

longitudinal study tracking participants over a long enough period of time to allow their professional circumstances to change (for example, through changing jobs or acquiring new managers and colleagues) would allow to investigate whether psychosocial work environment affects decision avoidant behaviour. Alternatively, an experimental study examining the effects of a psychosocial work environment intervention on decision avoidant behaviour may be conducted.

In addition, Study 4 did not find a mechanism through which anxiety may be affecting avoidant decision making. Originally, it was suggested that this relationship may be mediated by risk perception, however, the link between risk perception and decision avoidance was not significant. More evidence from a larger sample is needed. Future research may assess risk perception and decision avoidance through the same decision-making vignettes to shed light on this relationship. Using the same vignettes for both decision avoidance and risk perception assessment would allow researchers to track participants' decision-making process better. That would be particularly helpful considering that risk perception is thought to be domain-specific, so risk perception ratings in one domain may not generalise to how people appraise risks in other areas (Blais & Weber, 2006).

5.4 Conclusions

This research contributed to the existing body of evidence for the links between confidence and success (C. Anderson et al., 2012; Belmi et al., 2020), examining the specific dimension of decision confidence and its relationships with career outcomes. However, only a weak association was found between decision confidence and self-reported decision-making rationality and there was no significant association between decision confidence and performance on decision-making tasks at all, suggesting that

decision confidence in the respondents may not be substantiated by rational decision-making abilities.

At the same time, no measures of rational decision making were consistently associated with career outcomes. This provides further support for the suggestion made in the previous research that confidence may confer unfair social advantages and that objective evaluations of skills and performance need to be used in recruitment and promotion decisions instead of relying on subjective judgments which may be influenced by how confidently candidates present themselves (C. Anderson et al., 2012; Belmi et al., 2020). As for the links between rational decision making and career outcomes, further research is needed, perhaps focusing in specific decision contexts relevant to the target population of workers.

The research presented in this thesis also indicated significant links between decision avoidance and career outcomes as well as and between decision avoidance and poor psychosocial work environment, mediated by anxiety. This suggests that making changes to the psychosocial work environment targeted at improving employee well-being may have a positive effect not only on employees' decision avoidant behaviour but also on their career outcomes. However, these findings came from a correlational study and further longitudinal or experimental research (for example, studying the effects of a psychosocial work environment intervention) is needed to establish the directions of the discovered relationships.

In this thesis, the understudied area of decision making and career outcomes at the individual level was examined. The results provided some initial evidence for the relationships that decision confidence and decision avoidance have with both career progression and career satisfaction. Directions for future research were also suggested to explore this area further. The findings of this thesis may be of use to recruiters and managers as well as individual employees who would like to improve their career prospects. First, as previous research has (e.g., Highhouse, 2008; Levashina et al.,

2014), the results of this thesis suggests the need for objective candidate assessment measures in order to avoid granting unfair advantages to candidates who present themselves confidently, because confidence may not always be substantiated. Second, they provide further evidence for the importance of a favourable psychosocial work environment by demonstrating its links not only with work-related anxiety, but also with decision avoidance. Third, these results may guide employees seeking career progression in adapting their decision-making approach to challenge decision avoidance and become more proactive in making decisions.

The main conclusion of the research reported in this thesis is that the cognitive approach to decision making (i.e. the use of rationality and intuition) does not seem to be as important to career outcomes as the way decision makers feel and behave in decision situations: that is, how confident they are about their choices and how proactively they make decisions. This has implications for both organisations in terms of implementing mechanisms to objectively assess candidates and for individual employees who may adapt their decision-making approach if they are seeking career progression.

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Appendices

Appendix I. Information sheets and consent forms

Studies 1, 3, and 4

INFORMATION SHEET FOR PARTICIPANTS

Decision-making styles as predictors of career success

Part 1

I would like to invite you to participate in this research project, which is part of my doctoral degree in Organisational Psychology at Birkbeck, University of London. This project has received ethical approval (number: OPEA 19/20-14). To make an informed decision on whether you would like to take part in this study, please take a few minutes to read this information sheet.

Who is conducting this research?

The research is conducted by Meg Kiseleva, under the guidance of supervisors Dr Chris Dewberry and Dr Kevin Teoh from Birkbeck, University of London.

What is the purpose of the study?

The aim of the study is to explore the relationships between decision-making styles, attitude to risk, and career outcomes, and how much the work environment can affect decision-making.

Why have I been invited to take part?

I am inviting people who are at least 18 years old, work full-time in the UK (including those who have recently been furloughed), and are fluent in English to take part in this study.

What are the procedures for taking part?

This research consists of three parts:

- Part one will take about 10 minutes and you will be asked about how your approach making decisions, demographic questions, and some questions related to your career. You will also be asked to provide your email address to be sent the link to the next part of the survey. Your email address will not be shared with any third parties.

- The link to part two will be sent in one-week's time and you will be asked to confirm your email address to ensure that responses can be matched. You will be asked about your work environment, attitude to risk, and how anxious you are at the moment in relation to your workplace. It will take about 15 minutes. At the end of the questionnaire you will be asked if you can be contacted in about 6-months' time for a follow-up survey.

- Part three will be done in 6-months' time to examine how changes in the work environment can influence the level of anxiety, attitude to risk, and decision-

making, and some of the questions you would have answered in parts one and two will be repeated.

There will be two raffles to win a £10 Amazon gift voucher, which you can enter if you complete part two and part three. You will be asked to provide your email address to enter the prize draw at both points.

