Decisions, Decisions: Understanding How the Need and Ability to Achieve Closure Relate to Mental Health and Wellbeing

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Statement of Originality

I hereby certify that the work embodied in the thesis is my own work, conducted under normal supervision. The thesis contains no material which has been accepted, or is being examined, for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made. I give consent to the final version of my thesis being made available worldwide when deposited in the University's Digital Repository, subject to the provisions of the Copyright Act 1968 and any approved embargo.

Signed:

Name of Student: Monica Gendi

Date: 13/12/2019

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Abstract

Previous research has shown that the need for closure is positively related to mental health problems and the ability to achieve closure is negatively related to mental health problems. However, previous research has not established the mechanisms of these relations or considered the aetiology of the need and ability to achieve closure. In the present body of work, I investigated decision-making and social factors as potential mediators of the relations of the need and ability to achieve closure with mental health. Regarding decision-making, Studies 1-3 showed that process regret, option regret, and decision-making stress consistently mediated the relations between the need for closure and mental health and between the ability to achieve closure and mental health. Regarding social factors, Study 4 demonstrated that social support mediated the relation between the ability to achieve closure and mental health, but not the relation between the need for closure and mental health. Increased stress in response to everyday stressors also mediated the relations between the need for closure and mental health and between the ability to achieve closure and mental health. Regarding aetiology, Study 4 showed that the need and ability to achieve closure were both significantly related to attachment styles. Study 5 confirmed that both a high need for closure and a low ability to achieve closure longitudinally predict poorer mental health, but did not show any significant mediation effects, possibly due to low power. These findings highlight the importance of future research about the relations between decision quality and need and ability to achieve closure. This knowledge would help us to understand why those with a high need or low ability to achieve closure experience elevated regret, decision stress, and stress about everyday stressors and consequently develop interventions to improve their mental health. The relations of the need and ability to achieve closure with attachment style demonstrate the importance of developing an integrated theoretical framework that addresses the aetiology of the closure constructs.

CHAPTER 1

GENERAL INTRODUCTION:

WHAT ARE THE NEED FOR CLOSURE AND THE ABILITY TO ACHIEVE CLOSURE?

Preamble

Everyone has *that* friend. Let's call her Monica. Monica cannot and will not make plans on the spur of the moment. She needs at least five (5) business days' notice if you want to go out for dinner. If you insist on going to a new restaurant, she needs to look up its location and menu immediately to plan her route, parking spot, main, and dessert. Woe betide the wait staff if the online version of the menu is outdated.

When you get to the restaurant and decide to share entrées, Monica becomes increasingly frustrated as everyone mulls over the options. She wants to make a decision quickly. We're having the tempura prawns and the spring rolls. There, that's a relief.

If you disagree about something during the meal, Monica is unlikely to change her mind. She refuses to engage with your points about why the dress looks white and gold when in fact it is blue and black (Weintraub, 2018). She doesn't want to have philosophical arguments about the nature of perception. It is what it is, and that's that.

Monica's not a big fan of the friend sitting on her other side who speaks in epigrams and likes to be mysterious. When conversation turns to Ross and Rachel's fractious relationship, Monica knows exactly who is to blame for the latest fight (it's Ross. It's always Ross). It annoys her that you think that they both have good points. Isn't it obvious who is in the wrong?

After dinner, Monica's relieved to get home. Her shoes go into the cabinet, her coat goes on the rack, and her dress goes into the laundry basket. A place for everything and everything in its place. Ah, that's better.

Monica is a person with a high *need for closure*. In the vignette above, Monica exhibits high preference for predictability, need for decisiveness, discomfort with ambiguity, closedmindedness, and need for order. Regardless of the extent to which you can personally relate to Monica, it probably would not surprise you to learn that she is prone to mental health problems including delusion-proneness, anxiety, depression, and symptoms of general psychological distress such as phobic anxiety/agoraphobia, hostility, obsessive-compulsiveness, and interpersonal sensitivity (Colbert & Peters, 2002; Colbert, Peters, & Garety, 2006; McKay, Langdon, & Coltheart, 2006; Roets & Soetens, 2010). However, despite this well-established link between the need for closure and mental health problems, the mechanisms and boundaries of these relations have not been thoroughly investigated.

Some researchers, without explicitly addressing this question, have hinted at potential mediating variables. For example, Sollár and Vanečková (2012) found that the need for closure was associated with paying more attention to stressors. This may contribute to psychological distress, particularly when those stressors are uncontrollable. Therefore, people with a high need for closure may experience more mental health problems because they spend more time thinking about stressors even when these stressors cannot be resolved by a problem-solving approach.

Roets and Soetens (2010) suggested a slightly different explanation. They posited that people with a high need for closure experience more mental health problems because they experience frequent decision-making distress. People with a high need for closure find decision-making situations frustrating and difficult due to the inherent uncertainty of such situations. Decision-making situations occur constantly in day-to-day life, and hence people with a high need for closure are faced with very frequent stressors, which may then affect their mental health more broadly.

Both above-mentioned explanations have theoretical merit, but neither has been explicitly tested. Importantly, there are many well-established effects of a high need for closure on various other variables, some of which may help to explain its link with mental health problems. The main goal of the present thesis is to answer the question of why people with a high need for closure experience poorer mental health. In the present chapter, I outline research showing that the need for closure affects a wide range of information processing, decision-making, and social processes. The present thesis attempts to link previously disjointed research on (a) the effects of need for closure and (b) factors contributing to mental health problems in order to explain why Monica and people like her might struggle with their mental health.

The Importance of Investigating Mental Health, Mental Illness, and Wellbeing

Investigation of the causes of mental illness is an essential and timely endeavour. Mental illness is one of the leading causes of ill-health and disability worldwide, with one in four people globally being affected at some point throughout their lives (World Health Organization, 2001). The most common forms of mental illness are anxiety and depression, with an estimated 275 million people suffering from anxiety problems (Fleming, 2019) and 300 million experiencing depression (World Health Organization, 2018). These numbers are likely to be underestimates because stigma and discrimination mean that people experiencing mental illness often remain undiagnosed (Fleming, 2019).

Mental health problems, while less serious than mental illnesses, affect the ways that people think and feel and can develop into mental illness if not appropriately treated (Australian Government Department of Health, 2007). Mental health problems are expected to cost the global economy 16 trillion USD by 2030 in lost productivity alone, and many people with mental health problems remain untreated, particularly in low and middle-income

countries (Fleming, 2019). Mental health problems are estimated to cause 13.5 million deaths per year that could be prevented by mental health treatment (Boseley, 2018). Early treatment of mental health problems or mental illness results in the best outcomes (Australian Government Department of Health, 2007). It is therefore important to study the causes of mental health problems and consider the potential for early intervention.

In addition to investigating mental health problems, the present research program also includes measures of positive wellbeing, which has not yet been investigated in relation to the need for closure. It is important to investigate wellbeing in addition to mental health problems. Although mental ill-health and wellbeing are correlated, the correlation between them is not high enough to justify conceptualising them as opposite ends of a single spectrum (e.g., Keyes, 2005). The most recent conceptualisations of wellbeing suggest that it is not merely the absence of mental health problems. Rather, wellbeing refers to an overall state of wellness, including considerations of social and family functioning and the ability to realise one's potential in subjectively important domains (e.g., Slade, 2010). Therefore, the present research includes measures of both mental health and wellbeing. The term "mental health" is used throughout to mean both mental health problems and (lack of)wellbeing for the sake of brevity.

Why Does the Need for Closure Affect Mental Health?

On the surface, it seems obvious why Monica and others with a high need for closure might experience high levels of mental health problems. The world is an unpredictable, disorderly place. Strong desires for order and predictability are constantly thwarted. The constant disappointment and frustration of unmet needs may then go on to cause psychological distress and mental health problems.

This explanation for the relation between need for closure and mental health was proposed by Roets and Soetens (2010), who found that people with a high dispositional need

for closure report poorer mental health. They suggested that this link occurred because Western society provides enormous amounts of consumer and other choice. Situations which involve large amounts of choice necessarily create uncertainty about which is the best option. This uncertainty, according to Roets and Soetens, is frustrating and stressful to people with a high need for closure, and hence leads to their poorer mental health.

This explanation is theoretically plausible. However, it does not provide any potential avenues for intervention. Instead, it implies that people with a high need for closure will always experience poorer mental health in societies that emphasise choice and individualism, and hence that this issue can only be addressed by changing people's dispositional need for closure. This is likely to be difficult because dispositional need for closure is thought to be a stable individual difference (Webster & Kruglanski, 1994).

On the other hand, investigating other mechanisms through which the need for closure influences mental health may help us to identify mediators that are open to intervention. For example, perhaps Monica has fewer friends to provide her with social support because she does not like the unpredictability associated with meeting new people. This lack of social support means that she would lack a buffer against stressful events (e.g., Olstad, Sexton, & Søgaard, 2001). However, it might be possible to intervene to improve Monica's social network by encouraging her to seek friendships in more structured settings. Or perhaps Monica's desire to make decisions rapidly and get them out of the way leads to her making poor decisions that go on to negatively impact her mental health. In that case, it may be possible to provide her with decision-making tools that assist her to work through decisions more carefully despite her desire to get them out of the way. Hence, the identification of pathways by which the need for closure may affect mental health can also help us identify potential interventions that do not rely on attempting to change people's dispositional need for closure.

What is the Need for Closure?

The need for closure is a cognitive motivation that describes the extent to which an individual prefers predictability and certainty to ambiguity (Webster & Kruglanski, 1994). It is defined as the desire for "*an* answer on a given topic, *any* answer…compared to confusion and ambiguity" (Kruglanski, 1990b, p. 337). That is, people who have a high need for closure are motivated to come to a firm conclusion about a situation, belief, or problem as quickly as possible, regardless of whether the conclusion is positive or negative, rather than to remain in a state of uncertainty. On the other hand, people with a low need for closure prefer to remain in a state of deliberation and ambiguity rather than to have clear-cut answers or plans.

Before proceeding, it is important to clearly define the concept of closure. The word *closure* is sometimes used in common parlance to mean a comforting sense of finality (Merriam-Webster, n.d.) in relation to moving on from important, negative life events such as bereavement or the end of a relationship. However, within the present thesis, the word closure refers to certainty in one's knowledge. The need for closure is sometimes referred to by researchers and theorists as *the need for cognitive closure*. Throughout the present thesis I will used the term *the need for closure* for brevity.

The need for closure construct arises from *lay epistemic theory*. Lay epistemic theory describes the process by which people gain knowledge in their everyday life (Kruglanski & Freund, 1983). Knowledge consists of two aspects: content (i.e., what you know) and confidence (i.e., how sure you are about what you know). These aspects of knowledge are created by hypothesis generation and hypothesis evaluation respectively (Kruglanski & Freund, 1983).

To illustrate these two processes, consider an example of an uncertain or ambiguous situation. Imagine that you submitted an article to a journal six months ago, and you have not received a response. In the hypothesis generation phase, you could imagine several possible

explanations for the lack of response from the editor. For example, perhaps the journal received a vast volume of submissions, and therefore could not consider them all within the timeframe that you originally expected. Or perhaps the editor *has* responded to your submission, but the email went to your junk email folder, which you have not been checking due to the tiresome unoriginality of Nigerian prince scams lately. Perhaps the editor or reviewers found your submission so appalling that they could not bring themselves to reply.

Once you have generated a number of hypotheses, the hypothesis validation stage involves testing the hypotheses against the evidence available (Kruglanski & Freund, 1983), which includes previously gained knowledge. For example, your past history with journal article submissions may suggest that editors and reviewers generally have no compunctions about informing authors that their work is appalling. This is evidence contrary to the last hypothesis that you generated. You can engage in informational search by checking your junk folder to find evidence about the veracity of the second hypothesis that you generated. If you find no letters from the editor there, you may conclude that the first hypothesis is the most plausible, especially since you know that it is very prestigious journal and is likely to be highly sought after by authors. Therefore, after considering the evidence for or against each of the hypotheses generated, you can be reasonably confident that you have not heard regarding your article submission because of the high volume of submissions received by the journal.

The need for closure is a motivational variable that affects the ways in which people engage in these hypothesis generation and validation processes. According to lay epistemic theory, a person's motivation to achieve closure is a function of the perceived costs and benefits of closure (Kruglanski, 1990a). The higher the perceived benefits of closure, the higher the motivation to achieve closure. On the other hand, the higher the perceived costs of closure, the lower the motivation to achieve closure. As outlined below, when people have a

high need for closure, they usually tend to generate fewer hypotheses and test their hypotheses less thoroughly to arrive at certainty as soon as possible.

The costs and benefits of closure are related both to stable individual differences and to contextual factors. Hence, there are both trait and state aspects of the need for closure. From a trait perspective, there are innate individual differences in the extent to which people tolerate or enjoy ambiguity.[1] The most proximal cause of these differences relates to stress experienced during conditions of uncertainty, which then motivates the achievement of certainty. People with a high dispositional need for closure feel more subjective and physiological distress during uncertain or ambiguous situations, and this distress increases while the ambiguity is unresolved (Roets & Van Hiel, 2008). The experience of distress provides an internal, intrinsic benefit to achieving closure and therefore creates a high motivation to achieve closure. However, this explanation fails to account for why some individuals experience more distress than others in uncertain situations.

The causes of individual differences in the experience of stress in response to uncertainty are less clear and have not been extensively investigated. Some researchers have focused on genetic explanations for the need for closure, demonstrating that some gene variants are associated with greater stress in uncertain situations (e.g., Colzato, Waszak, Nieuwenhuis, Posthuma, & Hommel, 2010; Drabant et al., 2012; Heinz et al., 2007; Nolan, Bilder, Lachman, & Volavka, 2004). Other researchers have focused on more social variables that may explain differences in the need for closure, such as attachment. Mikulincer (1997) found that insecurely attached people scored higher on the need for closure scale (Webster &

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1 Individual differences in the tolerance or enjoyment of ambiguity have been extensively researched through constructs such as intolerance of uncertainty (e.g., Dugas, Freeston, & Ladouceur, 1997) or personal need for structure (e.g., Thompson, Naccarato, Parker, & Moscowitz, 2013). In the present thesis, I focus on the construct of the need for closure rather than other similar constructs because of its well-established relations with variables that may explain its relation to mental health problems, as outlined below. This thesis is therefore grounded in lay epistemic theory rather than the theories that underlie other similar constructs.

Kruglanski, 1994) and were more prone to the types of biases that are typical of people with high need for closure (discussed in more detailed below). Mikulincer suggested that attachment style influences the need for closure through its effects on people's confidence in dealing with distress. Situations that threaten existing knowledge (i.e., ambiguous or unpredictable situations) are inherently somewhat distressing. However, securely attached people believe that distress is temporary and that they can deal with being distressed. On the other hand, insecure attachment can cause a sense of helplessness and low self-efficacy. Consequently, insecurely attached people attempt to avoid challenges to their worldviews because they feel ill-equipped to deal with these challenges. Therefore, according to Mikulincer, uncertainty-inducing events are more stressful for insecurely attached people due to their negative beliefs about their own capacity to deal with them. Such people perceive high costs of not achieving closure due to their perceived inability to deal with stressful situations and therefore have a high need for closure.

Investigating the aetiology of the need for closure may provide clues for why the need for closure is associated with mental health. For example, Mikulincer's (1997) explanation of the link between attachment and need for closure may also help to explain the link between need for closure and mental health. Specifically, if people with a high need for closure lack confidence in their capacity to deal with stressful events, then they may perceive such events as more distressing. In turn, this increased subjective distress may contribute to their poorer mental health. In Chapter 6 of the present thesis, I report an investigation of the associations among attachment style, need for closure, and distress in response to stressful events.

In addition to the existence of individual differences in dispositional need for closure, the need for closure also has a state component. There are multiple situational factors that affect the perceived benefits and/or costs of closure. For example, previous research has used time pressure to manipulate the need for closure. Pressure to decide quickly results in an

increase in the benefits of achieving closure, and consequently an increase in the need for closure (e.g., Heaton & Kruglanski, 1991). Other researchers have used different manipulations that increase the costs of not achieving closure. For example, a noisy environment motivates people to achieve closure quickly so that they can leave the unpleasant situation (e.g., Kruglanski, Webster, & Klem, 1993). The present research focuses mainly on dispositional rather than state need for closure because it is dispositional need for closure that has been linked with mental health problems in previous research (e.g., Roets & Soetens, 2010).

Need for Closure and Decision-Making

As a cognitive motivation, an individual's need for closure affects the way in which they process information and make decisions. A person with a high need for closure is motivated to (a) process information such that they arrive at closure as soon as possible and (b) maintain this closure to avoid the subjectively aversive state of a lack of closure. These processes are termed *seizing* and *freezing* respectively (Kruglanski & Webster, 1996).

In the seizing process, people with a high need for closure tend to rely on the most accessible information in order to make a judgement as quickly as possible. That is, they generate fewer hypotheses regarding a situation. This tendency exacerbates biases that rely on accessibility, resulting in increased susceptibility to primacy effects in some cases (Webster & Kruglanski, 1994) and recency effects in others (Richter & Kruglanski, 1998). Reliance on more accessible information or pre-existing opinions rather than attending to all the information presented also results in less comprehensive informational search, generation of fewer hypotheses and reliance on heuristics when available (Choi, Koo, Choi, & Auh, 2008; de Dreu, Koole, & Oldersma, 1999; Klein & Webster, 2000; Mayseless & Kruglanski, 1987).

Once a person with a high need for closure has seized on a judgement, they "freeze" on it. This means that people with a high need for closure tend to be closedminded once they

have reached a conclusion (Kruglanski et al., 1993). The desire for "permanence" of knowledge results in restriction of informational search to prototypical rather than diagnostic information (Kruglanski & Mayseless, 1988). That is, people with a high need for closure look for information that confirms their prior judgement rather than information that would help them to distinguish between the validity of their prior judgement and an alternative. Hence, they test hypotheses less comprehensively. This bias in favour of confirmatory evidence enables high need for closure people to maintain their prior knowledge rather than challenging it and therefore introducing uncertainty.

It should be noted that the seizing and freezing processes outlined above are tendencies rather than inevitable outcomes of a high need for closure. The need for closure is a goal rather than an information processing style (Roets, Kruglanski, Kossowska, Pierro, & Hong, 2015). The expression of these tendencies depends on what is most likely to achieve the goal (closure) in each situation. In situations where people with a high need for closure do not have a confident pre-existing opinion about something or there is no clear decision rule available, they might engage in a *more* comprehensive informational search before forming an opinion (Jaśko, Czernatowicz-Kukuczka, Kossowska, & Czarna, 2015; Kruglanski, Peri, & Zakai, 1991; Van Hiel & Mervielde, 2002). This is contrary to the usual seizing tendency that results in a less comprehensive search. This increase in informational search occurs because closure is not merely the making of a decision but rather the crystallisation of knowledge (Livi, Kruglanski, Pierro, Mannetti, & Kenny, 2015). Therefore, some initial level of plausibility or confidence must be reached before closure is achieved. In the absence of an existing opinion, a high need for closure leads to intensive informational search in order to achieve this level of confidence. It is therefore important to keep in mind that a high need for closure is not about quick decision-making or cognitive biases per se. Rather, these biases usually (but not always) assist with the attainment of the goal of closure. The interaction

between need for closure and initial confidence in a judgement is further discussed in this chapter's section on the ability to achieve closure.

The paragraphs above outline the effects of a high need for closure on a number of behavioural decision-making characteristics and tendencies that would tend to lower the quality of decisions (e.g., the use of heuristics, decision speed, informational search, etc.). Also as outlined above, Roets and Van Hiel (2008) established that people with a high need for closure experience high levels of subjective distress during uncertainty, which likely promotes behaviours aimed at reducing the amount of time spent being uncertain by speeding up decision time. The objective behavioural tendencies and the subjective perceptions of decision-making that are associated with a high need for closure form two sets of potential pathways between a high need for closure and poorer mental health.

First, the fact that people with a high need for closure tend to make decisions quickly and without comprehensively considering all the available information may lead to lower decision quality. This lower decision quality may result in negative outcomes that affect mental health (e.g., poor health behaviours, poor financial choices). I have termed this potential mechanism the "objective decision quality hypothesis."

Second, feeling that one's decision-making process was suboptimal can also cause subjective distress regardless of the outcome of the decision (e.g., Inbar, Botti, & Hanko, 2011). Hence, if people with a high need for closure are aware that they tend to use biases rather than engaging in comprehensive informational searches, they may experience distress about their decision-making processes even after a decision has been reached. This post-decision distress, combined with the distress felt by high need for closure people throughout the decision-making process, may affect mental health directly, as proposed by Roets and Soetens (2010). I have termed this mechanism the "decision-making distress hypothesis." Although Roets and Soetens suggested this mechanism, they did not test it. In the present

thesis, I focus mainly on testing and expanding on the subjective decision quality explanation for the relation between the need for closure and mental health.

Social Consequences of the Need for Closure

The cognitive effects of a high need for closure extend beyond explicit decision-making situations to have flow-on effects for many aspects of life, including social processes and behaviours. The effects of the need for closure in the social sphere are very well-established and range from the interpersonal level to the intergroup level. For example, people with a high need for closure tend to engage in more stereotyping and prejudice (e.g., Bar-Tal & Labin, 2001; Sun, Zuo, Wu, & Wen, 2016; Van Hiel, Pandelaere, & Duriez, 2004), likely because stereotyping provides a fast way to achieve certainty about a person. People with a high need for closure tend to engage in less perspective-taking and empathy towards dissimilar others, probably because their own perspective is most accessible and hence provides the fastest route to closure (Webster Nelson, Klein, & Irvin, 2003). People with a high need for closure are more likely to use abstract, vague language when talking to others, which in turn leads to less relational closeness (Rubini & Kruglanski, 1997).

The relative lack of perspective-taking and the use of language that does not engender feelings of closeness may lead high need for closure people to have fewer and/or less close relationships with others. Hence, it is important to consider whether lower levels of perspective-taking and empathy lead to less social support, which in turn may explain the poorer mental health of people with a high need for closure. The question of whether perspective-taking and social support can explain the relation between the need for closure and mental health is addressed in Study 4 of the present thesis.

Importantly, the findings regarding the need for closure and social outcomes have not been integrated with the research examining how the need for closure relates to mental health. Given the importance of social support and other social processes in maintaining good

mental health (e.g., Olstad et al., 2001; Thoits, 2011), the social effects of a high need for closure are a promising potential mechanism linking high need for closure and mental health. In the present thesis, I investigated whether social support and other social processes such as social approach and avoidance goals can help to explain the relation between the need for closure and mental health.

The Relation Between the Ability to Achieve Closure and Mental Health

Let us turn away from Monica for a few minutes and think of another friend. We will call her Anne. She is attending the same dinner with you.

Anne arrives at the restaurant late. She explains breathlessly that "time just got away with me!" You are not surprised – this happens every time you go out. She changed her outfit three times before settling on this one, and she could not for the life of her find the discount voucher she had for this restaurant: "I definitely put it in a safe place!"

It takes her ages to decide on what she is having. Steak or salmon? Maybe the steak – this place is famous for their steaks. But the salmon might be a healthier option – did you hear something on the news about how red meat is killing us slowly? But she does not eat steak all that often; maybe just this once would not be that bad. But the salmon comes with a delicious sauce…She is annoyed with herself for not being able to pick her dinner, but her annoyance does not seem to make her any better at it. She makes her decision (steak) in a split second just as the waiter is asking what she will have. When the waiter leaves, she continues to wonder if she should have ordered the salmon instead.

After a while, the dinner conversation turns to relationships. Anne has been dating Ben for almost a year, but it turns out that she has not introduced him to her family or any of her friends. "I just don't know if he's that into me," she says, fretfully.

Anne is a person with a low *ability to achieve closure*. The ability to achieve closure is the sister construct to the need for closure. The *need* for closure refers to the desire for

certainty and order, whereas the *ability* to achieve closure refers to the individual's capacity to achieve certainty in the correctness of made decisions and to structure life (Bar-Tal, 1994a). The ability to achieve closure is sometimes referred to as the *ability to achieve cognitive structure*. The term *ability to achieve closure* is used in the present thesis for the sake of brevity and for consistency with the need for closure terminology. The term *ability to achieve cognitive structure* is used only when discussing the history of the construct in Chapter 2.

The links between the ability to achieve closure and mental health are less comprehensively established than the links between the need for closure and mental health. Only one study has explicitly investigated the possibility of a relation between ability to achieve closure and mental health problems. Roets and Soetens (2010) found that the need for closure and the ability to achieve closure exerted independent, opposite effects of symptoms of psychopathology. Specifically, mental health problems were positively associated with the need for closure and negatively associated with ability to achieve closure. There was no interaction between need and ability.

Roets and Soetens (2010) posited that the ability to achieve closure affects mental health because people have to make constant choices in daily life. Feeling unable to make these choices confidently may give rise to feelings of frustration or helplessness that may then lead to psychological distress more generally. However, this study did not test either this or any other potential mechanism for this effect. Hence, the reasons for the link between ability to achieve closure and mental health problems remain unknown, although some studies have shown links between ability to achieve closure and mental health-relevant variables such as coping effectiveness (Bar-Tal & Spitzer, 1999). The present research aims to fill this gap in the literature by investigating the processes of this relation.

Although there is little research specifically on the ability to achieve closure and mental health, indecisiveness is well-established as a symptom of mental health problems (e.g., Gaudiano, Young, Chelminski, & Zimmerman, 2008; Germeijs & Verschueren, 2011; Santos, 2001). Lewicka (1997) found that depressed participants took longer to make decisions and were less biased in their information search, paying more equal attention to each alternative than did the non-depressed participants. This may reflect that depression is associated with a low ability to achieve closure, with depressed people being less confident in their decision-making abilities. On the other hand, it may also reflect a low need for closure, since in less complex or important decision-making situations, people with a low need for closure have a slower decision speed than those with a high need for closure.

Much of the research surrounding the relation between indecisiveness and mental health is from the perspective that mental health issues cause indecisiveness. The present thesis extends on this literature by considering whether indecisiveness (i.e., a low ability to achieve closure) can contribute to mental health problems as well, such that the relation between these two constructs is bidirectional.

As outlined below, the need and ability to achieve closure interact to predict many outcome variables. Hence, any investigation of the effects of the need for closure on mental health is incomplete without considering the ability to achieve closure. Therefore, in the present thesis, the need for closure and the ability to achieve closure are treated as equally important predictor variables and their interactions are tested for throughout.

What is the Ability to Achieve Closure?

The ability to achieve closure has been conceptualised in multiple ways across its history. A full discussion of these changes is beyond the scope of this thesis. However, a summary is provided here in order to provide context for my conceptualisation of the construct throughout the thesis.

Early conceptualisations of the ability to achieve closure referred to "the creation and use of abstract mental representations (e.g., schemata, prototypes, scripts, attitudes, and stereotypes)" (Neuberg & Newsom, 1993, p. 113). According to Neuberg and Newsom, the ability to achieve cognitive structure is the ability to integrate previous experience and knowledge into such abstract, simple generalisations, which improve cognitive efficiency in interpreting new information. This definition of the construct was commonly used by early researchers (e.g., Bar-Tal, 1994a).

Later conceptualisations of the ability construct have defined it in relation to need. That is, the ability to achieve cognitive structure was defined as the ability to process information in a way that is consistent with one's need for cognitive structure (i.e., need for closure; e.g., Bar-Tal & Guinote, 2002; Bar-Tal, Kishon-Rabin, & Tabak, 1997). According to this perspective, it is assumed that people with a high need for closure prefer to use simple cognitive structures, and people with a low need for closure prefer to use more intensive piecemeal processing. Consequently, according to this definition, a person who uses simple cognitive structures has a high dispositional ability to achieve closure only if they also have a high need for closure. If they have a *low* need for closure, then the use of simple cognitive structures demonstrates a *low* dispositional ability to achieve closure. This is in direct contrast to the Neuberg and Newsom (1993) definition, which suggests that the use of simple cognitive structure represents a high ability to achieve closure across the board.

Defining ability in relation to need presents some theoretical and methodological issues. From a theoretical perspective, it is not clear that people with a high need for closure always prefer to use cognitive structuring/simple structures. As outlined in the need for closure section above, need for closure interacts with the context to determine what kind of processing is used. People with a high need for closure tend to use more heuristic and shallow processing when that type of processing enables them to achieve closure quickly (e.g., when

they have an existing opinion or decision rule). However, when they have an initially low level of confidence in their judgement, high need for closure people use more systematic and deeper processing in order to reach certainty (Jaśko et al., 2015; Kruglanski et al., 1991; Van Hiel & Mervielde, 2002). Therefore, a definition of dispositional ability to achieve closure that assumes that the type of processing preferred by people with high or low need for closure remains the same cross-situationally is not appropriate.

From a methodological perspective, defining ability in relation to need does not accord with the measurement instrument (the Ability to Achieve Cognitive Structure Scale; Bar-Tal, 1994a). The items in the scale refer only to the ease or difficulty of decision-making and structuring life. They do not measure either processing type or need for closure. Hence, the scale cannot identify the relation between processing type and need for closure and therefore cannot capture the construct as defined by Bar-Tal et al. (1997).

Possibly in response to these issues, researchers in more recent years have used a different approach to the ability to achieve closure that addresses both the theoretical and methodological issues with the previous conceptualisation. The most recent interpretation of the ability construct has not been specifically concerned with the ways in which people prefer to process information. Rather, the ability to achieve closure has been conceptualised as the ability to make decisions quickly and confidently and to structure one's life (e.g., Roets & Soetens, 2010). Unlike previous definitions in which ability was defined in relation to need, this most recent definition is less concerned with *why* people can achieve closure. It is therefore a "pure" ability construct that is theoretically orthogonal from the need construct. This conceptualisation does not rely on unsupported theoretical assumptions about the preferred information processing characteristics of people with a high or low need for closure. Methodologically, defining the ability to achieve closure as ease of decision-making

and processing more generally (rather than ease and difficulty of using specific cognitive processes) is also more consistent with the measurement instrument.

Another approach to the ability to achieve closure may be derived from Kossowska, Szumowska, Dragon, Jásko, & Kruglanski's (2018) framework for the need for closure. Kossowska et al. suggest that people with a high need for closure (i.e., who are strongly motivated to achieve closure) are willing to do whatever is necessary to satisfy this need. If only minimal processing is necessary, then they will engage only in minimal processing. However, in situations where closure would require more effortful processing, then people with a high need for closure will be motivated to use effortful processing. This is consistent with the research about the information processing effects of a high need for closure outlined earlier in this chapter.

According to Kossowska et al.'s (2018) perspective on the need for closure, the ability to achieve closure might be conceptualised as the ability to shift between more effortful and less effortful processing, depending on the situation (I am grateful to M. Kossowska for this suggestion, personal communication, February 7, 2020). In this conceptualisation, a person with a high need for closure would have a high ability to achieve closure if they use less effortful processing when that is sufficient to achieve closure, and more effortful processing when more effort is required to achieve closure. On the other hand, a person with a high need for closure would have a low ability to achieve closure if their levels of processing effort do not vary according to the demands of the situation.

This approach combines some aspects of each of the previous approaches. It is similar to Bar-Tal's (1997) perspective that the ability to achieve closure is the ability to process information in accordance with one's processing preferences, except that processing preferences are acknowledged to be dependent both on the individual's level of the need for closure *and* on the situation. In relation to Roets and Soetens' (2010) position on the ability to

achieve closure, processing flexibility or lack thereof may manifest as subjective ease or difficulty. People who are able to process information flexibly with regard to situational requirements may experience decision-making as easy (i.e., have a high ability to achieve closure according to Roets and Soetens). On the other hand, those who are less flexible may experience decision-making as difficult (i.e., have a low ability to achieve closure according to Roets and Soetens).

However, from a methodological perspective, the idea that the ability to achieve closure refers to flexibility of information processing according to preferences and situational factors cannot be measured by the Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). The scale measures only subjective ease or difficulty. The conjecture that processing flexibility results in subjective ease or difficulty of decision-making and structure at a dispositional level has not been tested, and hence the scale is not an appropriate operationalisation of this novel approach to the ability to achieve closure. Of the three approaches outlined in this section, the scale can only appropriately operationalise Roets and Soetens' (2010) conceptualisation.

Therefore, to avoid the methodological and theoretical issues with both Bar Tal et al.'s (1997) approach and the new conceptualisation of the construct, the ability to achieve closure is conceptualised in the present thesis as the ability to make decisions swiftly and confidently and the ability to structure life. This definition is consistent with recent research (e.g., Roets & Soetens, 2010; Roets & Van Hiel, 2007), reflects the content of the measurement instrument clearly, and avoids assumptions about the relations between need for closure, processing preferences, and ability to achieve closure.

Interactions Between the Need for Closure and the Ability to Achieve Closure

As outlined above, a high need for closure usually results in heuristic, quick information processing, but in some cases promotes more systematic, slower information

processing. Bar-Tal and colleagues suggested that these contrasting effects can be considered as a function of the ability to achieve closure. Specifically, they suggested that the usual effects of a high need for closure on information processing manifest only when the individual also has a high ability to achieve closure. For example, Kossowska and Bar-Tal (2013) demonstrated that there was a positive correlation between need for closure and heuristic processing only for participants with a high ability to achieve closure. That is, for participants who had a high dispositional ability to achieve closure, a high need for closure resulted in more heuristic processing and a low need for closure resulted in more systematic processing. However, when participants had a low dispositional ability to achieve closure, there was a negative correlation between need for closure and heuristic processing.

The interactions between need and ability to achieve closure have been replicated across multiple outcome variables as well as different operationalisations of ability. For example, need and ability to achieve closure interact to predict stereotyping (Bar-Tal & Guinote, 2002), variance in impression formation tasks (Bar-Tal et al., 1997), and use of framing heuristics and confirmation bias (Bar-Tal, 2010). The same interaction effects have been found when using situational manipulations (rather than dispositional measures) of the ability to achieve closure (Kossowska, Dragon, & Bukowski, 2015). Hence, there is extensive evidence that a high need for closure results in heuristic processing only when the individual also has a high ability to achieve closure. People with a high need for closure and a low ability to achieve closure process more systematically, as do people with a low need for closure and a high ability to achieve closure.

However, not all systematic processing is the same. Kossowska and Bar-Tal (2013) found that people with a low need and high ability to achieve closure process information systematically and, importantly, effectively filter out irrelevant information. On the other hand, people with a high need and low ability to achieve closure also process information

systematically but demonstrate an increased recall of irrelevant information, indicating that they did not filter the information they required from the rest of the information presented. The researchers suggested that this processing pattern reflects hypervigilance, which is the tendency not to discriminate between relevant and irrelevant information. Instead, hypervigilant people collect and pay attention to both relevant and irrelevant information (Janis & Mann, 1977). Bar-Tal, Shrira, and Keinan (2013) reviewed a number of studies that showed this interaction between ability to achieve closure and need for closure on information processing. Hypervigilance is akin to panic in decision-making and is positively related to emotional stress (Mann, Burnett, Radford, & Ford, 1997) and negatively related to life satisfaction (Deniz, 2006). Hence, although Roets and Soetens (2010) found no interaction between need and ability to achieve closure on symptoms of psychopathology, there is reason to believe that the interactions between need and ability on information processing may go on to affect mental health.

The interactions between need and ability may also have important implications for the mechanisms by which the need and ability to achieve closure affect mental health. For example, as outlined above, people with a high need for closure tend to engage in less perspective-taking. However, if they also have a low ability to achieve closure, they may engage in *more* perspective-taking because they lack confidence about what the other person is thinking and attempt to know for certain by putting themselves in the other person's position. Similarly, I posited above that people with a high need for closure might make poorer decisions because they decide quickly and without extensive processing. However, having a low ability to achieve closure might mean that people with a high need for closure would process information *more* comprehensively and hence make higher quality decisions. Hence, an examination of the relations between the need and ability to achieve closure and

mental health must include both constructs to create a more accurate and detailed picture of the effects of each and their interactions.

The research by Roets and Soetens (2010) remains the only study to consider the effects and interactions of both the need and the ability to achieve closure on mental health problems in the general population. The present research aimed to investigate the mechanisms and boundaries of these relations. Identifying mediating and moderating factors in the relations between need/ability to achieve closure and mental health is important for addressing these mental health problems because there is no evidence that dispositional need or ability to achieve closure are prone to change. Hence, identifying flexible mediators and moderators that can be intervened upon is important for addressing the mental health problems experienced by people with a high need or low ability to achieve closure.

As outlined above, the need for closure has well-established effects on decision-making variables including decision speed, decision stress, and information processing during decision-making. Additionally, the need for closure affects social processes including communication, perspective-taking, and empathy. Although the research surrounding it has been less comprehensive, the ability to achieve closure has also been shown to affect information processing and coping. Consequently, the present research program investigates whether the effects of the need and ability to achieve closure on decision-making and social variables may help to explain their associations with mental health and wellbeing.

Overview of Chapters

The present thesis takes a somewhat exploratory approach to investigating the mechanisms of the effects of the need and ability to achieve closure on mental health and wellbeing. Chapter 2 provides an overview and critical analysis of the existing research investigating the relations between the need and ability to achieve closure and mental health and then demonstrates the need for a different approach to that taken by previous researchers.

Chapters 3, 4, and 5 detail the first three studies in the thesis. These studies focus on the role of decision-making variables in the relations between the need/ability to achieve closure and mental health/wellbeing. As outlined in the present chapter, the need and ability to achieve closure affect both decision-making behaviours and subjective feelings about decision-making. Hence, the first three studies consider the possibility that decision-making factors can help to explain the relations between need/ability to achieve closure and mental health. In Chapter 3, I describe Study 1, which considers whether individual differences that may affect decision-making, such as self-efficacy or openness, play a role in the relations between need/ability to achieve closure and mental health. Chapter 4 describes Study 2, which shifts the focus to subjective feelings about decision-making. This study primarily investigates the roles of decision-making beliefs, decision-making stress, and regret in the relations between need/ability to achieve closure and mental health. In Study 3 (Chapter 5), I delve more closely into regret. Specifically, the study involves determining whether different types of regret are better mediators than others of the relations between need/ability to achieve closure and mental health.

In Chapter 6, I move from decision-making to social explanations for these relations. As outlined above, the need for closure affects multiple social phenomena including perspective-taking and social support. Therefore, Study 4 investigates whether people with a high need for closure or low ability to achieve closure report less perspective-taking and social support, and whether these lead to poorer mental health.

Study 5 (Chapter 7) takes a semi-longitudinal approach. Once of the key issues with Roets and Soetens' (2010) study was the cross-sectional nature of the study, which meant that the authors could not draw temporal or causal conclusions about the relation between the need/ability to achieve closure and psychological distress. The first four studies in the present thesis are also cross-sectional and hence suffer from the same issue. Study 5 addresses this

issue by measuring need/ability to achieve closure, mental health/wellbeing, and the mediators identified over the previous four studies at two time-points six months apart.

Finally, Chapter 8 contains a general discussion and synthesis of the findings of all five studies. This chapter also discusses the strengths, limitations, and theoretical and practical implications of the research and contains suggestions for future research in this area.

CHAPTER 2

LITERATURE REVIEW:

CLOSURE AND MENTAL HEALTH – WHAT WE ALREADY KNOW

Most of the previous work on the relations between the need or ability to achieve closure and mental health focused on delusions as an outcome variable due to the similarity between the cognitive style of those with a high need for closure and the jumping to conclusions bias demonstrated by those who are prone to delusions. As outlined below, this line of inquiry did not demonstrate any evidence that a high need for closure causes people to jump to conclusions, and these studies had serious methodological and statistical issues. However, these studies were the first to demonstrate a link between the need and ability to achieve closure and the more common mental health problem of anxiety, which forms an important part of the present thesis. In this chapter, I outline the previous findings regarding the relations of both the need and the ability to achieve closure with mental health and then discuss the key methodological and theoretical issues limiting the conclusions that can be drawn from these studies. To conclude, I explain how the present body of work addresses these issues.

Limits of the Present Review

All the need for closure research reviewed below has used the need for closure construct and scale specifically. Some researchers have also found relations between mental health and other constructs similar to the need for closure. For example, the personal need for structure is positively associated with depression, hopelessness, suicidal ideation, anxiety, and stress (Ciarrochi, Said, & Deane, 2005; Majer, Beasley, & Jason, 2017; Prokopčáková, 2015; Thompson, Naccarato, Parker, & Moskowitz, 2013). Intolerance of uncertainty is positively related to worry, anxious arousal, and anhedonic depression (Berenbaum, Bredemeier, & Thompson, 2008).

These findings are not reviewed in the present thesis because the need for closure construct, although related, is distinct from the personal need for structure and intolerance of uncertainty. The personal need for structure scale (Neuberg & Newsom, 1993) measures the same construct with the same theoretical basis as the need for closure scale, but more narrowly, focusing on the preference for order and predictability (Webster & Kruglanski, 1994). The need for closure is broader, tapping closedmindedness, discomfort with ambiguity, and the need for decisiveness in addition to the preference for order and predictability. Similarly, intolerance of uncertainty is closely related to some aspects of the need for closure but does not capture the need for order or decisiveness aspects to the same extent as the need for closure (Berenbaum et al., 2008). Hence, the need for closure is a more comprehensive construct. Empirically, the need for closure is quite strongly correlated with these other constructs (.66 with the need for cognitive structure, .76 with the personal need for structure, and .57 with intolerance for ambiguity; Rubin, Paolini & Crisp, 2011), reflecting these conceptual and measurement similarities.

Additionally, as outlined in the previous chapter, the effects of the need for closure on decision-making and social phenomena are well established, and the construct is grounded in a firm theoretical framework. These characteristics mean that the hypotheses in the present body of work are founded both on clear theoretical grounds and on relevant previous research. Consequently, the present thesis focuses exclusively on the need for closure (and the ability to achieve closure) rather than other related constructs.

Does the Jumping to Conclusions Bias Explain the Link Between the Need for Closure and Delusions?

Early research regarding the need for closure and mental health investigated the link between need for closure and mental health problems related to delusions. Researchers focused on this particular mental health issue for theoretical reasons. Specifically, the seizing

tendency that forms one aspect of a high need for closure is conceptually similar to the *jumping to conclusions* bias (e.g., Garety, 1991). The jumping to conclusions bias is the tendency of people who are experiencing delusions to use less information to make a decision and is thought to contribute to delusion formation. As outlined in the previous chapter, people with a high need for closure often use less information to make decisions than people with a low need for closure. Consequently, Colbert and Peters (2002) hypothesised that people with a high need for closure are more likely to be prone to delusions due to an increased tendency to jump to conclusions.

Colbert and Peters (2002) tested this hypothesis in the general population with two groups of non-deluded participants. The high delusion proneness group included people whose scores fell in the upper quartile of the Peters et al. Delusions Inventory (Peters, Joseph, & Garety, 1999) and the low delusion proneness group included people whose scores fell in the lowest quartile. As predicted, people in the high delusion proneness group had significantly higher need for closure than people in the low delusion proneness group. However, the need for closure was not associated with jumping to conclusions, suggesting that jumping to conclusions is not the mechanism by which high need for closure is associated with delusion proneness.

Colbert and Peters (2002) used the original decisiveness subscale of the need for closure scale in conjunction with the other subscales to form a total need for closure score. However, Roets and Van Hiel (2011b) demonstrated that this subscale measures the *ability* to be decisive as opposed to the *need* for decisiveness. As shown throughout the rest of this chapter, the ability to achieve closure usually affects third variables in the opposite direction to the need for closure. Hence, confounding these constructs in a single score is likely to weaken the true relation between the need for closure and mental health. Fortunately, subsequent studies investigating the need for closure's relation to mental health have analysed

the original decisiveness subscale separately to the rest of the need for closure scale and avoided this issue.

Another limitation to the research conducted by Colbert and Peters (2002) is the artificial dichotomisation of delusion proneness into “high” and “low” delusion proneness groups. The approach of artificially dichotomizing continuous variables has been criticised by many researchers for both reducing the power to detect real effects and, in some cases, increasing the possibility of detecting spurious effects (e.g., Fitzsimons, 2008; Irwin & McClelland, 2003; Maxwell & Delaney, 1993).

The dichotomisation issue was addressed by McKay et al. (2006). McKay et al. tested similar hypotheses with a similar sample to Colbert and Peters (2002) but used correlational techniques instead of grouping participants into high and low delusion proneness categories. In contrast to Colbert and Peters’ research, McKay et al. found no relation between overall need for closure and delusion proneness. Only the discomfort with ambiguity subscale of the need for closure scale showed a significant positive correlation with delusion-proneness. However, discomfort with ambiguity was not associated with jumping to conclusions, again suggesting that this bias does not explain why people with a high need for closure experience more delusion proneness.

McKay et al.’s (2006) research also provided some preliminary evidence for a negative relation between the *ability* to achieve closure and delusion proneness. Although McKay et al. (2006) did not explicitly include the ability to achieve closure in their study, some of their measures may have inadvertently captured the ability construct. First, they used the original decisiveness subscale of the need for closure scale (Webster & Kruglanski, 1994), which measures the ability to be decisive (Roets & Van Hiel, 2007). Second, they included a measure of decisiveness created by Milgram and Tenne (2000), which measures how quickly people make both routine and important decisions. This construct is similar to the ability to

achieve closure. McKay et al. found that both the original decisiveness subscale of the need for closure scale and the Milgram and Tenne decisiveness measure were negatively associated with delusion proneness. Consequently, this study was the first to show that a high ability to achieve closure is associated with lower delusion proneness.

Interestingly, although the McKay et al. (2006) study did not provide evidence that jumping to conclusions explains the relation between the need for closure and mental health, the results suggested that this mechanism might explain the relation between *ability* to achieve closure and mental health. Specifically, the original need for closure decisiveness subscale (measuring ability) was negatively associated with both jumping to conclusions and delusion proneness. Hence, people with a high ability to achieve closure may experience less delusion proneness because they are less likely to jump to conclusions. However, the Milgram and Tenne (2000) measure of decisiveness was not associated with jumping to conclusions, and so there is mixed evidence regarding the role of jumping to conclusions in the relation between ability to achieve closure and delusion proneness. Due to the inconsistent pattern of results, the researchers were unable to draw firm conclusions about the role of the jumping to conclusions bias in the relations between need for closure/decisiveness and delusion proneness.

The research by Colbert and Peters (2002) and McKay et al. (2006) established some early, though somewhat inconsistent, evidence for the relations between the need and ability to achieve closure and delusion proneness. However, neither study found clear evidence to suggest that the jumping to conclusions bias explained these relations. The lack of evidence for this particular mechanism suggests that different mechanism may be responsible for these relations.

Does Anxiety Explain the Link Between the Need for Closure and Delusions?