If you would like to receive a general summary of the findings once responses have been analysed, you can contact me at the email address provided below.

What are my participation rights?

Participation in this research guarantees the right to withdraw, to ask questions about how your data will be handled and about the study itself, the right to confidentially, the right to refuse to answer questions, and to be given access to a summary of the findings.

What if I want to withdraw my information?

If you wish to withdraw responses or any personal data gathered during the study, you may do so in the following way:

- If you provide your email address in order to be contacted for the follow-ups, you can withdraw your data by contacting me at the email address below, quoting the email address that you provided. You can ask for your data to be removed up until the point of analysis, which will take place approximately in March 2021.

- If you do not provide your email address, you will be given the option to withdraw your data at the end of the survey.

What will happen to my responses to the study?

Data collected in this study will be analysed and used for my PhD thesis. Data may also be used for conference presentations and academic publications, but only general trends/responses will be reported and no identifying information will be released.

Will my responses and information be kept confidential?

All information will be treated with the strictest confidence throughout the study. Information will be kept in secure folders on a password-protected computer, or a secure filing cabinet. Access to such information will only be allowed to the researcher, researcher supervisors, and, upon request, examiners and reviewers. Your responses will be coded to preserve your anonymity and your email address, should you wish to provide it in order to participate in the follow-up surveys, will be kept in a separate password-protected document, matched by code to the rest of your responses. Your email address will only be stored until the last wave of data collection is completed in approximately 9 months' time, after which point it will be destroyed.

If your colleague or manager has sent you this link, please be assured that your personal data will not be shared with your company or any other third parties. Aggregate company-specific responses will only be shared with companies if at least 10 employees participate in this research to protect participant anonymity. Otherwise, only general findings from this study can be shared.

What are the possible risks to taking part?

In most cases, answering questions in this questionnaire should not present any risk to you above the normal risk expected in everyday life. However, I am aware that answering questions about issues related to work and work environment may be potentially distressing at present. Furthermore, I acknowledge that the current COVID-19 pandemic may be a source of stress for you. If you experience distress, you can stop at any time. You can skip questions you are uncomfortable answering.

If thinking about your experiences leaves you feeling upset, there are a number of national organisations that can offer you support. For example:

MIND (www.mind.org.uk) provides advice and support to empower anyone experiencing mental health problems. Telephone: 0300 123 3393. Monday to Friday 9am-6pm.

Samaritans (www.samaritans.org) offer a 24-hour helpline staffed by trained volunteers who will listen sympathetically. Telephone 0845 909090.

Any further questions?

If you have any questions or require more information about this study, please contact either of:

Meg Kiseleva
mkisel02@mail.bbk.ac.uk
Research Student

Dr Chris Dewberry
c.dewberry@bbk.ac.uk
Dr Kevin Teoh
k.teoh@bbk.ac.uk
Research Supervisors

Department of Organisational Psychology,
Birkbeck, University of London,
Clore Management Building,
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School of Business, Economics and Informatics
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You also have the right to submit a complaint to the Information Commissioner's Office
https://ico.org.uk/

Please read the following items and tick the appropriate boxes if you agree with the statements below.

- □ I have read the information sheet in full, any questions I had have been answered, and I understand I may ask further questions at any time.
- □ I understand what is involved in participating, that it is voluntary, and that I may withdraw at any stage during the survey.
- □ I am at least 18 years old and can give consent to taking part in this research.
- □ I agree to take part in this study under the conditions set out in the information sheet.

INFORMATION SHEET FOR PARTICIPANTS

Decision-making styles as predictors of career outcomes

Part 2

Thank you very much for having participated in the first part of this research and for agreeing to be contacted for the follow-up. Please take a moment to read the information sheet below to make an informed decision about continuing participation.

Who is conducting this research?

The research is conducted by Meg Kiseleva, under the guidance of supervisors Dr Chris Dewberry and Dr Kevin Teoh from Birkbeck, University of London, as part of a doctoral research project in Organisational Psychology at Birkbeck, University of London. This project has received ethical approval (number: OPEA 19/20-14).

What is the purpose of the study?

The aim of the study is to explore the relationships between decision-making styles, attitude to risk, and career outcomes, and how much the work environment can affect decision-making.

Why have I been invited to take part?

I am inviting people who are at least 18 years old, work full-time in the UK (including those who have recently been furloughed), and are fluent in English to take part in this study.

What are the procedures for taking part?

You have already completed part one of this study.

- In part two, you will be asked about your work environment, attitude to risk, and how anxious you are at the moment in relation to your workplace. It will take about 15 minutes. At the end of the questionnaire you will be asked if you can be contacted in about 6-months' time for a follow-up survey. You will also be asked to confirm your email address to ensure that responses can be matched. If you wish, you can enter a prize draw to win a £10 Amazon voucher.

- Part three will be done in 6-months' time to examine how changes in the work environment can influence the level of anxiety, attitude to risk, and decision-

making, and some of the questions you would have answered in parts one and two will be repeated. There will be another raffle held at that time.

If you would like to receive a general summary of the findings once responses have been analysed, you can contact me at the email address provided below.

What are my participation rights?

Participation in this research guarantees the right to withdraw, to ask questions about how your data will be handled and about the study itself, the right to confidentially, the right to refuse to answer questions, and to be given access to a summary of the findings.

What if I want to withdraw my information?

If you wish to withdraw responses or any personal data gathered during the study, you can contact me up until the point of data analysis, which will take place approximately in March 2021, quoting the email address you provided to be contacted for the follow-up.

What will happen to my responses to the study?

Data collected in this study will be analysed and used for my PhD thesis. Data may also be used for conference presentations and academic publications, but only general trends/responses will be reported and no identifying information will be released.

Will my responses and information be kept confidential?

All information is treated with the strictest confidence throughout the study. Information is kept in secure folders on a password-protected computer, or a secure filing cabinet. Access to such information will only be allowed to the researcher, researcher supervisors, and, upon request, examiners and reviewers.

Your responses are coded to preserve your anonymity and your email address is kept in a separate password-protected document, matched by code to the rest of your responses. Your email address will only be stored until the last wave of data collection is completed in approximately 9 months' time, after which point it will be destroyed.

Email addresses collected for the prize draw will be stored in a separate password-protected document and will be destroyed after the winner is randomly selected and sent the voucher after this wave of data collection is completed.

What are the possible risks to taking part?

In most cases, answering questions in this questionnaire should not present any risk to you above the normal risk expected in everyday life. However, I am aware that answering questions about issues related to work and work environment may be potentially distressing at present. Furthermore, I acknowledge that the current COVID-19 pandemic may be a source of stress for you. If you experience distress, you can stop at any time. You can skip questions you are uncomfortable answering.

If thinking about your experiences leaves you feeling upset, there are a number of national organisations that can offer you support. For example:

MIND (www.mind.org.uk) provides advice and support to empower anyone experiencing mental health problems. Telephone: 0300 123 3393. Monday to Friday 9am-6pm.

Samaritans (www.samaritans.org) offer a 24-hour helpline staffed by trained volunteers who will listen sympathetically. Telephone 0845 909090.

Any further questions?

If you have any questions or require more information about this study, please contact either of:

Meg Kiseleva
mkisel02@mail.bbk.ac.uk
Research Student

Dr Chris Dewberry
c.dewberry@bbk.ac.uk
Dr Kevin Teoh
k.teoh@bbk.ac.uk
Research Supervisors

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Birkbeck, University of London,
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School Ethics Officer
School of Business, Economics and Informatics
Birkbeck, University of London
London WC1E 7HX

You also have the right to submit a complaint to the Information Commissioner's Office https://ico.org.uk/.

Please read the following items and tick the appropriate boxes if you agree with the statements below.

- ☐ I have read the information sheet in full, any questions I had have been answered, and I understand I may ask further questions at any time.
- ☐ I understand what is involved in participating, that it is voluntary, and that I may withdraw at any stage during the survey.
- ☐ I am at least 18 years old and can give consent to taking part in this research.
- ☐ I agree to take part in this study under the conditions set out in the information sheet.

Study 2

INFORMATION SHEET FOR PARTICIPANTS

Career outcomes and objective and subjective measures of rationality

I would like to invite you to participate in this research project, which is part of my PhD in Organisational Psychology at Birkbeck, University of London. This project has received ethical approval (number: OPEA-20/21-08). To make an informed decision on whether you want to take part in this study, please take a few minutes to read this information sheet.

Who is conducting this research?

The research is conducted by Meg Kiseleva, under the guidance of supervisors Dr Chris Dewberry and Dr Kevin Teoh, from Birkbeck, University of London.

What is the purpose of the study?

The aim of the study is to investigate the link between rationality and career progression.

Why have I been invited to take part?

I am inviting people who are at least 18 years old, work full-time in the UK, and are fluent in English to take part in this study.

What are the procedures of taking part?

If you decide to take part, you will be asked to complete an online questionnaire, which will take approximately 25 minutes. It involves questions about how you normally approach decision making, a number of imaginary scenarios where you will be asked to make a decision, and some questions about yourself and your career.

As a thank you for your participation, you will be invited to enter a prize draw for a chance to win one of two £20 Amazon vouchers. If you would like to receive a summary of the findings, once the data have been analysed, you can contact me at the email address below.

What are my participation rights?

Participation in this research guarantees the right to withdraw, to ask questions about how your data will be handled and about the study itself, the right to confidentially and anonymity, the right to refuse to answer questions and to be given access to a summary of the findings.

What if I want to withdraw my information?

If you wish to withdraw responses or any personal data gathered during the study, you may do this without any consequences. You will be provided with an option to do this at the end of the survey. If you wish to discontinue participation at any point during the survey, your partial responses will not be used.

What will happen to my responses to the study?

Data collected in this study will be analysed and used for my PhD thesis. It may also be used for academic publications and/or conference presentations.

In line with open research practices, data will be made open for other researchers to use. Information which may lead to your identification, such as your name, will not be requested.

Will my responses and information be kept confidential?

Your personal identifying information will be treated with the strictest confidence throughout the study. If you choose to provide your email address to be entered in the prize draw, you will be redirected to a separate survey, so your email address will not be associated with the rest of your responses. Email addresses will be stored in a password-protected document and destroyed after the winners are randomly chosen and sent electronic vouchers.

If your colleague or manager has sent you this link, please be assured that your personal data will not be shared with your company or any other third parties. Aggregate organisation-specific responses may only be shared if at least 10 employees of that company participate in this research to protect participant anonymity. Otherwise, only general findings of this study can be shared. Demographic information, such as age, gender, ethnicity, and education level, will not be shared with the companies.

What are the possible risks to taking part?

In most cases, answering questions in this questionnaire should not present any risk to you above the normal risk expected in everyday life. However, I acknowledge that thinking about employment in the current COVID-19 pandemic may be a source of stress. If you experience distress, you can stop at any time. You can skip questions you are uncomfortable answering.