In contrast to McKay et al. (2006) and Colbert and Peters (2002), Freeman et al. (2005) considered more general, affect-based mechanisms for the relations between the need for closure and delusions. Freeman et al. used a virtual reality task to test the possibility that anxiety explains the link between the need for closure and persecutory delusions. Unexpectedly, none of the need for closure subscales were associated with delusions in this study, possibly due to the narrow focus on a specific type of delusion (i.e., persecutory delusions). However, social anxiety about the virtual avatars was positively associated with the preference for predictability and discomfort with ambiguity subscales of the need for closure. Freeman et al. therefore demonstrated that the need for closure is associated with mental health problems other than delusion proneness.

Freeman et al.'s (2005) study also provided evidence that the ability to achieve closure is associated with mental health problems other than delusion-proneness. Again, although the researchers did not explicitly measure the ability to achieve closure, they included the original need for closure decisiveness subscale, which measures the ability to be decisive. This subscale was negatively associated with social anxiety.

Freeman et al. (2005) suggested that the failure to consider anxiety may have confounded previous findings of a relation between the need for closure and delusions. That is, they suggested that the relation between need/ability to achieve closure and delusions is not especially meaningful in itself. Instead, these relations appear to occur because anxiety is associated with both need/ability to achieve closure and delusions. The relations between delusions and anxiety are well-established both theoretically and empirically (e.g., Freeman & Garety, 1999; Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002). There is also evidence demonstrating that anxious arousal is associated with uncertainty for people with a high need for closure (Roets & Van Hiel, 2008), although the links between ability to achieve

closure and anxiety have been less comprehensively investigated. Hence, it is plausible that need/ability to achieve closure and delusions are related to each other only because they are both related to anxiety.

Colbert et al. (2006) took this argument one step further and posited that anxiety may in fact mediate the relation between the need for closure and delusions. Specifically, Colbert et al. suggested that people with a high need for closure experience more anxiety in response to psychotic perceptual anomalies than those with a low need for closure due to the uncertainty about origin or meaning of these anomalies. Hence, people with a high need for closure are more likely to accept delusional explanations for perceptual anomalies because delusions provide an explanation for them and reduce hence uncertainty.

Colbert et al. (2006) tested this idea by measuring anxiety and need for closure in early psychosis patients, generalised anxiety disorder patients, and a control group. The researchers took two measurements one year apart. Two main types of analyses were used to investigate the links between the need for closure, anxiety, and delusions. First, Colbert et al. investigated the levels of need for closure in each group. They found that both generalised anxiety disorder patients and deluded patients had higher need for closure than the non-clinical control group at baseline. After one year, participants in the deluded group continued to have higher need for closure than participants in the control group, regardless of whether they were then recovered from their delusions or not. However, the recovered anxiety disorder participants had lower need for closure than the non-recovered anxiety disorder participants.

This pattern of results may suggest that the need for closure is a factor involved in delusion proneness, but not necessarily delusion maintenance, because both currently delusional and previously delusional people had the same levels of need for closure. On the other hand, since people with currently experiencing generalised anxiety disorder had higher

need for closure than people with a previous generalised anxiety disorder diagnosis, the need for closure seems to be associated with active anxiety rather than proneness to anxiety. However, because all participants in the generalised anxiety group had a diagnosis of generalised anxiety disorder before beginning the study, the directionality of the relation between the need for closure and anxiety is not clear. This limitation highlights the importance of research specifically investigating the temporal relations between the need for closure and anxiety.

Colbert et al. (2006) also conducted multiple regression analyses using only the baseline data to determine whether age, gender, state anxiety, or trait anxiety predicted need for closure. They found no significant predictors of the need for closure in the deluded or control groups. However, trait anxiety positively predicted need for closure in the generalised anxiety disorder group. Unfortunately, this cross-sectional approach cannot help us to determine whether a high need for closure predicts deterioration in mental health.

To investigate the temporal order of the relation between need for closure and mental health, Colbert et al. (2006) considered the relation between changes in need for closure and changes in anxiety over the one-year study period. They found no relation between the change scores, which suggests that changes in the need for closure are not associated with changes in anxiety. However, the need for closure scores unexpectedly decreased over time in all groups. The need for closure is generally conceived of as a trait variable, and previous research has demonstrated that it is stable over a 12-week period (Webster & Kruglanski, 1994). Because the need for closure scores decreased across all groups, we cannot draw firm conclusions from the analyses showing no relation between need for closure change scores and anxiety change scores. The research by Colbert et al. (2006) therefore demonstrates a need for further investigation of the stability of the need for closure construct to help understand its role in predicting mental health problems. I am not aware of any research

considering whether the ability to achieve closure is a stable individual difference. Additionally, Colbert et al.'s research demonstrates the need for a true longitudinal approach to determine the temporal relations between need and ability to achieve closure and mental health.

Importantly, Colbert et al.'s (2006) main research question was about whether the relationship between the need for closure and delusions "is indirect and occurs through the association of NFC with anxiety" (Colbert et al., 2006, p. 1386). However, the use of regression analyses without testing the indirect effect of anxiety means that this research question was not appropriately tested. Mediation analyses are required in order to appropriately test hypotheses about whether the relation between two variables occurs through a third variable (e.g., Preacher & Hayes, 2004). Due to the lack of mediation analysis, it is not clear whether anxiety does in fact mediate the relations between the need for closure and delusions. It is possible that, as proposed by Freeman et al. (2005), people with a high need for closure are simply more prone to both anxiety and delusion proneness, as opposed to anxiety causing delusion proneness in this population. Future research questions that relate to mechanisms should involve mediation analyses including tests of the indirect effect. In either case, the underlying causes of the relation between the need for closure and anxiety are not clear and require further investigation.

In summary, the research by Colbert et al. (2006) established a relation between the need for closure and both anxiety and delusions. It also showed that the relation between the need for closure and anxiety may be bidirectional. However, longitudinal statistical approaches are required to confirm the directionality of these relations, and further research is required to determine why those with a high need for closure tend to have higher levels of anxiety.

Beyond Anxiety: The Role of Affect in the Link Between the Need for Closure and Delusions

Other researchers broadened the focus from anxiety to consider the role of depression in the relation between need for closure and delusion-related symptoms. Bentall and Swarbrick (2003) investigated the relationship between need for closure and paranoid symptoms in acutely ill persecutory delusions patients, remitted persecutory delusions patients, and a control group, with depression included as a covariate. Acutely ill and remitted patients both had higher need for closure and higher levels of depressive symptoms than non-clinical control participants. The group differences in need for closure remained even after taking depression into account.

Like Colbert and Peters (2002), Bentall and Swarbrick (2003) concluded that a high need for closure is associated with vulnerability to delusional ideation rather than being a result of active delusions. The fact that depression could not account for the results suggests that need for closure may be associated with vulnerability to delusions independently of the effect of need for closure on affect. Interestingly, the acute patient group scored higher than the control participants on the original decisiveness subscale of the need for closure scale, which measures the ability to be decisive. In contrast to the findings by McKay et al. (2006), this relation suggests that the ability to achieve closure is *positively* associated with mental health problems. The lack of consistency surrounding the association of the ability to achieve closure with mental health problems points to a need for further investigation of the direction and strength of this relation.

However, the conclusions that can be drawn from Bentall and Swarbrick's (2003) research are limited due to the categorisation of paranoid symptoms into three participant groups. As explained above, the use of groups rather than a continuous measure of paranoid symptoms reduces the power to detect whether the need for closure is associated with

symptom severity (e.g., Fitzsimons, 2008; Irwin & McClelland, 2003; Maxwell & Delaney, 1993). A correlational statistical approach is more appropriate in testing research questions involving two continuous variables. Despite this limitation, Bentall and Swarbrick's work demonstrated that the need for closure is positively associated with depressive symptoms, adding to the research outlined above demonstrating the links between the need for closure and anxiety.

Freeman et al. (2006) addressed the categorisation issue in their research which expanded on the findings regarding the links between the need for closure and both depression and anxiety. The researchers used continuous measures to distinguish between two possible mechanisms by which the need for closure is related to delusional beliefs: (a) High need for closure may cause people to rapidly accept explanations with little evidence (direct route), or (b) need for closure may influences affect (anxiety and depression), which in turn influences symptoms of psychosis (indirect route). The direct route is similar to the jumping to conclusions bias that was tested but not supported in the research by Colbert and Peters (2002) and McKay et al. (2006). The indirect route hypothesis is more consistent with the results obtained by the studies reviewed above. Hence, Freeman et al.'s (2006) represents an attempt to resolve the previous uncertainty regarding how the need for closure relates to delusion proneness.

Two groups participated in the research: patients with diagnoses of schizophrenia, schizo-affective disorder, or delusional disorder and a non-clinical comparison group. The clinical group scored higher than the non-clinical group on the reduced need for closure scale (discomfort with ambiguity, need for order, and preference for predictability subscales), and lower than the non-clinical group on the original decisiveness subscale. However, despite the higher need for closure among the clinical group, the need for closure was not associated with delusions or negative symptoms in this group. Consistent with the research by McKay et al.

(2006) and in contrast to the research by Bentall and Swarbrick (2003), the original decisiveness subscale had negative associations with some symptoms (hallucination frequency, distress, and controllability, delusion distress, and negative symptoms of psychosis). Depression and anxiety were positively associated with the need for closure and negatively associated with decisiveness in both the clinical and non-clinical groups. Together, these results suggest that a high need for closure is not directly associated with symptoms of psychotic illnesses, but rather that it is associated with negative affect, which may then affect psychotic symptoms. Conversely, a high ability to be decisive is associated with less anxiety and depression.

Freeman et al. (2006) also tested whether depression, anxiety, or clinical diagnosis status predicted the need for closure or decisiveness. They found that depression, anxiety, and clinical diagnosis status all predicted the need for closure, but only depression and anxiety predicted decisiveness. However, the cross-sectional nature of the data means that it is impossible to determine whether the need or ability to achieve closure cause changes in depression, anxiety, or psychosis symptom or vice versa. As outlined above, a longitudinal approach is necessary to draw these conclusions.

Despite the fact that the need and ability to achieve closure are related to anxiety, including social anxiety (e.g., Freeman et al., 2005; Freeman et al., 2006), not all types of anxiety disorders seem to be associated with the need for closure. For example, in a non-clinical population, the need for predictability negatively predicted impulses and the order subscale positively predicted checking and precision symptoms, but closedmindedness and discomfort with ambiguity were not associated with any symptoms of obsessive-compulsiveness, and neither was the overall need for closure (Mancini, D'Olimpio, Del Genio, Didonna, & Prunetti, 2002). The researchers suggested that people with obsessive-compulsive symptoms do not have a high need for certainty, but rather a high need for

accuracy, and hence that the need for closure does not cause symptoms of obsessive-compulsive disorder. However, the original decisiveness subscale of the need for closure scale negatively predicted rumination symptoms, suggesting that a high ability to achieve closure is associated with less obsessive-compulsive symptoms.

Mancini et al. (2002) noted that the relation between decisiveness and obsessive-compulsive symptoms was likely due to their shared variance with anxiety and depression. This finding is in line with the research by Freeman et al. (2005) and Freeman et al. (2006), which suggested that the relation between delusions and the need for closure is due to the relations between the need for closure and depression and/or anxiety, rather than a result of cognitive biases that result from a high need for closure. Given the lack of evidence for a cognitive bias pathway linking the need for closure and delusion proneness (Colbert & Peters, 2002; McKay et al., 2006), the general distress explanation for the links between these constructs is worth further investigation.

Relations Between the Need and Ability to Achieve Closure and Psychological Distress

I am aware of only one study investigating the association between the need/ability to achieve closure and general psychological distress. Roets and Soetens (2010) approached the link between the need and ability to achieve closure and mental health from a decision-making perspective. However, unlike previous researchers who focused on objective measures of the decision-making process (i.e., jumping to conclusions; Colbert & Peters, 2002; McKay et al., 2006), Roets and Soetens suggested a more subjective decision-making explanation.

Roets and Soetens (2010) linked the need for closure construct to the choice overload phenomenon. Choice overload refers to the fact that increased decision set sizes can often lead to decreased satisfaction in the chosen option as well as poor mental health more generally (Schwartz, 2000). Roets and Soetens suggested that, because people with a high

need for closure are averse to uncertainty, such people are probably also averse to large choice sets, which increase uncertainty about which option is best. Hence, the negative effects of large amounts of choice on mental health are likely to be particularly bad for people who have a high need for closure and will be less severe for people with a low need for closure. Roets and Soetens suggest that, because living in Western society involves constant exposure to large choice sets, a high need for closure should be associated with poorer mental health. As predicted, the researchers found that the need for closure positively predicted general psychological distress as measured by the Symptom Checklist 90 (Derogatis, 1977) as well as each of the subscales except somatisation (obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism).

Roets and Soetens (2010) also considered the effects of the ability to achieve closure on psychological distress. This is significant because no other research has explicitly considered the relation between ability to achieve closure and mental health, although the original decisiveness subscale of the need for closure scale (measuring ability) has usually shown positive associations with mental health. This suggests empirically that the ability to achieve closure has the opposite effect on mental health to the need for closure (e.g., Freeman et al., 2006; McKay et al., 2006). From a theoretical perspective, it makes sense that those with a low ability to achieve certainty in their decisions would suffer mental health problems in Western society, since at any given time there are numerous alternative options that produce uncertainty about whether the “right” option was chosen. As predicted, Roets and Soetens found that the ability to achieve closure negatively predicted general psychological distress as well as each of the Symptom Checklist 90 (Derogatis, 1977) subscales, suggesting that a high ability to achieve closure is good for mental health.

Importantly, Roets and Soetens (2010) also investigated whether the need and ability to achieve closure interacted to predict mental health. As outlined in the previous chapter, there is a large amount of empirical evidence demonstrating the interaction of the need and ability to achieve closure on several outcomes. Additionally, this interaction seems plausible from a theoretical perspective; having a high aversion to uncertainty would likely be worse for mental health if the individual also has a low ability to resolve uncertainty. Hence, the inclusion of both need and ability and a consideration of their interaction is important for understanding their effects on any outcome variables. Interestingly, Roets and Soetens found no interaction effects between need and ability on any outcome variables. The authors concluded that the effects of the need and ability to achieve closure on psychological distress are additive rather than interactive.

Roets and Soetens' (2010) research confirmed previous research showing that the need for closure is positively associated with anxiety, depression, and symptoms related to delusion proneness including paranoid ideation and psychoticism, as well as mental health problems that had not previously been demonstrated to be associated with the need for closure including interpersonal sensitivity and phobic anxiety. Additionally, this research was the first to demonstrate clearly that the ability to achieve closure is negatively associated with each of these mental health problems. Roets and Soetens also offered a theoretical explanation for these results, linking them with the choice overload phenomenon and suggesting that individual differences in cognitive needs and abilities affect the extent to which this phenomenon negatively affects mental health.

The research by Roets and Soetens (2010) provides an important starting point to the key question regarding why the need and ability to achieve closure are associated with mental health. However, an important issue with the research is that the theoretical explanation regarding the relation between need/ability to achieve closure and decision-making distress

was not tested. People with a high need for closure experience more distress during ambiguous perceptual tasks (Roets & Van Hiel, 2008). It is possible that the uncertainty associated with decision-making would lead to more distress for people with a high need for closure and that this distress would go on to influence mental health. However, the mediating role of decision-making distress was not tested in the study by Roets and Soetens, meaning that this theoretical explanation is still only speculative.

Another issue with Roets and Soetens' (2010) decision distress hypothesis for the relation between the need/ability to achieve closure is that it was based on findings from a laboratory perceptual task rather than an everyday decision-making task. Decision-making situations in life are likely to differ from perceptual tasks in at least two important ways: (a) the extent to which individuals are emotionally involved in the uncertainty associated with the situation, and (b) the amount of control that individuals have over the situation. A real-life decision-making situation is likely to promote more emotional involvement with the uncertainty faced during the situation compared to a perceptual task in a research study. Hence, people with a high need for closure may be even more distressed in real life decision-making situations than in laboratory perceptual tasks. Similarly, people with a low ability to achieve closure may find their inability to come to a clear-cut decision more frustrating when the decision is important.

However, at the same time, everyday decision-making also involves more control than a perceptual task. Individuals with a high need for closure may use heuristics to decide quickly and free themselves from the hassle of the uncertain situation. Therefore, everyday decision-making situations may not negatively affect the mental health of high need for closure people since they may not remain in such situations for long. A test of Roets and Soetens' (2010) subjective decision quality hypothesis for the link between the need/ability to achieve closure and mental health requires the measurement of distress in decision-making

situations specifically to determine whether this distress mediates the relation between the need for closure and mental health.

The question of how the need for closure relates to perceptions of everyday decision-making was considered by Roets, Soetens, Au, and Yanjun (2013), who found that those with a high need for closure are more likely to perceive choice as a burden than those with a low need for closure. Interestingly, there was no relation between the need for closure and the perception of choice as a blessing for Western participants. As the authors explain, this finding suggests that people with a high need for closure experience ambivalence about choice. Although on a personal level they perceive choice as undesirable due to their dislike of uncertainty, they are also surrounded by a cultural context that emphasises the benefits of choice. The fact that those with a high need for closure perceive choice as a burden and are ambivalent about choice as a blessing further supports the possibility that distress during decision-making may lead to poorer mental health.

A more comprehensive view of decision-making may also be useful in helping to understand the relations between the need/ability to achieve closure and mental health. Factors of the decision-making context (e.g., decision importance, decision time) as well as other individual difference factors (e.g., self-efficacy) may affect the extent to which the need and ability affect distress during decision-making and hence mental health according to Roets and Soetens' (2010) suggestion. In addition, it is important to consider the aftermath of the decision-making situation in order to understand how the need and ability to achieve closure affect mental health through these situations. In particular, the way that people feel about their decision after making it is likely to affect the extent to which decision-making distress contributes to mental health problems. If a decision-making situation is distressing but the outcome is satisfactory, the stress of the situation may dissipate and hence be less likely to affect mental health more broadly. On the other hand, if the individual continues to

experience stress or dissatisfaction about each decision even after it is made (as described by some reverse scored items of the ability to achieve cognitive structure scale; Bar-Tal, 1994a), then this extended decision-making stress may be more likely to negatively affect mental health.

The broader issue with the work by Roets and Soetens (2010) and with each of the studies reviewed in the present chapter is the lack of consideration of other potential mechanisms for the relations between the need and ability to achieve closure and mental health. As outlined in the previous chapter, apart from its effects on decision-making variables, the need for closure also has well-established effects on social phenomena. People with a high need for closure demonstrate less perspective-taking and empathy and more prejudice and stereotyping (Bar-Tal & Labin, 2001; Sun et al., 2016; Van Hiel et al., 2004; Webster Nelson et al., 2003). These social consequences of a high need for closure may result in poorer social outcomes such as lower social support, which would then have negative flow-on effects for mental health (e.g., Olstad et al., 2001; Thoits, 2011). It is important to consider the effects of the need and ability to achieve closure on multiple aspects of life in order to paint a detailed picture of the ways in which these individual differences affect people's lives and health.

Finally, all but one of the studies reviewed above considered the association between the need/ability to achieve closure and mental health cross-sectionally. Colbert et al. (2006) measured need for closure and mental health at two time points but did not statistically test whether the baseline need for closure predicted mental health one year later after controlling for baseline mental health. Hence, the associations found by previous researchers between the need for closure and mental health may be a result of a reverse causal order. That is, poor mental health may cause people to become less able to deal with uncertainty and hence develop a high need for closure. Similarly, poor mental health may reduce an individual's

confidence in their decisions and hence result in a low ability to achieve closure. It is also possible that the relations between need/ability to achieve closure and mental health are bidirectional. It is therefore important to take a longitudinal approach to help determine the temporal relation between need/ability to achieve closure and mental health.

The Present Research

The present thesis aimed to investigate the mechanisms of the relation between the need/ability to achieve closure and mental health. To investigate this primary research question, I tested a range of theoretically and empirically relevant mediators of these relations, focusing more on the subjective experiences of individuals as opposed to the cognitive bias (jumping to conclusions) explanation espoused by earlier researchers of the links between need/ability and delusion-proneness. I tested indirect effects in order to investigate the strength of the evidence for specific mechanisms that may be responsible for the links between need/ability and mental health.

The mechanisms that were investigated in the present thesis consisted of a combination of confirmatory and exploratory tests. Regarding confirmatory tests, I tested Roets and Soetens' (2010) decision distress hypothesis using both experimental and correlational approaches to decision-making stress. I also tested the decision accumulation aspect of this hypothesis by including a series of decision tasks within one of the studies.

Regarding exploratory research questions, I considered additional theoretically relevant variables that may explain the relation between the need/ability to achieve closure and mental health both via decision-making and via other plausible pathways. To further investigate the decision distress hypothesis, I included an exploratory test of other factors that may influence decision-making stress, including decision importance and feelings after decision-making. Moving beyond decision-making, I considered the roles of social

phenomena such as perspective-taking and social support in explaining the relations between the need/ability to achieve closure and mental health.

I also attempted to address the statistical and methodological issues with the previous research outlined above which established the existence of a relation between the need/ability to achieve closure and mental health. I used a correlational approach rather than artificially categorising continuous measures of mental health or the need/ability to achieve closure. This approach increases the power to detect relations between the predictor and outcome variables. I also included a specific measure of the ability to achieve closure to attempt to resolve the discrepancies between the results of McKay et al. (2006) and Freeman et al. (2006) showing that high decisiveness (ability) is associated with better mental health and Bentall and Swarbrick's (2003) finding that high decisiveness (ability) is associated with *poorer* mental health. Importantly, I considered the interaction between the need and ability to achieve closure, which has been important in predicting other outcome variables. Finally, I conducted a semi-longitudinal study to investigate the temporal order of the relations between need/ability to achieve closure and mental health to enable me to draw firmer conclusions regarding the causal relation between these constructs.

CHAPTER 3

STUDY 1:

EXPLORING DECISION-MAKING FACTORS

As outlined in the previous chapters, Roets and Soetens (2010) suggested that the negative effects of decision-making on mental health should be more pronounced for people who find uncertainty stressful (i.e., those with a high need for closure) and for people who find decision-making difficult (i.e., those with a low ability to achieve closure). They therefore tested the cross-sectional associations between mental ill-health (as measured by the Symptom Checklist 90; Derogatis, 1977) in the general population and the need and ability to achieve closure and found that mental health problems were positively related to the need for closure and negatively related to the ability to achieve closure.

The first aim of the present study was to replicate Roets and Soetens' (2010) findings using the 21-item Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 2004). I expected that DASS scores would be positively related to the need for closure and negatively related the ability to achieve closure. I also tested whether the need and ability to achieve closure are related to wellbeing as well as mental health. In line with the previous findings regarding mental health, I expected that satisfaction with life would be negatively related to the need for closure and positively related to the ability to achieve closure.

The second aim of the present study was to explore the decision-making distress hypothesis for the relations between the need/ability to achieve closure and mental health problems. As outlined previously, Roets and Soetens (2010) suggested that, because people need to make many decisions every day, the decision-making stress and frustration experienced by those with a high need or low ability to achieve closure accumulates and contributes to poorer mental health. Hence, the model proposed by Roets and Soetens

suggests that decision-making stress is responsible for the link between the need/ability to achieve closure and mental health.

If this decision-making distress explanation for the links between need and ability to achieve closure and mental health is correct, then factors relating to decision-making stress may be involved in one of two ways. First, dispositional factors affecting decision stress may act as moderators of these relations. For example, people who have high self-efficacy (i.e., high confidence in their ability to solve problems) may find decision-making less stressful than people who have low self-efficacy, regardless of their need for closure. Therefore, having high self-efficacy may decrease the strength of the relations between the need/ability to achieve closure and mental health.

Second, dispositional decision-making variables may mediate the relations between the need and ability to achieve closure and mental health. Regret is one example of a potential mediator of these relations. I am not aware of any research directly testing the relations between the need or ability to achieve closure and dispositional regret. However, Inbar et al. (2011) suggested that decision regret can stem from negative evaluations of the choice process, and specifically from the subjective sense of having rushed in making the choice. People with a high need for closure tend to make decisions quickly, presumably in order to get past the uncertainty associated with decision-making (e.g., Evans, Rae, Bushmakin, Rubin, & Brown, 2017). Hence, people with a high need for closure may often feel regretful about rushing through their decisions, and this regret may then affect their mental health.

The present study takes an exploratory approach to investigating how decision-making variables are involved in the relations between the need and ability to achieve closure and mental health and wellbeing. I measured several dispositional variables that may affect the extent to which people find decision-making stressful, including generalised self-efficacy,

decision regret, maximisation, openness to experience, independent/interdependent problem-solving style, and sense of power. I aimed to investigate whether any of these variables acted as mediators or moderators of the relations between need and ability to achieve closure and mental health and wellbeing.

I also considered the decision-making distress hypothesis in an experimental setting. The decision-making context may also affect the stressfulness of the decision and therefore affect the relations between mental health and the need and ability to achieve closure. Two key aspects of the decision context are the choice set size and the time in which the decision needs to be made. Haynes (2009) found that people find decisions more difficult and frustrating when they must choose from many options in a short period of time compared to having more time or fewer options. If the need and ability to achieve closure affect mental health because of their effects on decision-making stress, then the relations between need and ability to achieve closure and mental health may be stronger when the decision is more difficult (and therefore more stressful) and weaker when the decision is easier (and therefore less stressful). This approach is consistent with the perspective of MacKinnon and Fairchild (2009) and MacKinnon, Fairchild, and Fritz (2007), who suggested that single-mediator models should be tested by manipulating the proposed mediators and measuring the effect of this manipulation on the outcome. In this case, decision stress is the proposed mediator, and choice set size and decision time are intended to manipulate this variable. If decision stress mediates the relation between need/ability to achieve closure and mental health, then high need/low ability people in the higher decision stress groups (fast decision and/or many choices) should experience more state anxiety than people with low need for closure or high ability to achieve closure.

I effected these manipulations by asking participants to choose their preferred activity from a list of either three or nine activities and instructing participants either to decide

quickly or to think carefully. I then measured their state anxiety. I hypothesised that the relations between state anxiety and the need and the ability to achieve closure would be stronger when participants had to choose quickly or from many options and weaker when participants were asked to think carefully or had only three options to choose from.

In summary, the present study had two main aims: (a) to replicate the relations between need/ability to achieve closure and mental health and consider wellbeing as an additional outcome, and (b) to explore the decision-making distress hypothesis with both dispositional measures and manipulated decision context factors affecting decision-making stress.

Method

I report how I determined my sample size, all data exclusions (if any), all manipulations, and all measures in this study and in all subsequent studies included in this thesis. The final item in the survey requested participants' informed consent for their data to be used for the research. This approach was taken because consent is more genuinely informed at the end of a survey, when the participant has seen all the items. Participants who initially consent may change their mind after completing some of the items. Having the informed consent question at the end of the survey is therefore consistent with Australian National Health and Medical Research Council's (2007) National Statement on Ethical Conduct in Human Research: "Participants are entitled to withdraw from the research *at any stage*" (p. 21; my emphasis). This approach was taken for all the studies included in this thesis. The methodology of the present study was designed by Rubin (2015). I then designed and undertook a secondary analysis of the data set. Please note that I then designed all subsequent studies. A copy of all the research surveys included in the present thesis can be found at https://osf.io/gzq4s/?view_only=39feebdd7b4a4308ab2e0fa5daefff1a

Participants and Design

I am not aware of any previous studies that considered the relationships between the need or ability to achieve closure and any of the potential moderator or mediator variables included in the present study. Hence, I was unable to conduct a power analysis to determine the number of participants required to detect moderation or mediation effects. Instead, I conducted a power analysis to determine the number of participants required to detect the correlation between the key predictor and outcome variables. In Roets and Soetens' (2010) study, the relation between the need for closure and anxiety was $r = .18$. An a priori power analysis showed that a two-tailed bivariate correlation with an alpha level of .05 and a power value of .90 would require 320 participants in order to detect an effect of this size. This sample size is also consistent with that used by Roets and Soetens ($N = 304$). Hence, I attempted to recruit 320 participants who had useable data.

I collected data from a total of 346 participants. Of these, eight participants withdrew from the survey part way through and thus did not respond to the final informed consent item. A further 11 participants completed the survey but actively declined their informed consent for their data to be analysed. These 19 participants were excluded from the analyses. In addition, three participants completed the survey twice and one participant completed the survey three times. The second and third completions were deleted for these four participants (i.e., 5 responses were excluded).

The final sample consisted of 322 people (57 men and 265 women) with a mean age of 22.54 years ($SD = 7.10$ years; eight missing responses). With regards to ethnicity, most participants indicated that they were Caucasian (87%), with 5% identifying as Asian, 3% identifying as Aboriginal or Torres Strait Islander, 1% as African, and 4% indicating “other” for ethnicity (and one missing response). Most participants were enrolled in first year psychology courses (83%), with 17% from second-year psychology courses.

The study utilised a cross-sectional, experimental design. There were two experimental manipulations: decision time (fast/slow) and choice overload (high/low). Following random assignment, 159 participants were assigned to the fast decision condition (49%) and 163 were assigned to the slow decision condition (51%). One hundred and seventy-three participants were assigned to the low choice condition (54%) and 149 participants were assigned to the high choice condition (46%). Therefore, the study had a 2 (decision time: fast/slow) * 2 (choice overload: high/low) between-subjects design with state variable outcome measures. It also included a cross-sectional, correlational component with quantitative, self-report trait measures.

Procedure

Participants were undergraduate psychology students at a large Australian public university. Students received 2% course credit for their participation, which was voluntary and anonymous. The research instrument was a self-report online questionnaire titled "Personality and Mental Health" and took approximately 30 to 40 minutes to complete. In the information statement, participants were told that the study was investigating how certain personality variables predict people's mental health.

The first part of the survey included dispositional measures of the need and ability to achieve closure, variables related to decision-making, and measures of mental health and wellbeing over the past week. The scales were presented in a random order for each participant. The items within each scale were also presented in a random order for each participant.

After the dispositional measures, participants completed the choice task and responded to a measure of state anxiety. They also rated the levels of frustration, difficulty, satisfaction, and regret associated with the choice.

Next, participants completed the Perceived Awareness of the Research Hypothesis Scale, which measures the extent to which participants believe that they know what the researchers are predicting (Rubin, 2016). Finally, participants responded to demographic items including social class, age, and gender. The survey webpage flagged items that were left blank and prevented participants from continuing until they completed each item. Therefore, there was no missing data except for some demographic variables that participants were permitted to leave blank if they were concerned about compromising their anonymity.

Individual Difference Measures

Dispositional Variables. Participants responded to the dispositional variable scales on a 7-point Likert-type response scale from *strongly disagree* (1) to *strongly agree* (7).

Participants completed the 41-item Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994) and the 24-item Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). The Need for Closure Scale (NFCS) aims to measure the extent to which people prefer certainty over ambiguity. Examples of items in the NFCS are “I don’t like situations that are uncertain” and “I hate to change my plans at the last minute.” The Ability to Achieve Cognitive Structure Scale (AACSS; Bar-Tal, 1994a) measures the extent to which people can make decisions confidently and order their lives. Examples of items used in the AACSS include “I tend to hesitate when I have to make an important decision even after thinking a lot about it” and “I have no problem meeting deadlines.”

Participants also completed several individual difference measures related to decision-making. To measure participants’ decision regret tendencies and the extent to which they engage in maximising (as opposed to satisficing) behaviour, I included the Regret and Maximisation Scales (Schwartz et al., 2002). The regret scale includes items such as “once I make a decision, I don’t turn back (R)” and the maximisation scale includes items such as “I never settle for second best.”

I included the Independent and Interdependent Problem-Solving Scale (IIPSS; Rubin, Watt, & Ramelli, 2012) to determine the extent to which participants rely on others to help them make decisions and solve problems. The scale includes items such as "I prefer to consult with others before making important decisions."

I measured the extent to which participants felt able to make their own decisions and to solve problems that they are faced with using the Sense of Power Scale (Anderson, John, & Keltner, 2005, as cited in Anderson & Galinsky, 2006) and the General Self-efficacy Scale (Schwarzer & Jerusalem, 1995). The Sense of Power Scale includes items such as "if I want to, I get to make the decisions," and the General Self-efficacy Scale includes items such as "I can usually handle whatever comes my way."

I measured participants' openness to new experiences using the Openness to Experience subscale of the Big Five Inventory (John, Donahue, & Kentle, 1991), which includes items such as "I see myself as someone who is curious about many different things."

Mental Health and Wellbeing. Participants also completed measures of mental health and wellbeing. Mental health was measured with the 21-item Short-Form Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 2004). The depression subscale measures symptoms relating to mood disorders, the stress subscale measures symptoms like those of generalised anxiety disorder, and the anxiety subscale measures symptoms related to anxiety disorders other than generalised anxiety disorder (Brown, Chorpita, Korotitsch, & Barlow, 1997). The DASS measures these symptoms over the past week with seven items for each subscale. It includes items such as "I felt down-hearted and blue" for depression, "I felt I was close to panic" for anxiety, and "I found myself getting agitated" for stress. Participants responded to these items using a 4-point scale to indicate the frequency with which they experienced these feelings over the past week, from *never* (0) to *almost always* (3).

Wellbeing was measured with the Life Satisfaction Scale (SWL; Diener, Emmons, Larsen, & Griffin, 1985). The scale includes five items measuring life satisfaction over the past week (e.g., "I am satisfied with my life"). Participants responded on a 7-point Likert-type scale from *strongly disagree* (1) to *strongly agree* (7).

Experimental Manipulation of Time Pressure and Choice Overload

Participants were told to imagine that they needed to spend $100 of their own money on one of the activities in a list that would be provided to them on the following page. They were instructed to read all the activity descriptions and select the activity they would purchase if they had to purchase one activity from the list. After reading these instructions, participants were randomly assigned to one of two decision time conditions. In the fast decision time condition, participants were asked to "read each description as quickly as possible." In the slow decision time condition, participants were asked to "take your time to read each description carefully."

Participants were also randomly assigned to one of two choice overload conditions. In the high choice overload condition, participants were shown a list that consisted of nine activities. In the low choice overload condition, participants were shown a list consisting of three activities. I counterbalanced the low choice conditions so that each of the nine items from the high choice condition appeared in the low choice condition list the same number of times.

The activities listed included items such as streaming service subscriptions, limousine rides, and restaurant vouchers. I am grateful to Dr Graeme Haynes for providing the list of activities included in his 2009 choice overload study (Haynes, 2009). I edited the list to refer to activities available in the city in which the study was conducted (Newcastle, Australia). I deleted one item (a night in a hotel room) because most participants were likely to already live in Newcastle and hence would not be interested in staying at a hotel there.

After reading the activity list, participants indicated which activity they would spend $100 on by entering the number assigned to their chosen activity into a text box (1-9 in the high overload condition or 1-3 in the low overload condition).

State Variables. After making their choice, participants completed the state version of the State-Trait Inventory for Cognitive and Somatic Anxiety (Ree, French, MacLeod, & Locke, 2008). Participants were instructed to respond to each item referring to how they felt "right now." Ten items in this scale measure cognitive anxiety (e.g., "I think the worst will happen") and 11 items measure somatic anxiety (e.g., "I feel dizzy"). Participants responded to each item on a 7-point Likert-type scale from *strongly disagree* (1) to *strongly agree* (7).

Participants then responded to four ad-hoc items about the decision. These items measured the difficulty and frustration associated with the decision and participants' satisfaction and regret regarding their choice. These four items had 9-point response scales ranging from *totally disagree* (1) to *totally agree* (9).

Results

Analytical Approach

Exploratory nature of this study. Because there is little published research on the mechanisms and boundaries of the relations between need and ability to achieve closure and mental health and wellbeing, much of Study 1 was exploratory. This means that I conducted many tests on various aspects of the data collected. In order to be transparent, the results of the present study are reported in some detail. However, subsequent studies in the thesis are less exploratory and therefore their results are reported more succinctly.

The relation and interaction between the need for closure and the ability to achieve closure. To determine whether the need and ability to achieve closure exert independent effects on third variables, I controlled for ability in analyses where need was the predictor, and vice versa in sensitivity analyses. The results of these sensitivity analyses are

reported where they show a different pattern of results to the main analyses. Across most analyses, the effects of the need for closure on mental health and wellbeing were still significant when accounting for the ability to achieve closure, and vice versa. Because the two constructs had independent effects on the outcome variables, I decided to treat them separately from one another throughout the thesis rather than including both as key predictor variables in the same analysis.

I also checked throughout all the studies whether the need for closure and the ability to achieve closure interacted to predict any of the outcome variables, because previous researchers have found that these two constructs interact to predict behaviour (particularly in decision-making contexts; e.g., Bar-Tal, 1994a; Kossowska & Bar-Tal, 2013). In most analyses for this thesis, there was no significant interaction between need and ability. However, where there was a significant interaction between the need for closure and the ability to achieve closure, I have reported it. If an analysis is reported without reference to an interaction between the need for closure and the ability to achieve closure, the reader should assume that no significant interaction was found.

Sensitivity Analyses. The main analyses are reported with univariate outliers excluded. That is, participants were excluded from an analysis if their score on any of the variables in that analysis was ±3 *SD* from the mean. I chose this approach because many of the analyses that included univariate outliers were significant, but became nonsignificant when univariate outliers were excluded. Hence, the most conservative approach was to report the results with the outliers excluded. I have followed this approach across all the studies reported in this thesis.

Sensitivity analyses were conducted on all the results reported in the present study and across the whole thesis. The sensitivity analyses involved reconducting analyses with outliers included (±3 *SD* from sample means) and also with covariates added (age, gender,

perceived awareness of the research hypotheses, and the need for closure or the ability to achieve closure as outlined above). In analyses where a nonsignificant result becomes significant due to the inclusion of outliers, the results are not reported because they are likely driven by a small number of people in the sample with extreme scores. However, to be conservative, when a significant result becomes nonsignificant due to the inclusion of outliers, this change in results is reported to demonstrate that the original results (i.e., excluding outliers) should be interpreted with caution.

Preliminary Analyses

Normality. For all my studies, prior to conducting the main analyses, I checked for non-normality by examining the skew and kurtosis of the aggregate indices. In the present study, all skew and kurtosis values were no larger than ± 2.0, except for age. Age had skewness of 2.80 (SE = 0.14) and kurtosis of 9.62 (SE = 0.27). I therefore used a log 10 transformation on the age data. After transformation, the skewness became 1.97 (SE = 0.14) and the kurtosis became 3.63 (SE = 0.27). While the kurtosis is still in the non-normal range, age is not a key variable, and so I considered this improvement in normality to be sufficient.

Reliability. The Cronbach α coefficients for all the aggregate measures were acceptable (αs ≥ .70; see Table 3.1).

Table 3.1

Key Variables: Means, Standard Deviations, and Cronbach αs

Variable	*M*	*SD*	α
NFCS	4.63	0.60	.87
AACSS	3.69	0.81	.86
Regret	4.74	1.06	.73
Maximisation	4.45	0.82	.71
IIPSS	3.75	1.04	.87
Sense of Power	4.55	0.94	.85
Self-efficacy	4.94	0.96	.90
Openness	4.71	0.82	.76
State decision appraisal	2.81	1.51	.77
State anxiety	3.17	1.17	.93
DASS	17.57	13.00	.95
Satisfaction with life	4.45	1.44	.90

Note. NFCS = Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994). AACSS = Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). IIPSS = Independent and Interdependent Problem- Solving Scale (IIPSS; Rubin et al., 2012). SWL = Life Satisfaction Scale (Diener et al., 1985). DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004). The decision appraisal scores were obtained by averaging participants' responses to the relevant items on a 9-point scale between *totally disagree* (1) and *totally agree* (9) such that higher scores reflecting more negative appraisals. The DASS scores were obtained by summing participants' responses to the relevant items from *never* (0) to *always* (3). The minimum possible DASS score is 0 and the maximum is 63. All other scores were obtained by averaging participants' responses to the relevant items on a 7-point scale between *strongly disagree* (1) and *strongly agree* (7).

Comparison with norms. I performed a one-sample *t*-test to determine whether the DASS scores for this sample were comparable to published norms. Crawford, Cayley, Lovibond, Wilson, and Hartley (2011) found that the mean 21-item DASS score for the general adult Australian population was 8.3 (*SD* = 9.83; possible scores range from 0 to 63). A one-sample *t*-test showed that the DASS scores of participants in the present sample were

significantly higher than the norm (M = 17.57, SD = 13.00), $t(321) = 12.80$, $p < .001$. This is consistent with previous research, which has found that university students tend to have poorer mental health than the general population (e.g., Stallman, 2010). Additionally, the sample included a large proportion of women (82%), who typically report higher levels of mental ill-health (e.g., Salk, Hyde, & Abramson, 2017).

Exploratory factor analysis on state decision appraisal variables. For all the studies in the present thesis, I conducted exploratory factor analyses only for scales and measures that are new or that were substantially changed from their originally validated forms.

As described in the Method section, after choosing an activity from the list, participants were asked to indicate the extent to which they found the choice task frustrating and difficult, the extent to which they were satisfied with their choice, and the extent to which they regretted not having made a different choice. I expected that people in the fast decision time and/or high choice overload conditions would experience more difficulty, frustration, and regret, and less satisfaction compared with people in the slow decision time and/or low choice overload conditions.

In order to check whether it was appropriate to combine these variables into a single measure of participants' perception of their decision, I performed a principal axis exploratory factor analysis on the state decision appraisal data (i.e., frustration, difficulty, regret, and reverse-scored satisfaction). The Kaiser-Meyer-Olkin measure of sampling adequacy was higher than .50 (.75), indicating good sampling adequacy, and Bartlett's test of sphericity was significant ($p < .001$), indicating that the decision appraisal variables are related to one another and therefore that structure identification is appropriate.

Only one factor had an eigenvalue greater than 1.0. I conducted a parallel analysis using Watkins' (2000) Monte Carlo software to simulate factor analyses on 100 random

datasets, each comprising of four variables and 322 participants. The parallel analysis showed that only the first factor in the real dataset had an eigenvalue larger than the corresponding factor in the simulated dataset (2.39 vs 1.16). Consequently, I specified the extraction of one factor using the Promax method of oblique rotation with a Kappa value of 3. According to Costello and Osborne (2005), .400 is the minimum loading that should be considered adequate for item retention in exploratory factor analysis. All four items loaded ≥ .61 on the extracted factor and this factor explained 59.67% of the variance.

I therefore created an aggregated variable from the means of the frustration, difficulty, regret, and satisfaction items. I labelled this aggregate variable *decision appraisal*, and I used the aggregate variable rather than these individual items for all subsequent analyses. Higher scores on decision appraisal indicate more negative evaluations of the decision (i.e., lower satisfaction, higher regret, higher difficulty, and higher frustration). The decision appraisal items had a Cronbach α of .77 and a mean inter-item correlation of .46.

Main Analyses

As outlined above, this study was exploratory, and hence I conducted many analyses. For the sake of clarity and conciseness, the results of these exploratory analyses are reported in the main text only if they are relevant to my final theoretical inferences. The results of the analyses that are less theoretically relevant to the overall conclusions reached by the present thesis are reported in Appendix A. This approach is taken throughout the rest of the present thesis. The mediation and moderation findings are summarised in overview tables at the end of the results section in this chapter (Tables 3.8 and 3.9) and in each subsequent empirical chapter.

Correlations. I expected that the need for closure would be positively associated with state mental health problems (state anxiety after the choice task) and mental health problems over the past week (DASS) and negatively associated with satisfaction with life. Conversely,

I expected that the ability to achieve closure would be negatively associated with mental health problems and positively associated with satisfaction with life. The correlation analyses, which were consistent with predictions, are summarised in Table 3.2.

Table 3.2

Correlations Between Key Variables

	2	3	4	5	6	7	8	9	10	11	12
1. NFCS	-.32**	.32**	.22**	-.01	-.15**	-.27**	-.28**	.20**	.34**	.37**	-.19**
2. AACSS		-.57**	-.35**	-.01	.32**	.55**	.21**	-.35**	-.58**	-.53**	.44**
3. Regret			.35**	-.10	-.18**	-.33**	-.14*	.24**	.38**	.34**	-.25**
4. Maximisation				.01	-.06	-.06	-.09	.24**	.32**	.20**	-.05
5. IIPSS					-.10	.07	.00	.00	.11*	.09	-.20**
6. Sense of power						.44**	.26**	-.21**	-.31**	-.29**	.32**
7. Self-efficacy							.36**	-.30**	-.46**	-.45**	-.46**
8. Openness								-.16**	-.15**	-.09	.15**
9. State decision appraisal									.43**	.53**	-.26**
10. State anxiety										.75**	-.48**
11. DASS											-.47**
12. SWL											

NFCS = Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994). AACSS = Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). IIPSS = Independent and Interdependent Problem- Solving Scale (IIPSS; Rubin et al., 2012). DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004). SWL = Life Satisfaction Scale (Diener et al., 1985).

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

Moderation analyses. In all moderation analyses, low scores were defined as scores at the 16th percentile and high scores were defined as scores at the 84th percentile. The median was used as the measure of central tendency. The percentile approach is more appropriate than the use of -1 *SD* and +1 *SD* to represent low and high scores respectively because the percentiles will always correspond to a value within the range of the data regardless of its distribution. In contrast, the standard deviations may correspond to non-existent values if the data is highly skewed (Hayes, 2017).

Effects and interactions of the need and ability to achieve closure on mental health and wellbeing. Previous researchers have found an interaction between the need for closure and the ability to achieve closure on several dependent variables including heuristic processing and stereotyping (e.g., Kruglanski & Freund, 1983). I therefore tested whether the need for closure and the ability to achieve closure interact to affect mental health (DASS and state anxiety) or wellbeing (satisfaction with life).

For DASS as the outcome, I investigated this potential interaction using Model 1 of Hayes' (2017) PROCESS software, entering the ability to achieve closure as the predictor variable, the need for closure as the moderator variable, and DASS as the outcome variable. In this analysis and all subsequent analyses involving PROCESS Model 1, variables were mean centred by PROCESS in order to provide more interpretable output. As in ordinary linear regression, the coefficients for each variable represent the effect of that variable when the other variables are at zero (i.e., the mean when the variables are mean centred). PROCESS therefore provides conditional rather than main effects.

Consistent with Roets' and Soetens' (2010) findings, there was a significant conditional effect of need for closure ($b = 4.91$, $SE = 1.04$, $t = 4.74$, $p < .001$) and a conditional effect of ability to achieve closure ($b = -7.14$, $SE = 0.74$, $t = -9.67$, $p < .001$) on DASS scores, but no significant interaction between need and ability ($p = .784$).

Next, I repeated this analysis replacing DASS with state anxiety as the outcome variable and found the same pattern of results. Need for closure (b = 0.36, SE = 0.10, t = 3.77, p < .001) and ability to achieve closure (b = -0.75, SE = 0.07, t = -11.05, p < .001) were significant predictors of state anxiety, but there was no interaction (p = .539).

Finally, I investigated the effects of need for closure and ability to achieve closure and their interaction on satisfaction with life. Consistent with the analyses involving DASS and state anxiety, ability to achieve closure was a significant predictor of SWL (b = 0.77, SE = 0.10, t = 7.89, p < .001), and there was no interaction between need and ability (p = .238). However, need for closure was not a significant predictor of SWL (p = .221).

Because the effect of the need for closure on satisfaction with life was not significant when the ability to achieve closure is accounted for, I did not test for mediators of this relation. Although it is possible to find mediators of a nonsignificant relation (Hayes, 2017), this is not the focus of the present work, which aims to discover the mechanisms of existing effects. However, I conducted the planned moderation analyses on the relation between need for closure and satisfaction with life to investigate the presence of interactions that may have prevented the finding of a main effect of need for closure.

Additionally, since the need for closure and the ability to achieve closure did not interact to predict any mental health or wellbeing outcome variables, the effects of the full Need for Closure and Ability to Achieve Cognitive Structure Scales on mental health are reported separately throughout the remainder of this chapter.

Moderators of the relations between the need and ability to achieve closure and mental health and wellbeing. In this section, I report moderations of six key relations: two predictors (the need for closure and the ability to achieve closure) each predicting three outcomes (DASS, state anxiety, and satisfaction with life). For each relation, I tested six potential moderators (regret, maximisation, generalised self-efficacy,

independent/interdependent problem-solving style, openness, sense of power, and social class).

Moderators of the relation between the need for closure and DASS. I hypothesised that dispositional variables that reduce the stress of decision-making should weaken the relationship between the need for closure and mental health, while variables that increase the stress of decision-making should strengthen the relationship between the need for closure and mental health. Specifically, I predicted that the positive relation between need for closure and mental health problems would be stronger for people who report high levels of trait regret, maximisation, or independent decision-making, and weaker for people who report high self-efficacy, openness, sense of power, or social class. Similarly, I predicted that the negative relation between the need for closure and wellbeing would be stronger when dispositional regret, maximisation, or independent decision-making are high, and weaker when self-efficacy, openness, sense of power, or social class are high.

I used PROCESS Model 1 to test the moderation predictions regarding mental health problems over the past seven days. Need for closure scores were entered as the predictor variable and DASS scores were entered as the outcome variable. None of the predicted moderator variables significantly moderated the relation between need for closure and mental health problems over the past week (Ns range from 313 to 315; all ps $\geq .123$).

This pattern of results was mostly replicated when the tests were reconducted with the ability to achieve closure as a covariate, except that the moderating effect of self-efficacy became significant ($p = .006$) when ability was accounted for. This effect occurred in the expected direction; the relation between need for closure and DASS scores was largest when generalised self-efficacy was low ($b = 7.40$, $p < .001$), smaller though still significant at median levels of self-efficacy ($b = 4.57$, $p < .001$) and non-significant when generalised self-efficacy was high ($b = 2.02$, $p = .124$).

Moderators of the relation between the need for closure and state anxiety. I tested the effects of the proposed dispositional decision-making moderators on the relation between the need for closure and state anxiety measured after the choice task. Dispositional regret significantly moderated the relation between the need for closure and state anxiety ($p = .021$). As predicted, the relation between the need for closure and state anxiety was smallest when dispositional regret was low ($b = 0.29$, $p = .028$) larger at median levels of dispositional regret, ($b = 0.49$, $p < .001$), and largest when dispositional regret was high ($b = 0.69$, $p < .001$). None of the other variables significantly moderated the relation between need for closure and state anxiety (all *p*s ≥ .082).

The pattern of results remained similar when the ability to achieve closure was included as a covariate except that generalised self-efficacy also became a significant moderator ($p = .005$), with a significant positive relation between need for closure and state anxiety at low levels of generalised self-efficacy ($b = 0.57$, $p < .001$) that became smaller at median levels of self-efficacy ($b = 0.31$, $p < .001$) and nonsignificant at high levels of self-efficacy ($p = .503$).

Moderators of the relation between the need for closure and SWL. I also tested the effects of the proposed moderators on the relation between the need for closure and SWL and found no significant moderators (all *p*s ≥ .055). However, when ability to achieve closure was included as a covariate, regret became a significant moderator ($p = .047$), with the relation between the need for closure and SWL being strongest when dispositional regret was high, $b = -0.39$, $SE = 0.18$, $t = -2.12$, $p = .035$, and nonsignificant when dispositional regret was at the median ($p = .225$) or low ($p = .734$).

Moderators of the relations between the ability to achieve closure and DASS. Next, I tested whether the relation between the ability to achieve closure and mental health problems was moderated by any of the dispositional decision-making variables. The relation between

the ability to achieve closure and DASS was not moderated by regret, maximisation, sense of power, self-efficacy, openness, independent/interdependent problem-solving style, or social class (all *ps* ≥ .071).

Moderators of the relations between the ability to achieve closure and state anxiety. I then investigated whether any of the dispositional decision-making variables moderated the relation between ability to achieve closure and state anxiety as measured after the choice task. The relation between ability to achieve closure and state anxiety was not moderated by social class, regret, maximisation, sense of power, self-efficacy, openness, or independent/interdependent problem-solving style (all *p*s ≥ .345).

Moderators of the relations between the ability to achieve closure and SWL. Finally, I tested whether the decision-making variables moderated the relation between ability to achieve closure and SWL. Dispositional regret was a significant moderator of the relation ($p = .008$). Specifically, as predicted, the relation between ability to achieve closure and SWL was largest when dispositional regret was high, $b = 1.00$, $SE = 0.14$, $t = 7.36$, $p < .001$, smaller when dispositional regret was at the median, $b = 0.78$, $SE = 0.11$, $t = 7.05$, $p < .001$, and smallest when dispositional regret was low, $b = 0.57$, $SE = 0.14$, $t = 4.04$, $p < .001$.

Social class also moderated the relation between ability to achieve closure and SWL ($p = .045$). In line with predictions, the relation between ability to achieve closure and SWL was largest when social class was low, $b = 0.87$, $SE = 0.12$, $t = 7.51$, $p < .001$, smaller when social class was at the median, $b = 0.66$, $SE = 0.09$, $t = 7.36$, $p < .001$, and smallest when social class was high, $b = 0.53$, $SE = 0.13$, $t = 4.21$, $p < .001$.

None of the other dispositional variables moderated the relation between ability to achieve closure and SWL (all *p*s ≥ .052).

Mediation Analyses. There is a debate in the mediation literature regarding whether it is appropriate to test for indirect (i.e., mediation) effects of nonsignificant relations. Hayes

(2017) asserted that it is not necessary for all component paths to be significant in order to test for mediation effects (pp. 79-81). Hence, according to this view, it is acceptable to report mediations of nonsignificant total effects. However, Yzerbyt, Muller, Batailler, and Judd (2018) argued that researchers should be wary of reporting significant indirect effects without considering the whole model and all the component pathways, including whether the total effect is significant. This approach is more in line with the traditional Baron and Kenny approach to mediation, which involves testing each individual pathway in the model (Baron & Kenny, 1986). Throughout this chapter and the rest of this thesis, I have followed the logic of Yzerbyt et al. and tested mediation models only if all the correlations between the predictor, mediator/s, and outcome were significant (Table 3.2 shows the correlations between all key variables). I chose this approach to be conservative, since Yzerbyt et al. suggest that testing only for indirect effects leads to an inflated Type I error risk.

I report the unstandardised coefficients for all mediation analyses. Standardised effects are not comparable across different samples because standardisation involves scaling the effects in terms of the sample's variability. Hayes (2017) therefore recommends the reporting of unstandardized coefficients for ease of comparison between studies that have the same response scales (see also Pek & Flora, 2017). However, I also report the completely standardised indirect effect (CSIES; Preacher & Kelley, 2011) for significant effects in order to compare the relative effect sizes of the different mediators identified within each study.

Mediation models are specified according to theoretical considerations. In general, reverse mediation models are not reported. Firm conclusions about causal direction cannot be drawn by comparing the indirect effect size of a primary mediation model with the indirect effect size of the reverse mediation model (Lemmer & Gollwitzer, 2017) or by comparing the *p*-values of the primary model and the reverse model (Thoemmes, 2015). Study 5 has a

longitudinal design in order to more appropriately test the proposed mediation models and draw firmer conclusions regarding causation.

Throughout this thesis, in order to make conclusions regarding only the most robust mediators, I focus only on mediators that were significant in both single-mediator and parallel mediator models rather than mediators that were significant in single-mediator models but became nonsignificant when tested in parallel with other mediators.

This section is structured in the same way as the moderators section, with one key difference: when accounting for other relevant variables, there was no significant relation between the need for closure and state anxiety or satisfaction with life. Hence, I did not test mediators of these relations. Therefore, in this section, I report tests of six potential mediators of five relations: the relations between the need for closure and DASS and between the need for closure and state anxiety, and the relations between the ability to achieve closure and DASS, state anxiety, and satisfaction with life.

Mediators of the relation between the need for closure and DASS. I tested mediation models using Hayes' (2017) PROCESS software, which uses a path analytical framework and bootstrapping to estimate indirect effects. I used 5,000 bootstrapping iterations to obtain bias-corrected and accelerated bootstrap 95% confidence intervals for indirect effects. PROCESS Model 4 was used to investigate regret, maximisation, generalised self-efficacy, and sense of power as potential mediators of the relation between need for closure and DASS scores. Independent and interdependent problem-solving and openness were not significantly related to the need for closure and DASS respectively (see Table 3.2), and hence they are not tested as mediators. The significant mediation models are summarised in Table 3.3.

Table 3.3

Mediators of the Relation between the Need for Closure and DASS

Mediator	Effect type	*b* (*SE*)	95% CI	CSIE	*t*	*p*
Regret	Total	7.77 (1.10)	5.60, 9.94	-	7.04	< .001
	Direct	6.11 (1.11)	3.93, 8.29	-	5.52	< .001
	Indirect	1.66 (0.49)	0.82, 2.77	.08	-	-
Maximisation	Total	7.81 (1.10)	5.64, 9.97	-	7.10	< .001
	Direct	7.26 (1.12)	5.07, 9.46	-	6.51	< .001
	Indirect	0.54 (0.31)	0.04, 0.19	.03	-	-
Self-efficacy	Total	7.76 (1.10)	5.60, 9.92	-	7.07	< .001
	Direct	5.80 (1.03)	3.77, 7.83	-	-	< .001
	Indirect	1.97 (0.53)	1.06, 3.18	.09	-	-
Sense of Power	Total	7.82 (1.10)	5.66, 9.98	-	7.12	< .001
	Direct	7.12 (1.08)	5.00, 9.24	-	6.61	< .001
	Indirect	0.70 (0.30)	0.20, 1.39	.03	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014). The total effects are slightly different for each analysis because each analysis was conducted excluding outliers on the predictor, mediator, and outcome variables. This means that each total effect was calculated on a slightly different sample for each analysis in this study and throughout the rest of the thesis.

The first mediation test investigated whether need for closure (predictor variable) predicted DASS (outcome variable) via regret (mediator variable). As shown in Table 3.3, and consistent with the correlations and regression analysis reported above, there was a significant positive total effect of need for closure on mental health problems, showing that higher need for closure was associated with more mental health problems. There was also a significant positive direct effect of need for closure on mental health problems when

controlling for regret (b = 6.11). However, the direct effect was smaller than the total effect (b = 7.77). The 95% confidence intervals for the indirect effect were both positive, indicating a significant difference between the size of the total effect and the direct effect at the $p < .05$ level (b = 1.66). In other words, the relation between need for closure and mental health problems over the past week was partially accounted for by variability in the tendency to engage in retrospection over past decisions.

The second mediation test investigated whether need for closure predicted mental health problems via maximisation. Table 3.3 shows that the direct effect of need for closure on mental health problems when controlling for maximisation (b = 7.26) was smaller than the total effect of need for closure on mental health problems (b = 7.81). This decrease in effect size was significant at the $p < .05$ level (b = 0.55). Therefore, the relation between need for closure and mental health problems over the past week was partially accounted for by variability in the tendency to maximise during decision-making.

The third test showed that the direct effect of need for closure on mental health problems when controlling for generalised self-efficacy (b = 5.80) was significantly smaller than the total effect (b = 7.86). Therefore, the relation between need for closure and mental health problems over the past week was partially accounted for by variability in generalised self-efficacy.

Finally, the fourth test shown in Table 3.3 demonstrated that variability in sense of power also partially accounted for the relation between need for closure and mental health problems. The direct effect of need for closure on mental health problems when controlling for sense of power (b = 7.12) was significantly smaller than the total effect (b = 7.82). Therefore, the effect of need for closure on mental health problems was mediated by regret, maximisation, self-efficacy, and sense of power when tested separately.

Sensitivity analyses showed that when controlling for ability to achieve closure, each of the four significant indirect effects identified above became nonsignificant. Therefore, variability in ability to achieve closure accounted for all the variance in the relation between need for closure and DASS scores that was previously accounted for by regret, maximisation, generalised self-efficacy, and sense of power.

I also conducted a parallel mediation analysis in order to check whether some of the significant mediators of the relation between need for closure and DASS were significant only due to shared variance with another of the mediators. This analysis was conducted by entering the need for closure as the predictor variable, regret, maximisation, generalised self-efficacy, and sense of power as simultaneous mediators, and DASS as the outcome variable. The parallel mediation demonstrated that the indirect effects of maximisation and sense of power became non-significant at the $p < .05$ level in the parallel mediation. Therefore, only regret ($b = 1.06$, $SE = 0.42$, CSIES = .05) and generalised self-efficacy ($b = 1.73$, $SE = 0.54$, CSIES = .08) operated as mediators independently of the other variables and each other. Again, when controlling for ability to achieve closure, all the indirect effects in the parallel mediation become nonsignificant.

Mediators of the relation between ability to achieve closure and DASS. I investigated regret, maximisation, generalised self-efficacy, and sense of power as potential mediators of the relation between ability to achieve closure and DASS scores. Independent and interdependent problem-solving and openness were not significantly related to the ability to achieve closure and the DASS respectively, and hence they were not tested as mediators of these relations.

Of the tested mediators, only self-efficacy and sense of power were significant. The tests involving nonsignificant mediators (regret and maximisation) are reported in Appendix A to save space in the main text.

As shown in Table 3.4, self-efficacy (CSIES = -0.13) and sense of power (CSIES = -0.04) mediated the relation between the ability to achieve closure and mental health problems over the past seven days.

When sense of power and self-efficacy were included in a parallel mediation together, the indirect effect of sense of power became non-significant at the $p < .05$ level. Therefore, only generalised self-efficacy accounted for unique variation in the relation between ability to achieve closure and mental health problems.

Table 3.4

Mediators of the Relation Between Ability to Achieve Closure and DASS

Mediator	Effect type	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Sense of Power	Total	-8.13 (0.74)	-9.58, -6.69	-	-11.05	< .001
	Direct	-6.20 (0.85)	-7.86. -4.55	-	-7.33	< .001
	Indirect	-1.94 (0.60)	-3.23, -0.85	-.04	-	-
Self-efficacy	Total	-8.16 (0.73)	-9.59, -6.72	-	-11.20	< .001
	Direct	-7.54 (0.76)	-9.03. -6.04	-	-9.93	< .001
	Indirect	-0.62 (0.28)	-1.27, -0.16	.13	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Mediators of the relation between the need for closure and state anxiety. As outlined above, the need for closure also significantly predicted state anxiety, and so I investigated the potential dispositional mediators of this relation.

As shown in Table 3.5, regret, maximisation, self-efficacy, and sense of power each separately mediated the relation between the need for closure and state anxiety, although only sense of power remained significant when controlling for the ability to achieve closure. In a parallel mediation, only maximisation and self-efficacy remained significant.

Table 3.5

Mediators of the Relation Between the Need for Closure and State Anxiety

Mediator	Effect type	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Regret	Total	0.67 (0.10)	0.46, 0.87		6.38	< .001
	Direct	0.46 (0.10)	0.26, 0.67		4.47	< .001
	Indirect	0.20 (0.05)	0.11, 0.31	.10	-	-
Maximisation	Total	0.67 (0.10)	0.46, 0.87	-	6.43	< .001
	Direct	0.56 (0.10)	0.36, 0.77	-	5.49	< .001
	Indirect	0.10 (0.07)	0.05, 0.19	.05	-	-
Sense of Power	Total	0.66 (0.10)	0.45, 0.87	-	6.29	< .001
	Direct	0.59 (0.10)	0.39, 0.79	-	5.75	< .001
	Indirect	0.07 (0.03)	0.30, 0.16	.04	-	-
Self-efficacy	Total	0.67 (0.10)	0.46, 0.87	-	6.40	< .001
	Direct	0.47 (0.10)	0.27, 0.66	-	4.73	< .001
	Indirect	0.20 (0.05)	0.11, 0.31	.10	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

I also tested whether decision appraisal as measured after the choice task mediated the relation between the need for closure and state anxiety. This test aligns with Roets and Soetens (2010) decision distress hypothesis, which suggests that, for people with a high need or low ability to achieve closure, poor mental health arises from distress associated with decision-making. The PROCESS Model 4 analysis showed that the direct effect of ability to achieve closure on state anxiety when controlling for decision appraisal (b = 0.57) was significantly smaller than the total effect of ability to achieve closure on state anxiety (b = 0.71), demonstrating a significant mediation effect. The completely standardised indirect effect size was .09, indicating a small to medium mediation effect. However, this effect became nonsignificant when accounting for the ability to achieve closure.

Mediators of the relation between ability to achieve closure and state anxiety. Next, I investigated the potential mediating effect of the dispositional decision-making variables on the relation between the ability to achieve closure and state anxiety.

As shown in Table 3.6, maximisation, self-efficacy, and sense of power each separately significantly mediated the relation between ability to achieve closure and state anxiety. Regret and openness did not significantly mediate the relation (see Appendix A). I did not test independent and interdependent problem-solving style as a mediator because it was not significantly related to the ability to achieve closure. In a parallel mediation, only maximisation (b = -0.09, CSIES = -.06) and self-efficacy (b = -0.17, CSIES = -.12) were significant.

Decision appraisal as measured after the choice task also mediated the relation between the ability to achieve closure and state anxiety. The direct effect of ability to achieve closure on state anxiety when controlling for decision appraisal (b = -0.70) was significantly smaller than

the total effect of ability to achieve closure on state anxiety (*b* = -0.83), demonstrating a significant mediation effect (CSIES =.09).

Table 3.6

Mediators of the Relation Between Ability to Achieve Closure and State Anxiety

Mediator	Effect type	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Maximisation	Total	-0.86 (0.07)	-0.97, -0.71	-	-12.71	< .001
	Direct	-0.77 (0.07)	-0.91, -0.63	-	-11.12	< .001
	Indirect	-0.07 (0.03)	-0.12, -0.02	-.05	-	-
Sense of Power	Total	-0.83 (0.07)	-0.96, -0.70	-	-12.63	< .001
	Direct	-0.77 (0.07)	-0.91, -0.64	-	-11.27	< .001
	Indirect	-0.06 (0.02)	-0.12, -0.02	-.04	-	-
Self-efficacy	Total	-0.83 (0.07)	-0.96, -0.70	-	-12.47	< .001
	Direct	-0.67 (0.08)	-0.83, -0.52	-	-8.67	< .001
	Indirect	-0.16 (0.06)	-0.28, -0.05	-.11	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Mediators of the relation between ability to achieve closure and satisfaction with life. Finally, I investigated whether the decision-making variables mediated the relation between ability to achieve closure and satisfaction with life. As shown in Table 3.7, maximisation, sense of power, and self-efficacy significantly mediated this relation (see Appendix A for nonsignificant mediation analyses). When these three variables were entered into a parallel mediation, only self-efficacy remained significant.

Table 3.7

Mediators of the Relation Between Ability to Achieve Closure and SWL

Mediator	Effect type	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Maximisation	Total	-0.80 (0.09)	0.62, 0.97	-	8.77	< .001
	Direct	0.88 (0.10)	0.69, 1.07	-	9.11	< .001
	Indirect	-0.08 (0.04)	-0.15, -0.01	-.04	-	-
Sense of Power	Total	0.78 (0.09)	0.60, 0.96	-	8.62	< .001
	Direct	0.67 (0.09)	0.49, 0.86	-	7.15	< .001
	Indirect	0.11 (0.04)	0.03, 0.19	.06	-	-
Self-efficacy	Total	0.79 (0.09)	0.61, 0.97	-	8.57	< .001
	Direct	0.48 (0.11)	0.27, 0.69	-	4.52	< .001
	Indirect	0.31 (0.07)	0.18, 0.45	.17	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Effects of experimental manipulations on state anxiety. The present study involved two experimental manipulations: decision time (fast/slow) and choice overload (high/low). I expected that participants would experience more state anxiety if they were in the fast decision time or the high choice overload conditions as opposed to the slow decision time or high choice overload conditions. Further, I expected that participants would experience the most state anxiety if they were in both the fast decision time *and* the high choice overload condition. I also expected that the effects of the experimental conditions (i.e., high choice overload and/or fast decision time) would be most pronounced for participants who were high in need for closure and/or low in the ability to achieve closure.

The main hypotheses regarding the interaction between need for closure and the experimental conditions and the interaction between ability to achieve closure and the experimental conditions were not supported. A summary of the analyses that led to this conclusion is below. All the relevant analyses are reported in full in Appendix A.

Two-way ANOVAs on the experimental conditions showed that only the decision time manipulation produced the expected effect on state anxiety, $F(1, 316) = 11.61$, $p = .001$, such that participants in the slow decision time condition reported less state anxiety ($M = 2.94$, $SD = 1.15$) than participants in the fast decision time condition ($M = 3.36$, $SD = 1.08$). Contrary to predictions, there was no main effect of choice overload and no interaction between choice overload and decision time on state anxiety (ps > .230).

As predicted, PROCESS Model 3 analyses showed a significant three-way interaction between need for closure, decision time, and choice overload on state anxiety, $b = 0.95$, $SE = 0.42$, $t(310) = 2.25$, $p = .025$, 95% CI [0.12, 1.78]. I expected the three-way interaction to show that participants with a high need for closure experience significantly more anxiety after decision-making when they have to choose quickly from many options. However, the interaction between decision time and choice overload was significant only at low levels of need for closure. Specifically, when participants had a low need for closure and were in the low choice condition, there was no significant effect of decision time condition on anxiety ($p = .868$). However, when participants had a low need for closure and were in the *high* choice condition, there was a significant negative effect of decision time on anxiety, $b = -0.69$, $SE = 0.26$, $t = -2.68$, $p = .008$, 95% CI [-1.19, -0.18]. In other words, being asked to choose quickly produced more anxiety than being asked to think carefully, but only when participants had a low need for closure and needed

to choose from many options. Contrary to predictions, there was no significant three-way interaction between ability to achieve closure, decision time, and choice overload on state anxiety (p = .806). These results are discussed in Appendix A.

To aid the reader, a summary of the main mediation and moderation findings is contained in Tables 3.8 and 3.9.

Table 3.8

Overview of the Mediators and Moderators of the Relations between NFCS and Mental Health

Variable	Mental Health Outcome	Moderation	Moderation (controlling for AACS)	Mediation	Mediation (controlling for AACS)	Mediation (parallel)
Regret	DASS	N	N	**Y**	N	**Y**
	State anxiety	**Y**	**Y**	**Y**	N	N
	SWL	N	Y	-	-	-
Maximisation	DASS	N	N	Y	N	N
	State anxiety	N	N	**Y**	**Y**	**Y**
	SWL	N	N	-	-	-
IIPSS	DASS	N	N	-	-	-
	State anxiety	N	N	N	-	-
	SWL	N	N	-	-	-
Sense of Power	DASS	N	N	**Y**	N	N
	State anxiety	N	N	**Y**	N	N
	SWL	N	N	-	-	-
Self-efficacy	DASS	N	**Y**	**Y**	N	**Y**
	State anxiety	N	**Y**	**Y**	N	**Y**
	SWL	N	N	-	-	-
Openness	DASS	N	N	-	-	-
	State anxiety	N	N	N	-	-
	SWL	N	N	-	-	-
Social class	DASS	N	N	-	-	-
	State anxiety	N	N	-	-	-
	SWL	N	N	-	-	-
Decision appraisal	State anxiety	-	-	**Y**	**Y**	-

Table 3.9

Overview of the Mediators and Moderators of the Relations between AACSS and Mental Health

Variable	Mental Health Outcome	Moderation	Moderation (controlling for NFCS)	Mediation	Mediation (controlling for NFCS)	Mediation (parallel)
Regret	DASS	N	N	N	-	-
	State anxiety	N	N	N	-	-
	SWL	**Y**	**Y**	-	-	-
Maximisation	DASS	N	N	N	-	-
	State anxiety	N	N	**Y**	**Y**	**Y**
	SWL	N	N	-	-	-
IIPSS	DASS	N	N	-	-	-
	State anxiety	N	N	-	-	-
	SWL	N	N	-	-	-
Sense of Power	DASS	N	N	**Y**	**Y**	N
	State anxiety	N	N	**Y**	**Y**	**Y**
	SWL	N	N	-	-	-
Self-efficacy	DASS	N	N	**Y**	**Y**	**Y**
	State anxiety	N	N	**Y**	N	N
	SWL	N	N	-	-	-
Openness	DASS	N	N	-	-	-
	State anxiety	N	N	N	-	-
	SWL	N	N	-	-	-
Social class	DASS	N	N	-	-	-
	State anxiety	N	N	-	-	-
	SWL	**Y**	**Y**	-	-	-
Decision appraisal	State anxiety	-	-	**Y**	**Y**	-

Discussion

Previous researchers have found that the need for closure is positively associated with mental health problems and that the ability to achieve closure is negatively associated with mental health problems in the general population (Roets & Soetens, 2010). Although the need and ability to achieve closure interact to predict people's behaviour and cognitive strategies in decision-making contexts (e.g., Kossowska & Bar-Tal, 2013), Roets and Soetens established that there was no significant interaction between need and ability on mental health. In the present study, I expanded on Roets and Soetens' research with two main goals: (1) to replicate the findings of Roets and Soetens using two different mental health outcome measures as well as a measure of wellbeing and (2) to explore the decision-making distress hypothesis with both dispositional measures and manipulated decision context factors affecting decision-making stress.

Replication of Roets and Soetens (2010)

Roets and Soetens (2010) used the Symptom Checklist-90 to measure mental ill-health over the past seven days and investigate its relations to the need for closure and the ability to achieve closure. They found that the need for closure was a significant positive predictor of scores on the full Symptom Checklist-90 and all its subscales except for sleeping problems. Additionally, they found that the ability to achieve closure was a significant negative predictor of the full Symptom Checklist-90 scale and each of its subscales. However, there was no significant interaction between need and ability in predicting mental ill-health.

In the present study, I attempted to replicate the results reported by Roets and Soetens (2010) using two different measures of mental ill-health: the 21-item DASS measuring mental health problems over the past seven days (Lovibond & Lovibond, 2004) and the state version of

the State-Trait Inventory for Cognitive and Somatic Anxiety (Ree et al., 2008), which was administered after completing a decision-making task. This study also extended on Roets and Soetens' findings by investigating the effects of need and ability to achieve closure on wellbeing. I predicted that the need for closure would be negatively related to wellbeing and that the ability to achieve closure would be positively related to wellbeing.

Consistent with predictions, there was a positive association between need for closure and DASS scores and a negative association between ability to achieve closure and DASS scores. Consistent with Roets and Soetens' (2010) findings, there was also no interaction between need and ability when predicting DASS.

Consistent with predictions, need and ability to achieve closure were also significant predictors of state anxiety after the choice task. Again, there was no interaction between need and ability to predict state anxiety.

The hypotheses regarding the predictors of satisfaction with life were only partially supported. Although both need for closure and the ability to achieve closure were correlated with satisfaction with life, the effect of the need for closure become nonsignificant when controlling for the ability to achieve closure. The interaction between need and ability was also not significant.

The pattern of predictors of mental health and wellbeing suggests that the need and ability to achieve closure affect both mental health and wellbeing, but that the ability to achieve closure is a more powerful predictor, particularly of wellbeing. However, because this is the first study to investigate the effects of the need and ability to achieve closure on wellbeing, these results should be interpreted with caution. Further research is required to establish the roles of need and ability to achieve closure in predicting wellbeing.

Moderators

Based on Roets and Soetens' (2010) explanation that need and ability to achieve closure affect mental health through their effects on decision-making stress, I hypothesised that variables that reduce decision-making pressures would weaken the relations between need and ability to achieve closure and mental health, and variables that increase decision-making pressures would strengthen these relations. Specifically, I expected that high social class, self-efficacy, sense of power, openness, and interdependent decision-making style would result in a weaker relation between mental ill-health and the need and ability to achieve closure compared to low levels of these variables. On the other hand, high dispositional regret and maximisation should strengthen the relation between mental ill-health and the need and ability to achieve closure compared to low levels of these variables.

In general, these moderation predictions were not supported. Most of the decision-making variables did not act as moderators of the relevant relations, with the exceptions of regret and social class. Regret significantly moderated the relations between (a) need for closure and state anxiety, (b) need for closure and satisfaction with life, and (c) ability to achieve closure and satisfaction with life. These moderations occurred in the expected directions: high levels of dispositional regret resulted in stronger relations between need for closure and state anxiety/satisfaction with life and between the ability to achieve closure and satisfaction with life.

Social class moderated the relation between ability to achieve closure and satisfaction with life in the expected direction, such that the positive relation between ability to achieve closure and satisfaction with life was weaker for people of a higher social class and stronger for people of a lower social class. This may be because choices are generally more consequential for people of lower social classes, since they have fewer material resources and therefore fewer

opportunities to make decisions (e.g., Snibbe & Markus, 2005). Therefore, for people in lower social classes, their ability to be confident in their decision-making may be more important for their wellbeing than it is for people of higher social classes, who are aware that they have the resources to make a different decision if their present choice is suboptimal.

As outlined above, dispositional regret was the most consistent moderator of the relations between need/ability to achieve closure and mental health. This finding suggests that decision-making distress experienced by people with a high need or low ability to achieve closure (Roets & Van Hiel, 2008) is more impactful for their mental health if they continue to ruminate on their decisions after making them. On the other hand, the relation between need/ability to achieve closure is weaker for people who do not usually regret their decisions. Rumination about their decisions may involve uncertainty about whether they made the right choice, which would be particularly stressful for people with a high need for closure.

None of the other decision-making variables moderated any of the relevant relations. This lack of moderation may have occurred because none of the decision-making variables are directly related to the reduction of uncertainty associated with decision-making, which is likely to be the primary reason that decision-making is stressful for people with a high need for closure. For example, people who have a relatively interdependent decision-making style may feel less responsibility for making their choices, but decision-making is still inherently imbued with uncertainty, and is therefore likely to remain stressful for people with a high need for closure. Therefore, factors which do not affect the uncertainty involved in decision-making may not be effective in moderating the relations between need and ability to achieve closure and mental health.

Dispositional Mediators

I explored the dispositional decision-making variables as mediators of the relations between need and ability to achieve closure and mental health with mixed results.

Dispositional mediators of the relations between need for closure and mental health. Independent/interdependent problem-solving style and openness did not significantly mediate any relevant relations. However, regret and self-efficacy were significant mediators of the relation between need for closure and DASS scores, and maximisation also mediated the relation between the need for closure and state anxiety. These results suggest that people who have a high need for closure experience more dispositional regret and maximisation tendencies and lower self-efficacy, and that this mediates their poorer mental health.

However, it is not clear what conclusions should be drawn from the mediation results due to two methodological and statistical problems. First, the mediation effect found for the relations between the need for closure and DASS discussed above became nonsignificant when ability to achieve closure was entered as a covariate. This effect is likely to be because the ability to achieve closure is moderately correlated with both (a) the need for closure and (b) DASS scores. It may therefore explain some variance in the relation between these two constructs and hence decrease the amount of unexplained variance to be explained by mediators such as regret. This issue is discussed further throughout the following chapters and in the general discussion in particular.

Second, Schwartz et al.'s (2002) measure of regret may not have been appropriate. This measure might more accurately be considered a measure of *reminiscence* about past decisions rather than a measure of regret per se because four of the five items ask non-valenced questions about the extent to which participants tend to look back on past decisions (e.g., "whenever I

make a choice, I'm curious about what would have happened if I had chosen differently"). These items assess people's tendency to reflect on decisions rather than their tendency to negatively reassess these decisions. Only one item in the scale asks participants to consider whether they feel bad about their past decisions ("if I make a choice and it turns out well, I still feel like something of a failure if I find out that another choice would have turned out better"). It would therefore be useful for future research to include more positively and negatively valenced items that assess the extent to which people tend to feel positive or negative about their past decisions in order to confirm that people with a high need for closure tend to experience more regret. Additional items were added to the regret measure in Study 2 in order to address this issue.

Future research should consider why people with a high need for closure may experience more regret about their decisions. As outlined above, it is possible that people with a high need for closure experience more regret because they rush through their decisions in order to minimise uncertainty and therefore regret not considering their options more carefully (i.e., process regret). However, another possibility is that people with a high need for closure experience more regret about the *outcomes* of their decisions. Because people with a high need for closure prefer to make decisions more quickly compared to people with a low need for closure (e.g., Kruglanski, & Webster, 1996), it appears likely that they would not think through their options adequately and would therefore make poorer decisions. Studies 2 and 3 attempt to discover whether people with a high need for closure experience more outcome regret, more process regret, or both.

Dispositional mediators of the relations between ability to achieve closure and mental health. Self-efficacy also mediated the relation between the ability to achieve closure and each outcome variable: DASS scores, state anxiety scores, and satisfaction with life. One interpretation of this result is that people with a high ability to achieve closure may have better

mental health and wellbeing because they have higher levels of self-efficacy. However, it is not clear whether generalised self-efficacy and the ability to achieve closure should be considered totally distinct constructs. The ability to achieve closure may be conceptualised as a specific form of self-efficacy. That is, the belief in one's ability to make decisions confidently and to structure one's life may be a specific aspect of the belief in one's ability to succeed in achieving their goals and desires more generally. Indeed, the correlation between the two measures is considerable (r = .56), suggesting that the mediating effect of self-efficacy may occur because of the high amount of variance shared by the ability to achieve closure and self-efficacy rather than because self-efficacy is the mechanism though which the ability to achieve closure affects mental health and wellbeing. This issue is discussed further throughout the rest of the thesis.

Decisional Appraisal as a State Mediator

I also considered whether decision appraisal after the choice task mediated the relations between need/ability to achieve closure and state anxiety. These analyses reflect Roets and Soetens' (2010) suggestion that decision-making distress is behind these relations. I hypothesised that people with a high need for closure (or low ability to achieve closure) would perceive the choice task as more frustrating than people with a low need for closure (or a high ability to achieve closure). I expected that this frustration would result in high need for closure (or low ability to achieve closure) participants perceiving the task as more difficult and experiencing more regret and less satisfaction with their choice. Further, I hypothesised that this appraisal of their decision-making and of the choice itself would mediate their higher anxiety.

I hypothesised that decision appraisal would mediate the relations between the need/ability to achieve closure and state anxiety. Both of these hypotheses were supported, but the mediating effect on the relation between need for closure and state anxiety was

nonsignificant when the ability to achieve closure was added as a covariate. Decision appraisal (i.e., frustration, difficulty, satisfaction, and regret) mediated the negative relation between the ability to closure and state anxiety. These findings suggest that people with a low ability to achieve closure experience more anxiety due to decision-making because they experience the decision-making process as unpleasant and its outcome as disappointing. Hence, these findings are consistent with Roets and Soetens' (2010) proposed mechanism for the relation between ability to achieve closure and mental health: people with a low ability to achieve closure experience poorer mental health because they find decision-making more frustrating and difficult.

Roets and Soetens (2010) suggested that high levels of frustration and difficulty affect mental health because in modern Western society there are a myriad of decisions to be made every day, leading to an accumulation of stress. However, in the present study, I could not test whether decision stress accumulated over time for two reasons: (1) the study included only one decision, and (2) I measured mental health problems over the past seven days and so it would not make sense to include mental health as an outcome of the decision appraisal in the study itself. This problem was partially addressed in Study 3, where decision stress and difficulty were measured for a series of twelve decisions to determine whether the accumulation of decisions resulted in more stress and difficulty.

It is also important to consider that the causal order of the relations between decision appraisal and state anxiety may be reversed. That is, it is possible that people with a high need for closure or low ability to achieve closure experience more state anxiety, either during decision-making specifically (e.g., Roets & Van Hiel, 2008) or in general, and their anxiety leads them to perceive the decision-making processes as frustrating and difficult and to be regretful

and dissatisfied with the outcome. In line with this reasoning, previous research has shown that people are more regretful about their decisions when they feel that their decision-making process was suboptimal (Inbar et al., 2011). Additionally, as with self-efficacy, the experience of stress and frustration during the decision-making is somewhat similar to the ability to achieve closure, which is partly about confidence in decision-making contexts (e.g., "I often experience stress when I have to reach a clear-cut decision"). Hence, decision appraisal may be too closely related to the ability to achieve closure empirically (r = -.37) and theoretically to be a useful mediator. Consequently, this mediation model may not represent an informative psychological process.

Overall, the results of the present study provide several novel insights about the nature and mechanisms of the relations between the need and ability to achieve closure and mental health and wellbeing. This is the first study to investigate the effects of need and ability to achieve closure on wellbeing, demonstrating that ability, but not need, is associated with satisfaction with life. With regards to the boundaries of these effects, regret was the most consistent moderator of these effects such that high levels of regret strengthened the relation between need/ability to achieve closure and mental health. Regret also acted as a mediator of the relation between the need for closure and mental health. This mediation is explored further in the next chapter with Study 2, which included additional valenced items to improve the measurement of dispositional regret. Study 2 also included a measure of lay beliefs about decision-making in order to investigate whether people with a high need for closure experience more regret if they believe a quick decision is a bad decision. Finally, Study 2 expanded on Study 1 by adding a measure of dispositional decision stress in order to investigate its mediating role in the relations between need and ability to achieve closure and mental health and wellbeing.

CHAPTER 4

STUDY 2:

INVESTIGATING DECISION STRESS AND REGRET

The present study had two main aims: (a) to determine whether the mediators identified in the previous study explain unique variance in the relations between need/ability and mental health after decision stress is accounted for, and (b) to test lay beliefs about decision-making as a potential explanation for why people with a high need or low ability to achieve closure experience more regret. I also made a methodological adjustment to the measure of regret.

The Role of Decision Stress in the Relations between the Need and Ability to Achieve Closure and Mental Health

In Study 1, I tested several potential decision-making mediators of the relations between the need/ability to achieve closure and mental health. I found that regret and self-efficacy both mediated the relation between the need for closure and DASS scores, and that self-efficacy mediated the relations between the ability to achieve closure and mental health. However, I did not test whether decision stress mediated these relations. This is an important omission because the decision-making distress hypothesis put forward by Roets and Soetens (2010) suggests that decision stress should be the key mediator between the need/ability to achieve closure and mental health.

Because I did not measure decision stress, I cannot determine whether the mediators identified in Study 1 reflect separate mechanisms or whether they were significant only because of their relation with decision stress. It is possible that once decision stress is accounted for, these factors will no longer mediate these relations. Hence, to determine whether the mediators from

Study 1 explain unique variance of their own or whether their mediation effects are reflective of their relations with decision stress, I included a measure of decision stress in the present study.

The Moderating Effect of Lay Beliefs about Decision-Making on the Relation between Need for Closure and Regret

The previous study showed that regret mediated the relation between the need for closure and mental health. In the present study, I aimed to better understand why people with a high need for closure experience more regret. People in general tend to believe that deciding quickly leads to a poorer choice (Ariely & Zakay, 2001). At the same time, people with a high need for closure experience discomfort during decision-making uncertainty (e.g., Roets & Van Hiel, 2008) and therefore prefer to make decisions quickly. Therefore, people with a high need for closure may experience more regret because they decide quickly and believe that deciding quickly leads to poorer outcomes.

In the present study, I included a measure of the lay belief that a quick choice is a bad choice. I expected that this belief would moderate the relation between the need for closure and regret such that it would be stronger for people who strongly believe that a quick choice is a bad choice than for people who do not hold this belief. I therefore hypothesised that lay beliefs about decision-making would moderate the mediating effect of regret on the relation between the need for closure and mental health, as shown in Figure 3.1.

Adjusting the Regret Measure

As outlined above, regret significantly mediated several key relations in Study 1. However, the Schwartz et al. (2002) regret measure used in that study may be a measure of decision reflection rather than decision regret specifically. The scale is comprised of five items, four of which measure the tendency to engage in counterfactual thinking regarding past decisions

rather than the tendency to negatively assess past decisions (e.g., “whenever I make a choice, I’m curious about what would have happened if I had chosen differently). This distinction is important because not all counterfactual thinking is associated with regret. For example, people may engage in downward comparisons during counterfactual thinking, which results in improved affect (Roese, 1997).

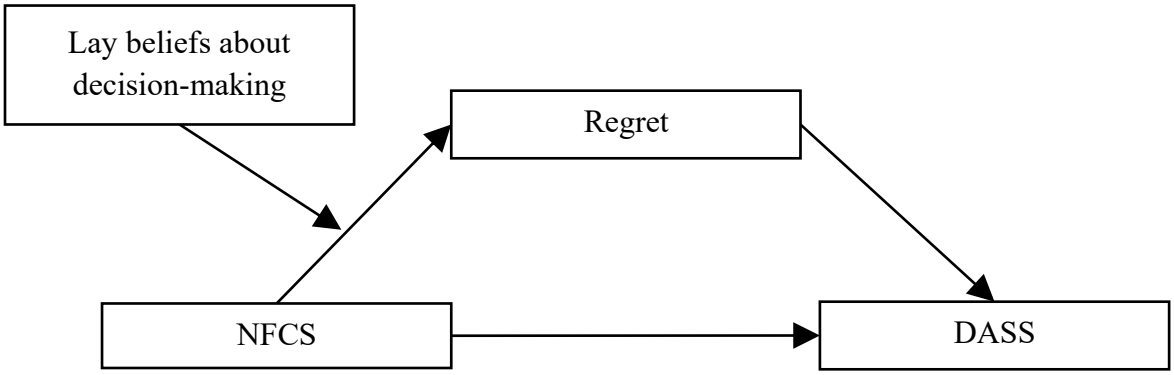

Figure 3.1. Conceptual moderated mediation model.

In the present study, I included additional valenced items to ensure that the regret measure reflected people’s negative re-evaluations of (rather than merely reflection on) their past decisions. I tested whether this revised measure of regret mediated the relations between the ability to achieve closure and mental health and wellbeing and whether the previous finding that regret mediates the relation between the need for closure and mental health was replicated.

Experimental Manipulation of Time Pressure and Choice Overload

The present study included the same experimental manipulation as Study 1. The previous study was the first to investigate relations between need/ability to achieve closure and decision context (choice set size and decision time) on mental health. Hence, to draw firmer conclusions about these relations, I attempted to replicate these results.

Several moderation hypotheses regarding decision relief, decision responsibility, and perceptions of the world's stability were also tested in this study. However, the results of these hypotheses have no bearing on the conclusions drawn in this chapter or the thesis in general. Therefore, for the sake of brevity, these variables and the associated results are reported in Appendix B.

In summary, the present study used cross-sectional data to replicate and extend the findings from the previous study. I aimed to replicate the key finding from Study 1 that mental health problems were negatively associated with the ability to achieve closure and positively associated with the need for closure. Additionally, the present study expanded on the previous study by investigating whether (a) decision stress mediated the relations between the need/ability to achieve closure and mental health, (b) lay beliefs about decision-making moderated the relations between the need and ability to achieve closure and regret, and (c) the revised regret measure mediated the relation between the ability to achieve closure and mental health.

Method

Participants and Design

Participants were undergraduate psychology students at the same large Australian public university as the Study 1 participants. Participation was voluntary and anonymous. Participants either completed the survey as an optional part of their coursework for a second-year social and personality psychology course, or they received 2% course credit for completing the survey. There was a possibility that participants could complete the survey twice: once as part of their coursework and once for research experience credit. Multiple completions were relatively unlikely to occur given that the coursework subject was a second-year course and the research experience credit subjects were first- and third-year courses. Nevertheless, to address this

possibility, participants were asked at the end of the survey whether they had completed the survey previously. Key analyses were reconducted excluding participants who said they had previously completed the survey (seven participants) or may have previously completed the survey (27 participants) to check whether this changed the pattern of results.

The design and measures used in Study 2 were very similar to those used in Study 1. Therefore, as with Study 1, I attempted to recruit 320 participants who had useable data. However, only 232 people attempted the survey. Of these 232 participants, 19 participants did not complete the survey and a further five participants actively declined to provide their informed consent. These participants were excluded from the analysis, leaving a total of 208 participants (51 men, 157 women) with a mean age of 23.43 years (*SD* = 6.54 years).

I used the Monte Carlo Power Analysis for Indirect Effects web app to conduct a post-hoc mediation power analysis (Schoemann, Boulton, & Short, 2017). The need for closure showed smaller relations with the potential mediators and outcomes in Study 1 than the ability to achieve closure, and regret was the most interesting mediator of these relations. So, to be conservative, I based the mediation power analysis on the correlations between the need for closure and regret (r = .32), the need for closure and DASS (r = .37), and regret and DASS (r = .34). Using 1000 replications and 20,000 Monte Carlo draws per replication and with a 95% confidence level, the analysis showed that a dataset with 208 participants had a power of .95 to detect indirect effects of the size indicated by these correlations. Hence, the sample was large enough to detect the types of mediation effects that were being investigated in this study.

With regards to ethnicity, 90% of participants identified as White, 3% as Aboriginal or Torres Strait Islander, 3% as Asian, 0.5% as African, and 3% indicated “other” for the ethnicity

item. One participant declined to respond to this item. Most students were from first year courses (58%), with 26% from second year and 15% from third year courses.

The study utilised the same 2 x 2 experimental design as Study 1, with a cross-sectional, correlational component and quantitative, self-report dispositional measures. As with Study 1, participants were asked to read a list of activities and choose the one they would prefer to purchase with their own money. Decision time (fast/slow) and choice overload (high/low) were experimentally manipulated. One hundred and seven participants were randomly assigned to the fast decision time condition and 101 to the slow decision time condition. One hundred and thirteen participants were assigned to the low choice condition and 95 to the high choice condition. State outcome variables were then measured.