Below is a number of national organisations that can offer support if you are in distress. For example:

MIND (www.mind.org.uk) provides advice and support to empower anyone experiencing mental health problems. Telephone: 0300 123 3393. Monday to Friday 9am-6pm.

Samaritans (www.samaritans.org) offer a 24-hour helpline staffed by trained volunteers who will listen sympathetically. Telephone 0845 909090.

Any further questions?

If you have any questions or require more information about this study before or during your participation, please contact either of:

Meg Kiseleva
mkisel02@mail.bbk.ac.uk
Research Student

Dr Chris Dewberry
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London WC1E 7HX

You also have the right to submit a complaint to the Information Commissioner's Office https://ico.org.uk/

Please read the following items and tick the appropriate boxes if you agree with the statements below.

- ☐ I have read the information sheet in full, I understand the purpose of this research is to examine the relationship between rational decision making and career outcomes.
- ☐ Any questions I had have been answered, and I understand I may ask further questions at any time.
- ☐ I understand what is involved in participating, that it is voluntary, and that I may withdraw at any stage during the survey.
- ☐ I understand the results may be used for academic publications, such as dissertation, thesis, or journal articles, and presented at academic conferences.

Appendix II. Study 2 decision-making tasks

Framing effect

Instruction text:

You will be presented with a number of hypothetical scenarios. Please read them carefully and answer the questions below. Please remember that there is no right or wrong answer.

FE1. A large car manufacturer has recently been hit with a number of economic difficulties and it appears as if three plants need to be closed and 6,000 employees laid off. The vice-president of production has been exploring alternative ways to avoid this crisis and has developed two plans:

Positive frame:

Plan A: This plan will save 1 of the 3 plants and 2,000 jobs.

Plan B: This plan has a 1/3 probability of saving all 3 plants and all 6,000 jobs, but has a 2/3 probability of saving no plants and no jobs.

Which plan would you select?

Negative frame:

Plan A: This plan will result in the loss of 2 of the 3 plants and 4,000 jobs.

Plan B: This plan has a 2/3 probability of resulting in the loss of all 3 plants and all 6,000 jobs, but has a 1/3 probability of losing no plants and no jobs.

Which plan would you select?

Scale: (1) Definitely Plan A – (7) Definitely Plan B.

(adapted from Bazerman, 1984)

FE2. Imagine that in one particular local authority[1] it is projected that 1,000 students will drop out of school during the next year. Two programmes[2] have been proposed to address this problem, but only one can be implemented. Based on the other local authorities' experiences with the programmes, estimates of the outcomes that can be expected from each programme can be made. Assume for the purposes of this decision that these estimates of the outcomes are accurate and are as follows:

Positive frame:

If Programme 1 is adopted, 400 of the 1,000 students will stay in school.

[1] "Changed from "state"
[2] "Program" changed to "Programme"

If Programme 2 is adopted, there is 2/5 chance that all 1,000 students will stay in school and 3/5 chance that none of the 1,000 will stay in school.

Which programme would you favour[3] for implementation?

Negative frame:

If Programme 1 is adopted, 600 of the 1,000 students will drop out of school.

If Programme 2 is adopted, there is 2/5 chance that none of the 1,000 will drop out of school and 3/5 chance that all 1,000 students will drop out of school.

Which programme would you favour for implementation?

Scale: (1) Definitely Programme A – (7) Definitely Programme B.

(adapted from Fagley & Kruger, 1986; via Fagley & Miller, 1990)

FE3. A civil defence[4] committee in a large metropolitan area met recently to discuss contingency plans in the event of various emergencies. One emergency under discussion was the following: "A train carrying a very toxic chemical derails and the storage tanks begin to leak. The threat of explosion and lethal discharge of poisonous gas is imminent. If nothing is done, 3,000 people are expected to die." Two possible actions were considered by the committee.

Positive frame:

If Option A is adopted, it will result in saving 1,000 of 3,000 lives.

If Option B is adopted, there is a 1/3 chance that all 3,000 lives will be saved and a 2/3 chance that none of the 3,000 lives will be saved.

Which option would you choose?

Negative frame:

If Option A is adopted, it will result in losing 2,000 of 3,000 lives.

If Option B is adopted, there is a 2/3 chance that none 3,000 lives will be lost and a 1/3 chance that all 3,000 lives will be lost.

Which option would you choose?

Scale: (1) Definitely Option A – (7) Definitely Option B.

(adapted from Fischhoff, 1983)

[3] “Favor” changed to “favour”
[4] “Defense” changed to “defence”

FE4. Imagine that your client has £6,000[5] invested in the stock market. A downturn in the economy is occurring. You have two investment strategies that you can recommend under the existing circumstances to preserve your client's capital.

Positive frame

If Strategy A is followed, £2,000 of your client's investment will be saved.

If Strategy B is followed, there is a 1/3 probability that the entire £6,000 will be saved, and a 2/3 probability that none of the money[6] will be saved.

Given this information, which of these two strategies would you favour[7]?

Negative frame

If Strategy A is followed, £4,000 of your client's money will be lost.

If Strategy B is followed, there is a 1/3 probability that nothing will be lost, and a 2/3 probability that the £6,000 will be lost.

Given this information, which of these two strategies would you favour?

Scale: (1) Definitely Strategy A – (7) Definitely Strategy B.

(adapted from Roszkowski & Snelbecker, 1990)

FE5. Imagine that a chemical company has recently been forced to go out of business. The total assets of the company are worth £240,000[8]. Two alternatives for selling the properties are proposed.