Procedure

The procedure was the same as the procedure for Study 1. The research instrument was a self-report online questionnaire titled “Personality and Mental Health” and took approximately 30 to 40 minutes to complete. In the information statement, participants were told that the study was investigating how certain personality variables predict people’s mental health. The first part of the survey included dispositional measures of the need and ability to achieve closure, variables related to decision-making, and measures of mental health and wellbeing over the past week. The scales were presented in a random order for each participant, and the items within each scale were also presented in a random order for each participant. Participants completed the choice task and then completed measures of state anxiety and rated the levels of frustration, difficulty, satisfaction, regret, and sense of being rushed regarding the choice. Next, participants completed the Perceived Awareness of the Research Hypothesis Scale (Rubin, 2016). Finally, participants responded to demographic items including social class, age, and gender.

Individual Difference Measures

Many of the measures in Study 2 were identical to those in Study 1, including the Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994), the Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a), the DASS (Lovibond & Lovibond, 2004), the Life Satisfaction Scale (Diener et al., 1985), the Regret and Maximisation Scales (Schwartz et al., 2002), and the General Self-efficacy Scale (Schwarzer & Jerusalem, 1995). Each of these measures is described in more detail in the Method section of Chapter 3.

I made a small adjustment to the wording of two of the maximisation items. I changed wording of one item from "renting videos is really difficult…" to "choosing something to watch is really difficult…" to account for the fact that video rentals are no longer particularly common. Similarly, the item "I find that writing is very difficult, even if it's just writing a letter to a friend…" was adjusted to refer to a "message" rather than a "letter."

I added several new items to the present study. One issue identified in Study 1 was that four out of the five items of the Regret Scale (Schwartz et al., 2002) ask participants non-valenced questions about the extent to which they reflect on previous decisions (e.g., "whenever I make a choice, I'm curious about what would have happened if I had chosen differently"). These questions do not adequately capture whether participants chronically experience *regret*, which involves a negative reassessment rather than merely reflection on previous decisions. To address this issue, I created three additional valenced items: "whenever I look back on a choice, I usually feel that I made the right decision (R)," "whenever I make a choice, I often think I should have made a different choice," and "if I make a choice and it turns out well, I don't feel it matters how other choices would have turned out (R)." In total, the measure of chronic decision regret included four un-valenced items, two positively worded items, and two negatively worded items.

Decision-making over the past month. As outlined in the introduction of this chapter, the decision distress hypothesis proposed by Roets and Soetens (2010) assumes that decision stress mediates the relation between the need and ability to achieve closure and mental health. However, chronic decision stress was not measured in Study 1. This was remedied in the present study by adding four items measuring the extent to which participants found their important decisions over the past month stressful: "I was quite anxious about the decision(s)," "I didn't worry too much about the decision(s) (R)," "I found the thought of making the decision(s) to be a bit stressful," and "I was quite relaxed about making the decision(s) (R)." The similarity between this measure, generalised self-efficacy, and the ability to achieve closure is discussed in the discussion section of this chapter and in Chapter 8.

As with Study 1, all the individual difference measures except for the DASS had a 7-point Likert-type response scale from *strongly disagree* (1) to *strongly agree* (7). The DASS had a response scale from *never* (0) to *almost always* (3).

Experimental Manipulation of Time Pressure and Choice Overload

As in Study 1, participants were told to imagine that they needed to spend $100 of their own money on one activity from a list. Participants were randomly assigned to a choice overload condition (high/low) and a decision time condition (fast/slow). The manipulation of choice overload was identical to that in Study 1: in the high overload condition, the list consisted of nine activities, while in the low overload condition, the list consisted of three activities. More details about the activities can be found in the Method section of Study 1.

The manipulation of decision time differed slightly from Study 1. Participants in the fast decision time condition were asked to:

> Read each description as quickly as possible. It should take about 2 minutes to decide which activity you would purchase. You will be asked to report how long you took to complete the task using the timer here. When you are ready to begin, open the link, start the timer, and click "next" below to view the list of activities [original emphasis].

Participants in the slow decision time condition received the same instructions, except that they were asked to "read each description carefully" (original emphasis) and were told that the decision should take them about five minutes. The link took participants to an online timer. Participants then viewed the list of activities, which was identical to that described in Study 1 (3 in the low choice condition and 9 in the high choice condition). On the following page, participants entered the number (1-9) associated with their chosen activity and the time they took to make the decision in minutes and seconds into separate text boxes.

This method of manipulating decision time is similar to Study 1, but the time estimates and request for participants to record their decision time were added to the original experimental design. This change was made so that I could determine whether participants who were asked to decide quickly did in fact decide in less time than those who were asked to think carefully. Two minutes and five minutes were chosen as the time limits in order to be consistent with previous research on the interaction between decision time and choice overload (Haynes, 2009).

State Variables. After making their choice and recording the time that their decision took, participants responded to the state version of the State-Trait Inventory for Cognitive and Somatic Anxiety (Ree et al., 2008) on a 7-point Likert-type scale from *strongly disagree* (1) to *strongly agree* (7). More detail about this measure can be found in the Method section for Study 1.

Participants then responded to the same four ad-hoc items from Study 1 measuring the extent to which they found the choice task to be frustrating and difficult, the extent to which they were satisfied with their choice, and the extent to which they regretted their choice. Two additional items were added to more comprehensively measure participants' regret ("I think I made the right decision" (R); "I wish I'd made a different decision"). Two reverse-scored items were added to better measure frustration and difficulty ("I found the activity choice task to be easy;" "I found the activity choice task to be pleasant"). Finally, two items measuring the extent to which participants felt rushed during the decision were also included ("I felt that I was rushed while making my choice;" "I feel that I had enough time to make a good choice"). As in Study 1, participants responded to each of these items on a Likert-type scale from *totally disagree* (1) to *totally agree* (9). As explained below, all the items relating to the decision were averaged to form a mean state decision appraisal variable in which higher scores reflected more negative evaluations of the decision.

Results

Preliminary Analyses

Missing data. The survey webpage flagged items that were left blank and prevented participants from continuing until they completed each item. Therefore, there was no missing data except for demographical variables that participants were permitted to leave blank if they were concerned about compromising their anonymity. Of the 208 participants, six declined to provide their age, and one declined to provide their ethnicity.

Normality. All skew and kurtosis values for the aggregate variables were no larger than ± 2.0. However, age had skewness of 2.26 (SE = 0.17) and kurtosis of 5.41 (SE = 0.34). After a log 10 transformation, the skewness became 1.69 (SE = 0.17) and the kurtosis became 2.30 (SE =

0.34). As with the previous study, while the kurtosis is still outside the normal range, I considered this improvement in normality sufficient because age was not a key variable.

Reliability. The Cronbach α coefficients for most of the aggregate measures were acceptable (αs ≥ .76; see Table 4.1). However, the lay beliefs about decision making measure had a Cronbach α of .65, and so results involving this variable should be interpreted with some caution. The justification for the composition of the new aggregate variables is outlined below.

Table 4.1

Key Variables: Means, Standard Deviations, and Cronbach αs

Variable	*M*	*SD*	α
Need for closure	4.39	0.60	.87
Ability to achieve closure	3.80	0.83	.88
Satisfaction with life	4.62	1.17	.84
Dispositional regret (revised)	4.15	0.87	.76
Dispositional self-efficacy	5.07	0.92	.92
DASS	15.57	11.17	.94
State anxiety	3.02	1.15	.94
Lay beliefs about decision-making	4.34	0.92	.65
Decision stress	4.59	1.13	.80
State decision appraisal	2.75	1.37	.90

Note. The need for closure, ability to achieve closure, satisfaction with life, regret, generalised self-efficacy, state anxiety, lay beliefs about decision-making, and decision stress scores were obtained by averaging participants' responses to the relevant items on a 7-point scale between *strongly disagree* (1) and *strongly agree* (7). The DASS scores were obtained by summing participants' responses to the relevant items from *never* (0) to *always* (3). The minimum possible DASS score is 0 and the maximum is 63. The decision appraisal scores were obtained by averaging participants' responses to the relevant items on a 9-point scale between totally disagree (1) *and totally agree* (9) such that higher scores reflected more negative appraisals.

Exploratory factor analyses. I conducted exploratory factor analyses on the measures I created or adjusted: regret, decision stress, decision appraisal, and decision beliefs.

Revised regret measure. As outlined in the Method section, I added three items to Schwartz's (2000) regret measure in this study. I therefore conducted a principal axis exploratory factor analysis to determine whether the new items loaded onto the same factor as the original items. The Kaiser-Meyer-Olkin measure of sampling adequacy demonstrated good sampling adequacy (.75) and Bartlett's test of sphericity was significant ($p < .001$), indicating that the regret items are related to each other.

Three factors had an eigenvalue greater than 1.0. However, a parallel analysis (Watkins, 2000) on 100 random datasets comprising of eight variables and 208 participants showed that only the first factor in the real dataset had an eigenvalue larger than the corresponding factor in the simulated dataset (3.07 and 1.34 respectively). Consequently, I specified the extraction of one factor using the Promax method of oblique rotation with a Kappa value of 3.

One of the items had a loading lower than the .40 cut-off recommended by Costello and Osborne (2005). The new item "if I make a choice and it turns out well, I don't feel it matters how other choices would have turned out" loaded only .32 onto the extracted factor. This might have occurred because this item was difficult to understand. I therefore removed the item. The remaining seven items loaded ≥ .41 on the extracted factor and this factor explained 30.43% of the variance.

Decision stress. I conducted a principal axis exploratory factor analysis on the four items that measured stress during decision-making over the past month (Kaiser-Meyer-Olkin = .76, Bartlett's test of sphericity $p < .001$). Only one factor had an eigenvalue greater than one, and a parallel analysis (Watkins, 2000) showed that only the first factor in the real dataset had an eigenvalue larger than the corresponding factor in the simulated dataset (2.52 and 1.14 respectively). I specified the extraction of one factor using the Promax method with a Kappa

value of 3 and found that all four items loaded ≥ .59 on the extracted factor, which explained 63.09% of the variance.

Decision beliefs. I conducted a principal axis exploratory factor analysis on the four items measuring the extent to which people believe that a fast choice is a bad choice (Kaiser-Meyer-Olkin = .51, Bartlett's test of sphericity $p < .001$). Two factors had eigenvalues greater than 1, but a parallel analysis (Watkins, 2000) showed that only the first factor in the real dataset had an eigenvalue larger than the corresponding factor in the simulated dataset (1.94 and 1.11 respectively). I specified the extraction of one factor using the Promax method with a Kappa value of 3 and found that all four items loaded ≥ .50 on the extracted factor, which explained 63.09% of the variance.

Decision appraisal. As outlined in the Method section, the decision appraisal measure consisted of the six decision appraisal items from the previous study and an additional four items. I therefore conducted an exploratory power analysis to check whether the new items loaded onto the same factor as the original items (Kaiser-Meyer-Olkin = .87, Bartlett's test of sphericity $p < .001$). Only one factor had an eigenvalue greater than one and a parallel analysis showed that only that factor in the real dataset had an eigenvalue larger than the corresponding factor in the simulated dataset (5.55 and 1.39 respectively). All 10 items loaded ≥ .47 on the extracted factor, which explained 50.93% of the variance.

Main Analyses

Correlations. The correlations between the key variables are reported in Table 4.2. Consistent with the hypotheses and findings of the previous study, I found that the need for closure was positively related to state anxiety (as measured after the choice task) and mental health problems over the past week (DASS). Also consistent with hypotheses and the previous

study, the ability to achieve closure was negatively related to state anxiety and DASS and positively related to SWL.

However, contrary to the previous study, the correlation between the need for closure and satisfaction with life was not significant. This may be due to the lower power in this study compared to the previous study because there were far fewer participants (N = 208 compared to N = 322 in the previous study). It is also worth noting that the sizes of all the correlations between the key predictor and outcome variables were smaller in the present study than they were in the previous study (rs in the present study ranged from |.03| to |.52|, M = .30 compared to |.19| to |.58|, M = .41 in the previous study).

Table 4.2

Correlations Between Key Variables

	2	3	4	5	6	7	8	9	10	11
1. NFCS	-.11	.25**	.08	.19**	.29**	-.21**	.06	.22**	.22**	-.03
2. AACSS		-.60**	-.52**	-.62**	-.50**	.54**	-.29**	-.52**	-.50**	.32**
3. Decision stress			.45**	.47**	.36**	-.40**	.30**	.43**	.45**	.19**
4. Decision beliefs				.44**	.27**	.36**	.36**	.19**	.25**	-.25**
5. Regret (revised)					.45**	-.46**	.41**	.46**	.43**	-.36**
6. Maximisation						-.14*	.17*	.32**	.26**	-.16*
7. Self-efficacy							-.40**	-.37**	-.38**	.41**
8. Negative decision appraisal								.33**	.33**	-.27**
9. State anxiety									.77**	-.43**
10. DASS										-.47**
11. SWL										

Note. NFCS = Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994). AACSS = Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). SWL = Life Satisfaction Scale (Diener et al., 1985). DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004).

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

Effects and interactions of the need and ability to achieve closure on mental health. I tested whether both need and ability predicted mental health when the other was accounted for and whether they interacted to predict mental health.

Consistent with the previous study's findings, need (b = 2.97, SE = 1.07, t = 2.77, p = .006) and ability (b = -6.36, SE = 0.78, t = -8.13, p < .001) both significantly predicted DASS scores, and there was no significant interaction (p = .997).

Also in line with the findings from Study 1, state anxiety was predicted by both need (b = 0.33, SE = 0.11, t = 2.87, p = .005) and ability (b = -0.71, SE = 0.08, t = -8.49, p < .001) to achieve closure, and there was no interaction effect (p = .297).

Finally, I tested whether the need and ability to achieve closure interacted to predict wellbeing. Again, in line with Study 1's findings, only ability to achieve closure significantly predicted satisfaction with life (b = 0.45, SE = 0.10, t = 4.68, p < .001). Need for closure and the interaction between need and ability were not significant predictors of satisfaction with life (ps ≥ .944). Consistent with the approach in the previous chapter, since need and ability do not interact to predict any mental health or wellbeing outcomes, their effects are reported separately throughout the remainder of this chapter.

Moderation Analyses. I checked whether regret, maximisation, self-efficacy, or social class moderated the relations between need or ability to achieve closure and the mental health outcome variables (DASS, state anxiety, and SWL). However, the results of these moderation analyses were generally either nonsignificant or inconsistent with the pattern of results found in the previous study. I am therefore unable to draw firm conclusions from these analyses, which are reported in Appendix B.

I also tested the predicted moderators that were new to the present study (decision responsibility, decision relief, and world stability). However, the results of each of these tests were not consistent with hypotheses. The tests are reported in Appendix B. A summary of the results reported in Appendix B, as well as the main mediation and moderation findings reported in the main text, can be found in the overview tables at the end of the results section of this chapter (Tables 4.8 and 4.9).

Mediation Analyses. As in the previous chapter, this section reports the potential mediators of (a) the relations between the need for closure and state anxiety and between need for closure and DASS scores and (b) the relations between the ability to achieve closure and DASS, state anxiety, and satisfaction with life. Because the need for closure did not predict SWL over and above the effects of the ability to achieve closure, I did not test any mediators of this relation.

Mediators of the relation between the need for closure and DASS. I tested Roets and Soetens' (2010) decision-making distress hypotheses by testing dispositional decision stress as a mediator of the relation between the need for closure and DASS scores. As shown in Table 4.3, and consistent with predictions, PROCESS Model 4 showed that there was a significant indirect effect through decision stress (b = 1.89).

Next, I tested whether the mediations identified in the previous study were replicated in the present study. In the previous study, regret, maximisation, and self-efficacy each mediated the relation between the need for closure and DASS scores when tested separately. As shown in Table 4.3, these mediation effects were replicated in the present study. However, when ability to achieve closure was included as a covariate, each of these three indirect effects became nonsignificant.

Table 4.3

Mediators of the Relation between the Need for Closure and DASS

Mediator	Effect type	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Decision Stress	Total	3.94 (1.23)	1.52, 6.35	-	3.21	.002
	Direct	2.05 (1.13)	-0.18, 4.27	-	1.81	.071
	Indirect	1.89 (0.65)	0.04, 0.18	0.11	-	-
Regret	Total	4.06 (1.22)	1.65, 6.47	-	3.32	.001
	Direct	2.69 (1.13)	0.47, 4.92	-	2.38	.018
	Indirect	1.36 (0.56)	0.27, 2.52	.08	-	-
Maximisation	Total	3.94 (1.23)	1.52, 6.35	-	3.21	.002
	Direct	2.67 (1.24)	0.23, 5.13	-	2.16	.032
	Indirect	1.26 (0.46)	0.47, 2.29	.07	-	-
Self-efficacy	Total	3.94 (1.23)	1.52, 6.35	-	3.21	.002
	Direct	2.62 (1.16)	0.33, 4.92	-	2.26	.025
	Indirect	1.31 (0.52)	0.34, 2.37	.07	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

I conducted a parallel mediation analysis in order to check whether some of these significant mediators are significant only due to shared variance with another of the mediators. I was particularly interested in whether the other mediators remained significant when decision stress was included in the parallel model. Consistent with predictions, the indirect effect of decision stress remained significant in the parallel mediation, $b = 1.20$, $SE = 0.40$, CSIES = .07. Consistent with the results of the previous study, the indirect effects of regret ($b = 0.63$, $SE = 0.37$, CSIES = .04) and self-efficacy ($b = 0.68$ $SE = 0.40$, CSIES = .04) remained significant at

the $p < .05$ level in the parallel mediation, while the effect of maximisation became nonsignificant.

The analysis was reconducted excluding participants who said either that they had completed the survey before or that they may have completed the survey before. In the reconducted analysis, only self-efficacy and decision stress remained significant mediators of the relation between the need for closure and DASS. This change in the pattern of results may have occurred because people who thought they had done the survey before responded differently to people who had not. However, this explanation is confounded by the reduction in statistical power after excluding the 33 participants who indicated that they had or may have done the survey before. It is also important to note that the debriefing that participants received regarding the non-experimental aspect of the study was very general. Consequently, even if participants mistakenly completed the same survey twice, the fact that they had been debriefed at the end of their first completion should not have had a large effect on their response patterns.

Consistent with the previous study, when ability to achieve closure was included as a covariate in the parallel mediation analysis, regret, maximisation, and self-efficacy were nonsignificant. However, decision stress remained significant, $b = 0.63$, $SE = 0.30$, CSIES = .04.

Moderated mediation of the relation between the need for closure and DASS. As outlined in the Introduction, I hypothesised that the relation between the need for closure and regret would be moderated by lay beliefs about decision-making. Specifically, I expected that the relation between need for closure and regret would be stronger for people who strongly believed that fast decisions are bad decisions and weaker for those who did not endorse this belief. These hypotheses reflect a potential moderated mediation model as shown in Figure 3.1.

As outlined above, regret significantly mediated the relation between the need for closure and DASS. However, contrary to predictions, lay beliefs about decision-making did not moderate the relation between the need for closure and regret (p = .499). Additionally, there was no moderated mediation effect at a $p < .05$ level when testing this hypothesis using PROCESS Model 7 (index of moderated mediation = -0.34, SE = 0.52, 95% CI [-1.40, 0.65]).

Mediators of the relation between ability to achieve closure and DASS. First, I tested whether decision stress mediated the relation between the ability to achieve closure and DASS scores. As shown in Table 4.4, and consistent with predictions, the indirect effect of decision stress was significant (b = -1.75).

I then tested the mediators from the previous study. Contrary to the previous study's findings, self-efficacy did not mediate the relation between ability to achieve closure and DASS (although it did mediate the relation when participants who said they had or may have completed the survey before were removed from the analysis). Consistent with the previous study's findings, maximisation also did not mediate the relation. However, contrary to the previous study's findings, but consistent with predictions, regret did mediate this relation (b = -1.59).

I entered both significant individual mediators of the relation between ability to achieve closure and DASS scores into a parallel mediation. I found that both decision stress and regret remained significant when included in the parallel mediation model. However, when participants who either said they had or may have completed the survey before were removed from the analysis, only regret was significant.

Table 4.4

Mediators of the Relation Between Ability to Achieve Closure and DASS

Mediator	Effect type	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Decision Stress	Total	-6.46 (0.79)	-8.01, -4.91	-	-8.22	< .001
	Direct	-4.72 (0.96)	-6.62, -2.81	-	-4.89	< .001
	Indirect	-1.75 (0.61)	-2.92, -0.55	-.14	-	-
Regret	Total	-6.46 (0.79)	-8.01, -4.91	-	-8.22	< .001
	Direct	-4.88 (0.99)	-6.84, -2.92	-	-4.91	< .001
	Indirect	-1.59 (0.64)	-2.94, -0.41	-.11	-	-
Maximisation	Total	-6.46 (0.79)	-8.01, -4.91	-	-8.22	< .001
	Direct	-6.34 (0.90)	-8.13, -4.56	-	-7.02	< .001
	Indirect	-0.12 (0.50)	-1.08, 0.92	N/A	-	-
Self-efficacy	Total	-6.46 (0.79)	-8.01, -4.91	-	-8.22	< .001
	Direct	-5.43 (0.92)	-7.25, -3.61	-	-5.88	< .001
	Indirect	-1.03 (0.63)	-2.28, 0.20	N/A	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Mediators of the relation between the need for closure and state anxiety. In the previous study, I found that regret, maximisation, self-efficacy, and sense of power mediated the effects of the need for closure on state anxiety. Consistent with Study 1, regret, maximisation, and self-efficacy mediated the relation between the need for closure and state anxiety (Table 4.5), and each became nonsignificant when the ability to achieve closure was included as a covariate. Decision stress (which was not tested in Study 1) was also a significant mediator of this relation

and was the only mediator to remain significant when all of the mediators were entered into a parallel model. In contrast to Study 1, decision appraisal did not mediate this relation.

Table 4.5

Mediators of the Relation Between Need for Closure and State Anxiety

Mediator	Effect type	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Decision Stress	Total	0.35 (0.12)	0.10, 0.61	-	2.71	.007
	Direct	0.13 (0.12)	-0.11, -0.38	-	1.05	.294
	Indirect	0.22 (0.07)	0.11, 0.38	.12	-	-
Regret	Total	0.38 (0.13)	0.11, 0.62	-	2.84	.005
	Direct	0.20 (0.12)	-0.04, 0.43	-	1.65	.101
	Indirect	0.17 (0.06)	0.06, 0.31	.09	-	-
Maximisation	Total	0.35 (0.13)	0.10, 0.61	-	2.71	.007
	Direct	0.15 (0.13)	-0.12, 0.41	-	1.10	.273
	Indirect	0.21 (0.07)	0.10, 0.36	.11	-	-
Self-efficacy	Total	0.35 (0.13)	0.10, 0.61	-	2.71	.007
	Direct	0.18 (0.13)	-0.07, 0.43	-	1.41	.161
	Indirect	0.18 (0.06)	0.07, 0.32	.09	-	-
Decision Appraisal	Total	0.35 (0.13)	0.10, 0.61	-	2.71	.007
	Direct	0.29 (0.12)	0.04, 0.53	-	2.33	.021
	Indirect	0.06 (0.05)	-0.03, 0.18	NA	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Mediators of the relation between ability to achieve closure and state anxiety. Dispositional decision stress mediated the relation between ability to achieve closure and state anxiety (Table 4.6; $b = -0.15$). This mediation effect became nonsignificant when the need for closure was included as a covariate, suggesting that the need for closure explains differences in the relation between ability to achieve closure and state anxiety more effectively than dispositional decision stress.

In the previous study, I found that maximisation and self-efficacy mediated the effect of the ability to achieve closure on participants' state anxiety after completing the choice task. However, as shown in Table 4.6, neither of these mediators was significant at the $p < .05$ level in the present study.

On the other hand, while regret did not mediate the relation between ability to achieve closure and state anxiety in the previous study, it did mediate this relation in the present study ($b = -0.18$).

When regret and decision stress were entered into a parallel mediation, only regret remained a significant mediator of the relation between the ability to achieve closure and state anxiety. When participants who said that they had completed the survey previously (seven participants) were removed from the analysis, both decision stress and regret were significant parallel mediators.

Finally, I checked whether state decision appraisal in relation to the choice task mediated the relation between the ability to achieve closure and state anxiety. Consistent with the previous study, there was a significant indirect effect of decision appraisal.

Table 4.6

Mediators of the Relation Between Ability to Achieve Closure and State Anxiety

Mediator	Effect type	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Decision Stress	Total	-0.73 (0.08)	-0.90. -0.56	-	-8.61	< .001
	Direct	-0.58 (0.10)	-0.78, -0.37	-	-5.53	< .001
	Indirect	-0.15 (0.07)	-0.28, -0.02	-.11	-	-
Regret	Total	-0.74 (0.08)	-0.91, -0.58	-	-8.85	< .001
	Direct	-0.56 (0.11)	-0.77, -0.35	-	-5.30	< .001
	Indirect	-0.18 (0.06)	-0.30, -0.06	-.03	-	-
Maximisation	Total	-0.75 (0.08)	-0.91, -0.59	-	-9.03	< .001
	Direct	-0.70 (0.10)	-0.89, -0.51	-	-7.34	< .001
	Indirect	-.05 (0.05)	-0.15, 0.05	N/A	-	-
Self-efficacy	Total	-0.75 (0.08)	-0.91, -0.59	-	-9.03	< .001
	Direct	-0.68 (0.10)	-0.88, -0.49	-	-6.89	< .001
	Indirect	-0.07 (0.06)	-0.19, 0.05	N/A	-	-
Decision Appraisal	Total	-0.72 (0.08)	-0.89, -0.56	-	-8.57	< .001
	Direct	-0.65 (0.09)	-0.82, -0.48	-	-7.48	< .001
	Indirect	0.08 (0.03)	-0.15, -0.02	-.06	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Mediators of the relation between ability to achieve closure and SWL. Finally, I considered potential mediators of the relation between the ability to achieve closure and satisfaction with life. As shown in Table 4.7, there was no significant indirect effect of decision stress at the $p < .05$ level.

Table 4.7

Mediators of the Relation between Ability to Achieve Closure and SWL

Mediator	Effect type	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Decision Stress	Total	0.45 (0.09)	0.27, 0.64	-	4.80	< .001
	Direct	0.46 (0.12)	0.27, 0.69	-	3.90	< .001
	Indirect	-0.01 (0.07)	-0.14, 0.12	N/A	-	-
Regret	Total	0.49 (0.09)	0.31, 0.68	-	5.26	< .001
	Direct	0.29 (0.12)	0.06, 0.53	-	2.46	.015
	Indirect	0.20 (0.08)	0.05, 0.36	.14	-	-
Maximisation	Total	0.47 (0.09)	0.29, 0.66	-	5.08	< .001
	Direct	0.48 (0.11)	0.27, 0.69	-	4.52	< .001
	Indirect	-0.01 (0.06)	-0.13, 0.11	N/A	-	-
Self-efficacy	Total	0.47 (0.09)	0.29, 0.66	-	5.08	< .001
	Direct	0.24 (0.11)	0.04, 0.45	-	2.30	.022
	Indirect	0.23 (0.07)	0.11, 0.37	.16	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

In the previous study, self-efficacy and maximisation mediated this relation. In the present study, as shown in Table 4.7, self-efficacy mediated the relation between ability to achieve closure and satisfaction with life, but maximisation did not. In contrast to the previous study's findings, regret also mediated the relation between ability to achieve closure and satisfaction with life.

When self-efficacy and regret were entered as parallel mediators of the relation between the ability to achieve closure and satisfaction with life, both remained significant.

Moderated mediation of the relation between the ability to achieve closure and mental health. I did not originally plan to test the moderated mediation model shown in Figure 3.1 with ability to achieve closure as the predictor. This is because the hypothesised model involves regret as the mediator, and regret did not mediate the relations between ability to achieve closure and mental health in the previous study. However, as shown above, regret mediated the relations between ability to achieve closure and each of the outcome variables in the present study.

Additionally, there is reason to believe that lay beliefs about decision speed would affect the relation between ability to achieve closure and regret. People with a low ability to achieve closure struggle to be decisive. However, this may result in less regret about their decisions if they believe that fast decisions are bad decisions. On the other hand, believing that fast decisions are *good* decisions may result in a stronger relation between the ability to achieve closure and regret.

I conducted an exploratory test with PROCESS Model 1 to determine if lay beliefs about decision-making moderated the relation between the ability to achieve closure and regret. There was no moderation effect (p = .257). Additionally, the index of moderated mediation for the whole proposed model was not significant for any moderated mediation models involving the ability to achieve closure as the predictor, regardless of the specific mental health outcome.

Effects of experimental manipulations on state anxiety and decision appraisal. The hypotheses regarding three-way interactions between the two experimental manipulations (choice overload and decision time) and need for closure or ability to achieve closure were not supported, and hence the results and discussion for this aspect of the study are in Appendix B rather than the main text.

Tables 4.8 and 4.9 below summarise the main mediation and moderation results from the present study.

Table 4.8

Overview of the Mediators and Moderators of the Relations between NFCS and Mental Health

Variable	Mental Health Outcome	Moderation	Moderation (controlling for AACS)	Mediation	Mediation (controlling for AACS)	Mediation (parallel)
Regret (revised)	DASS	N	-	**Y**	N	**Y**
	State anxiety	N	-	**Y**	N	**Y**
	SWL	N	-	-	-	-
Maximisation	DASS	N	-	**Y**	N	N
	State anxiety	N	-	**Y**	N	**Y**
	SWL	N	-	-	-	-
Decision stress	DASS	N	-	**Y**	**Y**	**Y**
	State anxiety	N	-	**Y**	**Y**	**Y**
	SWL	N	-	-	-	-
Self-efficacy	DASS	N	-	**Y**	N	**Y**
	State anxiety	N	-	**Y**	N	**Y**
	SWL	N	-	-	-	-
Social class	DASS	N	-	-	-	-
	State anxiety	N	-	-	-	-
	SWL	N	-	-	-	-
Decision appraisal	State anxiety	N	-	N	-	-

Note. There is no column for moderation (controlling for AACS) because none of the proposed moderators were significant before controlling for AACS.

Table 4.9

Overview of the Mediators and Moderators of the Relations between AACSS and Mental Health

Variable	Mental Health Outcome	Moderation	Moderation (controlling for NFCS)	Mediation	Mediation (controlling for NFCS)	Mediation (parallel)
Regret (revised)	DASS	N	-	Y	Y	Y
	State anxiety	N	-	Y	-	Y
	SWL	N	-	Y	Y	Y
Maximisation	DASS	N	-	N	-	-
	State anxiety	N	-	N	-	-
	SWL	N	-	N	-	-
Decision stress	DASS	N	-	Y	Y	Y
	State anxiety	N	-	Y	N	N
	SWL	N	-	N	-	-
Self-efficacy	DASS	N	-	N	-	-
	State anxiety	Y	N	N	-	-
	SWL	Y	Y	Y	Y	Y
Social class	DASS	N	-	-	-	-
	State anxiety	N	-	-	-	-
	SWL	N	-	-	-	-
Decision appraisal	State anxiety	N	-	Y	Y	-

Discussion

In the previous study, I made three key findings: (a) mental health problems are negatively related to the ability to achieve closure and positively related to the need for closure, (b) wellbeing is predicted by the ability to achieve closure but not by the need for closure, and (c) self-efficacy mediated the relations between the need/ability to achieve closure and mental health, while regret mediated the relation between the need for closure and mental health. In the present study, the first two sets of findings were replicated using a confirmatory approach in contrast to the exploratory approach of the previous study. The confirmatory approach allowed me to reach more confident conclusions compared to Study 1. As described below, the mediation findings differed slightly in this study compared to Study 1.

The present study also expanded on these findings by investigating additional potential mechanisms through which the need and ability to achieve closure relate to mental health. Specifically, I investigated whether decision stress mediated the relations between the need/ability to achieve closure and mental health, and whether the mediation effect of decision stress accounted for the mediations by other decision-making variables. I also considered whether lay beliefs about decision-making moderated the relations between the need/ability to achieve closure and regret. Each of these analyses is discussed in more detail below.

Associations of Need/Ability to Achieve Closure with Mental Health and Wellbeing

Consistent with the previous study, linear regression models showed that both DASS and state anxiety were negatively predicted by the ability to achieve closure and positively predicted by the need for closure. Also consistent with the previous study, satisfaction with life was predicted by the ability to achieve closure but not by the need for closure (once ability was taken into account).

These results suggest that both need and ability are important for predicting mental health problems, but the ability to achieve closure is a more important predictor of wellbeing. Hence, the ability to achieve closure may be a more important target than the need for closure for interventions to improve mental health more broadly. However, longitudinal research is required to understand the temporal relations between these variables.

The Mediating Effects of Decision Stress

Roets and Soetens' (2010) decision-making distress hypothesis suggests that decision stress explains why people with a high need for closure or low ability to achieve closure experience poorer mental health. In the present study, I tested decision stress as a mediator of these relations.

I found that decision stress mediated the relation between the need for closure and DASS scores and between the need for closure and state anxiety. Decision stress remained a significant mediator when included in a parallel mediation with regret and self-efficacy (and maximisation in the case of state anxiety as an outcome variable).

In single-mediator models, decision stress also mediated the relation between ability to achieve closure and both (a) DASS scores and (b) state anxiety. However, when regret was included in the models as a parallel mediator, decision stress was only a significant mediator of the relation between the ability to achieve closure and DASS. In the parallel model, decision stress no longer mediated the relation between the ability to achieve closure and state anxiety.

Hence, the results suggest that decision-making stress cannot completely explain why people with a high need for closure or low ability to achieve closure have poorer mental health. Both regret and self-efficacy remained significant in some parallel models, demonstrating that they explain additional unique variance in these relations.

It is also important to note that there are conceptual similarities between the ability to achieve closure and decision stress. Many items measuring the ability to achieve closure refer to stress or difficulty during decision-making (e.g., "I often experience stress when I have to reach a clear-cut decision,"), although some refer to discomfort *after* decision-making (e.g., "even after I have reached a decision, I continue to think about the pros and cons in order to make sure that I did not make a mistake"). Consistent with this conceptual similarity, there was also a high correlation between the two scales (r = -.60). Therefore, as with self-efficacy, it is possible that the mediating effect of decision stress on relations involving the ability to achieve closure as a predictor are due to a lack of divergent validity rather than a distinct psychological mechanism.

The Mediating Effects of Self-efficacy and Regret

The results regarding the mediating effect of self-efficacy were mixed. Consistent with the findings of the previous study, self-efficacy was a significant parallel mediator of the relation between the need for closure and DASS scores (even when accounting for regret). Self-efficacy also mediated the relation between the ability to achieve closure and satisfaction with life (along with regret) but was not a significant parallel mediator of the relations between ability to achieve closure and DASS or state anxiety after accounting for decision stress and regret.

This lack of mediation may be because of the reduced power in the present study compared to the previous study (208 participants vs 322 participants). However, as outlined in the Discussion of the previous chapter, self-efficacy is closely conceptually related to the ability to achieve closure. Self-efficacy is therefore not a particularly informative mediator of relations between the ability to achieve closure and the outcome variables from a theoretical perspective. Hence, I focused more strongly on regret as a mediator of these relations.

As noted above, regret significantly mediated the relation between the need for closure and DASS scores even after accounting for self-efficacy. Additionally, although regret did not mediate these relations in the previous study, the revised regret measure mediated the relations between the ability to achieve closure and each of the outcome variables. Regret remained significant in all parallel mediation models accounting for self-efficacy and/or decision stress.

These results suggest that people with a high need for closure or low ability to achieve closure experience more regret about their decisions and that this regret leads to poorer mental health and wellbeing both immediately after decision-making (i.e., state anxiety) and in general. Importantly, this mediation effect was significant even after accounting for decision stress, suggesting that feelings after decision-making may also be important mechanisms in the relations between need/ability to achieve closure and mental health. Hence, an extension of Roets and Soetens' (2010) decision distress hypothesis may be necessary in order to take these findings into account. Because the original Regret Scale (Schwartz et al., 2002), which includes mainly nonvalenced items, did not mediate the relations between ability to achieve closure and mental health in the previous study, the mediation effect may be specific to feelings of personal responsibility for negative outcomes of decisions rather than merely revisiting past decision-making situations.

Moderated Mediation of the Relations between the Need/Ability to Achieve Closure and Mental Health

The consistent findings of regret as a mediator of the relations between need/ability to achieve closure and mental health suggest that the experience of regret is an important mechanism linking cognitive styles and mental health. However, the reasons that people with a high need or low ability to achieve closure experience more regret are still unclear. In the present

study, I investigated one potential moderator of the relation between the need for closure and regret: people's beliefs about decision-making. People who have a high need for closure tend to rush through decision-making (Evans et al., 2017). At the same time, regret can stem from negative perceptions of the decision process and not merely the outcome (Connolly & Reb, 2005). Hence, people with a high need for closure should experience more regret when they more strongly believe that a quick decision is a bad decision. However, this hypothesis was not supported; lay beliefs about decision-making did not moderate the relation between need for closure and regret.

I also considered whether lay beliefs about decision-making might moderate the relation between the ability to achieve closure and regret. People with a low ability to achieve closure tend to struggle with decisiveness. This may be less likely to result in regret if they believe that a quick decision is a bad decision (and hence that taking longer results in better decisions). However, lay beliefs about decision-making also failed to moderate the relation between the ability to achieve closure and regret.

A methodological explanation for this lack of moderation relates to the psychometric properties of the lay beliefs about decision-making measure. The measure did not meet the acceptable threshold for reliability (Cronbach $\alpha = .65$). It should also be noted that the correlations between the lay beliefs measure and other measures such as decision stress ($r = .45$) were fairly high, suggesting a lack of divergent validity for the measure of lay beliefs about decision-making.

A more theoretical explanation for the lack of a moderation effect is that people with a high need for closure may not perceive themselves to be quick decision-makers. People with a high need for closure tend to be more confident in their decisions and to spend objectively less

time decision-making (e.g., Evans et al., 2017). However, there does not seem to be any previous research about the relation between the need for closure and subjective sense of decision-making speed. It is possible that, although they are objectively fast decision-makers, those people with a high need for closure do not perceive themselves to be fast decision-makers. Due to the aversiveness of decision-making for people with a high need for closure, they are likely to feel that even short amounts of time spent decision-making are sufficient. Hence, they may perceive their decision-making to be relatively slow. If so, then people with a high need for closure who strongly believe that a quick decision is a bad decision would not experience more regret because they do not believe that they make quick decisions. Therefore, the predicted interaction between need for closure and lay beliefs on regret would not eventuate. Unfortunately, I cannot test this explanation with the existing data because I did not measure the extent subjective decision-making speed.

A different approach is required to explain the fact that lay beliefs about decision-making did not moderate the relations between the ability to achieve closure and regret. By the nature of items in the Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994b), people who score low on this measure are aware that they make decisions slowly. Perhaps hesitation and indecisiveness, which are characteristic of a low ability to achieve closure, are stressful even if one believes that thinking about a decision for a long time is necessary to make a good decision. That is, there is a distinction between a slow decision and one that is characterised by self-doubt, frustration, and difficulty. Although the latter type of decision is slow, not all slow decisions involve difficulty and frustration. Hence, this indecision may lead to regret even if, in general, one believes that slow decisions tend to be better.

Overall, this study demonstrated the importance of looking beyond decision stress and considering other decision-related factors that may help to explain the relations between need/ability to achieve closure and mental health. Regret was the most consistent mediator of these relations. Hence, the rest of the thesis therefore focuses mainly on understanding the mediating role of regret.

It is still unclear why people with a high need or low ability to achieve closure experience more regret than those with low need or high ability. Learning more about the type of regret that is experienced by those with a high need for closure or low ability to achieve closure may help shed light on this question. For example, if people with a high need for closure experience regret related to the option they chose, but not the decision-making process, then this would suggest that people with a high need for closure do not perceive the relatively fast speed of their decisions (Evans et al., 2017) to detract from their quality. The next study therefore investigated the types of regret experienced by those with a high need or low ability to achieve closure.

CHAPTER 5

STUDY 3:

FOCUSING ON DECISION REGRET, STRESS, AND IMPORTANCE

In Study 2, regret consistently mediated the associations between the need and ability to achieve closure and mental health. That is, people with a high need for closure or low ability to achieve closure reported higher levels of chronic regret, which mediated their poorer mental health. Decision stress also mediated the associations between need and ability to achieve closure and DASS. Specifically, people with a high need for closure or low ability to achieve closure reported experiencing more stress during decision-making over the past month, which mediated their poorer mental health in the past seven days. In the present study, I further investigated the roles of both regret and decision stress in contributing to the poorer mental health of people with a high need for closure or low ability to achieve closure.

Types of Regret

The connection between regret and poorer mental health is intuitively clear. Consistently feeling that one has made poor decisions and feeling a personal responsibility for those choices is likely to be associated with feeling more depressed regarding past decisions and more anxious about the potential of making poor decisions in the future. Research has confirmed that regret is associated with poorer mental health. For example, counterfactual thinking, which is one aspect of regret, is related to social anxiety (Kocovski, Endler, Rector, & Flett, 2005). Regret in late life is associated with depression and attempted suicide (Bruine de Bruin, Dombrovski, Parker, & Szanto, 2016). Further, the reduction of repetitive negative thinking (of which chronic regret is a type) reduces depression and anxiety (Topper, Emmelkamp, Watkins, & Ehring, 2017).

However, the links between need/ability to achieve closure and regret are less clear. In the present study, I investigated the types of regret experienced by such people to form a clearer understanding of these relations.

Option regret. Option regret refers to the sense that the chosen option was not appropriate, and the wish that a different option had been chosen instead (Connolly & Reb, 2005)[2]. High levels of option regret result in more depressive symptoms (Broomhall & Phillips, 2018). People with a high need for closure may experience more option regret because they tend to make decisions quickly and without fully considering all the alternatives (e.g., Evans et al., 2017). This tendency means that they are more likely to make suboptimal decisions that result in poor outcomes, as outlined in the objective decision quality hypothesis in the General Introduction. Hence, they may experience frequent option regret. I therefore expected that option regret would mediate the relation between the need for closure and mental health.

There are no established links between the ability to achieve closure and decision time. However, the items in the Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a) suggest that one aspect of a low ability to achieve closure is the tendency to make decisions slowly (e.g., "I tend to hesitate when I have to make an important decision even after thinking a lot about it"). Hence, people with a low ability to achieve closure may experience *less* option regret, since they take a lot of time to make decisions. However, as noted in the previous chapter, not all slow decisions are frustrating and difficult. It is possible for someone to think through a decision slowly and carefully without feeling frustrated that the decision has not yet been finalised. In the same way, although people with a low ability to achieve closure make decisions slowly, their

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2 This is sometimes referred to as "outcome regret." However, some researchers have pointed out that regret about the option that was chosen is distinct from regret about the consequences of choosing that option (Connolly & Reb, 2005). I have therefore preferred the term "option regret."

slow speed is likely to reflect a lack of self-confidence rather than a careful and systematic review of the options. Hence, their slow decision speed does not preclude people with a low ability to achieve closure from experiencing option regret.

Further, some aspects of a low ability to achieve closure are likely to increase the experience of option regret. People with a low ability to achieve closure tend to keep thinking about their decisions after they are made (e.g., "even after I have reached a decision, I continue to think about the pros and cons in order to make sure that I did not make a mistake"). This continued rumination might lead to identifying or imagining more preferable options later and therefore cause high levels of option regret. Consequently, although people with a low ability to achieve closure make decisions slowly, they are still likely to experience option regret.

Process regret. According to decision justifiability theory (Connolly & Zeelenberg, 2002), regret arises not only from suboptimal outcomes of a decision, but also from a sense that the decision was unjustifiable. One of the major components of justifiability is the extent to which the decision was competently and carefully made; that is, the decision process.

As with option regret, process regret has also been associated with poorer mental health, although the causal direction of the relation is not clear. For example, people with current depressive symptoms experience more regret (compared to people who had never been depressed) regarding a decision that had no negative consequences but was not well thought through (Kraines, Krug, & Wells, 2017). However, the researchers were unable to determine whether increased self-blame contributes to depression, or whether it is a consequence or symptom of depression.

In the present study, I investigated two types of process regret: underconsideration regret and overconsideration regret (Lee & Cotte, 2009). *Underconsideration* regret refers to regret that

one did not spend enough time and effort considering the alternatives before making a decision. On the other hand, *overconsideration* regret refers to regret that one wasted unnecessary time and effort on a decision.

People with a high need for closure may experience more underconsideration regret because their decision-making preferences are at odds with the generally accepted wisdom that quick decisions are bad decisions (Ariely & Zakay, 2001). On the other hand, as noted in the previous chapter, people with a high need for closure find decision-making situations aversive. Hence, they may consider any amount of time spent in these situations to be excessive. This would result in a positive relation between need for closure and overconsideration regret. Hence, it is not clear whether a high need for closure should result in more underconsideration regret or more overconsideration regret.

As noted above, people with a low ability to achieve closure tend to make decisions slowly, which may result in overconsideration regret. However, due to their low confidence in decision-making, such people may feel that they should have spent additional time on their decisions. Therefore, as with the need for closure, it is not clear whether the ability to achieve closure should be associated with overconsideration regret or underconsideration regret.

Decision Stress

The second aim of the present study was to investigate the role of decision-making accumulation in the relations between the need/ability to achieve closure and mental health. Roets and Soetens (2010) suggested that the accumulation of decision-making stress contributes to the poorer mental health of people with a high need for closure or a low ability to achieve closure. Consistent with this suggestion and with other researchers' experimental findings (Roets & Van Hiel, 2008), in Study 1, I found that participants' appraisal of the decision they made

during the study mediated the relations between need/ability to achieve closure and state anxiety. Similarly, in Study 2, decision stress over the past month mediated the relations between need/ability to achieve closure and mental health. Specifically, people with a high need for closure or low ability to achieve closure experienced higher levels of decision stress over the past month, which mediated their poorer mental health over the past seven days.

However, these findings do not line up precisely with Roets and Soetens' (2010) decision distress hypothesis. Roets and Soetens suggested that it is the *accumulation* of decision stress over many decisions that causes the relation between the need/ability to achieve closure and mental health. I could not test this idea in the previous experimental studies because I only asked participants to make a single decision. Hence, in the present study, I asked participants to make a series of decisions and report the stress and difficulty associated with each decision. If Roets and Soetens' explanation is correct, then people with a high need for closure or low ability to achieve closure should report increased decision stress and difficulty for later decisions than for earlier decisions. Therefore, the relation between presentation order and decision stress should be positive and larger for people with a high need for closure/low ability to achieve closure than for people with a low need/high ability.

I also expected that decision stress and difficulty would mediate the relations between the need/ability to achieve closure and state anxiety and affect. This would be consistent with the previous studies' findings that decision stress over the past month mediates the relation between need/ability to achieve closure and mental health.

I extended on the decision-making distress hypothesis by examining sensitivity to decision importance. People with a high need for closure or low ability to achieve closure find decision-making stressful in general. Hence, their stress in decision-making situations may be

less dependent on the importance of the decision than it is for people with a low need or high ability. This is because they are already relatively stressed and therefore there is a limit to how much their stress levels can increase in response to more important decisions. I therefore expected to find interactions between need/ability to achieve closure and decision importance on decision stress. People with a high need or low ability should experience relatively high stress across all decisions, regardless of decision importance. On the other hand, people with a low need or high ability should experience higher stress for more important decisions and less stress for less important decisions. Therefore, I expected to find a stronger relation between need/ability and decision stress for low importance decisions than for high importance decisions.

The present study also included a novel manipulation of the need for closure in order to test whether specific aspects of the need for closure result in higher decision stress compared to others. However, manipulation checks revealed that the manipulation of need for closure was unsuccessful, and so for the sake of brevity, this manipulation will not be discussed further. A full explanation of this aspect of the study and its results are contained in Appendix C. The analyses regarding the hypotheses outlined above were performed on dispositional need for closure data.

In summary, the present study expanded on the previous studies by measuring different types of regret. I hypothesised that option regret would mediate the relations between need/ability to achieve closure and mental health. I did not have specific hypotheses about the relations between need/ability and underconsideration or overconsideration regret. Hence, I conducted exploratory analyses regarding to the roles of underconsideration and overconsideration regret in the relations between the need/ability to achieve closure and mental health.

The present study also expanded further on the findings regarding decision stress from the previous studies. Participants were asked to make a series of decisions in order to test the idea that decision stress accumulates for those with a high need or low ability to achieve closure, and whether this stress mediates their poorer mental health. The decisions differed in importance to test whether people with a high need or low ability are less sensitive to decision importance.

Method

Participants and Design

Participants were undergraduate students at the same large Australian public university as the participants for Studies 1 and 2. A total of 508 participants attempted the survey. Three hundred and twenty-four of these participants were students recruited from large non-psychology courses. These students were given the opportunity to enter a prize draw to win one of 15 $150 eGift vouchers at the end of the survey. The remaining 95 participants were psychology students recruited from a second-year social and personality psychology course who completed the study as an optional part of their coursework.

Of the 508 participants who attempted the survey, 163 did not reach the informed consent question (143 non-psychology participants and 23 psychology participants), and a further four declined their consent for their data to be used (three non-psychology participants and one psychology participant). Consequently, the total number of useable responses was 249 (178 non-psychology and 71 psychology).

The main mediation variable in this study was decision appraisal. Decision appraisal was also measured (though differently) in Study 1. Study 1 also included a measure of state anxiety, which was included in the present study. Therefore, I used the relevant relations from Study 1 to calculate the achieved power for detecting the mediating effect of decision appraisal on the

relation between the need for closure and state anxiety. I based the mediation power analysis on the correlations between the need for closure and state decision appraisal (r = .20), the need for closure and state anxiety (r = .34), and state decision appraisal and state anxiety (r = .43). Using 1000 replications and 20,000 Monte Carlo draws per replication and with a 95% confidence level, the Monte Carlo power analysis for indirect effects (Schoemann et al., 2017) showed that a dataset with 249 participants had a power of .88 to detect indirect effects of the size indicated by these correlations. Hence, the sample was large enough to detect the types of mediation effects that were being investigated in this study.

Of the 249 participants, 75 were men (30%) and 174 were women (70%). No participants selected "other" for gender. Participants had a mean age of 24.48 years (SD = 8.83). With regards to ethnicity, 90% of participants identified as White, 3 % as Asian, 3% as Aboriginal or Torres Strait Islander, and 4% as "other" (no participants selected "African"). Most participants were from the Education and Arts faculty (41.78%), followed by Science (27 %; this faculty includes the School of Psychology), Engineering and Built Environment (15%), Business and Law (5 %), and Health and Medicine (2%). The remainder belonged to faculties that were not listed (6 %) or did not know their degree's faculty (3%).

The experimental aspect of the study utilised a between-subjects design with six conditions and a cross-sectional, correlational component made up of quantitative, self-report state and dispositional measures. Participants were presented with a vignette at the beginning of the survey that was intended to elicit either high need for closure (five conditions: high discomfort with ambiguity, high closedmindedness, high need for decisiveness, high need for order, and high need for predictability) or a low need for closure. Participants then responded to twelve dilemmas and rated the stress and difficulty associated with each decision. State measures

of need for closure, decision stress, decision difficulty, anxiety, and positive and negative affect followed. Dispositional variables were measured at the end of the survey (need for closure and ability to achieve closure).

Procedure

The self-report questionnaire was titled "Personality and Moral Decision-Making," and was presented to participants online. In the information statement, participants were told that the study was investigating how certain personality variables predict people's decision-making. Participants who were not completing the survey as part of their coursework were also told that, on completion, they could enter a prize draw for an eGift voucher.

The need for closure manipulation vignettes appeared at the beginning of the survey. Participants were randomly assigned to one of the five experimental conditions (one condition for each aspect of the need for closure) or to the low need for closure condition. Each participant read the vignette corresponding to their experimental condition and then wrote about how they felt about the negative aspects of the situation described in the vignette. Participants could not move on from this section unless they had written 50-500 characters. All participants then completed a manipulation check that consisted of five items from the Need for Closure Scale adjusted to measure state rather than dispositional need for closure. Because the manipulation was unsuccessful, it is explained in more detail in Appendix C.

After completing the manipulation check, participants responded to a series of 12 moral and nonmoral dilemmas, which were presented in a random order for each participant. For each dilemma, participants read a short vignette with two possible choices at the end. Participants chose one of the two options and rated the stress and difficulty of making their choice before moving onto the next dilemma.

Participants then completed the state version of the 21-item State-Trait Inventory for Cognitive and Somatic Anxiety (Ree et al., 2008; for a detailed description, see Study 1) and the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The state anxiety measure and the PANAS were presented in a random order for each participant. The anxiety scale and the negative affect subscale of the PANAS were considered measures of state mental ill-health and the positive affect subscale of the PANAS was considered a measure of state wellbeing.

Next, participants responded to 12 questions regarding regret about the choices that they made in the dilemma task (Lee & Cotte, 2009). These questions measured foregone alternative regret (i.e., option regret) and both over- and under-consideration regret (i.e., process regret). The regret items were presented in a random order for each participant.

Participants were then asked how well they remembered their feelings about the story that they read at the beginning of the survey. They responded on a 5-point scale from *extremely well* (1) to *not well at all* (5). Participants then completed the trait measures of the need for closure and the ability to achieve closure. Finally, participants responded to the same demographic items that were included in Study 2.

Dilemmas

Participants were presented with 12 dilemmas. There were four categories of dilemmas differing in emotion content and importance of outcomes: non-moral dilemmas, everyday low emotion moral dilemmas, moral-impersonal dilemmas, and moral-personal dilemmas. There were three dilemmas in each category. All the dilemmas were sourced from a study about emotional engagement in moral judgement (Greene, Sommerville, Nystrom, Darley, & Cohen,

2001) except for the everyday low emotion moral dilemmas, which I created. Each dilemma had two potential responses, and participants had to select one of the two options.

The nonmoral dilemmas described situations in which both courses of action had advantages and disadvantages, but with no moral reasoning aspect. For example, in one nonmoral dilemma, participants were asked whether they should buy a new computer now, or wait a month and buy the computer at half price.

The everyday moral dilemmas described situations that involved a moral aspect but that did not involve high stakes or heightened emotions. For example, one dilemma asked participants whether they would leave a message for a person whose car they had slightly scratched.

The moral-impersonal dilemmas described situations that involved a moral aspect as well as high stakes but did not involve personal contact with the people who would be affected by the decision. For example, participants had to decide whether they should direct the Bureau of Health to recommend the use of a vaccine that provides immunity from a deadly disease to the vast majority of vaccinated people, but also causes the same disease in a small number of vaccinated people.

Finally, the moral-personal dilemmas described high stakes moral situations in which the actor would have some level of personal contact with the people affected by their decision. These included classic philosophical dilemmas such as Sophie's Choice, in which a person has to choose one of their two children to live, otherwise both children would be killed.

For each dilemma, participants were asked "what is the most appropriate course of action?" They had to choose one of the two options and then rate the stressfulness and difficulty

of the decision that they had just made on a 9-point scale from *totally disagree* (1) to *totally agree* (9).

State Variables

In order to measure state anxiety and state affect, participants completed the state version of the State-Trait Inventory for Cognitive and Somatic Anxiety (Ree et al., 2008) and the 20-item Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). A detailed description of the state anxiety measure is available in Chapter 3.

For the PANAS, participants were asked to "indicate to what extent you feel this way right now, at this precise moment in time." Each item was a single word describing a feeling or emotion. Positive affect words included "interested," "excited", "alert", and "inspired." Negative affect words included "distressed," "upset," "guilty," and "hostile". The words were presented in a random order for each participant. Participants responded to each word on a 5-point scale from *very slightly or not at all* (1) to *extremely* (5).

Participants' state regret about their responses to the dilemmas was measured by 12 items that were sourced from the Post-Purchase Consumer Regret Scale (Lee & Cotte, 2009). The items were adjusted to be relevant to dilemmas (rather than consumer products as in the original scale). Participants were asked to respond to the regret items while "looking back over the moral decisions that you just made." Questions targeted three types of regret: option regret (e.g., "if I were to do this task again, I would make different choices), underconsideration regret (e.g., "I regret not putting enough thought into my decisions"), and overconsideration regret (e.g., "I expended too much effort in making my decisions"). Participants responded on a 7-point scale from *strongly disagree* (1) to *strongly agree* (7).

Dispositional Variables

Participants completed the Brief Need for Closure Scale (Roets & Van Hiel, 2011b) and the Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a; for more details, see Study 1). In order to capture dispositional need and ability to achieve closure (rather than the manipulated state need and ability), participants were instructed that "the following questions are about how you feel IN GENERAL. Please think about how you usually feel when answering these questions." The Brief Need for Closure Scale consists of three items from each of the five subscales as opposed to the 41 items in the full scale. The brief scale was used instead of the full scale because many of the participants were non-psychology university students who would be less familiar with completing long surveys than psychology students, and therefore more likely to drop out of the study if the survey was too long. The items in each scale were presented in a random order for each participant. Participants responded on a 7-point scale from *strongly disagree* (1) to *strongly agree* (7).

Results

Preliminary Analyses

Missing data. The survey software was configured prevent participants from continuing to the next page of the survey unless they had responded to all items on the current page (except for some demographic items that they were able to leave blank). However, due to an error in the survey configuration, the first nine participants did not complete any of the regret items. Consequently, those participants are not included in any analyses involving the regret measure.

Exploratory factor analyses.

Regret. The factor structure of regret measure used in the present study was validated by its creators using both an exploratory and a confirmatory factor analysis (Lee & Cotte, 2009). However, I decided to conduct my own exploratory factor analysis on the scale for two reasons.

First, the scale was originally intended to measure post-purchase consumer regret. In the present study, the items were reworded in order to be appropriate for measuring regret regarding moral and nonmoral decisions. Participants did not receive any feedback on their choices, and there were no consequences of their decisions. These circumstances meant that the items and the context in which regret was measured were different from the original measure and context in which the scale was validated.

Second, due to an error in creating the survey, one underconsideration item was more likely to measure option regret. In the survey, the item incorrectly read "I feel that I could have made better decisions," but was supposed to read "*with more effort* [emphasis added], I feel that I could have made better decisions." Due to these changes to the scale, it was more appropriate to investigate its factor structure rather than to rely on the previously validated factor structure.

The items were intended to measure three aspects of regret: option regret, overconsideration regret, and underconsideration regret. I performed a principal axis exploratory factor analysis to determine whether the items would load onto three factors (Kaiser-Meyer-Olkin = .93, Bartlett's test of sphericity $p < .001$). However, only two factors had an eigenvalue greater than 1.0, and a parallel analysis (Watkins, 2000) showed that only the first two factors in the real dataset (6.36 and 1.30) had eigenvalues larger than the corresponding factors in the simulated dataset (1.36 and 1.27).

I therefore specified the extraction of two factors using the Promax method (Kappa value of 3). All four of the items about option regret and three of the four underconsideration regret

items loaded ≥ .61 onto one factor. I therefore created one 7-item subscale combining the option and underconsideration items, which I named "option/underconsideration regret". All four overconsideration items loaded ≥ .74 onto a separate factor. All cross-loadings were ≤ .15.

One item (originally from the underconsideration subscale) did not load above the .40 threshold onto either extracted factor. The item "I feel that with more information, I could have made better decisions" loaded .21 onto the option/underconsideration regret factor and -.02 onto the overconsideration factor. This item probably did not fit clearly into either factor because it is about something outside participants' control (the amount of information provided) rather than their own responsibility for the decision that they made.

It is interesting that option regret and underconsideration regret loaded together onto the same factor. This may be because the most obvious explanation for high option regret is that, on thinking about it further, the individual decided a different option was more appropriate. Consequently, they would also regret not thinking hard enough about the decision at the time to make the correct choice. That is, participants would experience underconsideration regret due to experiencing option regret and would therefore report high levels of both. I also checked the correlation between the original option and underconsideration regret subscales and found that it was very high ($r = .78$), confirming that it is appropriate to put these items into a single subscale.

It should also be noted that there was a moderate to high correlation between option/underconsideration regret and overconsideration regret ($r = .65$, $p < .001$). This is unexpected, because it suggests that people who experienced regret about under-thinking their decisions also experienced regret about *over-thinking* their decisions. This might have occurred because people who are prone to regret in general might experience overconsideration regret about some decisions and underconsideration regret about others, while people who are not

prone to regret would not experience either type of regret. This would result in a positive correlation between option/underconsideration regret and overconsideration regret. Due to the lack of divergent validity, results involving the regret subscales should be interpreted with some caution.

Decision stress and difficulty. I conducted split-half reliability analyses on participants' stress and difficulty ratings for each of the 12 dilemmas to determine if it was appropriate to create a single "decision appraisal" rating per dilemma. The 12 split-half reliability analyses indicated that participants' stress and difficulty ratings were strongly related to one another for each dilemma (all Spearman-Brown coefficients ≥ .80). Therefore, I averaged each participant's stress and difficulty ratings to create a single decision appraisal variable for each dilemma. These variables were used in analyses comparing the effects of different dilemma categories.

Next, I considered whether the 12 decision appraisal score for each participant could be aggregated into a single overall decision appraisal score across all decisions. It is important to note that I expected both within-subject variation and between-subject variation in participants' appraisals. I expected within-subjects variation to occur due to the different categories of dilemmas: on average (across all participants), I expected the moral personal dilemmas to be the most negatively appraised and the nonmoral dilemmas to be the least negatively appraised. This variation across dilemmas means that the decision appraisal ratings may not fit neatly into a single factor; some dilemmas were intended to be more difficult and stressful than others.

On the other hand, I also expected between-subjects variation in stress and difficulty ratings. This variation was expected to be associated with individual differences in the need and ability to achieve closure such that, on average (across all dilemmas), people with a high need or low ability to achieve closure experienced more decision stress and difficulty than people with a

low need or high ability to achieve closure. Because of my interest in this between-subjects variation, I checked whether the 12 decision appraisal ratings could be combined into a single decision appraisal factor.

I performed a principal axis exploratory factor analysis to determine whether the items would load onto a single factor (Kaiser-Meyer-Olkin = .85, Bartlett's test of sphericity $p < .001$). Three factors had eigenvalues greater than 1.0, but a parallel analysis showed that only the first factor in the real dataset had a larger eigenvalue than the first factor in the simulated dataset (3.89 and 1.38 respectively). I therefore specified the extraction of one factor using the Promax method (Kappa value of 3). Ten of the twelve items loaded above .44 onto the extracted factor. Two dilemma appraisals had ratings below the recommended cut-off of .40 (Costello & Osborne, 2005) of .37 and .25, and so they are not included in the overall decision appraisal factor. However, these items are still included in analyses in which each dilemma appraisal is considered separately (i.e., repeated measures analyses). The final overall decision appraisal variable was composed of the average of the ten items that loaded above .44 on the extracted factor, which explained 25.65% of the variance.

Normality. Most of the aggregate variables had skewness and kurtosis scores under ± 2.0. However, negative affect had a kurtosis of 3.54 (*SE* = .31). Four participants were outliers on the negative affect variable. When those four participants were excluded, the kurtosis became acceptable (1.31, *SE* = .31). Because I have taken the approach of excluding outliers on the key variables before conducting the main analyses throughout the whole thesis, I did not consider it necessary to transform the negative affect variable to address its high kurtosis.

Age had a skewness of 2.33 (*SE* = .31) and a kurtosis of 5.41 (*SE* = .31). After a log 10 transformation, the skewness became 1.74 (*SE* = .16) and the kurtosis became 2.25 (*SE* = .31).

As in the previous studies, although the transformation did not put the kurtosis within the acceptable range, I considered this improvement in normality sufficient because age is not a key variable.

Reliability. The Cronbach α coefficients for all the aggregate measures were within the acceptable range (all αs ≥ .80; see Table 5.1).

Table 5.1

Key Variables: Means, Standard Deviations, and Cronbach αs

Variable	*M*	*SD*	α
Brief need for closure	4.55	0.86	.84
Ability to achieve closure	3.78	0.93	.89
Option/underconsideration regret	2.49	1.17	.91
Overconsideration regret	2.43	1.20	.89
Overall decision appraisal	4.16	1.40	.80
State anxiety	3.03	1.19	.93
Positive affect	23.57	7.88	.88
Negative affect	16.36	7.18	.90

Note. The need for closure, ability to achieve closure, regret, and state anxiety scores were obtained by averaging participants' responses to the relevant items on a 7-point scale between *strongly disagree* (1) and *strongly agree* (7). The positive and negative affect scores were obtained by averaging responses to the relevant items on a 5- point scale from *very slightly or not at all* (1) to *extremely* (5). The overall decision appraisal scores were obtained by averaging participants' stress and difficulty ratings on a 9-point scale between *totally disagree* (1) and *totally agree* (9) across 10 dilemmas.

Main Analyses

As noted in the introduction of the present chapter, this study involved an attempt to experimentally manipulate the need for closure. However, the experimental manipulation was

unsuccessful. As shown in Appendix C, there were no significant differences between experimental groups on the manipulation check measuring participants' state need for closure or on any outcome variables. There were also no significant differences between experimental groups on the brief need for closure measure that was presented near the end of the survey. Therefore, I assumed that the manipulation did not affect participants' need for closure or their responses to any aspects of the survey. Consequently, I treated the brief Need for Closure Scale as a dispositional predictor variable. Participants were instructed to respond to this scale regarding how they usually felt.

Correlations. As in the previous studies, I checked for significant correlations between the predictor (need and ability to achieve closure) and outcome (state anxiety, positive affect, and negative affect) variables to establish a significant total effect before testing for mediations (Yzerbyt et al., 2018; Table 5.2). Consistent with the previous studies' findings, I expected that state anxiety would be positively associated with the need for closure and negatively associated with the ability to achieve closure. I expected to find the same pattern of results for negative affect.

On the other hand, in the previous studies, I found that wellbeing was associated with the ability to achieve closure but not the need for closure. Because positive affect is more closely related to wellbeing than mental health problems, I expected it to be unrelated to the need for closure and positively related to the ability to achieve closure. As shown in Table 5.2, each of these hypotheses was supported. People with a high need for closure reported more state anxiety and negative affect than people with a low need for closure. People with a high ability to achieve closure reported less state anxiety and negative affect and more positive affect than people with a

low ability to achieve closure. All of the potential mediators were related to state anxiety and negative affect, but none were related to positive affect.

Table 5.2

Correlations Between Key Variables

	2	3	4	5	6	7	8
1. Brief NFCS	-.36**	.26**	.24**	.27**	.37**	.25**	-.10
2. AACSS		-.36**	-.31**	-.33**	-.58**	-.37**	.25**
3. Decision appraisal			.38**	.31**	.30**	.22**	.03
4. Option/ underconsideration regret				.65**	.35**	.27**	-.01
5. Overconsideration regret					.37**	.31**	-.00
6. State anxiety						.60**	-.24**
7. Negative affect							-.06
8. Positive affect							

Note. Brief NFCS = Brief Need for Closure Scale (Roets & Van Hiel, 2011b). AACSS = Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a).

** $p < .01$.

Effects and interactions of the need and ability to achieve closure on mental health and wellbeing. I used PROCESS Model 1 to check whether the need and ability to achieve closure both predicted the outcome variables when adjusting for the other and whether they interacted.

Consistent with the findings of the previous studies, state anxiety was predicted by both need, $b = 0.27$, $SE = 0.08$, $t = 3.64$, $p < .001$, 95% CI [0.13, 0.42], and ability, $b = -0.66$, $SE =$

0.07, t = -9.61, p < .001, 95% CI [-0.80, -0.53]. The ability to achieve closure also predicted positive affect, b = 2.05, SE = 0.56, t = 3.65, p < .001, 95% CI [0.94, 3.15] and negative affect, b = -2.55, SE = 0.42, t = -6.09, p < .001, 95% CI [-3.37, -1.72], but the need for closure did not (ps > .059).

Consistent with the findings of the previous studies, the need for closure and the ability to achieve closure did not interact to predict any outcome variables (all ps > .050). However, when log 10 transformed age was entered as a covariate, the interaction between need and ability on negative affect became significant (p = .046). PROCESS Model 1 showed that there was a positive effect of the need for closure on negative affect at low levels of the ability to achieve closure, b = 1.64, SE = 0.65, t = 2.54, p = .012, 95% CI [0.37, 2.92]. The effect of the need for closure was not significant at median or high levels of the ability to achieve closure (ps ≥ .065).

Mediation analyses. This section reports the potential mediators of the relations of (a) the need for closure with state anxiety and negative affect and (b) the ability to achieve closure with state anxiety and negative affect. As outlined above, positive affect was not significantly related to any of the potential mediators or to the need for closure. Consequently, I have not reported any mediations involving positive affect. The mediations reported in the following text are summarised in overview Tables 5.8 and 5.9 at the end of this results section.

Mediators of the relation between the need for closure and state anxiety. As shown in Table 5.3, when tested individually, overall decision appraisal, option/underconsideration regret, and overconsideration regret were all significant mediators of the relation between the need for closure and state anxiety. However, the mediation effects of decision appraisal became nonsignificant when the ability to achieve closure was included as a covariate.

I entered all of the mediators into a parallel mediation analysis to determine whether any of the mediators operated independently of shared variance with other mediators. Only the effect of overconsideration regret remained significant, $b = 0.07$, $SE = 0.03$, 95% CI [0.01, 0.14], CSIES = .05. All the other mediators became nonsignificant at an alpha level of .05. When ability to achieve closure was included as a covariate, all the parallel mediation effects became nonsignificant. This suggests that the ability to achieve closure accounts for the variance in the relation between the need for closure and state anxiety that was otherwise accounted for by overconsideration regret.

Table 5.3

Mediators of the Relation Between the Need for Closure and State Anxiety

Mediator	Effect	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Decision appraisal	Total	0.51 (0.08)	0.35, 0.67	-	6.27	< .001
	Direct	0.43 (0.08)	0.27, 0.59	-	5.26	< .001
	Indirect	0.08 (0.03)	0.03, 0.14	.06	-	-
Option/underconsideration regret	Total	0.50 (0.08)	0.34, 0.66	-	6.15	< .001
	Direct	0.41 (0.08)	0.25, 0.57	-	5.09	< .001
	Indirect	0.09 (0.03)	0.04, 0.15	.07	-	-
Overconsideration regret	Total	0.51 (0.08)	0.35, 0.67	-	6.22	< .001
	Direct	0.40 (0.08)	0.24, 0.56	-	4.96	< .001
	Indirect	0.11 (0.03)	0.05, 0.18	.08	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Mediators of the relation between the need for closure and negative affect. As shown in Table 5.4, decision appraisal, option/underconsideration regret, and overconsideration regret all significantly mediated the relation between the need for closure and negative affect when tested individual, although decision appraisal became nonsignificant when ability to achieve closure was included as a covariate. However, in a parallel mediation, all the effects became nonsignificant, suggesting that all the mediators accounted for the same variance in explaining the relation between the need for closure and negative affect.

Table 5.4

Mediators of the Relation Between the Need for Closure and Negative Affect

Mediator	Effect	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Decision appraisal	Total	1.68 (0.46)	0.78, 2.58	-	3.67	< .001
	Direct	1.38 (0.46)	0.46, 2.29	-	2.96	.003
	Indirect	0.30 (0.13)	0.08, 0.57	.04	-	-
Option/underconsideration regret	Total	1.67 (0.46)	0.76, 2.59	-	3.60	< .001
	Direct	1.21 (0.46)	0.30, 2.13	-	2.61	.010
	Indirect	0.46 (0.17)	0.17, 0.82	.06	-	-
Overconsideration regret	Total	1.72 (0.46)	0.81, 2.63	-	3.72	< .001
	Direct	1.22 (0.46)	0.31, 2.13	-	2.65	.009
	Indirect	0.49 (0.20)	0.18, 0.94	.07	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Mediators of the relation between ability to achieve closure and state anxiety. Only option/underconsideration regret and overconsideration regret mediated the relation between the ability to achieve closure and state anxiety. Decision appraisal did not mediate the relation (Table 5.5). When both overconsideration and option/underconsideration regret were entered together in a parallel mediation, only overconsideration regret remained significant.

Table 5.5

Mediators of the Relation Between Ability to Achieve Closure and State Anxiety

Mediator	Effect	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Decision stress	Total	-0.74 (0.07)	-0.87, -0.61	-	-11.22	< .001
	Direct	-0.69 (0.07)	-0.83, -0.55	-	-9.81	< .001
	Indirect	-0.05 (0.03)	-0.10, 0.00	-.04	-	-
Option/underconsideration regret	Total	-0.73 (0.07)	-0.86, -0.60	-	-11.00	< .001
	Direct	-0.66 (0.07)	-0.80, -0.53	-	-9.73	< .001
	Indirect	-0.07 (0.02)	-0.11, -0.03	-.05	-	-
Overconsideration regret	Total	-0.74 (0.07)	-0.87, -0.61	-	-11.17	< .001
	Direct	-0.65 (0.07)	-0.79, -0.52	-	-9.62	< .001
	Indirect	-0.08 (0.03)	-0.14, -0.03	-.06	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Mediators of the relation between ability to achieve closure and negative affect. As shown in Table 5.6, only option/underconsideration regret and overconsideration regret mediated the relation between the ability to achieve closure and negative affect. Decision appraisal was not

a significant mediator. When the two significant mediators were entered together in a parallel mediation analyses, both became nonsignificant.

Table 5.6

Mediators of the Relation Between Ability to Achieve Closure and Negative Affect

Mediator	Effect	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Decision Appraisal	Total	-2.74 (0.40)	-3.52, -1.96	-	-6.92	< .001
	Direct	-2.54 (0.42)	-3.37, -1.71	-	-6.00	< .001
	Indirect	-0.20 (0.14)	0.15, -0.50	0.02	-	-
Option/underconsideration regret	Total	-2.78 (0.41)	-3.58, -1.98	-	-6.83	< .001
	Direct	-2.39 (0.42)	-3.21, -1.57	-	-5.73	< .001
	Indirect	-0.39 (0.16)	-0.73, -0.11	-.06	-	-
Overconsideration regret	Total	-2.76 (0.40)	-3.55, -1.96	-	-6.82	< .001
	Direct	-2.33 (0.42)	-3.15, -1.50	-	-5.54	< .001
	Indirect	-0.43 (0.18)	-0.82, -0.12	-0.06	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Dilemma importance.

Effects and interactions of dilemma importance and need for closure on decision appraisal. As outlined above, participants responded to three dilemmas in each of four categories. I averaged participants' appraisals of dilemmas in each category to obtain a single decision appraisal score per dilemma type.

I conducted a one-way repeated measures ANOVA testing the effects of dilemma type with the need for closure included as a covariate. Mauchly's test of sphericity was significant, showing that the assumption of sphericity was violated (Mauchly's W = .82, $p < .001$), and so the results are reported using the Huynh-Feldt correction.

There was a significant within-subjects main effect of dilemma type, $F(2.70, 666.20) = 5.35$, $p = .002$, partial $\eta^2 = .02$. Polynominal contrasts showed that there was a significant linear trend, $F(1, 247) = 9.17$, $p = .003$, partial $\eta^2 = .04$. Consistent with predictions, decision appraisals were least negative for nonmoral decisions, ($M = 2.35$, $SD = 1.22$), becoming more negative for everyday moral ($M = 3.37$, $SD = 1.49$), moral impersonal ($M = 4.02$, $SD = 1.72$), and moral personal decisions ($M = 5.69$, $SD = 2.11$) in that order. This analysis acts as a manipulation check, demonstrating that the within-subject manipulation of dilemma importance worked as intended.

Consistent with the correlations, there was also a significant between-subjects effect of need for closure, $F(1, 247) = 17.81$, $p < .001$, partial $\eta^2 = .07$. Hence, participants with a high need for closure reported more negative decision appraisals than those with a low need for closure.

These main effects were qualified by a significant interaction between dilemma type and need for closure on decision appraisal, $F(2.70, 666.20) = 5.13$, $p = .002$, partial $\eta^2 = .02$. To break down this interaction, I investigated the correlations between the need for closure and decision appraisal in each of the dilemma categories separately. As outlined in the introduction of the present chapter, I hypothesised that people with a high need for closure would be similarly stressed across all types of dilemmas because they find decision-making per se difficult. However, people with a low need for closure should be more sensitive to the type of decision and

consequently feel more negative about the more important dilemmas (moral impersonal and moral personal) and less negative about the less important decisions (non-moral and everyday moral). Therefore, the correlation between the need for closure and decision appraisal should be stronger for the less important decisions because high need for closure people should be highly stressed and low need for closure should be relatively relaxed. The correlation between need for closure and decision appraisal should be weaker for the more important decisions about which everyone should be relatively stressed. The correlations between need for closure and decision appraisal in each dilemma category are shown in Table 5.7.

Table 5.7

Correlations Between the Need for Closure and Decision Appraisal for Each Dilemma Category

Nonmoral	Everyday moral	Moral impersonal	Moral personal
.25**	.14*	.12	.28**

Note. * $p < .05$. ** $p < .01$.

As shown in Table 5.7, the pattern of correlations matches the hypothesised pattern except for the moral personal category. The relation between the need for closure and decision appraisal was significant for the nonmoral decisions ($r = .25$), weaker but still significant for the everyday moral decisions ($r = .14$), and nonsignificant for the moral impersonal decisions (r = .12). This pattern of results is consistent with the suggestion that the relation between the need for closure and decision appraisal should be stronger for less important decisions and weaker for more important decisions. However, comparisons of the correlation coefficients using the web interface for cocor (Diedenhofen & Musch, 2015) showed that none of the differences between correlations across the first three categories reached significance at a threshold of $p < .05$.

However, Zou's (2007) test showed that the difference between correlations in the nonmoral and moral impersonal conditions was close to significant, Zou's 95% CI [-0.0001, 0.26].

Contrary to predictions, the largest correlation between the need for closure and decision appraisal occurred for the final category, moral personal decisions. I had expected this category to have the *smallest* relation between need for closure and decision appraisal. Further, Zhou's calculation showed that the correlation between the need for closure and decision appraisal in the moral personal dilemma category (r = .28) was significantly larger than the same correlation in the everyday moral (r = .14; Zou's 95% CI [-0.27, -0.01]) and moral impersonal categories (r = .12; Zou's 95% CI [-0.28, -0.04]).

Effects and interactions of dilemma importance and ability to achieve closure on decision appraisal. I conducted a one-way repeated measures ANOVA with ability to achieve closure as a covariate to investigate whether there was a significant interaction between ability to achieve closure and dilemma type on decision appraisal. Mauchly's test of sphericity was significant (Mauchly's W = .81, p <.001), and so the Hyunh-Feldt correction was used.

Consistent with the ANOVA reported above, there was a significant effect of decision type, $F(2.68, 663.06) = 32.42$, $p < .001$, partial $\eta^2 = .12$, with a significant linear trend, $F(1, 247) = 78.79$, $p < .001$, partial $\eta^2 = .24$, suggesting that people appraised the more important decisions as more stressful and difficult than the less important decisions. Consistent with the correlations, the effect of ability to achieve closure on decision appraisal was also significant, $F(1, 247) = 39.86$, $p < .001$, partial $\eta^2 = .14$ such that those with a high ability to achieve closure appraised the decisions less negatively than those with a low ability. Contrary to predictions, there was no interaction between dilemma type and ability to achieve closure on decision appraisal, $F(2.68, 663.06) = 2.37$, $p = .076$.

Decision accumulation.

Effects and interactions of decision accumulation and need for closure on decision appraisal. I hypothesised that participants with a high need for closure would find the dilemma task progressively more difficult and stressful as the decisions accumulated. To test this hypothesis, I coded the order in which each participant responded to the dilemmas and then tested the effects of presentation order and the need for closure on decision appraisal. There was a significant main effect of presentation order on appraisal, $F(11, 2618) = 1.82$, $p = .045$, partial $\eta^2 = .01$, and a significant main effect of need for closure, $F(1,238) = 26.86$, $p < .001$, partial $\eta^2 = .10$.

These main effects were qualified by an expected interaction between presentation order and need for closure, $F(11, 2618) = 2.08$, $p = .019$, partial $\eta^2 = .01$. To investigate this interaction further, I split the data into two groups: high need for closure (> 1 *SD* above the mean; $n = 48$) and low need for closure (> 1 *SD* below the mean; $n = 48$). I expected that the effect of presentation order on decision appraisal would be significant in the high need for closure group but not in the low need for closure group. That is, people with a high need for closure should become more stressed after making many decisions, whereas people with a low need for closure should not.

To test this hypothesis, I conducted a repeated measures ANOVA testing the effects of decision accumulation in the high need for closure group and the low need for closure group. The results are shown in Figure 5.1. As predicted, there was a significant effect of presentation order in the high need for closure group, $F(11, 451) = 2.43$, $p = .006$, partial $\eta^2 = .06$, with a significant linear trend, $F(1, 41) = 8.11$, $p = .007$, partial $\eta^2 = .17$. However, this effect was in the opposite direction to predictions. Participants with a high need for closure appraised decisions *less*

negatively as the task went on. Consistent with hypotheses, there was no effect of presentation order in the low need for closure group ($p = .409$).

When considering Figure 5.1, it appears that the negative effect of presentation order on (negative) decision appraisal for people with a high need for closure is evident only because these people experienced particularly high levels of distress at the first decision (A. Roets, personal communication, February 7, 2020). Rather than experiencing decreasing distress at each subsequent decision, it appears that high need for closure people experience similar levels of distress in response to all decisions after the first one.

In order to test this possibility empirically, I reconducted the repeated measures ANOVA on the effects of presentation order on decision appraisal for the high need for closure group excluding the first decision. Consistent with Roets' suggestion, there was no significant effect on presentation order when excluding the first decision. Hence, it appears that people with a high need for closure experience a spike in decision stress when asked to make a single decision, but this stress decreases after the first decision to remain stable for subsequent decisions made within a short period of time.

Effects and interactions of decision accumulation and ability to achieve closure on decision appraisal. I repeated the above repeated measures ANOVA replacing the need for closure with the ability to achieve closure as a covariate. There was no significant linear effect of presentation order ($p = .149$). However, there was a significant linear effect of ability to achieve closure, $F(1, 238) = 38.00$, $p < .001$, partial $\eta^2 = .14$.

This main effect was qualified by a significant interaction between presentation order and ability, $F(11, 2618) = 2.31$, $p = .008$, partial $\eta^2 = .01$. To investigate this interaction, I split the ability data into two groups: high ability (> 1 *SD* above the mean; $n = 37$), and low ability (> 1

SD below the mean; $n = 42$). I expected the effect of presentation order to be significant in the low ability group but not the high ability group. However, contrary to predictions, the reconducted repeated measures ANOVA showed that the effect of presentation order was nonsignificant in both groups (both $ps \geq .291$).

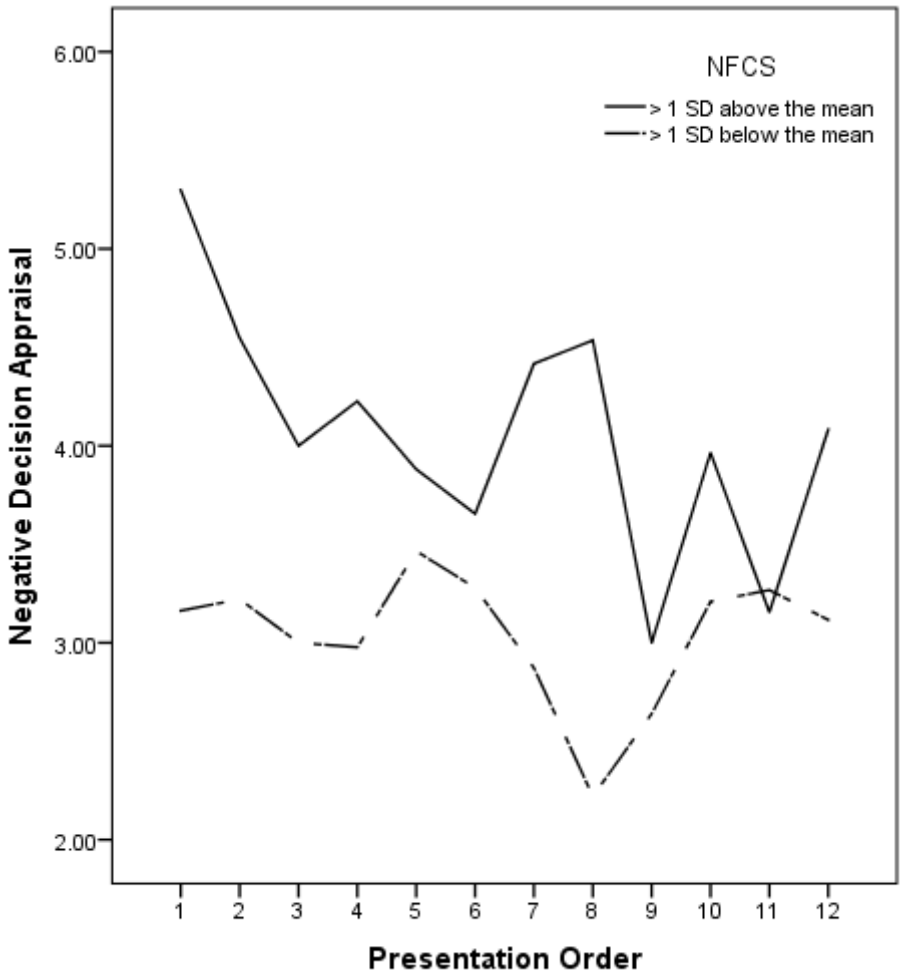

Figure 5.1. The effects of presentation order on negative decision appraisal at different levels of the need for closure.

The main mediation findings from the present study are summarised in overview Tables 5.8 and 5.9.

Table 5.8

Overview of the Mediators of the Relations between NFCS and Mental Health

Variable	Mental Health Outcome	Mediation	Mediation (controlling for AACS)	Mediation (parallel)
Option/ underconsideration regret	State anxiety	**Y**	**Y**	N
	Negative affect	**Y**	**Y**	N
Overconsideration regret	State anxiety	**Y**	**Y**	**Y**
	Negative affect	**Y**	**Y**	N
Decision appraisal	State anxiety	**Y**	N	N
	Negative affect	**Y**	N	N

Table 5.9

Overview of the Mediators of the Relations between AACSS and Mental Health

Variable	Mental Health Outcome	Mediation	Mediation (controlling for NFCS)	Mediation (parallel)
Option/ underconsideration regret	State anxiety	**Y**	**Y**	N
	Negative affect	**Y**	**Y**	N
Overconsideration regret	State anxiety	**Y**	**Y**	**Y**
	Negative affect	**Y**	**Y**	N
Decision appraisal	State anxiety	N	-	-
	Negative affect	N	-	-

Discussion

In previous studies, I established that people with a high need for closure or low ability to achieve closure tend to experience more regret and stress about their decisions, and this regret and stress mediates their poorer mental health. In the present study, I investigated the types of regret experienced by people with a high need or low ability to achieve closure. I also

investigated whether the accumulation of decisions across time resulted in more elevated stress for those with a high need or low ability to achieve closure. Finally, I considered whether people with a high need or low ability to achieve closure were less sensitive to decision importance.

Associations of Need and Ability to Achieve Closure with Affect and State Anxiety

In previous studies, I included a state measure of mental health (state anxiety) and dispositional measures of mental health (DASS) and wellbeing (satisfaction with life). In the present study, all the outcome measures were state measures (state anxiety and state positive and negative affect). I considered positive affect a state measure of wellbeing and negative affect a state measure of mental health problems. I used state measures in order to appropriately test the hypotheses about the effects of decision accumulation and importance on mental health.

The results in the present study were consistent with the results of previous studies. The need for closure was positively related to state anxiety and negative affect (i.e., state mental health problems), but was not related to positive affect (i.e., state wellbeing). On the other hand, the ability to achieve closure was negatively related to state anxiety and negative affect, and positively related to positive affect.

These findings confirm that although the need for closure is associated with mental health problems, it does not appear to be related to wellbeing. However, the ability to achieve closure is associated with both mental health problems and wellbeing. Hence, the state mental health measures had the same relations with the need and ability to achieve closure as did the longer-term mental health measures used in the previous studies.

Mediating Effects of Decision Stress and Types of Regret

The key finding regarding regret was that all types of regret were positively associated with the need for closure and negatively associated with the ability to achieve closure. People

who had a high need for closure or a low ability to achieve closure reported more option/underconsideration regret and more overconsideration regret, which mediated their higher levels of state anxiety and negative affect in individual mediations. Decision stress also mediated most of these relations.

However, in parallel mediations, either all mediators became nonsignificant, or overconsideration regret became the only significant mediator. These results suggest that the specific type of regret being experienced is not important in mediating the relations between need/ability to achieve closure and mental health. Rather, the fact that people with a high need or low ability tend to experience more regret overall is most important for their poorer mental health. The effects of decision stress were "wiped out" by the inclusion of regret in the parallel mediations, suggesting that regret is the more important mediator. As with the previous study, this suggests that people's feelings after decision-making may be more consequential for their mental health than their feelings during decision-making.

To understand the results, it is important to consider how each of the regret subscales related to one another. Contrary to the results of the scale's original validation, option regret and underconsideration regret loaded onto the same factor. As outlined in the Results section, this may have occurred because of the lack of external feedback about participants' choices. In the real world, when people make a decision, they often receive additional information about their chosen alternative that helps them assess whether they made the right choice. For example, if you choose a restaurant for dinner, you will subsequently eat at that restaurant. By eating at the restaurant, you gain information about its quality that you can assess to determine whether you made the right choice. If the food was poor and the service indifferent, then you may experience option regret and wish that you had chosen a different restaurant.

However, hypothetical decisions do not result in additional information about the option that was chosen, because the chooser does not go on to experience the consequences of their choice. Therefore, people must judge whether they made the right decision based only on information that was already available when the decision was made. In the present study, participants did not receive any feedback on their choice and there were no consequences for any decisions. Consequently, if they experienced option regret, it could not have been because the consequences of their decision revealed additional information about their chosen option that made them change their minds about the best choice. Rather, option regret was likely to be a result of changing their minds after ruminating on their decision. Hence, if they changed their mind after thinking further, they may have felt that they did not adequately process the information *before* making their choice. They would therefore simultaneously experience option regret and underconsideration regret.

Hypothetical decision tasks like the one used in the present study therefore cannot distinguish between regret due to making an objectively bad decision (and suffering its consequences) and regret due to feeling that one has not engaged in the decision-making process properly (regardless of the outcome). In future research, this question may be better answered by more directly examining the quality of the decisions made by people with a high need or low ability to achieve closure. For example, the Decision Outcome Inventory (Bruine de Bruin, Parker, & Fischhoff, 2007) may help researchers determine whether the need or ability to achieve closure are associated with poorer decision outcomes. This in turn may help to explain the poorer mental health of high need/low ability to achieve closure people: either directly due to poorer outcomes in life (as in the objective decision quality hypothesis outlined in Chapter 1), and/or indirectly through increased regret about their poorer decisions.

The second issue regarding the regret measures in the present study is that overconsideration regret was positively associated with option/underconsideration regret. There are no published studies reporting the correlations of overconsideration and underconsideration regret. However, it seems intuitive that these two constructs should be *negatively* correlated when relating to the same decision. The more someone regrets thinking too much about a decision, the less they should regret not thinking enough about that decision.

The positive correlation showing that people simultaneously regret thinking too much and not thinking enough has two potential explanations. First, from a methodological perspective, this may have occurred because we asked participants about their regret regarding all their dilemma decisions collectively, rather than regarding each decision individually. Regret-prone people may be prone to both types of regret, and so experience underconsideration regret about some decisions and overconsideration regret about others. People who are less prone to regret are likely to experience low levels of both types of regret across all decisions. This would result in a positive correlation between the two constructs when asking participants about their regret regarding all the dilemma decisions at once.

A more theoretical explanation for this positive relation between underconsideration and overconsideration regret is that people experience both types of regret simultaneously regarding a single decision if they perceive that their thought process was long but inadequate. This may occur if the individual spends a lot of time considering a decision, but then later thinks of another factor or perspective that they should have considered. Consequently, they could experience overconsideration regret and underconsideration regret simultaneously because they feel that they put in a lot of effort, but that this effort was wasted because they did not put in *enough* effort to make the right choice.

This second scenario, in which people tend to experience both overconsideration and underconsideration regret simultaneously about one decision, may help to explain the unexpected finding that all types of regret were positively related with the need for closure and negatively related with the ability to achieve closure. As shown in the correlation table (Table 5.2), the need for closure and the ability to achieve closure were negatively related. Therefore, people who have a high need for closure also tend to have a low ability to achieve closure. These people are likely to experience the scenario outlined above. Due to their low ability to achieve closure, they tend to think about their decisions a lot, both during and after making them. Simultaneously, they want to make decisions quickly to fulfil their high need for closure. Dwelling on a decision before making it, combined with a desire to make decisions quickly, would lead to overconsideration regret, because the individual would prefer not to put so much effort into their decisions. At the same time, continuing to dwell on decisions after they are made would lead to more underconsideration regret, because this rumination makes it more likely that the individual will later think of some previously unconsidered factor, and consequently feel that they would have made a better decision if they had thought of this factor earlier.