Positive frame

If Alternative A is adopted, the owner will recover £80,000.

If Alternative B is adopted, according to estimates, there is a 1/3 probability that all £240,000 will be recovered, and a 2/3 probability that zero assets will be recovered.

Which alternative would you select?[9]

Negative frame

If Alternative A is adopted, the owner will lose £160,000.

If Alternative B is adopted, according to estimates, there is a 1/3 probability that zero assets will be lost, and a 2/3 probability that all £240,000 of the assets will be lost.

Which alternative would you select?

[5] $ changed to £
[6] "Principal" changed to "money"
[7] "Favor" changed to "favour"
[8] £ changed to £
[9] Added to the original

Scale: (1) Definitely Alternative A – (7) Definitely Alternative B.

(adapted from Jou et al., 1996)

Sunk cost fallacy

Instruction text:

You will be presented with a number of hypothetical scenarios. Please read them carefully and answer the questions below. Please remember that there is no right or wrong answer.

SC1.

Investment scenario

You have paid £300[10] to join a tennis club for 6 months. During the first week of your membership, you develop tennis elbow.

How likely are you to keep playing tennis?[11]

Non-investment scenario

You enjoy playing tennis. One day on the court, you develop tennis elbow.

How likely are you to keep playing tennis?

Scale: (1) Extremely unlikely – (7) Extremely likely

(adapted from Frisch, 1993)

SC2.

Investment scenario

As the president of an airline company, you have invested 10 million dollars of the company's money into a research project. The purpose was to build a plane that would not be detected by conventional radar, in other words, a radar-blank plane. When the project is 90% completed, another firm begins marketing a plane that cannot be detected by radar. Also, it is apparent that their plane is much faster and far more economical than the plane your company is building.

[10] $ changed to £
[11] Changed from "Would you keep playing tennis?"

How likely are you[12] invest the last 10% of the research funds to finish your radar-blank plane?

Non-investment scenario

As president of an airline company, you have received a suggestion from one of your employees. The suggestion is to use the last 1 million dollars of your research funds to develop a plane that would not be detected by conventional radar, in other words, a radar-blank plane. However, another firm has just begun marketing a plane that cannot be detected by radar. Also, it is apparent that their plane is much faster and far more economical than the plane your company could build.

How likely are you invest the last million dollars of your research funds to build the radar-blank plane proposed by your employee?

Scale: (1) Extremely unlikely – (7) Extremely likely

(adapted from Arkes & Blumer, 1985)

SC3.

Investment scenario

You go out to a restaurant. The chocolate cheesecake[13] sounds great so you order it. It is wonderful but very rich, and after two bites you are full.

How likely are[14] you eat more of it?

Non-investment scenario

You go out to a restaurant. It is the restaurant's one-year anniversary and they are giving everyone free dessert. You get the chocolate cheesecake. It is wonderful but very rich, and after two bites you are full.

How likely are you eat more of it?

Scale: (1) Extremely unlikely – (7) Extremely likely

(adapted from Frisch, 1993)

SC4.

Investment scenario

[12] Changed from "Should you…"
[13] Changed from "chocolate amaretto kahlua cheesecake" not to exclude participants who do not drink alcohol
[14] Changed from "Would you…"

Assume you are the director of “Innovation Ltd”[15]. Your company has embarked on R&D for a new product—a lightweight mobile phone with extended battery life[16]. You have already spent £7m[17] on the project and would require an additional £3m to complete it. At this point in time, one of your competitors has come out with a superior mobile phone that, all other things being equal, is lighter and has longer battery life[18].

As the director of the company, how likely are you to[19] continue to invest the additional £3m to complete the project?

Non-investment scenario

Assume you are the director of “Innovation Ltd”. Your company is considering creating a new product – a lightweight mobile phone with extended battery life. The project would cost you £3m. Just before you embark on the project, one of your competitors has come out with a superior mobile phone that, all other things being equal, is lighter and has longer battery life.

As the director of the company, how likely are you invest the £3m in this the project?

Scale: (1) Extremely unlikely – (7) Extremely likely

(adapted from Tan & Yates, 1995)

SC5.

Investment scenario

You are staying in a hotel on holiday[20]. You paid £6.95[21] to see a film[22] on pay TV. After five minutes, you are pretty bored with the film.

How likely are you to continue watching it?[23]

Non-investment scenario

You are staying in a hotel on holiday. You turn on the TV and there is a film on. After five minutes, you are pretty bored with the film.

How likely are you to continue watching it?

Scale: (1) Extremely unlikely – (7) Extremely likely

(adapted from Frisch, 1993)

[15] Changed from “Innovation Pte Ltd”
[16] Changed from “a mobile phone that allows communication to be made within 500 miles”
[17] $ changed to £
[18] Changed from “that is lighter and that can communicate within 1000 miles”
[19] Changed from “would you…”
[20] “Vacation” changed to “holiday”
[21] $ changed to £
[22] “Movie” changed to “film”
[23] Changed from “Would you watch the film or not?”

Conjunction fallacy

Instruction text:

Below is a number of descriptions. Please read them carefully and rank the probability of each of the statements.

CF1. Bill is 34 years old. He is intelligent, but unimaginative, compulsive, and generally lifeless. In school, he was strong in mathematics but weak in social studies and humanities. Please rank order the following outcomes from most to least likely by assigning a number to each 1 – most likely, 8 – least likely).

A. Bill is a physician who plays poker for a hobby.
B. Bill is an architect.
C. Bill is an accountant.
D. Bill plays jazz for a hobby.
E. Bill surfs for a hobby.
F. Bill is a reporter.
G. Bill is an accountant who plays jazz for a hobby.
H. Bill climbs mountains for a hobby.

CF2. Linda is 31 years old, single, outspoken and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations. Please rank order the following outcomes from most to least likely by assigning a number to each (1 – most likely, 8 – least likely).

A. Linda is a teacher in elementary school.
B. Linda works in a bookstore and takes Yoga classes.
C. Linda is active in the feminist movement.
D. Linda is a psychiatric social worker.
E. Linda is a member of the League of Women Voters.
F. Linda is a bank teller.
G. Linda is an insurance salesperson.
H. Linda is a bank teller and is active in the feminist movement.

CF3. Suppose Novak Djokovic[24] reaches the Wimbledon finals in 2021[25]. Please rank order the following outcomes from most to least likely by assigning a number to each (1 – most likely, 4 – least likely).

A. Djokovic will win the match.
B. Djokovic will lose the first set.
C. Djokovic will lose the first set but win the match.
D. Djokovic will win the first set but lose the match.

[24] Changed from Bjorn Borg.
[25] Changed from “in 1981”.

CF4. Consider a regular six-sided die with four green faces and two red faces. The die will be rolled 20 times and the sequence of greens (G) and reds (R) will be recorded. Imagine that[26] you are asked to select one sequence, from a set of three, to win a prize[27] if the sequence you chose appears on successive rolls of the die. Please rank the following sequences in the order of preference by assigning a number to each (1 – most likely to bet on, 3 – least likely to bet on).[28]

A. RGRRR
B. GRGRRR
C. GRRRRR

CF5. A health survey was conducted in a representative sample of adult males in the UK[29] of all ages and occupations. Mr F. was included in the sample. He was selected by chance from the list of participants. Please rank the following outcomes from most to least probable by assigning a number to each (1 – most probable, 4 – least probable).[30]

A. Mr F. has had one or more heart attacks.
B. Mr F. is a smoker.
C. Mr F. has diabetes.[31]
D. Mr F. has had one or more heart attacks and he is over 55 years old.

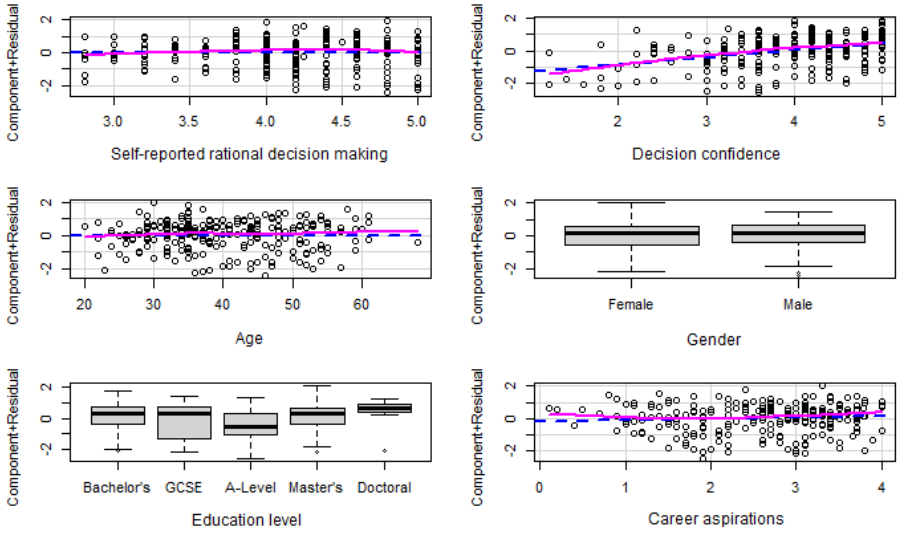
(adapted from Tversky & Kahneman, 1983)

[26] Added “Imagine that”
[27] Changed from “and you will win £25”
[28] Changed from “Please check the sequence of greens and reds on which you prefer to bet.”
[29] Changed from “British Columbia”
[30] Changed from “Which of the following statements is more probable?”
[31] Added options B and C.