Because I asked participants about their regret for all the decisions collectively, it is impossible to determine whether there is a positive correlation between overconsideration and underconsideration regret for methodological reasons (i.e., because some people experienced overconsideration regret about some decisions and underconsideration regret about others) or for theoretical reasons (i.e., because some people experienced both types of regret about the same decision). Future research should investigate this question more carefully by asking participants about their regret for each decision one at a time.

Despite this issue, the present study suggests that the type of regret is not important in understanding the relation between the need/ability to achieve closure and mental health. Instead, the findings suggest that people with a high need for closure or low ability to achieve closure experience high levels of all types of regret, and all types of regret mediate their poorer mental health.

Accumulation of Decision Stress

Roets and Soetens (2010) suggested that the need/ability to achieve closure are related to mental health because people with a high need for closure or low ability to achieve closure find decision-making more stressful, and this stress accumulates due to the large number of decisions that people must make in everyday (Western) life. I tested this idea by investigating whether there was an interaction between decision presentation order and need/ability to achieve closure on decision stress. I expected that people with a high need for closure would experience increasing levels of decision stress across the dilemma task, whereas people with a low need for closure would not. I also expected that people with a low ability to achieve closure would experience increasing decision stress across the task and that people with a high ability would not. Contrary to predictions, there was no effect of presentation order for people with a low ability to achieve closure.

Also contrary to predictions, people with a high need for closure did not experience increasing levels of decision stress as they made more decisions. Instead, after an initial spike of high stress for the first decision, levels of decision stress stabilised at a lower level across all subsequent decisions. However, this experimental situation does not necessarily reflect real life, where there is likely to be a larger gap in time between conscious decisions. Therefore, each decision may be perceived as a “first” decision, and hence those with a high need for closure

may experience a “spike” in stress at each decision (I am grateful to A. Roets for this interpretation, personal communication, February 7, 2020).

Sensitivity to Decision Importance

People with a high need for closure or low ability to achieve closure generally find decision-making unpleasant and/or difficult (e.g., Roets & Van Hiel, 2008). Thus, people with a high need/low ability should experience high levels of stress when decision-making, even for relatively trivial decisions. On the other hand, people with a high ability or low need do not find decision-making difficult or stressful in general, and so there is potential for their levels of stress to increase when decisions become more important or impactful. Consequently, I expected stronger correlations between the need/ability to achieve closure and decision appraisal for more trivial decisions, since people with a high need/low ability will be highly stressed (due to decision-making per se) and people with a low need/high ability will be less stressed. Conversely, I expected that there should be weaker correlations for more important decisions, because all participants should be relatively stressed.

I tested this hypothesis in the present study by asking participants to make decisions that ranged from trivial non-moral dilemmas (e.g., whether to take a bus or a train), to everyday moral dilemmas (e.g., whether to write off personal expenses as business expenses), to high importance non-personal dilemmas (e.g., whether to recommend use of a controversial vaccine), to high importance personal dilemmas (e.g., Sophie’s choice).

Contrary to hypotheses, there was no significant interaction between dilemma importance and ability to achieve closure on decision appraisal. There was an interaction between dilemma importance and need for closure. However, there were few significant differences in the strength

of the correlations between need for closure and decision appraisal between the different levels of decision importance.

Although most of the differences between the correlations were not significant, the trend was generally in the predicted direction. There was a significant positive correlation between decision appraisal and need for closure for non-moral dilemmas (r = .25), a weaker but still significant positive correlation for everyday moral dilemmas (r = .14), and no significant correlation for (high importance) impersonal dilemmas (r = .12). In a departure from the expected pattern, however, there was a positive correlation between need for closure and decision appraisal for the (highest importance) personal dilemmas (r = .28). This correlation was also the only one that was significantly different from the others.

The large correlation between need for closure and decision appraisal for moral-personal dilemmas was unexpected. It may have occurred due to the specific dilemmas in this category, which included Sophie's choice and the runaway trolley problem. These dilemmas are widely known and were probably familiar to many of the participants. Consequently, low need for closure participants may have found them less stressful than some of the the less important but unfamiliar dilemmas due to their relative familiarity. On the other hand, people with a high need for closure may have found the familiar dilemmas stressful because they find decision-making in general stressful. This would have resulted in a positive correlation between the need for closure and decision appraisal for these dilemmas.

The lack of significant differences between most of the correlations may have been because the difference in importance between all the dilemma categories was not especially large in real terms. As outlined in earlier sections of this chapter, participants' decisions did not have any material consequences, either within the study or beyond it. So, even if people with a low

need for closure or high ability to achieve closure are more sensitive to decision importance, this effect would not have been easily detectable because even the most important decisions were not important to participants' real lives. Therefore, perhaps it is unsurprising that the differences between the correlations were not significant. Further research involving more consequential decisions (and therefore more variance in decision importance) is required to determine whether people with a high need for closure are, in fact, less sensitive to decision importance than people with a low need for closure.

Overall, this study demonstrated that option/underconsideration and overconsideration regret both mediated the relations between need/ability to achieve closure and mental health in the same directions, and that no particular type of regret was consistently more important than others in explaining these relations. I also found no evidence to support the idea that people with a high need for closure or low ability to achieve closure experience accumulated stress in response to the accumulation of decision-making situations, since stress levels stabilised after an initial spike at the first decision.

It is important to note that the findings of the present study as well as the previous two studies have been based on cross-sectional data. In Study 5, the key findings from these studies were investigated using semi-longitudinal data to determine the causal order of the relations between need/ability to achieve closure, regret, decision stress, mental health, and wellbeing. In the next chapter, I investigated some non-decision-related mechanisms for the relation between the need/ability to achieve closure and mental health and wellbeing.

CHAPTER 6

STUDY 4:

BEYOND DECISION-MAKING – ATTACHMENT STYLE, STRESSFUL EVENTS, PERSPECTIVE-TAKING, AND SOCIAL SUPPORT

The previous three studies in this thesis focused on explaining how the need and ability to achieve closure are related to mental health and wellbeing through decision-making factors. In the present study, I moved beyond decision making factors. First, I considered the aetiology of the need and ability to achieve closure. Second, I investigated whether differences in the perceptions of stressful situations could help to explain the relations between the need/ability to achieve closure and mental health and wellbeing. Finally, I considered the potential for social (rather than decision-making) factors such as perspective-taking and social support to explain the relations between the need/ability to achieve closure and mental health.

Attachment Style and the Need and Ability to Achieve Closure

Most cognitive and personality variables originate from a complex interaction between biological factors and environmental factors (e.g., Barlow, 2019). From a biological perspective, some genetic correlates of individual differences in the need for closure have been identified (Roets et al., 2015). From an environmental perspective, Mikulincer (1997) considered the role of attachment in informing people's need for closure. I focused on this variable in the present research.

Attachment theory suggests that children's relationships with their primary caregivers form the basis of their working models about themselves and others, which then affect the way they relate to close others as adults (e.g., Collins & Read, 1990). Ainsworth, Blehar, Waters, and Wall (1978) identified three patterns of attachment: secure, anxious-ambivalent, and avoidant.

Securely attached infants had caregivers who were consistently responsive to signals of distress. In contrast, anxious-ambivalent children's caregivers were inconsistent in their response, and avoidant infants' caregivers were rejecting and unresponsive.

Mikulincer (1997) suggested that early experiences of distress and distress management also have flow-on effects for how people view the world and themselves, which in turn affects their need for closure. Specifically, Mikulincer suggested that securely attached people have more confidence in their capacity to deal with distress. This is because securely attached individuals have internalised their early experiences that distress is temporary. They feel that moving into unfamiliar spaces is not dangerous because their caregiver acted as a "secure base" that they could return to if the unfamiliar spaces were overwhelming. These early experiences inform working models that suggest that they can cope with distressing situations and result in an internalised secure base. Securely attached people should therefore be confident in dealing with the distress of uncertain situations. Because of their confidence in dealing with these types of situations, people with secure attachment styles should have a low need for closure.

Conversely, Mikulincer (1997) suggested that insecurely attached people have less confidence in their capacity to deal with their distress because they have internalised past experiences of not having a secure base from which to venture into uncertainty. Therefore, they develop the belief that they are unable to adequately cope with distress. Insecurely attached people are likely to be less confident in dealing with uncertainty and unpredictability, and consequently prefer certainty and predictability (i.e., have a high need for closure).

Consistent with these ideas, Mikulincer (1997) found that securely attached adults scored significantly lower on the preference for order and preference for predictability subscales of the Need for Closure Scale than both types of insecurely attached adults (anxious-ambivalent and

avoidant). Securely attached adults also scored significantly lower on discomfort with ambiguity than anxious-ambivalent adults.

Mikulincer (1997) used categorical measures of attachment style to test his hypotheses, classifying people as secure, avoidant, or ambivalent. However, more recent research has shown taxonomically that attachment is more accurately conceptualised as dimensional rather than categorical (e.g., Fraley, Hudson, Heffernan, & Segal, 2015). The use of such measures has shown slightly different results to Mikulincer's. Saroglou, Kempeneers, and Seynhaeve (2003) found that the preference for order and preferences for predictability subscales of the Need for Closure Scale (Webster & Kruglanski, 1994) were associated with continuous measures of attachment anxiety but not with attachment avoidance. These researchers did not investigate the other three subscales of the Need for Closure Scale.

In the present study, I attempted to create a more complete picture of the relations between all aspects of the need for closure and attachment style. I used continuous measures of attachment anxiety and attachment avoidance as well as including the complete revised Need for Closure Scale (Roets & Van Hiel, 2007; Webster & Kruglanski, 1994). I expected to replicate Mikulincer's findings that high levels of attachment anxiety and attachment avoidance are associated with a high need for closure. I also expected to replicate previous findings demonstrating that attachment style predicts wellbeing (e.g., Love & Murdock, 2004). Hence, I tested mediation models in which the need for closure would mediate the relations between attachment anxiety/avoidance and mental health.

The origins of the ability to achieve closure have not been previously investigated. In the present study, I also considered the possibility that attachment styles are related to the ability to achieve closure. People with a secure attachment style may have a high ability to achieve closure

because of their confidence in dealing with uncertainty. Confidence in uncertain situations (which include decision-making) should result in their being able to come to firm, confident decisions. Conversely, people with insecure attachment styles may have a low ability to achieve closure because they are not confident in their ability to deal with distress and uncertainty. This lack of confidence in uncertain situations should result in vacillation and difficulty coming to firm decisions. I therefore tested whether the ability to achieve closure mediated the relation between attachment avoidance/anxiety and mental health.

The Role of Subjective Distress Caused by Stressors in the Relations Between the Need/Ability to Achieve Closure and Mental Health

As outlined above, Mikulincer (1997) suggested that insecure attachment results in a high need for closure because people with insecure attachment styles are less confident in their ability to cope with distressing situations. Consistent with this view, the previous studies in the present thesis demonstrated that self-efficacy is negatively associated with the need for closure (and positively associated with the ability to achieve closure).

Another consequence of this lack of confidence may be the perception of how stressful such situations are. Because people with insecure attachment (and consequently a high need for closure) may lack confidence in their ability to deal with stressful situations, they may actually perceive such situations as more stressful than do people with secure attachment (and consequently a low need for closure). If so, this heightened perception of stressfulness is likely to contribute to their poorer mental health.

Previous research into the need for closure and the behavioural inhibition system provides initial evidence that people with a high need for closure do experience stressful events as subjectively more stressful. This is because people with a high need for closure tend to have

more sensitive behavioural inhibition systems (e.g., Czernatowicz-Kukuczka, Jaśko, & Kossowska, 2014; Jaśko et al., 2015). The behavioural inhibition system is responsive to negative events and signals of punishment and is therefore responsible for inhibiting behaviour that may result in a negative outcome. People with highly sensitive behavioural inhibition systems tend to perceive negative events more negatively than people with less sensitive behavioural inhibition systems do (Carver & White, 1994). This leads to prioritisation of avoidance goals (i.e., goals of avoiding negative events; Corr, Hargreaves-Heap, Tsutsui, Russell, & Seger, 2013). In turn, people with avoidance motivations react more strongly to negative events (Gable, Reis, & Elliot, 2000). In addition, sensitivity of the behavioural inhibition system is positively related to negative affectivity and manifest anxiety (Carver & White, 1994).

The relation between the need for closure and behavioural inhibition system sensitivity may help to explain the poorer mental health of people with a high need for closure. Because people with a high need for closure tend to have more sensitive behavioural inhibition systems, they may perceive negative events as more stressful than people with a low need for closure. This perception may in turn lead to poorer mental health. Therefore, people with a high need for closure may experience poorer mental health because they perceive stressful events as more stressful than people with a low need for closure due to their relatively high behavioural inhibition system sensitivity.

To investigate this idea, I considered background stress levels as a mediator of the relation between the need for closure and mental health. I expected that people with a high need for closure would experience more background stress (due to experiencing negative events as more stressful than people with a low need for closure) and therefore have poorer mental health.

There is no previous research on the relations between the ability to achieve closure and the behavioural inhibition system. However, if a low ability to achieve closure results from internalisation of the idea that one is not capable of dealing with distressing situations, then people with a low ability to achieve closure may also experience stressful situations as more stressful. As noted above, this perception is likely to lead to poorer mental health. I therefore tested the mediation model AACS → background stress → DASS, predicting that the ability to achieve closure would be negatively related to background stress, which in turn would be positively associated with mental health problems.

Potential Social Mediators of the Relations between the Need/Ability to Achieve Closure and Mental Health

Friendship approach and avoidance. As noted above, highly active behavioural inhibition systems lead to a prioritisation of avoidance goals. In the present study, I included an investigation specifically of friendship approach/avoidance goals. In a social context, avoidance goals tend to relate to maintaining the status quo and consequently minimising uncertainty and unpredictability (e.g., avoiding situations with the potential to harm friendships; Elliot, Gable, & Mapes, 2006). Hence, I expected that people with a high need for closure would also have high friendship avoidance motivations.

The effects of friendship avoidance motivations have not been studied with regard to mental health in general. However, in a longitudinal study, social avoidance goals positively predicted relationship anxiety eight weeks later (Gable, 2006). High social avoidance motivations therefore appear to have negative effects on relationships and may also have negative effects on mental health and wellbeing more generally. Consequently, I predicted that friendship avoidance would mediate the relation between the need for closure and mental health.

As outlined above, if the ability to achieve closure originates from secure attachment styles and internalisation of the idea that the individual is able to deal with distress, then people with a high ability to achieve closure should have low avoidance motivations. Therefore, I also tested whether friendship avoidance mediated the relation between the ability to achieve closure and mental health.

I also considered the role of approach goals. Prior research has yielded inconsistent findings regarding the relation between the need for closure and approach goals. Corr et al. (2013) found that the need for closure was positively related to some measures of approach motivation and negatively related to others. In the present study, I expected to find a negative relation between the need for closure and friendship approach. This is because approach motivations involve goals of deepening and developing friendships and sharing meaningful experiences (Elliot et al., 2006). These goals involve change and therefore uncertainty and unpredictability, which may make them less appealing to people with a high need for closure.

As far as I know, there is no research regarding the relations between the ability to achieve closure and approach or avoidance goals. However, people with a low ability to achieve closure may also tend to have low friendship approach goals because they are less confident in general and hence are less confident in their abilities to deepen their relationships. Social approach goals are associated with better wellbeing (Nikitin & Freund, 2008), and therefore having lower social approach goals may help to explain why people with a high need or low ability to achieve closure have poorer mental health. Consequently, I tested whether friendship approach goals mediate the relations between need/ability to achieve closure and mental health.

Perspective-taking and social support. Finally, I considered the roles of perspective-taking and social support on the relations between the need/ability to achieve closure and mental

health. People with a high need for closure prefer to reach certainty about situations and beliefs as quickly as possible. This preference results in tendencies to use heuristics and cognitive shortcuts in order to minimise processing time (e.g., De Dreu, Koole, & Oldersma, 1999). Previous research investigating the effects of the need for closure in the social domain has demonstrated that this tendency to use heuristics can result in negative intergroup processes such as stereotyping, prejudice, and discrimination (e.g., Roets & Van Hiel, 2011a; Roets & Van Hiel, 2011c).

More importantly for predicting mental health, the need for closure is also associated with interpersonal processes including perspective-taking. Perspective-taking is the tendency to adopt another person's point of view (Davis, 1983). Under high need for closure manipulations (time pressure), people are less likely to engage in perspective-taking regarding people who are dissimilar to them, probably because their own perspective is the most accessible one and therefore provides the quickest route to certainty (Epley, Keysar, Van Boven, & Gilovich, 2004; Webster Nelson et al., 2003). This lack of perspective-taking has consequences for communication; people with a high dispositional need for closure tend to communicate less effectively than people with a low dispositional need for closure, possibly because high need for closure people are less able to take the perspective of their audience (Richter & Kruglanski, 1999).

These effects of a high need for closure on perspective-taking and communication may have flow-on effects for social support. If people with a high need for closure tend not to see things from other people's point of view, particularly if those people are different to them, then they will probably find it more difficult to make and maintain close friendships with a wide variety of people. Similarly, if their communication is less effective, then their relationships may

be less satisfying (e.g., Arroyo & Segrin, 2011). Consequently, people with a high need for closure may not reap the benefits of having a large and varied social support network. Social support is strongly associated with better recovery from serious mental health problems (Corrigan & Phelan, 2004), better overall wellbeing and mental health in the general population (Kessler & McLeod, 1985), and reduced risk of mortality (House, Landis, & Umberson, 1988). Hence, perspective-taking and social support could help to explain the relation between the need for closure and mental health.

In the previous research outlined above, the relations found between the need for closure and perspective-taking involved an experimental manipulation of the need for closure rather than a measure of dispositional need for closure (Epley et al., 2004; Webster Nelson et al., 2003). Additionally, the link between perspective-taking and social support has not been empirically established. In the present research, I tested whether (a) dispositional need for closure is negatively related to perspective-taking, (b) perspective-taking is positively related to social support, and (c) social support is negatively related to mental health problems and positively related to wellbeing. I therefore tested a serial mediation model (need for closure → perspective-taking → social support → mental health/wellbeing).

I am not aware of any research regarding the relations between the ability to achieve closure and interpersonal phenomena such as perspective-taking or social support. Hence, I did not have firm hypotheses about these effects. However, as outlined above, those with a low ability to achieve closure may be less confident more generally and hence struggle to meet people and make friends, which may affect their mental health. I did not have a theoretical reason to believe that ability to achieve closure is related to perspective-taking, but throughout the rest of this these, the ability to achieve closure and the need for closure have had opposite

effects on most outcome variables. Therefore, I tested in an exploratory way whether people with a high ability to achieve closure reported more perspective-taking and social support and therefore better mental health/wellbeing (i.e., ability to achieve closure → perspective-taking → social support → mental health/wellbeing).

In summary, in the present study, I investigated the role of attachment style as an antecedent of the need and ability to achieve closure. I also investigated whether the subjective distress caused by stressors can help explain the relations between the need and ability to achieve closure and mental health. Finally, I investigated the potential mediating roles of social factors such as friendship goals, perspective-taking, and social support in the relations between the need/ability to achieve closure and mental health. Several other variables were also included, including coping flexibility. These analyses were less relevant to the overall findings of the thesis and therefore all information relating to these variables appears in Appendix D.

Method

Participants and Design

As outlined above, there are no previous studies that investigate the relations between continuous measures of the variables being investigated in the present study. This means there is no reasonable basis on which to conduct a power analysis regarding the indirect effects being investigated in the present study. Hence, I aimed to recruit 320 participants in line with the power analysis on the correlation between the need for closure and mental health conducted in Study 1.

Participants were undergraduate psychology students at the same large Australian public university as the participants for the previous studies. A total of 283 people attempted the survey. Ten participants did not respond to the informed consent question, and a further 16 participants

actively declined to consent for their data to be used. Consequently, the total number of useable responses was 257.

Of the 257 participants, 62 were male (24%) and 195 were female (76%). Participants had a mean age of 22.71 years (*SD* = 6.37 years). Most participants were White (89%), 4% were Aboriginal or Torres Strait Islander, 4% were Asian, 0.4% were African, and 3% selected "other" for ethnicity. Most participants were from second-year psychology courses (78%), with 9% from first-year courses and 12% from third-year courses.

The study had a cross-sectional, correlational design, with quantitative, self-report dispositional measures. In contrast to the previous studies, there was no experimental component.

Procedure

The survey was a self-report online questionnaire titled "Personality and Relationships," which took approximately 30-40 minutes to complete. Participants were told that the project was investigating how certain personality variables predict people's mental health. The main part of the survey consisted of measures of the need for closure, the ability to achieve closure, mental health and wellbeing, interpersonal reactivity, social support, friendship approach and avoidance, adult attachment, background stress, self-efficacy, and coping flexibility. The order in which participants responded to these scales was randomised. At the end of the survey, participants responded to the Perceived Awareness of the Research Hypothesis Scale (Rubin, 2016) and demographic items.

Descriptions of the measures and results relating to coping flexibility can be found in Appendix D.

Individual Difference Measures

The Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994), Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a), DASS (Lovibond & Lovibond, 2004), Life Satisfaction Scale (Diener et al., 1985), and the General Self-efficacy Scale (Schwarzer & Jerusalem, 1995) were all used in previous studies, and are described in more detail in the Method section of Chapter 3. Unless otherwise indicated, participants responded to all items by rating their agreement on a scale from *strongly disagree* (1) to *strongly agree* (7).

Social measures. To measure social support, I used the 24-item Social Provisions Scale (Cutrona & Russell, 1987). This scale includes six subscales, which measure adult attachment, social integration, reassurance of worth, reliable alliance, guidance, and opportunity for nurturance. One example of the items in this scale is "I have close relationships that make me feel good." The scale has good predictive, convergent, and discriminant validity, and test-retest reliability of between .37 and .66 (Cutrona & Russell, 1987).

To measure interpersonal reactivity, I used the perspective-taking, empathic concern, and personal distress subscales of the Interpersonal Reactivity Index (Davis, 1980; 21 items). The scale included items such as "I sometimes try to understand my friends better by imagining how things look from their perspective." The subscales of the Interpersonal Reactivity Index have good convergent and predictive validity (Davis, 1983).

To measure friendship approach and avoidance, I used the 8-item Relationship Goals Questionnaire: Friendship Version (Elliot et al., 2006). This scale measures the extent to which people have approach goals (e.g., "I am trying to deepen my relationships with my friends") and avoidance goals (e.g., "I am trying to make sure that nothing bad happens to my close

relationships") in their friendships. The scale has good factor analytic, reliability, and predictive validity properties (Elliot et al., 2006).

To measure adult attachment, I used the Relationship Questionnaire (Bartholomew & Horowitz, 1991) and the Adult Attachment Questionnaire (Simpson, Rholes, & Phillips, 1996). The Relationship Questionnaire consists of four items. Each item is a short paragraph that describes one attachment style (secure, fearful, preoccupied, and dismissing). The items have high discriminant and predictive validity (Bartholomew & Horowitz, 1991).

The Adult Attachment Questionnaire (Simpson et al., 1996) consists of 17 items measuring attachment avoidance and attachment ambivalence in relation to romantic partners. Avoidance refers to negative views of others and the tendency to withdraw from close relationships (e.g., "I'm not very comfortable having to depend on other people"), while ambivalence refers to negative views of the self in regards to relationships and worry over being abandoned (e.g., "I often worry that my partners don't really love me"). The subscales have good predictive and divergent validity (Simpson et al., 1996).

Background stress. The Background Stress Inventory (Terrill, Gjerde, & Garofalo, 2015) was used to measure the extent to which participants had experienced distress as a result of financial, occupational, environmental, health, and social domains over the past month. It consists of 25 items with five items per domain. Participants were instructed to respond to the items in relation to the distress they experienced as a result of the everyday life issues listed. Items included "not being able to pay your bills," "fulfilling the duties of your job," "pollution," "having a chronic illness or health problem," and "relationships that have ended." Participants responded on a 7-point scale from *no distress* (1) to *extreme distress* (7).

Results

Preliminary Analyses

Normality. Most of the aggregate variables had skewness and kurtosis scores under ± 2.0. However, age had a skewness of 2.34 (*SE* = 0.16) and a kurtosis of 5.44 (*SE* = 0.31). Consistent with the previous studies, I performed a log 10 transformation on the age data. The transformed data had a skewness of 1.78 (*SE* = 0.16) and a kurtosis of 2.68 (*SE* = 0.31), which I considered acceptable because age is not a main variable.

Reliability. The Cronbach α coefficients for all the aggregate measures were acceptable (αs ≥ .70; see Table 6.1).

Table 6.1

Key Variables: Means, Standard Deviations, and Cronbach αs

Variable	*M*	*SD*	α
Need for closure	4.50	0.60	.88
Ability to achieve closure	3.77	0.83	.89
Dispositional self-efficacy	5.02	0.84	.89
Attachment anxiety	3.68	1.15	.85
Attachment avoidance	3.67	1.09	.84
Background stress	2.80	1.04	.93
Friendship approach	5.55	0.98	.82
Friendship avoidance	5.21	1.15	.80
Perspective-taking	5.00	0.87	.78
Social support	5.54	0.88	.94
Satisfaction with life	4.64	1.27	.87
DASS	16.30	12.42	.95

Note: The DASS scores were obtained by summing participants' responses to the relevant items from *never* (0) to *always* (3). The minimum possible DASS score is 0 and the maximum is 63. The background stress scores were obtained by averaging participants' responses to the relevant items from *no distress* (1) to *extreme distress* (7). All other scores were obtained by averaging participants' responses to the relevant items from *strongly disagree* (1) and *strongly agree* (7).

Main Analyses

Correlations. Table 6.2 shows the correlations between all the proposed predictor, mediator, and outcome variables. These correlations indicated that it was appropriate to test need and ability to achieve closure as mediators of the relations between attachment style and mental health. They also indicated that it was appropriate to test self-efficacy, background stress, and

friendship avoidance as mediators of the relations between need/ability to achieve closure and mental health. However, contrary to predictions, perspective-taking was not related to ability to achieve closure, and social support was not related to the need for closure.

Effects and interactions of the need and ability to achieve closure on mental health, wellbeing, and social support. I checked whether the need and ability to achieve closure interacted to predict mental health or wellbeing, and whether both need and ability predicted mental health/wellbeing when the other was accounted for.

Consistent with previous studies' findings, PROCESS Model 1 showed that when the need for closure was entered as the predictor variable and the ability to achieve closure was entered as the moderator variable, both need (b = 3.39, SE = 1.11, t = 3.06, p = .003) and ability (b = -6.48, SE = 0.79, t = -8.25, p < .001) were significant predictors of DASS scores, and there was no interaction (p = .412). Also consistent with previous studies' findings, only ability to achieve closure was a significant predictor of satisfaction with life (b = 0.59, SE = .09, t = 6.24, p < .001). Neither the need for closure nor the interaction term were significant (both ps > .210).

Some previous research has indicated that the ability to achieve certainty and the need for certainty interact to predict perceptions of sufficiency of social support (Bar-Tal, 1994b). However, in the present study, the conditional effects of need and ability as well as the interaction were all nonsignificant (all ps > .393).

Table 6.2

Correlations Between Key Variables

	2	3	4	5	6	7	8	9	10	11	12
1. Need for closure	-.30**	-.25**	.17**	.17*	.18*	.07	.33**	-.29**	-.09	-.09	.30**
2. Ability to achieve closure	-	.49**	-.46**	-.39**	.41**	-.03	-.28**	.06	.33**	.37**	-.52**
3. Dispositional self-efficacy		-	-.35**	-.27**	-.30**	.17**	-.12	.30**	.29**	.37**	.37**
4. Attachment anxiety			-	.41**	.44**	.08	.38**	-.14*	.41**	-.37**	.45*
5. Attachment avoidance				-	.39**	-.27**	.04	-.19**	-.58**	.42**	.45**
6. Background stress					-	-.05	.22**	-.05	-.33**	-.31**	.60**
7. Friendship approach						-	.48**	.24**	.40**	.22**	-.10
8. Friendship avoidance							-	.03	.06	.03	.15*
9. Perspective-taking								-	.30**	.06	-.13*
10. Social support									-	.46**	-.47**
11. Satisfaction with life										-	-.45**
12. DASS											-

Note. DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004).

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

Because there were no interactions between need and ability on the outcome variables, their effects are reported separately throughout this chapter.

Mediation Analyses. Consistent with the approach taken in previous studies, I only checked for a mediation effect if the correlations between all the predictor, mediator, and outcome variables in a hypothesised mediation model were all significant. Consequently, I did not test any mediators of the relation between the need for closure and satisfaction with life. The mediators reported in the following section are summarised in overview Tables 6.7 and 6.8 at the end of this section.

Replication of the mediating effects of self-efficacy on the relations between need/ability to achieve closure and mental health. In previous studies, generalised self-efficacy mediated the relation between the need for closure and mental health and the relation between the ability to achieve closure and mental health. In the present study, there was a significant total effect of the need for closure on DASS, $b = 6.03$, $SE = 1.20$, $t = 5.03$, $p < .001$, 95% CI [3.67, 8.39], and a significant direct effect, $b = 4.48$, $SE = 1.17$, $t = 3.82$, $p < .001$, 95% CI [2.17, 6.79]. Consistent with previous studies, a significant indirect effect indicated that self-efficacy mediated this relation, $b = 1.55$, $SE = 0.46$, 95% CI [0.77, 2.54], CSIES = .07.

Also consistent with previous studies, there was a significant total effect of the ability to achieve closure on DASS, $b = -7.22$, $SE = 0.75$, $t = -9.58$, $p < .001$, 95% CI [-8.71, -5.74], and a significant direct effect, $b = -6.15$, $SE = 0.86$, $t = -7.17$, $p < .001$, 95% CI [-7.84, -4.46]. A significant indirect effect showed that self-efficacy mediated this relation, $b = -1.07$, $SE = 0.46$, 95% CI [-1.99, -0.19], CSIES = -.08.

Finally, the mediating effect of self-efficacy on the relation between ability to achieve closure on satisfaction with life was replicated, with a significant total effect, $b = 0.56$, $SE =$

0.09, $t = 6.31$, $p < .001$, 95% CI [0.39, 0.74], a smaller direct effect, $b = 0.38$, $SE = 0.10$, $t = 3.79$, $p < .001$, 95% CI [0.18, 0.58], and a significant indirect effect, $b = 0.18$, $SE = 0.06$, 95% CI [0.08, 0.30], CSIES = .12.

The need and ability to achieve closure as mediators of the relations between attachment anxiety/avoidance and mental health problems. Consistent with predictions, Table 6.3 shows that the need for closure mediated both (a) the relation between attachment anxiety and DASS and (b) the relation between attachment avoidance and DASS. However, both mediation models became nonsignificant when the ability to achieve closure was added as a covariate.

Table 6.3

The Need for Closure as a Mediator of the Relations Between Attachment Anxiety/Avoidance and DASS

Predictors	Effect	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Attachment anxiety	Total	4.52 (0.57)	3.40, 5.64	-	7.94	< .001
	Direct	4.11 (0.56)	3.00, 5.21	-	7.32	< .001
	Indirect	0.41 (0.19)	0.09, 0.84	.04	-	-
Attachment avoidance	Total	4.85 (0.61)	3.64, 6.05	-	7.93	< .001
	Direct	4.42 (0.60)	3.24, 5.60	-	7.37	< .001
	Indirect	0.43 (0.19)	0.11, 0.88	.04	-	-

Note. b = unstandardised regression coefficient. SE = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Consistent with predictions, Table 6.4 shows that the ability to achieve closure also mediated both (a) the relation between attachment anxiety and DASS and (b) the relation between attachment avoidance and DASS.

Table 6.4

The Ability to Achieve Closure as a Mediator of the Relations Between Attachment Anxiety/Avoidance and DASS

Predictors	Effect	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Attachment anxiety	Total	4.52 (0.57)	3.41, 5.64	-	7.99	< .001
	Direct	2.72 (0.59)	1.57, 3.88	-	4.64	< .001
	Indirect	1.80 (0.35)	1.21, 2.56	.18	-	-
Attachment avoidance	Total	4.85 (0.61)	3.65, 6.05	-	7.97	< .001
	Direct	3.20 (0.60)	3.02, 4.38	-	5.35	< .001
	Indirect	1.65 (0.33)	1.06, 2.33	.15	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

The ability to achieve closure as a mediator of the relations between attachment anxiety/avoidance and wellbeing. Next, I tested whether the ability to achieve closure mediated the relations between (a) attachment anxiety and satisfaction with life and (b) attachment avoidance and satisfaction with life. Consistent with predictions, both mediation models were significant (Table 6.5).

Table 6.5

The Ability to Achieve Closure as a Mediator of the Relations Between Attachment Anxiety/Avoidance and SWL

Predictors	Effect	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Attachment anxiety	Total	-0.40 (0.06)	-0.53, -0.28	-	-6.30	< .001
	Direct	-0.28 (0.07)	-0.41, -0.14	-	-3.95	< .001
	Indirect	-0.13 (0.03)	-0.20, -0.06	-.12	-	-
Attachment avoidance	Total	-0.49 (0.07)	-0.62, -0.36	-	-7.47	< .001
	Direct	-0.39 (0.07)	-0.52, -0.25	-	-5.54	< .001
	Indirect	-0.11 (0.03)	-0.17, -0.05	-.09	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CIs are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Background stress as a mediator of the relation between the need for closure and mental health. Table 6.2 shows that there were significant positive correlations between the need for closure, background stress, and DASS. Consequently, I tested whether background stress mediated the relation between the need for closure and DASS.

There was a total effect of the need for closure on DASS, $b = 5.82$, $SE = 1.18$, $t = 4.93$, $p < .001$, 95% CI [3.49, 8.15], which became smaller when controlling for background stress, $b = 3.99$, $SE = 0.98$, $t = 4.09$, $p < .001$, 95% CI [2.07, 5.92]. Consistent with predictions, there was significant indirect effect, indicating a significant mediation, $b = 1.83$, $SE = 0.65$, 95% CI [0.61,

3.16], CSIES = .09. However, this mediation became nonsignificant when the ability to achieve closure was included as a covariate.

Background stress as a mediator of the relation between the ability to achieve closure and mental health. Table 6.2 shows that there were significant correlations between ability to achieve closure, background stress, and DASS, and so I tested whether background stress mediated the relation between the ability to achieve closure and DASS. There was a significant total effect, $b = 5.74$, $SE = 1.16$, $t = 4.96$, $p < .001$, 95% CI [3.46, 8.02], and a smaller significant direct effect, $b = 3.90$, $SE = 0.96$, $t = 4.07$, $p < .001$, 95% CI [2.01, 5.78]. Consistent with predictions, a significant indirect effect demonstrated a significant mediation, $b = 1.84$, $SE = 0.64$, 95% CI [0.59, 3.09], CSIES = .10.

Background stress as a mediator of the relation between the ability to achieve closure and wellbeing. Next, I investigated whether background stress also mediated the relation between the ability to achieve closure and satisfaction with life. There was a significant total effect, $b = 0.56$, $SE = 0.09$, $t = 6.33$, $p < .001$, 95% CI [0.38, 0.73], and a significant direct effect, $b = 0.44$, $SE = 0.10$, $t = 4.61$, $p < .001$, 95% CI [0.25, 0.63]. In line with predictions, there was a significant indirect effect, $b = 0.12$, $SE = 0.04$, 95% CI [0.04, 0.21], CSIES = .08, indicating a mediation effect.

Friendship approach and avoidance as mediators of the relations between the need for closure and mental health. Friendship avoidance was significantly correlated with both the need for closure and DASS but friendship approach was not. Therefore, I tested whether friendship avoidance mediated the relation between the need for closure and DASS. The total effect was significant, $b = 5.85$, $SE = 1.21$, $t = 4.82$, $p < .001$, 95% CI [3.46, 8.24], as was the direct effect,

b = 5.48, SE = 1.29, t = 4.26, p < .001, 95% CI [2.95, 8.01]. Contrary to predictions, the indirect effect was not significant, b = 0.37, SE = 0.40, 95% CI [-0.37, 1.21].

Friendship approach and avoidance as mediators of the relations between the ability to achieve closure and mental health. I tested whether friendship avoidance mediated the relation between the ability to achieve closure and DASS. The total effect was significant, b = -7.26, SE = 0.75, t = -9.69, p < .001, 95% CI [-8.73, -5.78], as was the direct effect, b = -7.21, SE = 0.78, t = -9.26, p < .001, 95% CI [-8.75, -5.68]. However, contrary to hypotheses, the indirect effect was not significant, b = -0.04, SE = 0.20, 95% CI [-0.45, 0.35].

I did not test friendship approach as a mediator of the relation between ability to achieve closure and DASS because it was not significantly correlated with DASS scores. I did not test friendship approach or friendship avoidance as mediators of the relation between ability to achieve closure and satisfaction with life because friendship approach was not correlated with ability to achieve closure and friendship avoidance was not correlated with satisfaction with life.

Perspective-taking and social support as mediators of the relation between the need for closure and mental health. Table 6.2 shows that the need for closure is not significantly correlated with social support. Therefore, I did not include social support in the mediation model. I tested whether perspective-taking mediated the relation between the need for closure and DASS. The total effect was significant, b = 6.03, SE = 1.20, t = 5.03, p < .011, 95% CI [3.67, 8.39], and the direct effect was smaller, b = 5.69, SE = 1.27, t = 4.47, p < .001, 95% CI [3.19, 8.20], but the indirect effect was not significant, b = 0.34, SE = 0.44, 95% CI [-0.50, 1.22].

Perspective-taking and social support as mediators of the relations between the ability to achieve closure and mental health/wellbeing. Table 6.2 shows that the ability to achieve

closure is not significantly correlated with perspective-taking, and so I removed perspective-taking from the tested models.

First, I tested whether social support mediated the relation between the ability to achieve closure and DASS. The total effect was significant, b = -7.27, SE = 0.75, t = -9.68, p < .001, 95% CI [-8.75, -5.79], and the direct effect was smaller, b = -5.71, SE = 0.74, t = -7.68, p < .001, 95% CI [-7.17, -4.24]. Consistent with predictions, the indirect effect was also significant, b = -1.56, SE = 0.40, 95% CI [-2.41, -0.84], CSIES = -.11.

Second, I tested whether social support mediated the relation between the ability to achieve closure and satisfaction with life. The total effect was significant, b = 0.58, SE = 0.09, t = 6.47, p < .001, 95% CI [0.40, 0.75], and the direct effect was smaller, b = 0.39, SE = 0.09, t = 4.40, p < .001, 95% CI [0.21, 0.56]. In line with hypotheses, the indirect effect was significant, b = 0.19, SE = 0.04, 95% CI [0.11, 0.29], CSIES = .12.

The main mediation findings from the present chapter are summarised in Tables 6.6 and 6.7.

Table 6.6

Overview of the Mediators of the Relations between NFCS and DASS

Variable	Mediation	Mediation (controlling for AACS)
Self-efficacy	**Y**	**Y**
Background stress	**Y**	N
Friendship avoidance	N	-
Perspective-taking	N	-

Table 6.7

Overview of the Mediators of the Relations between AACSS and Mental Health

Variable	Mental Health Outcome	Mediation	Mediation (controlling for NFCS)
Self-efficacy	DASS	**Y**	**Y**
	SWL	**Y**	**Y**
Background stress	DASS	**Y**	**Y**
	SWL	**Y**	**Y**
Friendship avoidance	DASS	N	-
	SWL	-	-
Social support	DASS	**Y**	**Y**
	SWL	**Y**	**Y**

Discussion

In the present study, I shifted away from the decision-making variables that formed the focus of the previous studies in this thesis. I investigated attachment style as a possible antecedent of the need and/or ability to achieve closure. I also investigated the mediating effects of perceived stress and social factors that may help to explain why people with a high need for closure and/or low ability to achieve closure experience poorer mental health.

Consistent with previous studies, mental health problems were predicted by both the need and ability to achieve closure, while wellbeing was predicted only by ability. In most analyses, there was no interaction between the need and ability to achieve closure on mental health. The only exception was that, when controlling for age, the need and ability to achieve closure interacted to predict negative affect. Specifically, the need for closure was positively associated with negative affect only when ability to achieve closure was low. This suggests that people with a high need for closure only experience relatively high negative affect (compared to those with a low need for closure) if they also have a low ability to achieve closure. This is consistent with

Roets and Soetens' (2010) hypothesis about the interactive effects of the need and ability to achieve closure. However, because this finding was not replicated in any of the other four studies in the present thesis (or in Roets and Soetens' study), I am reluctant draw any firm conclusions from it.

Need and Ability to Achieve Closure as Mediators of the Relations between Attachment and Mental Health

As outlined in the introduction of this chapter, attachment styles have consequences for various aspects of life, including the formation of working models about the self and the world. Specifically relevant to the present work is Mikulincer's (1997) suggestion that attachment experiences inform working models about the individual's capacity to deal with unexpected events. People with secure attachment styles are likely to believe that they can deal well with such events, whereas people with insecure attachment styles internalise their early experience that uncertainty is difficult to deal with. Consistent with these theoretical ideas, Mikulincer found that people with secure attachment styles had a lower need for closure than people with insecure (anxious or avoidant) attachment styles, reflecting higher confidence in their capacity to deal with uncertainty. I extended on this work by taking a continuous approach to attachment style and investigating its relations with the ability to achieve closure as well the need for closure. I also considered whether the need for closure and ability to achieve closure may mediate the relations between attachment style and mental health (e.g., Love & Murdock, 2004).

Consistent with predictions, attachment avoidance and attachment anxiety were both positively associated with the need for closure and negatively associated with the ability to achieve closure. Also consistent with predictions, the relations between attachment avoidance/anxiety and DASS were both mediated by the need for closure and the ability to

achieve closure (tested separately). However, the mediating effect of the need for closure was nonsignificant when ability was included as a covariate, suggesting that ability to achieve closure explains more unique variance in the relations between attachment and mental health than need for closure. Ability to achieve closure also mediated the relations between attachment anxiety/avoidance and wellbeing. Need for closure was not tested as a mediator because it was not significantly related to wellbeing.

The fact that the ability to achieve closure was a more consistent mediator between attachment avoidance/anxiety and mental health/wellbeing than the need for closure is noteworthy, particularly because ability to achieve closure was not considered by Mikulincer (1997) and the origins of differences in the ability to achieve closure have not been investigated more generally. A secure attachment style may predict high ability to make quick, confident decisions because it engenders the belief that the individual has a high capacity for dealing with the world, promoting confidence and protecting against second-guessing or ruminating over choices. The fact that both need and ability were related to attachment avoidance and anxiety in similar ways also suggests the possibility that early attachment experiences shape both people's ability to deal with uncertainty and their preference for certainty. This idea is discussed in more detail in Chapter 8 (General Discussion).

Because attachment styles are formed very early in life and are largely dependent on the behaviour of others (rather than the individual in question), the reverse causal order seems less likely than the causal order tested in this study. However, it is possible that genetic factors affect children's need for closure (e.g., Roets et al., 2015) and this has flow on effects for their attachment experiences. As outlined in the General Discussion, further research is required to

determine when people develop individual differences in their preference for certainty and their ability to resolve uncertainty.

The Role of Subjective Distress Caused by Stressors: Background Stress as a Mediator of the Relations between Need/Ability to Achieve Closure and Mental Health

As outlined above, attachment styles may affect the need for closure through the individual's perceptions of their capacity to cope with uncertain and distressing situations. Perceptions of such capacity may also affect the subjective stressfulness of distressing situations. Previous research has demonstrated that the need for closure is associated with more sensitivity of the behavioural inhibition system (Czernatowicz-Kukuczka, et al., 2014; Jaśko et al., 2015), which is in turn associated with the perception of negative events as being more negative and distressing (Carver & White, 1994). In the present study, I investigated whether increased distress from everyday stressors could help explain why people with a high need for closure or low ability to achieve closure experience poorer mental health.

Consistent with hypotheses, people with a high need for closure reported more distress due to background stressors such as financial, relationship, or work stress, and this increased distress mediated their poorer mental health. Similarly, background stress mediated the relations between the ability to achieve closure and mental health/wellbeing. These results support the idea that people with a high need for closure or low ability to achieve closure experience more distress due to background stressors than people with a low need or high ability, and that these higher levels of stress accumulate to contribute to mental health problems.

The interpretation of these results is difficult, however, due to the background stress measure that was used. The background stress measure asked participants to rate their level of distress from "no distress" to "extreme distress" for each potential source of background stress,

such as “not being able to pay your bills.” Consequently, relatively high distress scores may have resulted from (a) experiencing a higher number of negative events, possibly due to poor decision-making skills (e.g., having many bills that you are unable to pay), (b) experiencing more severe negative events (e.g., having a very expensive bill that you are unable to pay), or (c) experiencing more distress than someone else who is in the same stressful situation.

In support of the latter possibility, the need for closure is associated with paying more attention to stressors (Sollár & Vanečková, 2012). Hence, people with a high need for closure may experience more stress in response to background stressors because they devote more attention to them. However, the present study could not distinguish between any of these three explanations. It is therefore not clear whether people with a high need for closure or low ability to achieve closure experience events as more stressful (due to more sensitive behavioural inhibition systems and/or paying more attention to stressors), or whether they experience more frequent or more stressful negative events, or a combination of both.

This difficulty in interpreting the results mirrors the ambiguity from the previous studies about why people with a high need or low ability to achieve closure experience more regret. It was not clear whether higher regret is due to objectively poorer decisions or to the way in which high need/low ability people process their decisions. A similar solution to the one proposed in the previous chapter may also help to address the ambiguity in the present study’s findings. Specifically, measuring the frequency and severity of stressful events as well as subjective measures of stressfulness would help to disentangle the potential explanations for these relations and provide a firmer basis for proposing and designing interventions to address the mental health of people with a high need for closure or low ability to achieve closure. If people with a high need or low ability are experiencing more frequent or severe stressors, then it may be useful to

investigate the reasons for this. For example, Mikulincer (1997) suggested that high need for closure may result in faulty decision-making. As outlined earlier regarding the objective decision quality hypotheses, poorer decisions may result in increased regret and also increased stressors. As suggested in the previous chapter, a consideration of the quality of the decisions made by people with a high need or low ability for closure could help to explain why they experience more stress.

As with the previous studies, it is also important to note that the cross-sectional nature of the present study means that the causal direction of these effects is not clear. For example, it is possible that having poorer mental health can result in increased distress caused by background stressors. In the next chapter, I describe Study 5, which attempted to address these issues using a two-wave semi-longitudinal approach.

Social Mediators of the Relations between the Need/Ability to Achieve Closure and Mental Health

The final thread of the present study involved investigating social factors that may help to explain why people with a high need for closure or low ability to achieve closure report poorer mental health. These variables complement the decision-making factors considered in the previous studies.