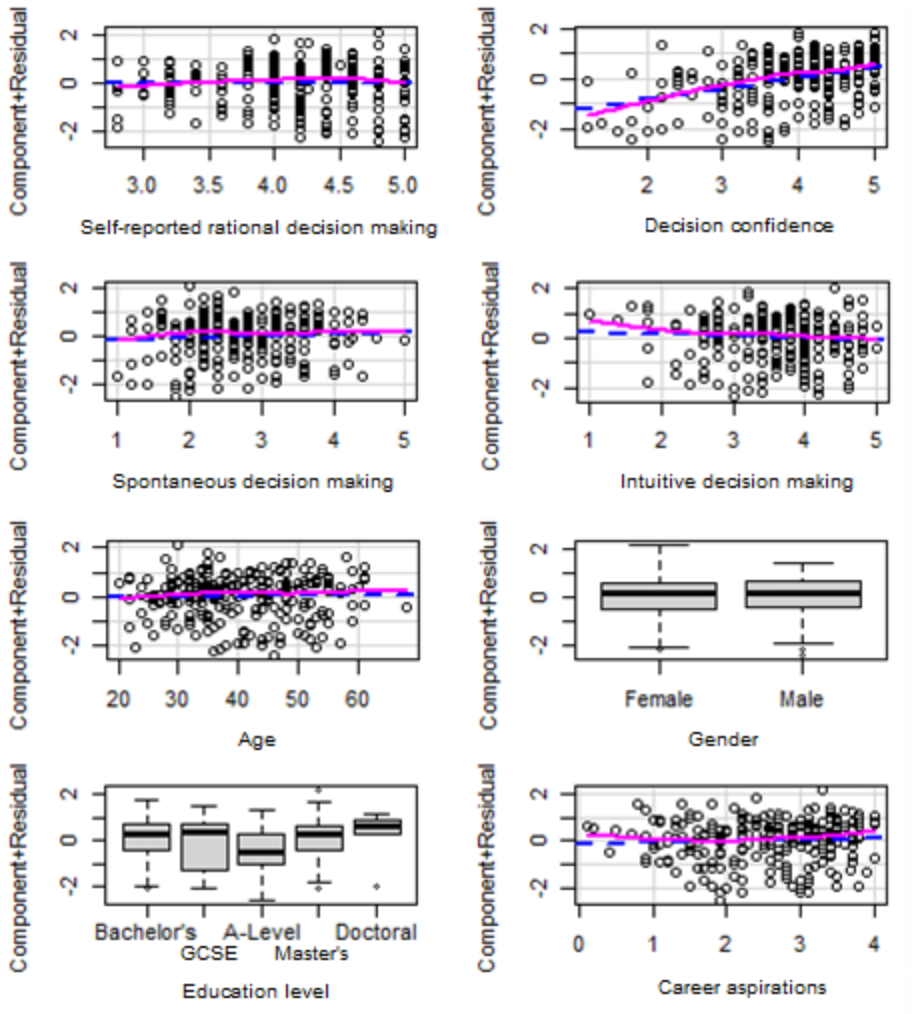
Appendix III. Regression diagnostics

Chapter 2

Study 1

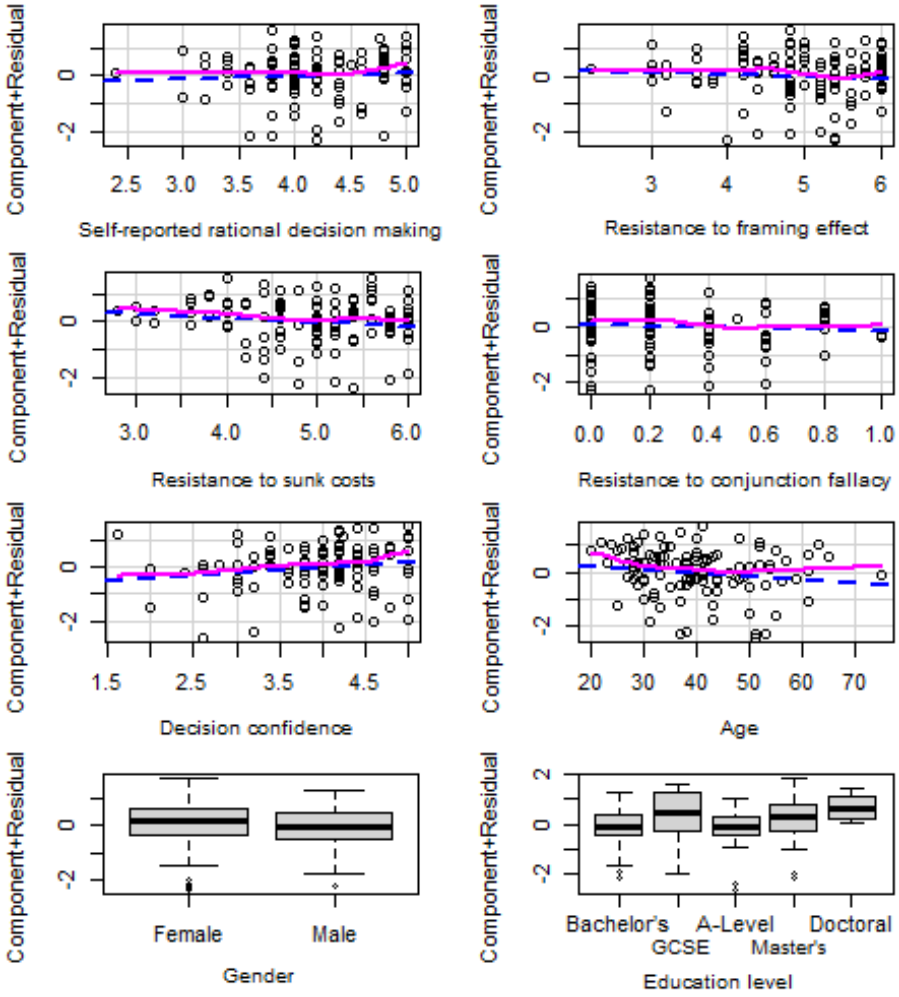


Appendix Figure 1. Self-reported rational decision making and decision confidence predicting career satisfaction linear regression model diagnostics: Partial-residual plots.
Model predictions are in the dashed blue line. Regression curve is in magenta.



Appendix Figure 2. All decision-making variables predicting career satisfaction linear regression model diagnostics: Partial-residual plots.
Model predictions are in the dashed blue line. Regression curve is in magenta.