Contrary to hypotheses, friendship avoidance did not mediate the relations between need/ability to achieve closure and mental health. This suggests that, although people with a high need for closure or low ability to achieve closure have more friendship avoidance goals, these avoidance goals do not contribute to their poorer mental health. This result is consistent with previous research that has found no relation between friendship avoidance goals and subjective wellbeing, though friendship avoidance goals are positively related to physical ill-health (Elliot

et al., 2006). It is possible that friendship avoidance is not consistently or strongly related to psychological health, and this is the reason that it did not mediate the relations between need/ability to achieve closure and mental health or wellbeing in the present study. Other mechanisms may be more important in explaining these relations, including the decision-making mechanisms considered in previous chapters.

I also considered the roles of perspective-taking and social support. Specifically, I investigated whether people with a high need for closure or low ability to achieve closure had lower perspective-taking tendencies, resulting in less social support and ultimately poorer mental health. However, although people with a high need for closure reported engaging in less perspective-taking, there was no relation between need for closure and social support, and so I did not test the proposed serial mediation model (NFCS → perspective taking → social support → mental health). Instead, I tested the model NFCS → perspective-taking → mental health. Perspective-taking did not mediate the relation between the need for closure and mental health. This is not surprising, since social support was a vital part of the proposed mechanism from a theoretical perspective. If the lower perspective-taking does not result in lower social support for people with a high need for closure, then there does not appear to be any reason that these reduced perspective-taking tendencies should negatively affect their mental health.

In contrast to the above findings, the ability to achieve closure was related to social support but not to perspective-taking. Hence, I did not test the hypothesised serial mediation model (i.e., ability to achieve closure → perspective taking → social support → mental health). However, social support mediated the relations between ability to achieve closure and (a) mental health and (b) wellbeing.

These findings suggest that people with a high ability to achieve closure have high levels of social support, contributing to their better mental health and wellbeing, but that high levels of social support are not associated with better perspective-taking skills for such people. Hence, we must consider other reasons for the relation between the ability to achieve closure and social support. People with a high ability to achieve closure may have more and/or better relationships with others because their ability to reach firm, confident decisions makes them more likely to make and carry out plans to socialise, or because confidence is an attractive trait to potential friends.

In summary, this study showed that both need and ability to achieve closure mediated the relations between continuous measures of attachment avoidance/anxiety and mental health/wellbeing, supporting and extending on the findings made by Mikulincer (1997) regarding the need for closure and categorical measures of attachment. These findings suggest that differences in attachment style may cause differences in need and ability to achieve closure, though no firm causal conclusions can be drawn from the present study. I also found that increased levels of background stress mediated the relations between need/ability to achieve closure and mental health/wellbeing, suggesting that the poorer mental health of people with high need/low ability may be partially attributable to increased distress from everyday stressors. Finally, I found that social support mediated the relations between ability to achieve closure and mental health/wellbeing, suggesting that people with a higher need for closure may experience better mental health and wellbeing due partially to their higher levels of social support. The issues regarding determining the temporal direction of many of the relations identified in this study and the previous studies are addressed in the next chapter, which utilised a semi-longitudinal two-wave design.

CHAPTER 7

STUDY 5:

A LONGITUDINAL INVESTIGATION OF THE RELATIONS BETWEEN CLOSURE AND MENTAL HEALTH

The previous four studies demonstrated cross-sectional evidence for the relations between need/ability to achieve closure and mental health/wellbeing. They also identified some possible mediators of these effects. These findings are useful from a preliminary perspective because they demonstrated a consistent pattern of relations between need/ability to achieve closure and mental health and wellbeing, suggesting the potential for a causal relation between these constructs. The mediation findings are also useful because they demonstrated that some decision-making variables consistently explain variance in the relations between need/ability and mental health (i.e., multiple types of regret, decision stress) while other variables do not (e.g., friendship avoidance). These associations suggest that the processes linking need/ability and mental health are mostly related to decision-making rather than social factors.

However, as outlined in the previous chapters, a cross-sectional approach cannot distinguish between different potential temporal relations between two constructs. So, it is not clear whether differences in the need and ability to achieve closure precede differences in mental health or vice versa. Similarly, cross-sectional approaches to mediation are flawed because mediation processes take place over time and therefore cannot be accurately detected by measuring all variables on a single occasion (Selig & Preacher, 2009). To address these issues, I attempted to find longitudinal evidence of some of the findings of the previous studies.

Temporal Relations Between Need/Ability to Achieve Closure and Mental Health

The first aim of the present study was to further investigate the temporal direction of the relations between need/ability to achieve closure and the outcome variables. Across the previous studies in this thesis, I assumed that need/ability to achieve closure affect mental health and wellbeing, rather than that mental health and wellbeing affect the need and ability to achieve closure. However, this assumption is not the only plausible way of viewing the relations between these constructs. Previous research, both by other researchers and in the present thesis, has both measured dispositional need for closure and manipulated state need for closure (e.g., Shah, Kruglanski, & Thompson, 1998). The fact that the need for closure can be manipulated suggests that, while there is an element of consistency in a person's need for closure, it is also subject to change depending on situational factors. It is therefore plausible that an individual's current state of mental health could affect their need for closure. For example, a person may feel more motivated to seek certainty when they are feeling anxious than when they are not feeling anxious.

One previous study has involved a manipulation of the ability to achieve closure, demonstrating that ability is also subject to change under different circumstances (Kossowska et al., 2015). Hence, a reverse causal relation to the one assumed throughout the previous studies seems plausible. Feeling anxious may reduce confidence and hence decrease the ability to be certain in one's decisions. In support of this idea, previous research has found that state anxiety is associated with increased indecision and uncertainty, although the cross-sectional nature of the study also raises questions about the causal direction of these effects (Campagna & Curtis, 2007).

One necessary (though not sufficient) condition for the inference of a causal relation between two variables is that the predictor precedes the outcome. Therefore, to infer that need/ability to achieve closure cause changes in mental health/wellbeing, a longitudinal design is required. In the present study, I measured need/ability to achieve closure, mental health, and wellbeing at two time points approximately six months apart. As outlined above, both temporal directions are plausible: need/ability to achieve closure may predict mental health/wellbeing, and mental health/wellbeing may predict need/ability. However, in line with previous researchers (e.g., Colbert et al., 2006; Roets & Soetens, 2010), I expected that need for closure at Time 1 would be positively related to mental health at Time 2, controlling for mental health at Time 1. Similarly, I expected that ability to achieve closure at Time 1 would be negatively related to mental health problems (and positively related to wellbeing) at Time 2, controlling for mental health problems (or wellbeing) at Time 1.

In the present study, I used a more comprehensive measure of wellbeing than the Life Satisfaction Scale (Diener et al., 1985) used in the previous studies. The COMPAS-W (Gatt, Burton, Schofield, Bryant, & Williams, 2014) measures both hedonic and eudaimonic wellbeing. Hedonic wellbeing refers to pleasure or happiness, whereas eudaimonic wellbeing refers to a multidimensional approach to psychological functioning that includes autonomy, growth, self-acceptance, life purpose, mastery, and relatedness (Ryan & Deci, 2001). The use of a more comprehensive measure enabled me to make more confident conclusions regarding wellbeing more broadly rather than just the hedonic aspect measured in previous studies.

Longitudinal Assessment of Mediators of the Relations Between Need/Ability to Achieve Closure and Mental Health and Wellbeing

The second aim of the present study was to investigate the mediation effects found in the previous cross-sectional studies over two data collection points with a six-month time lag. As outlined by Selig and Preacher (2009), longitudinal research is necessary to establish the existence of mediation effects because (a) the mediation process unfolds over time, and (b) repeated measures enables researchers to control for previous levels of the variables in question. Cross-sectional data cannot demonstrate the existence of a process that occurs over time because all of the variables are measured simultaneously. For the same reason, there is no way to control for previous levels of the outcome variables, and therefore no way to tell whether the predictor and mediator predict change in the outcome variable.

Therefore, in the present study, all variables were measured at two time points to establish that the predictor predicts change over time in the mediator and the outcome variables, and that the mediators predict change over time in the outcomes. I tested several mediators that demonstrated significant indirect effects in the cross-sectional mediation analyses conducted in the previous studies, including self-efficacy, the Schwartz (2000) measure of regret, process and outcome regret (Lee & Cotte, 2009), background stress (Terrill et al., 2015), and decision stress.

I also included a measure of regret that specifically targets both action regret and inaction regret. In general, people tend to experience more regret following action than inaction, particularly when the results of the action or inaction are negative (e.g., Kahneman & Tversky, 1982; Landman, 1987). This means that people should generally experience more inaction regret than action regret. This may be particularly true of people with a high need for closure, who may avoid doing new things due to their preference for certainty, and then later regret missing out. It

may also be characteristic of people with a low ability to achieve closure, who would find it difficult to make a firm decision to take action and may therefore regret missed opportunities. However, only one item of the Regret Scale (Schwartz et al., 2002) refers to regret regarding inaction, and hence this scale may be under-estimating people's true levels of regret. Therefore, I created a more comprehensive measure of regret that includes items relating to action and items relating to inaction. I expected that this regret measure would mediate the relations between need/ability to achieve closure and mental health/wellbeing.

Two sets of analyses conducted on the Study 5 data are reported in Appendix E. First, I tested physical health as an additional outcome variable. Second, I tested decision relief and world instability (as described in Appendix B) as mediators of the relations between the need/ability to achieve closure and mental health. These tests are reported in Appendix E for the sake of brevity because they do not contribute to the conclusions reached in this research

In summary, in the present study, I aimed to (a) establish that need/ability to achieve closure longitudinally predict mental health and wellbeing, and (b) test the potential mediators of these relations longitudinally.

Method

The present study involved collecting data from participants at four Australian universities in two waves at least six months apart. I conducted a power analysis to determine how many participants to recruit for a power of .90. I used the smallest significant correlation obtained across Studies 1-4 between a predictor variable (i.e., need for closure or ability to achieve closure) and a dispositional outcome variable (i.e., satisfaction with life or DASS), which was the correlation of r = -.19 between the need for closure and satisfaction with life in Study 1. An a priori power analysis showed that a two-tailed bivariate correlation with an alpha

level of .05 and a power of .90 would require 287 participants to detect a correlation of .19 or larger. I rounded up to 300 to account for incomplete data or lack of consent. Previous longitudinal research has had very high attrition rates between waves (e.g., 27% in Iyer, Jetten, Tsivrikos, Postmes, & Haslam, 2009; 71% in Rubin, Evans, & Wilkinson, 2016). To be conservative, I assumed an attrition rate of 60%. In order to have approximately 300 participants complete Time 2 with an attrition rate of 60% from Time 1 to Time 2, I attempted to collect useable data from 750 participants in Time 1.

The first wave of data collection occurred in Semester 2, 2017 at the University of Newcastle (n = 268), the University of Melbourne (n = 191), and the University of New South Wales (n = 178), and in Trimester 3, 2017/2018 at the University of New England (n = 98). Across all universities, a total of 735 responses were collected. After removing duplicates, the final Time 1 sample consisted of 731 participants. Most participants were White (n = 481; 66%), with 191 Asian participants (26%), 10 Aboriginal or Torres Strait Islander participants (1%) and 10 African participants (1%). Thirty-six participants selected "other" for ethnicity (5%) and three declined to respond to the ethnicity question (0.4%). The mean age was 23.11 years (SD = 7.77), and 73% of participants were women.

To collect Time 2 data, I recontacted participants via email approximately 6 months after they completed the first survey and asked them to complete the survey again. One hundred and thirty-four people started the questionnaire, but 22 of those did not complete it, and so there were a total of 112 responses. After deleting two duplicate completions, there were 110 participants in the second wave. Of those 110 participants, five could not be matched to a Time 1 response because their longitudinal code (described in the Measures section) did not match any of the Time 1 longitudinal codes.

Table 7.1

Ethnicity, Age, and Gender Across Each University for Participants who Completed Both Waves

University	Ethnicity						Female participants (%)	Mean Age (*SD*)
	White (%)	ATSI (%)	African (%)	Asian (%)	Other (%)	Missing (%)		
UON	44 (91.67)	1 (2.08)	0 (0.00)	3 (6.25)	0 (0.00)	0 (0.00)	38 (79.17)	25.42 (7.57)
UOM	18 (78.26)	0 (0.00)	0 (0.00)	4 (17.39)	1 (4.35)	0 (0.00)	20 (86.96)	20.27 (3.77)
UNSW	7 (53.85)	0 (0.00)	0 (0.00)	5 (38.46)	1 (7.69)	0 (0.00)	12 (92.31)	19.38 (2.10)
UNE	20 (95.24)	0 (0.00)	0 (0.00)	1 (4.86)	0 (0.00)	0 (0.00)	19 (90.48)	35.35 (8.15)
All universities	89 (84.76)	1 (0.95)	0 (0.00)	13 (12.38)	2 (1.90)	0 (0.00)	89 (84.76)	25.49 (8.48)

Note. UON = University of Newcastle. UOM = University of Melbourne. UNSW = University of New South Wales. UNE = University of New England. ATSI = Aboriginal or Torres Strait Islander

Hence, the final longitudinal sample consisted of 105 participants with complete Time 1 and Time 2 responses. Forty-eight (46%) of the participants were from the University of Newcastle, 23 from the University of Melbourne (22%), 13 from the University of New South Wales (12 %), and 21 (20%) from the University of New England. Ethnicity, age, and gender information for the participants who completed both waves are shown in Table 7.1.

Procedure

The Time 1 survey was presented online to participants through each participating university's research experience credit system. Students were awarded course credit for the survey in alignment with each university's policy. Participants were told that the survey was measuring how certain personality variables predict mental health and wellbeing. The survey took 25-30 minutes to complete. The order in which the measures and the items within each measure were presented to participants was randomised, except for the demographic variables and creation of the longitudinal code, which were always presented at the end of the survey. Participants created a longitudinal code by entering the first letter of their name, the first letter of their mother's name, and the day and month of their birthday. At the end of the Time 1 survey, participants were asked to provide their student email address if they consented to being recontacted to participate in the Time 2 survey.

Participants were invited via student email to complete the Time 2 survey. The mean lag time between Time 1 and Time 2 survey completion was 36.61 weeks (*SD* = 5.39 weeks), with the minimum being 26.47 weeks and the maximum being 47.47 weeks. Students did not receive course credit for the Time 2 survey because there was no guarantee that they would be completing a psychology course that involved research participation points at the time of the Time 2 survey completion. Instead, at the end of the Time 2 survey, participants could enter a prize draw to win one of 15 $100 eGift vouchers. The Time 2 survey was otherwise identical to the Time 1 survey.

Measures

Many of the measures in the present study were identical to measures used in Study 1, including the Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski,

1994), the Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a), the DASS (Lovibond & Lovibond, 2004), the Regret Scale (Schwartz et al., 2002), and the General Self-efficacy Scale (Schwarzer & Jerusalem, 1995), each of which is described in more detail in Chapter 3.

The present study also included the measure of background stress used in Study 4 (described in Chapter 6). The financial stress subscale was removed from the background stress measure to save space. In Study 4, this subscale was not significantly related to the need for closure ($r = .11$, $p = .067$) and its relation with the ability to achieve closure was the smallest of all the background stress subscales ($r = -.22$, $p < .001$).

The measures of option and process (overconsideration and underconsideration) regret used in Study 3 (described in Chapter 5; Lee & Cotte, 2009) were also included in the present study. In Study 3, these items referred to regret about the moral decisions they had made as part of that questionnaire. However, in the present study, participants were instructed to respond to these items while thinking about the important decisions they had made over the past month. The items referred to general feelings of regret rather than feelings about specific decisions (e.g., “In general, I regret not putting enough thought into my decisions”). The error in the Study 3 survey regarding one of the underconsideration items was corrected in the present study.

A number of new measures were added to the present study. I measured action regret and inaction regret over the past month with two ad-hoc items each. The action regret items captured the extent to which participants regretted things they had done (e.g., “when I look back over my life, I regret some of the actions I have taken”). The inaction regret items measured the extent to which participants regretted failing to take action (e.g., “when I look back over my life, I realise that I have missed opportunities to do many of the things that I wanted to do”). The four action and inaction regret items were combined to form a single measure of inaction/inaction regret.

I measured wellbeing over the past month using the COMPAS-W Scale of Wellbeing, a 26-item scale that measures both hedonic and eudoamonic wellbeing (Gatt et al., 2014). The items span six aspects of wellbeing: composure, own-worth, mastery, positivity, achievement, and satisfaction. Items include "I work hard to accomplish my goals," and "I am usually quite a happy and positive person." The scale has good internal reliability across both the full scale (r = .84) and its subscales (average r = .71; Gatt et al., 2014). It is important to note that some items are part of multiple subscales. For example, the item "I rarely feel scared or anxious" is included in both the composure subscale and the satisfaction subscale.

Participants were instructed to respond to all the measures in relation to how they have felt over the past month, except for the DASS, which was measured over the past seven days, and the need and Ability to Achieve Cognitive Structure Scales, which did not have any time frame specified.

Results

Power Analysis

I conducted a post-hoc power analysis using Schoemann et al's (2017) Monte Carlo Power Analysis for Indirect Effects app. Because regret was the most consistent mediator of the relations between need for closure and mental health across the previous studies, I used the correlations between the need for closure, the Schwartz (2000) regret measure, and DASS as the effect size input. To be conservative, I used the smallest set of correlations between these variables obtained over the previous studies. The smallest correlations between need for closure, regret and mental health were found in Study 2 (rs ranging from .19 and r = .43). The power analysis showed that a study with a sample size of 105 with an alpha level of .05 would have a power of .46 to find a mediation effect of regret on the relation between the need for closure and

DASS scores. The low power means that the results of the present study should be interpreted with some caution.

Preliminary Analyses

Missing data. The survey software was set to prevent participants from continuing to the next page of the survey unless they had responded to all items on the current page (except age and ethnicity). However, due to an error in the survey randomisation, 9 participants were shown only 9 of 10 survey pages, with the omitted page being missing at random, and so not all measures were completed by all participants.

Exploratory factor analysis.

Option regret, underconsideration regret, and overconsideration regret. In Study 3, I found that the underconsideration and option regret items loaded together onto one factor, and the overconsideration items loaded onto a separate factor. In the present study, a principal axis exploratory factor analysis on the relevant items from Time 1 showed a similar factor structure to that found in Study 3. The Kaiser-Meyer-Olkin measure of sample adequacy was .80 and Bartlett's test of sphericity was significant ($p < .001$). Two factors had an eigenvalue greater than 1.00, and a parallel analysis showed that only the first two factors in the real dataset (4.94, 2.40) had eigenvalues larger than the corresponding factors in the simulated dataset (1.57, 1.44).

I therefore extracted two factors using the Promax method (Kappa = 3). The four overconsideration items loaded above .78 on one factor, with all cross-loadings $|< .08|$. The underconsideration and option regret items all loaded $\geq .44$ on the second factor, with all cross-loadings $|\leq .34|$. For all items, the loading onto the primary factor exceeded the cross loading by $|\geq .20|$, and so I retained all items in the factors in which they primarily loaded. Therefore,

consistent with the approach taken in Study 3, I created a 4-item Time 1 overconsideration regret subscale and an 8-item Time 1 option/underconsideration regret subscale.

I also conducted an exploratory factor analysis on the Time 2 data and found similar results (Kaiser-Meyer-Olkin = .88, Bartlett's test of sphericity $p < .001$). Three factors had an eigenvalue ≥ 1.00 (5.53, 1.89, 1.00), but a parallel analysis showed that only the first two factors in the real dataset had eigenvalues larger than the corresponding factors in the simulated dataset (1.61, 1.43). I therefore extracted two factors using the Promax method (Kappa = 3). All four overconsideration items loaded ≥.71 onto the first factor, with all cross-loadings |< .09|. All the underconsideration and option regret items loaded onto the second factor ≥ .46, with all cross-loadings |< .21|. Therefore, I created a Time 2 overconsideration regret subscale and a Time 2 option/underconsideration regret subscale with the same items used in the corresponding Time 1 aggregate measures.

Action/inaction regret. I tested whether the action and inaction regret items would load onto one factor or two. I conducted a principal axis exploratory factor analysis on the relevant items in Time 1. The Kaiser-Meyer-Olkin measure of sample adequacy was .73 and Bartlett's test of sphericity was significant ($p < .001$). Only one factor had an eigenvalue greater than 1.00, and a parallel analysis showed that only the first factor in the real dataset (2.48) had an eigenvalue larger than the corresponding factor in the simulated dataset (1.14). I therefore extracted one factor using the Promax method (Kappa = 3). All items loaded above .68 onto the extracted factor.

I repeated the principal axis exploratory factor analysis on the Time 2 data. The Kaiser-Meyer-Olkin measure of sample adequacy was .76 and Bartlett's test of sphericity was significant ($p < .001$). As with Time 1, only one factor had an eigenvalue greater than 1.00, and a

parallel analysis showed that only the first factor in the real dataset had a higher eigenvalue than the corresponding factor in the simulated dataset (2.59 and 1.14 respectively). I therefore extracted one factor using the Promax method (Kappa = 3). All items loaded above .67 onto the extracted factor. Hence, I created a single action/inaction regret measure for Waves 1 and 2 in which higher scores reflect higher levels of regret.

Normality. All variables across both waves had skewness and kurtosis scores under ± 2.0.

Reliability. The Cronbach α for all aggregate measures were within the acceptable range across both waves (Table 7.2).

I tested the test-retest reliability of the need for closure and the ability to achieve closure to investigate their stability over the 6-month study period. I found that both the need for closure ($r = .84$, $p < .001$) and the ability to achieve closure ($r = .81$, $p < .001$) had high test-retest reliability. Additionally, paired samples t-tests showed that there was no significant difference between Time 1 need for closure and Time 2 need for closure ($p = .369$) or between Time 1 ability to achieve closure and Time 2 ability to achieve closure ($p = .638$).

Attrition analyses. I conducted independent samples *t*-tests on the Time 1 data to determine whether participants who only completed Time 1 had significantly different scores on key variables (need for closure, ability to achieve closure, DASS, and COMPAS-W) than participants who completed both waves. All the *t*-tests were nonsignificant (all *p*s ≥ .064), showing that the participants who completed both waves did not differ significantly on these key constructs compared to participants who dropped out of the study after Time 1.

Table 7.2

Key Variables: Means, Standard Deviations, and Cronbach αs

	Time 1		Time 2	
Variable	*M* (*SD*)	α	*M* (*SD*)	α
Need for closure	4.36 (0.68)	.90	4.39 (0.71)	.91
Ability to achieve closure	3.68 (0.97)	.91	3.65 (0.97)	.91
Self-efficacy	4.91 (0.97)	.90	4.81 (1.09)	.92
Option/underconsideration regret	3.81 (1.11)	.85	3.79 (1.14)	.85
Overconsideration regret	4.36 (1.52)	.78	4.29 (1.53)	.72
Schwartz regret	4.32 (1.26)	.80	4.38 (1.32)	.84
Action/inaction regret	4.04 (1.38)	.80	4.15 (1.44)	.82
Decision stress	4.95 (1.21)	.87	4.91 (1.40)	.92
DASS	18.29 (11.81)	.93	18.80 (12.15)	94
Background stress	2.12 (0.56)	.86	2.13 (0.59)	.86
COMPAS-W	119.96 (21.55)	.90	118.17 (22.57)	.91

Note. The DASS scores were obtained by summing participants' responses to the relevant items from *never* (0) to *always* (3). The minimum possible DASS score is 0 and the maximum is 63. The background stress scores were obtained by averaging participants' responses to the relevant items from *no distress* (1) to *extreme distress* (7). The COMPAS-W scores were obtained by summing participants responses to the relevant items from *strongly disagree* (1) and *strongly agree* (7). The minimum possible COMPAS-W score is 20 and the maximum possible score is 140. All other scores were obtained by averaging participants' responses to the relevant items on a 7-point scale between *strongly disagree* (1) and *strongly agree* (7).

Main Analyses

Correlations. Table 7.3 shows the correlations of the Time 1 predictors and mediators with Time 2 mediators and outcomes.

Table 7.3

Correlations Between Time 1 Predictor and Mediator Variables and Time 2 Mediator and Outcome Variables

	W2 SE	W2 OUR	W2 OR	W2 SR	W2 AIR	W2 BS	W2 DS	W2 DASS	W2 CW
W1 NFCS	-.26**	.31**	.34**	.45**	.36**	.24**	.41**	.40**	-.24**
W1 AACSS	.57**	-.53**	-.58**	-.58**	-.45**	-.51**	-.56**	-.47**	.63**
W1 SE	.71**	.50**	-.31**	-.39**	-.46**	-.41**	-.36**	-.47**	.62**
W1 OUR	-.40**	.62**	.31**	.45**	.56**	.42**	.33**	.38**	-.59**
W1 OR	-.41**	.33**	.59**	.45**	.28**	.41**	.47**	.43**	-.44**
W1 SR	-.44**	.65**	.54**	.67**	.49**	.44*	.53**	.38**	-.49**
W1 AIR	-.57**	.56**	.28**	.36**	.59**	.41**	.31**	.37**	-.58**
W1 BS	-.41**	.43**	.31**	.39**	.36**	.66**	.40**	.50**	-.57**
W1 DS	-.44*	.33**	.51**	.67**	.21**	.46**	.61**	.47**	-.47**

Note. NFCS = Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994). AACSS = Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). SE = Self-efficacy (Schwarzer & Jerusalem, 1995). OUR = option/underconisderation regret (Lee & Cotte, 2009). OR = overconsideration regret (Lee & Cotte, 2009). SR = Schwartz regret (Schwartz et al., 2002). AIR = action/inaction regret. BS = background stress (Terrill et al., 2015). DS = Decision stress. DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004). CW = COMPAS-W (Gatt et al., 2014).

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

As shown in Table 7.3, all the predictors at Time 1 were related to the mediators and the outcomes at Time 2, and all the mediators at Time 1 were related to the outcomes at Time 2.

Mediation approach. To test for evidence of mediation effects using two waves of data, I used the multiple regression approach outlined in Rubin et al. (2016, pp. 728-729). I conducted four tests for each hypothesised mediation model as outlined below:

1. The effect of the predictor variable at Time 1 on the outcome variable at Time 2 controlling for the outcome variable at Time 1.
2. The effect of the predictor variable at Time 1 on the mediator variable at Time 2 controlling for the mediator at Time 1.
3. The effect of the mediator variable at Time 1 on the outcome variable at Time 2 controlling for the outcome at Time 1.
4. The effect of the predictor variable at Time 1 on the outcome variable at Time 2 controlling for the outcome and mediator variables at Time 1.

As outlined in Rubin et al. (2016), the first three tests demonstrate whether the data demonstrates the potential for a meaningful mediation effect to be detected according to the Baron and Kenny approach (Baron & Kenny, 1986; see also Yzerbyt et al., 2018). Specifically, Test 1 shows whether the predictor variable predicts the outcome variable. Tests 2 and 3 demonstrate whether the predictor variable significantly predicts the mediator (Test 2) and whether the mediator variable significantly predicts the outcome variable (Test 3).

Test 4 then shows whether there is still a significant relation between the predictor and outcome variables after controlling for the effect of the proposed mediator. If the mediation effect exists, then the effect of the predictor on the outcome found in Test 4 should be smaller than the effect found in Test 1 (when the mediator was not controlled for). This approach

represents an improvement over the cross-sectional approach taken in previous studies because, in the present study, the proposed causal variables (i.e., predictor and mediator variables) were measured at least 6 months before the outcome variables, and therefore we can be more certain about the temporal direction of the effect (Rubin et al., 2016). The Time 1 measures of the dependent variable are included as predictors in each model to account for the stability of individual differences in that variable over time (Rubin et al., 2016).

If any of the tests for each of the proposed mediation models was nonsignificant, I stopped testing that model and concluded that the mediation hypothesis was not supported. This is in line with the approach taken to mediation in the previous studies in the thesis, where I only tested mediation models if the correlations between the predictor, mediator, and outcome variables were all significant. This approach is based on the suggestion by Yzerbyt et al. (2018) that researchers should consider all paths, not only the indirect effect, when evaluating mediation models.

All tests were reconducted controlling for age, gender, ethnicity, social class, and Perceived Awareness of the Research Hypotheses (Rubin, 2016) as measured at Time 1. Ethnicity was dichotomised as White and non-White because there were very few participants in most of the non-White ethnicity categories. There was only one person in the third gender category, which introduced collinearity issues with the dummy coding of gender into two separate variables. Consequently, gender was included in the sensitivity tests as a single dichotomous covariate with the participant in the “other” category removed from the analysis. When the predictor in any analysis was the need for closure or the ability to achieve closure, the sensitivity analysis also involved adding the other variable as a covariate. The results of these sensitivity tests are reported only if the pattern of results is different to the main analyses.

Test 1. Test 1 establishes whether the predictor variables (need for closure and ability to achieve closure) predict the outcome variables (DASS and COMPAS-W). Table 7.4 shows that the need for closure longitudinally predicted DASS scores and COMPAS-W composure scores but did not predict any other outcome variables. Table 7.5 shows that the ability to achieve closure predicted COMPAS-W composure, own worth, and satisfaction. It did not predict any other outcome variables.

Table 7.4

Test 1: The Effects of Time 1 Need for Closure on Time 2 Measures of the Proposed Outcomes, Controlling for Time 1 Measures of the Proposed Outcomes

Dependent Variable	*b* (*SE*)	β	*t*	*p*
DASS	3.01 (1.39)	.17	2.17	.032
COMPAS-W Global	-1.95 (2.10)	-.06	-0.93	.355
COMPAS-W Achievement	0.04 (0.38)	.01	0.12	.907
COMPAS-W Composure	-1.26 (0.52)	-.16	-2.44	.017
COMPAS-W Own Worth	-1.52 (0.82)	-.13	-1.84	.069
COMPAS-W Satisfaction	-1.59 (1.05)	-.10	-1.52	.131
COMPAS-W Mastery	0.80 (0.57)	.11	1.40	.165
COMPAS-W Positivity	-0.63 (0.67)	-.07	-0.94	.352

Note. DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004). *b* = unstandardised regression coefficient. *β* = standardised regression coefficient.

Table 7.5

Test 1: The Effects of Time 1 Ability to Achieve Closure on Time 2 Measures of the Proposed Outcomes, Controlling for Time 1 Measures of the Proposed Outcomes

Dependent Variable	*b* (*SE*)	*β*	*t*	*p*
DASS	-0.85 (1.21)	-.07	-0.71	.482
COMPAS-W Global	3.29 (2.07)	.14	1.57	.116
COMPAS-W Achievement	0.11 (0.28)	.03	.383	.703
COMPAS-W Composure	1.36 (0.46)	.25	2.95	.004
COMPAS-W Own Worth	1.79 (0.69)	.23	2.61	.011
COMPAS-W Satisfaction	2.88 (0.97)	.26	2.98	.004
COMPAS-W Mastery	0.09 (0.43)	.02	0.21	.832
COMPAS-W Positivity	0.82 (0.52)	.13	1.59	.115

Note. DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004). *b* = unstandardised regression coefficient. *β* = standardised regression coefficient.

Test 2. Test 2 investigates whether the predictor variables at Time 1 were significantly related to the proposed mediators at Time 2, controlling for the effects of the mediators at Time 1. Table 7.6 demonstrates that the need for closure longitudinally predicted overconsideration regret, Schwartz regret, action/inaction regret, and decision stress. Table 7.7 shows that the ability to achieve closure longitudinally predicted option/underconsideration regret, overconsideration regret, Schwartz regret, and decision stress.

Table 7.6

Test 2: The Effects of Time 1 Need for Closure on Time 2 Measures of the Proposed Mediators, Controlling for Time 1 Measures of the Proposed Mediators

Dependent Variable	*b* (*SE*)	β	*t*	*p*
Self-efficacy	-0.14 (0.11)	-.09	-1.23	.222
Option/underconsideration regret	0.21 (0.14)	0.12	1.53	.129
Overconsideration regret	0.49 (0.18)	.33	2.73	.008
Schwartz regret	0.46 (0.15)	.24	3.08	.003
Action/inaction regret	0.41 (0.15)	.19	2.75	.007
Decision stress	0.44 (0.16)	.23	2.76	.007
Background stress	-0.04 (0.07)	-.04	-0.52	.602

Note. b = unstandardised regression coefficient. β = standardised regression coefficient.

Table 7.7

Test 2: Regression Analyses of the Effects of Time 1 Ability to Achieve Closure on Time 2 Measures of the Proposed Mediators, Controlling for Time 1 Measures of the Proposed Mediators

Dependent Variable	*b* (*SE*)	β	*t*	*p*
Self-efficacy	0.16 (0.10)	.15	1.70	.092
Option/underconsideration regret	-0.34 (0.11)	-.29	-3.18	.002
Overconsideration regret	-0.50 (0.17)	-.32	-3.03	.003
Schwartz regret	-0.32 (0.14)	-.24	-2.30	.024
Action/inaction regret	-0.12 (0.13)	-.08	-0.95	.345
Decision stress	-0.35 (0.15)	-.25	-2.43	.017
Background stress	-0.08 (0.06)	-.13	-1.31	.193

Note. b = unstandardised regression coefficient. β = standardised regression coefficient.

Test 3. Test 3 shows whether the proposed mediator variables longitudinally predicted the outcomes variables (controlling for previous levels of the outcome variables). I only tested mediators that were significantly associated with at least one predictor variable in Test 2. I also only tested outcome variables that were significantly predicted by need or ability to achieve closure in Test 1. Therefore, I tested all the regret measures and decision stress as predictors of DASS and the COMPAS-W composure, own worth, and satisfaction subscales.

Regret measures. Test 3 showed that, of the regret measures, only overconsideration regret significantly predicted Time 2 DASS after controlling for Time 1 DASS, $b = 1.34$, $p = .045$. No other regret measures longitudinally predicted DASS (option/underconsideration regret, Schwartz regret, and action/inaction regret; all ps > .097).

Considering the relevant COMPAS-W outcomes, only Schwartz regret predicted composure, $b = -0.74$, $p = .019$ (all other ps ≥ .103).

Own worth was predicted by overconsideration regret, $b = -1.04$, $p = .011$, option/underconsideration regret, b = -1.52, $p = .016$, Schwartz regret, $b = -1.30$, $p = .007$, and action/inaction regret, $b = -1.20$, $p = .016$). When all the significant predictors were entered together in the same regression, they all become nonsignificant.

Satisfaction was predicted by option/underconsideration regret, $b = -1.96$, $p = .007$, Schwartz regret, $b = -1.64$, $p = .007$, and action/inaction regret, $b = -2.08$, $p = .001$, but not by overconsideration regret ($p = .069$). When all the significant predictors were entered together, only action/inaction regret remained significant, $b = -1.61$, $p = .048$.

Decision stress. Test 3 showed that decision stress significantly predicted DASS, $b = 2.13$, $p = .012$. Decision stress also significantly predicted COMPAS-W composure, $b = -1.11$, $p = .001$, and satisfaction, $b = -2.03$, $p = .003$, but did not predict own worth ($p = .058$).

Test 4. Test 4 involved testing whether the effect size of the predictor on the outcome variable is smaller when controlling for the proposed mediator(s) than the effect size when not controlling for the mediator(s). Consistent with the approach to mediation taken throughout the present thesis overall, I only tested models where Tests 1-3 showed that the predictor was significantly related to the mediator and outcome and that the mediator was significantly related to the outcome. These models are described in Table 7.8.

All the effect sizes of the predictor variables on the outcome variables were smaller in Test 4 (i.e., when controlling for each proposed mediator) than they were in Test 1. Additionally, in most cases, the effect of the predictor became nonsignificant in Test 4, except for the effect of need for closure on DASS when controlling for overconsideration regret. These results are consistent with the idea that the proposed mediators do in fact mediate the effects of need and ability to achieve closure on the outcome variables.

Table 7.8

Comparison of Effect Sizes and P-Values Between Test 1 and Test 4

Predictor	Outcome	Test 1 Predictor		Proposed mediator	Test 4 Predictor	
		b	*p*		*b*	*p*
NFCS	DASS	3.01	.032	Overconsideration regret	2.96	.038
				Decision stress	2.32	.104
	Composure	-1.26	.017	Schwartz regret	-1.03	.059
				Decision stress	-0.84	.108
AACSS	Composure	1.36	.004	Schwartz regret	1.09	.059
				Decision stress	0.63	.234
	Satisfaction	2.88	.004	Schwartz regret	1.68	.161
				Decision stress	1.60	.155
				Option/underconsideration regret	2.02	.050[3]
				Action/inaction regret	1.92	.055
	Own worth	1.79	.011	Schwartz regret	1.08	.221
				Overconsideration regret	1.18	.175
				Option/underconsideration regret	1.45	.053
				Action/inaction regret	1.40	.069

Note. NFCS = Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994). AACSS = Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004). For Test 4, the predictor and proposed mediators were entered as predictor variables along with the Time 1 measure of the outcome variable as a control variable. The Test 1 column refers to the effect of the predictor on the outcome without controlling for the proposed mediator/s. If the Test 4 effect size is smaller than the Test 1 effect size, then there is provisional evidence for a mediation effect.

However, as outlined by Rubin et al. (2016, p. 731), simply determining whether the effect size is smaller in Test 4 than in Test 1 does not demonstrate whether the difference between these effect sizes is significant (i.e., whether the indirect effect is significant). Therefore, I also used PROCESS Model 4 (Hayes, 2017) to test each of the mediation models specified in

3 When covariates were included in the regression, the effect of ability to achieve closure on satisfaction, controlling for option/underconsideration regret, became significant, b = 2.20, p = .033.

Table 7.8, entering the predictor as measured at Time 1, the mediator as measured at Time 1, and the outcome as measured at Time 2. The outcome as measured at Time 1 was entered as a covariate.

As demonstrated in Table 7.9, only one mediation model was significant. Action/inaction regret mediated the relation between the ability to achieve closure and satisfaction such that people with a high ability to achieve closure have lower levels of action and inaction regret, which mediates their higher levels of satisfaction with life. None of the other mediation models were significant.

Reverse mediation tests.

Reverse Test 1. Throughout this thesis, I have assumed that the need and ability to achieve closure are dispositional variables and therefore that they are predictors of mental health and wellbeing. However, it is possible that having poorer mental health increases the desire for certainty and therefore increases the need for closure, and/or that poorer mental health decreases confidence in decision-making and therefore decreases the ability to achieve closure. To investigate this possibility, I conducted reversed versions of Test 1 to see whether mental health or wellbeing longitudinally predicted need or ability to achieve closure when controlling for Time 1 need (or ability).

Regression analyses showed that there was no longitudinal effect of DASS on need for closure or ability (ps $\geq .358$). Similarly, COMPAS-W scores did not longitudinally predict need or ability to achieve closure (ps $\geq .888$). I substituted each of the COMPAS-W subscales for the full scale and found that none of the subscales longitudinally predicted need or ability (all ps $\geq .449$). Hence, it is more plausible that need/ability to achieve closure are predictors rather than

outcomes of mental health and wellbeing. Consequently, I did not test any reverse mediation models involving switching the predictor and outcome variables.

I also considered the possibility of reverse models in which the outcome and mediator variables were switched (e.g., need for closure → DASS → decision stress). None of the reverse models were supported throughout Tests 1-4 and the PROCESS Model 4 analysis. The tests for these models are described in Appendix E.

Table 7.9

PROCESS Model 4 Analyses of Potential Mediation Models

Predictor	Outcome	Proposed mediator	Indirect effect (*SE*)	95% CI	CSIES
NFCS	DASS	Overconsideration regret	0.53 (0.47)	-0.22, 1.65	N/A
		Decision stress	0.86 (0.60)	-0.05, 2.26	N/A
	Composure	Schwartz regret	-0.25 (0.21)	-0.76, 0.06	N/A
		Decision stress	-0.33 (0.21)	-0.79, 0.01	N/A
AACSS	Composure	Schwartz regret	0.30 (0.37)	-0.46, 1.01	N/A
		Decision stress	0.61 (0.34)	-0.07, 1.28	N/A
	Satisfaction	Schwartz regret	0.99 (0.74)	-0.56, 2.36	N/A
		Decision stress	1.09 (0.74)	-0.36, 2.56	N/A
		Option/underconsideration regret	0.65 (0.40)	-0.02, 1.51	N/A
		Action/inaction regret	0.73 (0.36)	0.14, 1.54	.07
	Own worth	Schwartz regret	0.78 (0.59)	-0.36, 1.97	N/A
		Overconsideration regret	1.18 (0.86)	-0.27, 1.64	N/A
		Option/underconsideration regret	0.40 (0.36)	-0.15, 1.27	N/A
		Action/inaction regret	0.46 (0.33)	-0.12. 1.18	N/A

Note. NFCS = Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994). AACSS = Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004). *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Discussion

The present study had two main goals: (a) to establish whether need and ability to achieve closure longitudinally predict changes in the proposed mediators and outcomes, and (b) to test the mediation effects found in previous cross-sectional studies longitudinally.

The Relations Between Need/Ability to Achieve Closure and Mental Health Problems

In the previous studies, both the need for closure and the ability to achieve closure were cross-sectionally associated with mental health. However, in the present study, only the need for closure longitudinally predicted mental health problems. That is, people with a high need for closure reported poorer mental health after six months compared to people with a low need for closure. Ability to achieve closure did not longitudinally predict mental health problems.

The fact that ability to achieve closure is cross-sectionally but not longitudinally associated with mental health problems suggests that, although having a high ability to achieve closure is associated with having good mental health in the present, it does not predict future good mental health. Many of the potential explanations for this pattern of results are not supported by the data. For example, one explanation is that mental health predicts ability rather than vice versa. However, this is not supported by the results of the reverse Test 1 analyses, which showed that mental health did not longitudinally predict ability to achieve closure.

Another possible explanation is that ability is less stable than need and therefore less able to predict future outcomes. However, the correlation between Time 1 ability and Time 2 ability is very similar to the correlation between Time 1 need and Time 2 need ($r = .82$, $p < .001$ and $r = .84$, $p < .001$ respectively). Consequently, this explanation is not supported.

A third potential explanation is that a high need for closure predicts both low ability to achieve closure and poor mental health. However, a post-hoc regression on Time 2 ability to

achieve closure with Time 1 need for closure as the predictor (controlling for Time 1 ability) showed no longitudinal effect of need on ability ($p = .167$).

Other potential explanations for the fact that ability to achieve closure is cross-sectionally but not longitudinally associated with mental health are not testable using the present data. For example, it is possible that the ability to achieve closure affects mental health on a different timeline to the one tested. As Maxwell and Cole (2007) explain, mediation effects can differ dramatically in size depending on when the measurements are taken. Researchers have suggested that the time lag associated with predicting mental health problems can be quite long (i.e., over two years; Taris & Kompier, 2003). Additionally, the effects of stable trait variables on mental health outcomes are likely to occur early in the developmental trajectory (A. Roets, personal communication, February 7, 2020). That is, the negative impact of low ability to achieve closure on mental health may stabilise in early life rather than causing a continual decrease in mental health over the whole lifetime. Consequently, despite the present null result, a more comprehensive study (with more measurements over a longer timeline) should be conducted before ruling out the possibility that the ability to achieve closure is predictive of mental health.

The Relations between Need/Ability to Achieve Closure and Wellbeing

I explored whether the need or ability to achieve closure longitudinally predicted wellbeing, and whether some aspects of wellbeing were more closely associated with need/ability than others. In previous studies, satisfaction with life was associated with ability but not with need.

In the present study, I found that the need for closure longitudinally predicted only one aspect of wellbeing: composure. That is, people with a high need for closure reported lower levels of composure. Consistent with the results of the previous studies, the need for closure did

not predict satisfaction. The need for closure also did not predict achievement, mastery, own worth, or positivity. These results suggest that the need for closure is not associated with most aspects of positive wellbeing; people with a high need for closure have similar levels of wellbeing to people with a low need for closure, with composure being the one exception.

To further understand the negative relation between the need for closure and COMPAS-W composure, I considered the items in the composure subscale. An examination of the four items suggested that the subscale captures two constructs: mental health problems similar to those measured by the DASS ("I rarely feel scared or anxious;" "I am rarely sad or depressed") and cognitive reappraisal ("when I'm faced with a stressful situation, I usually make myself think about it in a way that helps me stay calm;" "when I want to feel less negative emotions, I usually change the way I'm thinking about the situation"). Therefore, composure as measured by the COMPAS-W appears to consist of two things: skills that help to maintain composure (i.e., cognitive reappraisal) and the outcome of possessing such skills (i.e., good mental health).

The association between high need for closure and poor mental health has been demonstrated repeatedly throughout the present thesis and has also been found by other researchers (e.g., Roets & Soetens, 2010). Hence, the relation between the need for closure and this aspect of composure is consistent with previous research.

The relation between the need for closure and cognitive reappraisal has not been investigated in previous research, but there is evidence that the need for closure is negatively associated with coping flexibility more generally (Cheng, 2003; cf. Appendix D). With regards to cognitive reappraisal specifically, people with a high need for closure prefer not to challenge their own beliefs. Hence, it is natural that they also tend not to reappraise their initial impressions of an event or situation, because this would involve challenging their beliefs. Therefore, the

negative relation between the need for closure and the cognitive reappraisal aspect of composure is also consistent with previous research. It is positive that there was no evidence of flow-on effects to other aspects of wellbeing. That is, despite the decline in composure, people with a high need for closure did not seem to experience deterioration in their sense of achievement, mastery, own worth, positivity, or satisfaction over the time lag tested.

With regard to the ability to achieve closure and wellbeing, ability longitudinally predicted satisfaction, which is consistent with the cross-sectional relation found between ability and satisfaction with life in previous studies. The inclusion of the more comprehensive COMPAS-W measure of wellbeing also allowed the detection of the longitudinal relations between ability to achieve closure and (a) composure and (b) own worth. That is, people with a high ability to achieve closure had increased satisfaction, composure, and own worth six months later.

The longitudinal relation between the ability to achieve closure and satisfaction is consistent with the findings of all the cross-sectional studies in the present body of work. The present study confirmed the temporal direction of this effect: people with a high ability to achieve closure experience an increase in satisfaction with life over a six-month period rather than vice versa. Hence, this study suggests that having a high ability to achieve closure is beneficial for future satisfaction.

The relations between ability to achieve closure and own worth is novel to the present study but is consistent with theoretical considerations. This relation would be expected in the present sample (Australian university students) because decisiveness is a valued dispositional in Australian society. Therefore, people with a high ability to achieve closure fulfil a cultural

expectation. In turn, fulfilment of cultural expectations improves evaluation of self-worth (e.g., Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004).