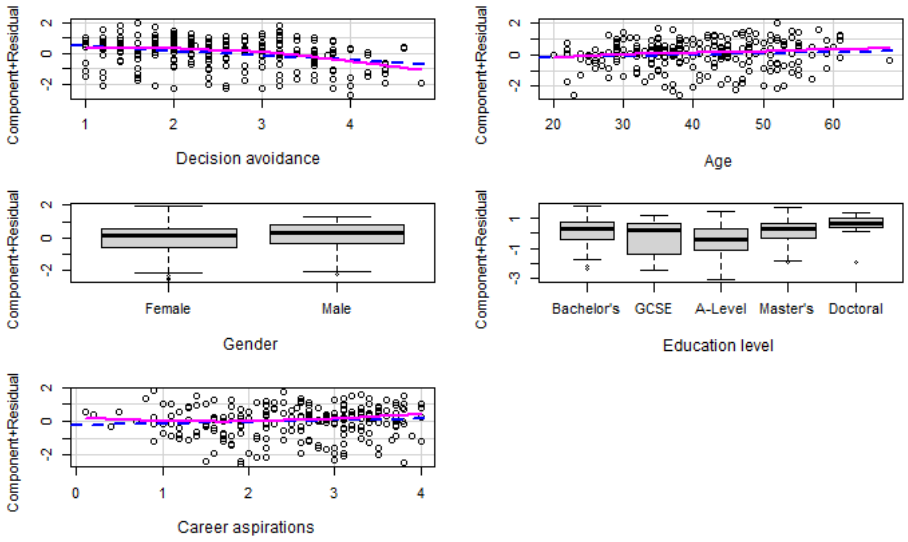
Study 2



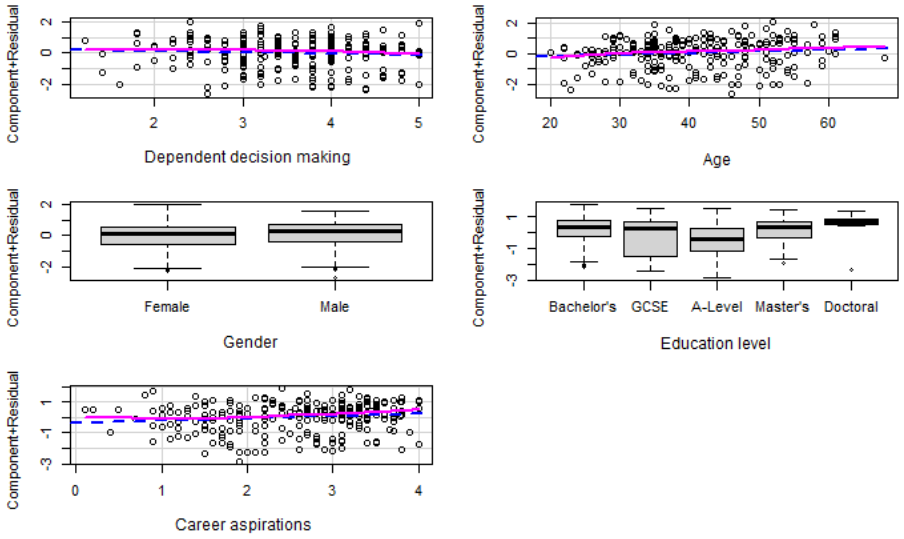
Appendix Figure 3. Self-reported rational decision making, decision-making tasks, and decision confidence predicting career satisfaction linear regression model diagnostics: Partial-residual plots.
Model predictions are in the dashed blue line. Regression curve is in magenta.

Chapter 3

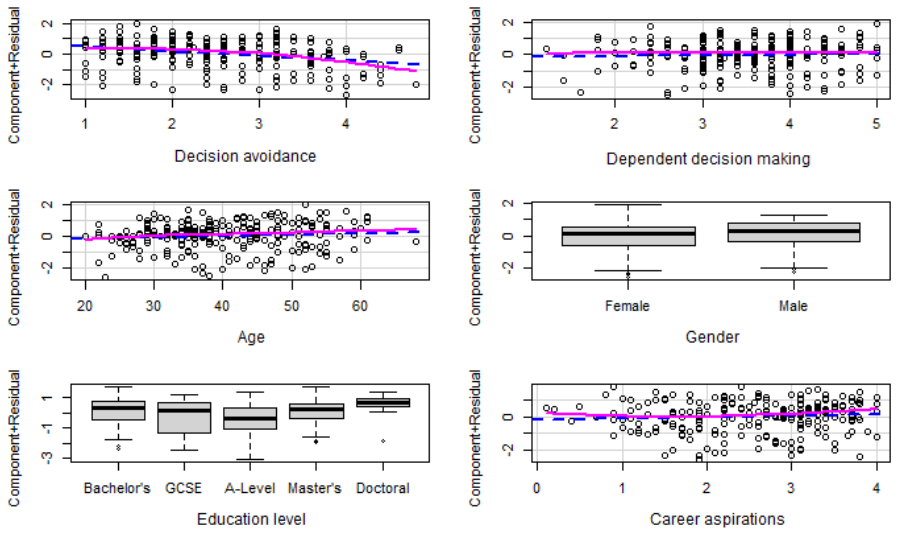
Study 3



Appendix Figure 4. Decision avoidance predicting career satisfaction linear regression model diagnostics: Partial-residual plots.
Model predictions are in the dashed blue line. Regression curve is in magenta.



Appendix Figure 5. Dependent decision making predicting career satisfaction linear regression model diagnostics: Partial-residual plots.
Model predictions are in the dashed blue line. Regression curve is in magenta.



Appendix Figure 6. Avoidant and dependent decision making predicting career satisfaction linear regression model diagnostics: Partial-residual plots.
Model predictions are in the dashed blue line. Regression curve is in magenta.