As discussed above, the composure subscale has items spanning two constructs: mental health and cognitive reappraisal. Therefore, the longitudinal relation between ability to achieve closure and composure suggests that people with a high ability to achieve closure experience better mental health and a higher tendency to engage in cognitive reappraisal in future. The relation between ability and mental health was evident in the previous cross-sectional studies, although ability was not longitudinally associated with the DASS in the present study. Therefore, the longitudinal relation between ability to achieve closure and the mental health aspect of composure is consistent with the previous studies in the thesis.

The relation between ability to achieve closure and the cognitive reappraisal aspect of COMPAS-W composure is interesting and novel. As outlined above, cognitive reappraisal is the ability to change one's interpretation of a situation to help regulate affect (e.g., Buhle et al., 2014). Therefore, it appears that having a high ability to be decisive in general also helps people to make meta-cognitive decisions about how to respond to situations. People with a high ability to achieve closure seem to be able to decide to change their perspective on a situation, which may then contribute to their better mental health (i.e., the other aspect of COMPAS-W composure). On the other hand, people with a low ability to achieve closure may struggle to decide on and implement cognitive reappraisal strategies because they cannot be certain that the strategy they are considering will be useful.

The link between ability to achieve closure and cognitive reappraisal also fits into the Study 4 finding that ability to achieve closure was also positively correlated with cognitive flexibility (i.e., the ability to select and switch between different emotion regulation techniques

in different situations; e.g., Cheng, 2001), as outlined in Appendix D. These relations suggest that one factor influencing people's tendency to use flexible coping and emotional regulation strategies is their ability to make a firm decision to change their approach to an affective situation. Further research should investigate this idea and the potential for interventions to improve people's ability to achieve closure.

Temporal Direction of the Relations between Need/Ability to Achieve Closure and Mental Health

One of the most important findings of the present study is that all the reverse Test 1 regressions were nonsignificant. Neither mental health problems nor wellbeing predicted changes in the need or ability to achieve closure six months later. In addition, the need and ability to achieve closure were very stable across the six-month study period. These findings support the causal direction assumed throughout the rest of this thesis: that people's cognitive motivations and abilities are stable, dispositional variables that are not affected by their mental health.

However, it is important to be cautious in interpreting null findings to mean that there is no effect. These findings may be a result of low power, particularly if the reverse effect is smaller than the effect of need/ability to achieve closure on mental health. The null findings may also be due to the time lag tested: mental health may affect need/ability on a different time scale than the one on which need/ability affect mental health, and so research with several time measurements is required to make any firm conclusions about the bidirectionality or otherwise of these effects. Nevertheless, the present research provides preliminary evidence for the idea that the need and ability to achieve closure are longitudinally predictive of mental health.

Relations between Different Aspects of Regret

This study included the measures of option and process (underconsideration and overconsideration) regret that were first used in Study 3. In Study 3, I found that option regret and underconsideration regret loaded onto the same factor. As outlined in Chapter 5, this may have occurred because the decisions that participants were asked to reflect on were hypothetical, and therefore experiencing underconsideration regret caused option regret. That is, because participants did not experience any consequences of their decisions, they could only consider that their decision was wrong (e.g., experience option regret) if they concluded they had not considered it carefully enough (e.g., experience underconsideration regret).

In the present study, the loading of option regret and underconsideration regret onto the same factor was replicated. However, the present study measured regret regarding real life decisions made over the past month. Consequently, the reasoning from Study 3 regarding the relation between option and underconsideration regret is not applicable. A new explanation is required for the fact that option and underconsideration regret appear to be the same construct, or at least are highly related to one another.

One possibility is that the causal order of the relation between option regret and underconsideration regret is reversed; rather than underconsideration regret causing option regret, option regret may cause underconsideration regret. That is, people would generally have no reason to regret underthinking their decision if they do not regret the option they chose. But if they do regret the option chosen, an individual may then consider what led them to make a poor choice. One reason that people may use to explain their regretted choice is that they did not consider the alternatives carefully enough. Therefore, people who experience underconsideration regret may do so because they first experienced option regret. If option regret is a necessary

precondition of underconsideration regret, then this would explain why the two types of regret were sufficiently related to load onto a single factor.

The positive relation between overconsideration regret and underconsideration regret found in Study 3 was also replicated in the present study: (r = 31**; Table 7.3). As outlined in Chapter 5, this relation does not seem logical; the more someone regrets thinking too much about their decisions, the less they should regret thinking too little about their decisions. Two explanations for this relation were outlined in Chapter 5: (1) people who are prone to regret experience overconsideration regret about some decisions and underconsideration regret about others, or (2) people experience both types of regret simultaneously about a single decision if they feel their decision process was lengthy but inadequate to make the right choice. The present study could not distinguish between these two explanations because regret was measured regarding multiple decisions collectively. However, the replication of this positive relation suggests that this issue should be investigated with a more careful study design (measuring regret for different decisions individually) and more attention should be devoted to considering theoretical links between different types of process regret.

Mediation Effects

All the mediation effects investigated in the present study were nonsignificant when tested using PROCESS Model 4. However, the longitudinal regression analyses demonstrated that the need for closure longitudinally predicted decision stress and Schwartz (2000) regret, which longitudinally predicted wellbeing. The need for closure also longitudinally predicted overconsideration regret, which along with decision stress longitudinally predicted mental health problems. The ability to achieve closure longitudinally predicted decision stress and all measures of regret, all of which longitudinally predicted wellbeing.

As noted in the power analysis at the beginning of the results section, the power to detect a mediation effect was very low (.44). Therefore, the lack of significant mediation effects is not unexpected. The issue of low power was compounded by the fact that there is no previous research to indicate the timeline for these potential mediation effects. I tested changes over a 6-month time lag in the present study, but this time lag was largely based on practical restrictions. Additionally, due to these restrictions, I measured the variables at only two time points. Consequently, the mediation tests were conducted using the simultaneous measures of the predictor and mediator variables. As noted above, causal processes should be investigated using multiple measurements over long time periods (Taris & Kompier, 2003), and mediation processes in particular are best investigated with at least three waves of data, such that the predictor at Time 1 predicts the mediator at Time 2, which predicts the outcome at Time 3.

Given the methodological problems outlined above, it is possible that regret and decision stress do mediate these effects, but their mediation was not detectable in the present study. Research with an appropriate number of participants and more than two measurements of the relevant variables is required to further investigate these potential causal processes.

In conclusion, the present study established that differences in the need and ability to achieve closure predict changes in mental health and some aspects of wellbeing, supporting the causal direction assumed throughout the rest of the thesis. Additionally, the relation between the ability to achieve closure and composure suggested that the ability to be decisive may be a key factor determining people's ability to engage in cognitive reappraisal and other flexible coping strategies. None of the mediations tested were supported, but this may be due to low power and other methodological issues. Further research is required to more properly investigate these and

other potential mechanisms of the relations between the need/ability to achieve closure and mental health/wellbeing.

CHAPTER 8

GENERAL DISCUSSION

In my view, the present research made key findings in three areas. First, the fact that the need and ability to achieve closure mediate the relations between attachment anxiety/avoidance and mental health suggests directions for future research and theory about the aetiology of the need and ability to achieve closure. Second, regret, decision stress, and stress about everyday stressors mediated the relations of the need and ability to achieve closure with mental health, supporting and extending on Roets and Soetens (2010) decision-making distress hypothesis for these relations. Finally, the present research established that the need and ability to achieve closure longitudinally predict mental ill-health, a temporal relation that was assumed but not tested by previous researchers.

Previous research demonstrated that the need for closure is positively associated with mental health problems and the ability to achieve closure is negatively associated with mental health problems (Colbert & Peters, 2002; Colbert et al., 2006; McKay et al., 2006; Roets & Soetens, 2010). However, researchers are yet to ascertain the mechanisms for these effects. Identifying these mechanisms can help clinicians to develop appropriate interventions for those with a high need for closure or low ability to achieve closure. At least one in four people globally experience a mental illness over their lifetime (World Health Organization, 2001) and 45% of the adult Australian population is expected to experience a mental health disorder during their lifetime (Australian Bureau of Statistics, 2007). In 2010, over 180 million disability adjusted life years were accounted for by mental and substance use disorders (Whiteford et al., 2013). Hence, identifying why some people are more likely to experience these issues than others is a timely and important endeavour.

In the present body of work, I set out to answer one main research question: why do people with a high need for closure and/or low ability to achieve closure experience poorer mental health? In investigating this question, I attempted to address issues with previous research, including methodological problems (e.g., a narrow focus on delusions as an outcome, a lack of measurement of the ability to achieve closure) and statistical problems (e.g., a lack of mediational and longitudinal analysis). I also sought to investigate a secondary research question regarding the aetiology of the need and ability to achieve closure by considering the relations between these variables and attachment styles.

In the present chapter, I will outline the findings regarding each research question in turn, incorporating a discussion of the theoretical and practical implications of each set of findings as well as directions for future research. I will then discuss the general limitations and conclude with a summary of the key findings and their implications.

How do the Need for Closure and the Ability to Achieve Closure Relate to Mental Health and Wellbeing?

Replication of Roets and Soetens (2010)

In Chapters 1 and 2, I outlined several studies that considered the relations of the need and ability to achieve closure with various mental health outcomes. In general, these studies found that the need for closure was positively associated with mental health problems and constructs like the ability to achieve closure were negatively associated with mental health problems. However, these studies suffered from a number of methodological and statistical limitations. For example, many studies had a narrow focus on delusions or related constructs as the only mental health outcomes and some studies dichotomised or otherwise artificially categorised either the predictor or outcome variables. Importantly, many studies did not

explicitly measure the ability to achieve closure, and consequently did not consider the potential interactions between need and ability on mental health outcomes.

Roets and Soetens (2010) addressed each of these issues by (a) taking a continuous statistical approach to both the predictors and the outcomes, (b) using general psychological distress as the mental health outcome measure, and (c) measuring both need and ability to achieve closure explicitly. They found that mental health problems were positively predicted by the need for closure and negatively predicted by the ability to achieve closure, and that there was no interaction between need and ability on mental health problems. In the present body of work, I attempted to replicate their findings regarding mental health problems using both state and dispositional measurements.

Roets and Soetens' (2010) findings were replicated across each of the four non-longitudinal studies in this thesis. The need for closure was positively associated with DASS scores (Studies 1, 2, and 4), state anxiety (Studies 1-3), and state negative affect (Study 3). The ability to achieve closure was negatively associated with DASS (Studies 1, 2, and 4), state anxiety (Studies 1-3), and state negative affect (Study 3). Hence, the findings were consistent with the previous research identifying cross-sectional relations between the need/ability to achieve closure and mental health.

Extension from Mental Health Problems to Wellbeing

Most previous research in this area focused on the effects of the need for closure on mental health problems. In the present research, I extended the focus from mental ill-health to consider wellbeing. As outlined in the General Introduction, wellbeing is not merely the absence of mental health problems. Rather, wellbeing is a positive construct encompassing satisfaction and healthy functioning in many aspects of life (e.g., Slade, 2010). Because wellbeing is distinct

from mental ill-health, it may have different predictors (Keyes, 2005). Hence, it is important to consider whether the need and ability to achieve closure affect wellbeing in the same way as they affect mental health problems.

I found a consistent pattern of results across all four cross-sectional studies. Wellbeing was associated with the ability to achieve closure but not the need for closure. This pattern occurred for both satisfaction with life (measured across the past seven days; Studies 1, 2, and 4) and positive affect (measured "right now;" Study 3). This pattern of results suggests that, cross-sectionally, the ability to achieve closure is associated with both wellbeing and mental ill-health and the need for closure is associated only with mental ill-health. However, as outlined below, the longitudinal findings diverged from this pattern of results.

Temporal Relations of Need and Ability to Achieve Closure with Mental Health and Wellbeing

One major issue with the previous work regarding the relations between need/ability to achieve closure and mental health was the untested assumption that the need and/or ability to achieve closure are predictors of mental health and not vice versa. The reverse causal order is theoretically plausible; experiencing mental health problems can affect people's motivations and abilities in other areas, including executive function, memory, and concentration (e.g., Marazziti, Consoli, Picchetti, Carlini, & Faravelli, 2010). Hence, it is possible that mental health problems cause people to experience a decrease in their ability to be decisive and/or an increase in their need for certainty. It is also possible that the effects are bidirectional; that is, that high need for closure and low ability to achieve closure cause poorer mental health, and poorer mental health in turn increases need for closure and decreases ability to achieve closure.

It is important to investigate the temporal order of these effects because they have different implications for the treatment and prevention of mental health problems. If the need for closure and the ability to achieve closure cause changes in mental health and/or wellbeing, then researchers and clinicians should consider ways in which need and ability can be intervened upon in order to prevent future mental health problems. However, if mental health problems cause changes in the need and ability to achieve closure, then it is more important to consider the underlying causes of the mental health problems rather than focusing on people's need or ability to achieve closure, which would in this case be better conceptualised as symptoms or outcomes of mental ill-health.

The question of change over time in the need and ability to achieve closure is also linked to the conceptualisation of these constructs. Previous research supports the idea that the need for closure has a situational component that can change over very short time periods (i.e., the length of a lab study session; e.g., Shah et al., 1998). Otherwise, both constructs are conceptualised as having trait characteristics and it is assumed that they show stability over time (e.g., Webster & Kruglanski, 1994). However, if the need and ability to achieve closure change significantly over longer periods of time, then theorists will need to reconsider their conceptualisation as trait-like variables.

Previous research has found conflicting results regarding the stability of the need for closure. Webster and Kruglanski (1994) found that the test-retest reliability of the original Need for Closure Scale was $r = .86$ over 12-13 weeks and concluded that the need for closure is a relatively stable construct. However, Colbert et al. (2006) found that (original) need for closure scores decreased over a one-year period across all groups in the study (control, generalised anxiety disorder patients, and deluded patients), which the researchers attributed to practice

effects. I am not aware of any studies considering the stability of the updated need for closure measure with the revised version of the need for decisiveness subscale (Roets & Van Hiel, 2007). Hence, it is not clear whether the need for closure is a stable construct. Additionally, to my knowledge, no researchers have considered the stability of the ability to achieve closure. Therefore, to address these issues, Study 5 aimed to investigate (a) the temporal stability of the need and ability to achieve closure, and (b) the temporal order of the relations between need/ability to achieve closure and mental health.

First, Study 5 demonstrated that both need and ability to achieve closure were quite stable over the 6-month study period (test-retest correlations of $r \geq .81$, $p < .001$). This finding is consistent with Webster and Kruglanski's (1994) conclusion that the need for closure is a stable trait-like variable. It also provides novel evidence that the ability to achieve closure is likewise a stable individual difference. The stability of these constructs supports their conceptualisation as dispositional predictor variables in the mediation models discussed below. That is, because the need and ability to achieve closure appear to remain stable over time, it is theoretically justifiable to consider their effects on the proposed mediator and outcome variables. In addition, their trait-like status highlights the importance of identifying the mediators of their relations with mental health, which are likely to be more malleable and hence more appropriate for intervention.

Second, Study 5 demonstrated that the need and ability to achieve closure longitudinally predicted mental health and not vice versa. Specifically, need for closure longitudinally predicted mental health problems and the composure aspect of wellbeing. The ability to achieve closure did not longitudinally predict mental health problems as measured by the DASS (Lovibond & Lovibond, 2004) but did predict the satisfaction, composure, and own worth aspects of wellbeing. Hence, a high need for closure predicts an increase in mental health problems and

deterioration in wellbeing over a six-month period. A low ability to achieve closure does not seem to predict a deterioration in mental health but does predict worsening wellbeing. Importantly, mental health problems and wellbeing did not longitudinally predict either need or ability to achieve closure, and so it does not appear that mental health problems impact the need for closure or the ability to achieve closure over the time period tested.

These findings address the important question of the temporal relation between the need and ability to achieve closure and mental health. Previous studies considering the relations between need/ability to achieve closure and mental health were generally cross-sectional (e.g., Roets & Soetens, 2010), and the only two-wave study on this issue was not analysed longitudinally (Colbert et al., 2006). Hence, the present body of work provides novel evidence that a high need for closure and low ability to achieve closure precedes deterioration in mental health.

It is worth noting that there was a slight inconsistency between the cross-sectional and longitudinal results. Cross-sectionally, need for closure predicted only mental health problems, whereas ability to achieve closure predicted both mental health problems and wellbeing. These findings are consistent with Roets and Soetens' (2010) cross-sectional findings regarding the relations of the need and ability to achieve closure with mental health problems. However, longitudinally, the need for closure predicted both mental health problems and wellbeing, while ability to achieve closure predicted only wellbeing.

One potential explanation for these results is that the need and ability to achieve closure affect mental health problems on different timelines to one another. That is, perhaps the need for closure affects mental health problems over a 6-month period, but the ability to achieve closure takes longer to affect mental health problems. Further research is required in order to determine

the precise nature of the relations between the need/ability to achieve closure and mental health problems as opposed to wellbeing. However, the results of the present body of work demonstrate that both the need and ability to achieve closure are stable predictors of overall mental health.

Interactions Between the Need and Ability to Achieve Closure on Mental Health

Across all the studies, there was no interaction between the need and ability to achieve closure on any mental health outcomes. This finding is consistent with Roets and Soetens' (2010) research, suggesting that their effects are additive rather than interactive. However, it is still somewhat unexpected given that the need and ability to achieve closure interact to predict other variables such as heuristic information processing (e.g., Jaśko et al., 2015; Kruglanski et al., 1991; Van Hiel & Mervielde, 2002). In particular, as outlined in Chapter 1, Kossowska and Bar-Tal (2013) found that people with a high need for closure and low ability to achieve closure are unable to filter out irrelevant information, which corresponds to a hypervigilant processing style. Because hypervigilance is related to emotional distress, I expected that the combination of a high need for closure and a low ability to achieve closure would be more strongly associated with mental health problems than any other combination, and hence it is surprising that this was not supported by the data in the present research program. From a theoretical perspective, it seems plausible that being unable to achieve decision certainty would be particularly bad for the mental health of those who highly value certainty. Hence, the lack of interaction between the two constructs on mental health measures deserves further investigation and explanation.

This lack of interaction may stem from a slight mismatch between closure as defined by the need for closure construct and closure as defined by the ability to achieve closure construct. For the need construct, *closure* incorporates certainty in decision-making, ambiguity, predictability, order, and closedmindedness (Webster & Kruglanski, 1994). However, the ability

to achieve closure measure includes only items relating to certainty in decision-making and ability to structure life (Bar-Tal, 1994a). Hence, the need for closure measure is broader than the ability to achieve closure measure.

To test whether these mismatch between the need and ability constructs was preventing the detecting of an interaction effect, I conducted post-hoc PROCESS Model 1 analyses using a restricted measure of the need for closure that includes only the order and decisiveness subscales. However, the PROCESS Model 1 analyses showed that there was no significant interaction between the restricted need for closure measure and with the ability to achieve closure on DASS across the four studies in which the DASS was measured (Studies 1-3 and Study 5; all ps $\geq .157$).

The lack of interaction suggests that, consistent with Roets and Soetens' (2010) conclusions, the effects of a low need for closure and high ability to achieve closure are additive rather than interactive. Hence, clinicians should focus on both constructs in order to achieve the best mental health outcomes.

The Relation between the Need for Closure and the Ability to Achieve Closure

The present research did not aim to consider the relations between the need and ability to achieve closure. However, examination of the correlations between these two constructs across each study yields an interesting finding. The need and ability to achieve closure were moderately negatively correlated across every study except Study 2 (rs range from -.22 to -.36, ps $< .01$). This conflicts with most of the existing research considering this relation, which usually reports no relation between the two constructs (e.g., Bar-Tal, 1994; Bar-Tal, Kishon-Rabin & Tabak, 1997; Bar-Tal, Raviv, & Spitzer, 1999; Kossowska & Bar-Tal, 2013; Webster & Kruglanski, 1994).

The negative relation between the need and ability to achieve closure raises interesting questions about the causal nature of this relation. On one hand, if desiring high levels of certainty decreases one's perception that they are able to achieve sufficient certainty, then a high need for closure may result in a low (perceived) ability to achieve closure. On the other hand, if closure is conceptualised as a universal desire, then having a low ability to achieve closure may result in high need for closure, and hence people need certainty because they are lacking it. Further theoretical and empirical work beyond the scope of the present research is required to investigate these potential causal relationships.

It is possible that the correlation between these two constructs prevented the finding of an interaction effect as outlined above. This issue would occur if the correlations were large enough that the likelihood of someone having both a high need for closure and a high ability to achieve closure was small. However, the largest correlation effect was -.36, which does not seem high enough to preclude the possibility that some people reported high scores (or low scores) on both variables. Hence, the lack of an interaction effect does not seem to be a statistical artefact.

Where do the Need and Ability to Achieve Closure Come From?

The Role of Attachment

Another aim of the present thesis was to investigate potential origins of individual differences in the need and ability to achieve closure. Lay epistemic theory is largely silent on the aetiology of the need for closure. Instead, the determinants of the need for closure are described at a more general level as the perceived costs and benefits of achieving closure (Kruglanski, 1990a). Moreover, there is no theory or evidence regarding the aetiology of the ability to achieve closure.

The aetiology of these variables has important practical implications. Understanding why some people chronically perceive high benefits of achieving closure and/or high costs of not achieving closure may help us to change people's perceptions of these costs and benefits and hence change their need for closure. Similarly, understanding why some people experience chronically low confidence in their decisions and their ability to organise their lives may help us to understand how this confidence can be increased.

Attachment theory provides one potential avenue for investigating the aetiology of the need and ability to achieve closure. Attachment theory suggests that early relationships with primary caregivers are important in shaping the way that people relate to themselves and others throughout life (e.g., Collins & Read, 1990). Securely attached people had caregivers who were consistently responsive to their needs and acted as a secure base from which the child could explore and learn. Anxiously attached children had caregivers who were inconsistent in their responses to the child's needs, instilling a sense of uncertainty about how to elicit caregiving behaviour from their primary attachment figure. Avoidantly attached children had caregivers who were consistently rejecting of and unresponsive to their child's needs.

Attachment style is associated with many psychosocial outcomes throughout life. Securely attached people have higher self-worth and self-esteem (Cassidy, 1988; Feeney & Noller, 1990), are less anxious and hostile (Kobak & Sceery, 1988), and have better coping skills (Feeney & Kirkpatrick, 1996), marital satisfaction (Meyers & Landsberger, 2002), and health behaviours (Maunder & Hunter, 2001). Attachment style is also related to stable personality traits including neuroticism, extraversion, and agreeableness (Shaver & Brennan, 1992). Most relevant to the present thesis, Mikulincer (1997) showed that people with secure attachment styles have a lower need for closure than people with insecure (anxious or avoidant) attachment styles.

However, I am not aware of any previous research considering the relations between attachment and the ability to achieve closure.

In the present body of work, I replicated Mikulincer's investigation of the relation between need for closure and attachment using continuous measures of attachment avoidance and attachment anxiety. Further, I extended on the previous findings that the need for closure is related to attachment (Mikulincer, 1997) and mental health (e.g., Roets & Soetens, 2010) and that attachment is related to mental health (Kobak & Sceery, 1988) by considering whether need/ability to achieve closure mediate the relations between attachment and mental health.

In Study 4, I found that both attachment avoidance and attachment anxiety were positively related to the need for closure and negatively related to the ability to achieve closure. Further, attachment avoidance and anxiety were positively related to mental health problems, and these relations were mediated by both the need and ability to achieve closure when tested separately. However, when need and ability were entered as parallel mediators, only ability mediated these relations. This pattern of results suggests that perhaps the ability to achieve closure is a more important mechanism of the relations between attachment style and mental health. This finding is in line with the fact that, when the ability to achieve closure was included as a covariate in mediations involving the need for closure as a predictor, the mediation effects usually became nonsignificant, possibly because ability to achieve closure had a stronger relation with the outcome variables than did the need for closure. The implications of these effects are discussed further in the limitations section of the present chapter.

The links between the need and ability to achieve closure and attachment anxiety make sense from a theoretical perspective. People with high attachment anxiety had caregivers who responded unpredictably to their needs, and hence they could not be certain whether their needs

would be met. Such people would understandably grow to experience uncertainty as highly aversive and hence develop a high need for closure.

At the same time, lacking a secure base for exploration means that both high attachment anxiety and high attachment avoidance would result in individuals who lack confidence in their capacity to explore new situations and solve problems, which may result in a low ability to achieve closure. Previous research has demonstrated that insecure attachment is associated with increased indecisiveness and lower decision-making self-efficacy regarding career choices (Wolfe & Betz, 2004). This relation between insecure attachment and career indecisiveness/decision self-efficacy is likely to reflect a broader relation between attachment and indecisiveness, suggesting an association between insecure attachment and low ability to achieve closure.

The relations between attachment avoidance/anxiety and need/ability to achieve closure may help to explain why the need and ability to achieve closure were significantly related to one another throughout four of the five the studies in the present body of work (*r*s ranging from -.23 to -.33, all *p*s < .001). As outlined above, the same set of early attachment experiences may contribute to both an aversion to uncertainty and a lack of confidence in decision-making and hence explain why people with a high need for closure also tend to have a low ability to achieve closure. At the moment, the need and ability to achieve closure have disparate literatures and there is no clear theoretical reasoning for the links between them. The finding that both need and ability relate to attachment style provides a starting point for further theoretical work that may be able to link both need and ability to achieve closure in a single coherent theoretical framework.

In summary, both attachment avoidance and attachment anxiety positively predict the need for closure and negatively predict the ability to achieve closure. Both need and ability

mediate the relations between attachment avoidance/anxiety and mental health, suggesting that early attachment experiences may contribute to mental health partially through their effects on people's attitudes towards uncertainty and their ability to be confident decision-making and structuring life. It is important to understand why some people have a high aversion to uncertainty and/or low confidence in their decisions to design appropriate interventions. Without this understanding, intervention approaches focusing on uncertainty are likely to be unsuccessful because they will not address the root cause of the high need for closure.

The relation between the need and ability to achieve closure

The present research did not aim to consider the relations between the need and ability to achieve closure. However, an examination of the correlations between these two constructs yields an interesting finding with potential implications for the aetiology of the need and ability to achieve closure. The need and ability to achieve closure were moderately negatively correlated across every study in the present research except for Study 2 (rs range from -.22 to -.36, ps $< .01$). This conflicts with most of the existing research considering this relation, which usually reports no relation between the two constructs (e.g., Bar-Tal, 1994; Bar-Tal, Kishon-Rabin & Tabak, 1997; Bar-Tal, Raviv, & Spitzer, 1999; Kossowska & Bar-Tal, 2013; Webster & Kruglanski, 1994).

The negative relation between the need and ability to achieve closure raises interesting questions about the causal nature of this relation. On one hand, if desiring high levels of certainty decreases one's perception that they are able to achieve sufficient certainty, then a high need for closure may result in a low (perceived) ability to achieve closure. On the other hand, if closure is conceptualised as a universal desire, then having a low ability to achieve closure may result in high need for closure. In terms of lay epistemic theory, this would occur because a low ability to

achieve closure would increase the perceived benefits of closure and hence increase the need for closure. Further theoretical and empirical work beyond the scope of the present research is required to appropriately investigate these potential causal relationships.

Mechanisms of the Relations of the Need and Ability to Achieve Closure with Mental Health

The five studies in the present research robustly established that a high need for closure is associated with poorer mental health while a high ability to achieve closure is associated with better mental health. The next goal of this research was to investigate the mechanisms (i.e., mediators) of the relations between need/ability to achieve closure and mental health. I investigated four sets of potential mechanisms of the relations: (a) subjective decision-making factors, (b) self-efficacy, (c) social factors, and (d) stressful events. The key findings were that regret, decision stress, and stressful events play the most important roles in the relations between the need/ability to achieve closure and mental health. However, the conceptual and empirical proximity of self-efficacy to the ability to achieve closure made its mediations less theoretically informative and the hypothesised social pathway was not well-supported. The implications of these findings are discussed in detail below.

Decision-Making

As outlined in the General Introduction, there are two potential decision-making pathways by which the need or ability to achieve closure may influence mental health. First, a high need for closure or low ability to achieve closure may result in objectively suboptimal decisions which go on to affect mental health (i.e., the objective decision quality pathway). Second, a high need for closure or low ability to achieve closure may result in lower decision satisfaction, independent from objective decision quality (i.e., the decision distress hypothesis).

In the present thesis, I focused on the decision distress pathway following the reasoning of Roets and Soetens (2010). Specifically, Roets and Soetens suggested that distress, frustration and helplessness might explain why high need for closure and low ability to achieve closure are associated with poorer mental health. However, they did not test these propositions. Hence, in the present study, I considered the extent to which the way people felt about decision-making mediated the relations between need/ability to achieve closure and mental health.

I considered people's subjective feelings about their decisions in both experimental and correlational contexts. Using both methodological approaches was necessary because each approach is uniquely suited to answering certain kinds of questions and not others. Experimental approaches are required for drawing causal conclusions about the relations between the predictors (the need and ability to achieve closure), mediators (e.g., decision stress, regret), and outcomes (e.g., state anxiety, state affect). By asking participants to make decisions within a study and then measuring the proposed mediators, I could be reasonably confident that individual differences in the mediators and outcomes occurred due to different responses to the decision-making task. Hence, using experimental approaches allowed me to draw conclusions about the effects of decision-making on people with differing levels of the need and ability to achieve closure.

However, one key issue with experimental approaches is that, for ethical and practical reasons, mental health cannot be the outcome variable. Indeed, ethics committees ensure that research studies do not affect the mental health of participants. Instead, experimental approaches rely on proxy state variables such as state anxiety or state affect. Hence, I could not conclude from the experimental studies that variables such as state decision stress mediate the relations between need/ability to achieve closure and longer-term mental health. Instead, I could only

conclude that these variables help to explain the relations between need/ability to achieve closure and *state* anxiety or affect. It is possible that these effects on state anxiety or affect wear off very soon after decision-making and do not go on to affect mental health or wellbeing in the longer term. To address this issue, the present body of work also included several correlational studies using outcome measures of mental health and wellbeing over the past week or month to test mediators between the need/ability to achieve closure and mental health.

Two key decision-making variables emerged as important mediators in the relations between the need/ability to achieve closure and mental health: decision stress and regret. The findings regarding each of these variables are discussed in detail below.

Decision Stress. The decision-making distress hypothesis (Roets & Soetens, 2010) regarding the relations between the need and ability to achieve closure and mental health relies on the assumption that people with a high need for closure and/or low ability to achieve closure experience stress during decision-making situations. Roets and Van Hiel (2008) found that people with a high need for closure experienced increasing distress during an ambiguous decision-making task. However, they did not measure mental health and hence could not test whether decision stress was the mechanism by which the need for closure affects mental health. I am not aware of any previous research regarding decision stress and the ability to achieve closure. Hence, I tested whether decision stress mediated the relations between the need or ability to achieve closure and mental health.

Study 2 included a correlational investigation of the role of decision stress in the relations between need/ability to achieve closure and mental health. I measured decision stress regarding an important decision made in the past month. Consistent with the decision stress hypothesis, decision stress cross-sectionally mediated the relations between the need/ability to achieve

closure and mental health problems. That is, people with a high need for closure experienced more decision stress, and this decision stress explained some of their poorer mental health. Similarly, people with a low ability to achieve closure experienced more decision stress, which explained some of their poorer mental health. I tested this mediation model again in Study 5 across two waves of data. Although I did not find a significant indirect effect, possibly due to the low power of that study, the individual pathways of the model were significant in regression analyses. That is, the need and ability to achieve closure longitudinally predicted decision stress (and mental health), and decision stress longitudinally predicted mental health problems.

I also conducted three experimental studies investigating the potential for state decision stress to mediate the relations between need/ability to achieve closure and state mental health. In Studies 1 and 2, participants made a single hypothetical decision about how they would spend $100 given a number of choices. I then measured participants' decision state decision stress, which included their feelings of frustration, difficulty, satisfaction, and regret about the decision. The relevant state outcome measure was state anxiety.

The experimental findings regarding the role of state decision stress were reasonably consistent with the correlational findings regarding dispositional decision stress. Consistent with the correlational findings, state decision stress mediated the relation between ability to achieve closure and state anxiety in Studies 1 and 2, as well as the relation between the need for closure and state anxiety in Study 1 (but not in Study 2). Hence, it appears that people with a high ability to achieve closure experience less stress (i.e., frustration and difficulty) during their decision-making than people with a low ability to achieve closure, and this may contribute to their better mental health (i.e., lower state anxiety).

However, the importance of this mediation effect from a theoretical or practical perspective should not be overstated due to the high empirical and conceptual similarity between the constructs of the ability to achieve closure and decision stress or appraisal. Decision stress over the past month had a high correlation with the ability to achieve closure across all studies in which both constructs were measured (correlations ranging from $r = -.60$ to $r = -.72$, all ps $< .001$). Conceptually, several items in the Ability to Achieve Cognitive Structure Scale refer to decision-making stress (e.g., "I often experience stress when I have to reach a clear-cut decision"). Therefore, it may not be particularly informative to identify decision stress as a mediator of the relation between the ability to achieve closure and mental health due to the overlap between decision stress and ability to achieve closure.

Decision stress is more conceptually distinct from the need for closure than from the ability to achieve closure, and hence may be a more informative mediator of relations involving need (rather than ability). The findings of the present body of research suggest that people with a high need for closure experience more stress during decision-making, and this stress contributes to their poorer mental health. However, the inconclusive findings in the longitudinal study leave questions about the temporal order of these effects unanswered. As outlined in the section regarding aetiology, it is possible that a high need for closure is a psychological reaction to a biological predisposition to stress during uncertainty. This idea would mean that decision stress precedes the need for closure temporally and causally. Hence, further research is required to draw any firm conclusions about the role of decision stress in the relation between the need for closure and mental health.

It is also likely that a single decision, as was examined in Studies 1 and 2, does not affect the mental health of those with a high need for closure. Instead, it is possible that engaging with

many decisions results in accumulated distress, which then affects mental health. The idea of accumulated stress forms the basis of Roets and Soetens' (2010) explanation for the relation between the need for closure and mental health. However, this proposition was not testable in Studies 1 and 2 because only one decision was included in the experimental task. Hence, the next step in testing the decision-making stress hypothesis was to consider the role of decision accumulation.

The effect of decision accumulation on decision stress. As outlined above, Roets and Soetens (2010) specifically suggested that it is not merely the making of a single decision that affects the mental health of those with a high need for closure or low ability to achieve closure. In Western society, people are required to make consumer and other decisions dozens of times a day. Hence, Roets and Soetens proposed that the build-up of decision stress across many decisions is detrimental to the mental health of people with a high need or low ability to achieve closure. I have termed this the *decision distress accumulation hypothesis*.

I investigated this idea using an experimental approach in Study 3, which involved a series of 12 questions regarding both moral and everyday dilemmas. The inclusion of 12 decisions to be made in quick succession allowed me to test the idea that accumulation of decisions causes increasing amounts of stress to people with a high need for closure or low ability to achieve closure. However, the results did not support my hypotheses. After an initial spike of high decision stress for the first decision, decision stress stabilised at a lower level for all subsequent decisions. There was also was no interaction between presentation order and *ability* to achieve closure on decision stress. That is, people with a low ability to achieve closure did not experience less stress at the end of the decision series than they experienced at the beginning.

Hence, people with a low ability to achieve closure did not seem to benefit from confronting multiple decision-making situations in quick succession.

It should also be noted that the methodology of this study may not have accurately reflected the "real world" of decision-making, in which there are often sizeable gaps between conscious decisions. Hence, it is likely that people with a high need for closure or low ability to achieve closure experience each of these decisions as a "first" decision and therefore find each of them equally stressful without being able to benefit from the potential desensitising effect of making these decisions in quick succession (as suggested by A. Roets, personal communication, 7 February, 2020).

Perhaps a more fruitful avenue for future research is the relation between the ability to achieve closure and satisficing (vs maximising). Satisficing involves making a choice based on a threshold of acceptable satisfaction (Schwartz et al., 2002). That is, satisficers simply choose an option that meets their minimum level of acceptability without trying to choose the best possible option. At the other end of the spectrum, maximisers want to choose the most optimal option. People who are high on maximising (and therefore low on satisficing) may consequently develop a low ability to achieve closure because it is very difficult to determine whether they have, in fact, made the best decision. In Study 1, maximising was positively associated with the ability to achieve closure, but due to time and space constraints, this relation was not explored further. A broader conceptualisation of decision-making difficulty may be useful for incorporating several related constructs including maximising/satisficing and the ability to achieve closure to establish how they are interrelated.

The effect of decision importance on decision stress. As outlined by Roets and Soetens (2010) and Schwartz (2000), people make many decisions every day. However, these decisions

do not carry equal importance. For example, imagine that your friend Monica from the General Introduction is an emergency room doctor with a high need for closure. In the morning, she needs to decide whether to have oatmeal or porridge for breakfast. Then she needs to decide whether to take a packed lunch or buy something at the cafeteria. When she arrives at work, she will have to make many life or death decisions in the course of her shift. On her return home, she needs to decide whether she will wind down by reading a book or watching TV.

Most people would probably find their decisions in the emergency room setting highly stressful and their decisions about food or leisure not stressful. However, it is possible that because Monica has a high need for closure, she will find all of these decisions stressful because they all involve uncertainty about the best option, regardless of the importance of the outcome of these decisions. Similarly, Anne, the friend with a low ability to achieve closure, finds decision-making in general stressful and may also be highly stressed regardless of the importance of the decision.

In Study 3, I investigated the possibility that people with a high need for closure or low ability to achieve closure are less sensitive to decision importance. I tested whether these people experience less variation in their stress in response to important vs unimportant decisions compared to people with a low need or high ability. Participants responded to four types of dilemmas: non-moral dilemmas, everyday moral dilemmas, high importance impersonal dilemmas, and high importance personal dilemmas. I expected that the relation between need/ability to achieve closure and decision stress would be strongest for the least important decisions because people with high need/low ability would be relatively stressed and those with a low need/high ability would be relatively relaxed. Conversely, I expected the relations between

need/ability and decision stress would be weakest for the most important decisions, about which everyone, regardless of need/ability to achieve closure, should be relatively stressed.

These hypotheses were not supported. Most of the correlations between need/ability and decision stress in different decision importance categories were not significantly different from one another, and those that were did not differ in the expected directions. This result suggests that people with a high need for closure or low ability to achieve closure are, in fact, sensitive to decision importance. That is, Monica and Anne would find emergency room decisions relatively more stressful than decisions about breakfast or Netflix.

However, I am cautious about drawing this conclusion because of methodological flaws in the research. All the dilemmas in the study were hypothetical, and hence there is a serious issue of ecological validity with the research. The research question was explicitly about decision importance, and hence it is problematic that there were no real consequences for any decisions made in the task. From a methodological perspective, decisions with differing consequences are required to investigate whether decision importance is a moderating factor. Future research needs to consider ways of introducing consequences to such tasks. This could be achieved by assigning monetary values to making the right decision, where there is more money at stake for some decisions than others. Alternatively, more intensive research methods such as experience sampling could capture the role of decision importance in day-to-day life.

In summary, decision stress was a consistent mediator of the relations between need/ability to achieve closure and mental health across all the studies in which it was measured. However, its conceptual similarity to the ability to achieve closure means that its mediating role in the relations between ability to achieve closure and mental health may have limited theoretical importance.

Contrary to the decision distress accumulation hypothesis, making multiple decisions in a row appears to decrease the decision stress associated with a high need for closure, suggesting a possible route for clinical intervention. Decision importance does not appear to affect the decision stress experienced by either high need for closure or low ability to achieve closure people, suggesting that they might experience high levels of decision stress because they do not distinguish between decisions that are "worth" stressing about and those that are not. However, feelings about decisions *while* making them is only part of the picture; in the next section, I consider the role of regret (i.e., people's feelings about decisions *after* making them).

Regret. Regret may be considered decision stress that continues to occur after a decision has been made. People who are high in dispositional regret tend to continue to revisit their decisions and feel that they could have made a better choice. Because regret is a more ongoing process than decision stress, it has the potential to be more influential on mental health in the long term. Hence, I extended on Roets and Soetens (2010) decision distress hypothesis by considering whether regret is one of the mechanisms by which the need and ability to achieve closure affect mental health.

Regret mediated the relations between the need/ability to achieve closure and mental health throughout most studies in which it was tested. I measured both dispositional and state regret. Dispositional regret mediated the relation between the need for closure and mental ill-health in Studies 1 and 2. That is, people with a high need for closure experienced more dispositional regret, which statistically explained some of their poorer mental health. In Study 2, dispositional regret also mediated the relation between the ability to achieve closure and mental health such that people with a low ability to achieve closure reported more dispositional regret, which mediated their higher levels of mental ill-health and lower levels of wellbeing.

In Study 3, participants reported their state levels of option regret, underconsideration regret, and overconsideration regret after making choices about 12 moral dilemmas. Option regret and underconsideration regret loaded onto the same factor in this study (and in Study 5). Option/underconsideration regret mediated the relations between the need/ability to achieve closure and both state anxiety and negative affect. That is, people with a high need for closure or low ability to achieve closure reported higher levels of option and underconsideration regret, which mediated their higher levels of state anxiety and negative affect. Interestingly, *over*consideration regret also mediated these relations in the same direction. People with a high need for closure or low ability to achieve closure experienced more overconsideration regret, which mediated their higher levels of state anxiety and negative affect.

In parallel mediations, the pattern of results was less consistent: in some cases, overconsideration regret remained significant, and in other cases, both option/underconsideration regret and overconsideration regret became nonsignificant when included together. As outlined in Chapter 5, I interpreted this inconsistency to suggest that both option and process regret are important mediators of these relations. It is interesting to note that people with a high need for closure experienced overconsideration regret despite usually making decisions more quickly (Evans et al., 2017). This may be because, due to their aversion to uncertainty, they tend to feel that any amount of time spent on decision-making is too long.

Interestingly, in Study 3, parallel mediation analyses showed that once regret was accounted for, decision stress no longer mediated the relations between the need for closure and mental ill-health or the relations between the ability to achieve closure and state anxiety or wellbeing. These results represent a departure from Roets and Soetens' (2010) suggestion that decision stress is behind the relations between the need/ability to achieve closure and mental

health. The importance of regret suggests that the need and ability to achieve closure continue to affect people's responses to decision situations even after a decision has been reached, whereas one would expect decision stress to dissipate after a decision is made. This may help to explain why the need and ability to achieve closure appear to affect mental health in a long-term way. If decision stress dissipated after each decision, then it may not accumulate to the extent necessary to impact mental health. However, the fact that people with a high need for closure and/or low ability to achieve closure continue to reflect on their decisions after making them demonstrates that this stress surrounding decision-making continues to affect them through their evaluation and re-evaluation of the decision afterwards.

The role of everyday regret in contributing to and maintaining mental ill-health is understudied. Research about regret often focuses on enormous, life-changing decisions or events such as bereavement (Torges, Stewart, & Nolen-Hoeksema, 2008) or gender affirmation surgery (Lawrence, 2003) rather than the constant regret regarding all decisions that was measured in the present body of work. Cross-sectional research has found that everyday regret (e.g., "I regret a lot of my actions") is associated with anhedonic depression and anxiety, and repetitive regret is associated with general psychological distress (Roese et al., 2009). Study 5 of the present body of work extends on Roese et al.'s research by demonstrating that everyday overconsideration regret longitudinally predicts mental health problems, and several types of regret (option/underconsideration regret, overconsideration regret, action/inaction regret, and the Schwartz regret measure) predict various aspects of wellbeing. Hence, it appears that experiencing high levels of regret about decision-making in everyday life can lead to deterioration in both mental health and wellbeing in the general population.

It is particularly interesting that overconsideration regret was the only type of regret to longitudinally predict deterioration in mental health. The sample size for this study was quite low (N = 105), and so caution is required when interpreting its results. However, if this pattern of results reflects reality, then it suggests that people's mental health suffers most from the perception of wasting too much time on decision-making rather than the decisions themselves. This makes sense given that most decisions that we make every day are trivial and, in most cases, their outcomes do not have a long-term impact on our lives. Hence, making the wrong decision (option regret) or not thinking the decision through properly (underconsideration regret) may dissipate as we realise that the consequences of our decisions were not particularly serious. The same is true of action and inaction regret; when the decision is trivial, regret about acting and regret about not acting may not last very long.

However, perceiving that we over-think our choices is likely to drain a lot of mental energy that feels wasted on trivial decisions. This robs people of mental energy that would be more pleasurably or profitably spent elsewhere and is likely to be exhausting and to induce high levels of self-doubt. Overconsideration regret may therefore be an important target of intervention for clinicians working with people with a high need for closure or low ability to achieve closure.

In order to target people's experience of regret, it is necessary to determine why they are experiencing high levels of regret. The importance of overconsideration regret in predicting deterioration in mental health and wellbeing suggests that poor decision quality is not solely responsible for the regret experienced by high need/low ability people. A person can still experience high levels of overconsideration regret for a "good" decision because overconsideration regret is about the amount of time spent on the decision rather than its

outcome. Hence, clinicians may have more success by equipping high need/low ability to achieve closure people with the meta-cognitive skills to address repetitive thinking and regret rather than providing them with tools or strategies for better decision-making. However, as noted above, the present body of work did not consider whether people with a high need or low ability to achieve closure make objectively poorer decisions. Research on this question should be carefully designed because mental health problems also affect people's use of good decision-making strategies (e.g., Leykin, Roberts, & DeRubeis, 2011).

Lay beliefs about decision-making. As outlined above, the need and ability to achieve closure were consistently related to regret. In Study 2, I tested the possibility that lay beliefs about decision-making moderate the relations between need/ability to achieve closure and regret. I expected that the positive relation between need for closure and regret would be stronger for people who strongly believe a fast decision is a bad decision and weaker for people who do not hold that belief. This is because those with a high need for closure make fast decisions, and hence believing that a fast decision is a bad decision may cause frequent regrets. On the other hand, I expected that the negative relation between ability to achieve closure and regret should be weaker for people who believe a fast decision is a bad decision, because people with a low ability to achieve closure decide slowly and hence holding this belief does not cast their own decision-making style in a negative light.

These moderation hypotheses were not supported. Regardless of whether people believed that a good decision is a fast decision, those with a high need for closure or low ability to achieve closure reported relatively high levels of regret. As outlined in Chapter 4, there were methodological issues associated with the investigation of this research question. However, if the null results represent a genuine lack of moderation by beliefs about decision speed, then people

with a high need or low ability to achieve closure may not experience regret due to a mismatch between their decision-making preference or style and what they believe makes a "good" decision. That is, people do not experience regret only when they believe their preferred or usual decision style (quick decisions for high need for closure and slow decisions for low ability to achieve closure) is problematic. Rather, high need for closure and low ability to achieve closure people experience decision regret even if they believe their decision style does not produce poorer outcomes.

This interpretation further supports the idea that people with a high need or low ability to achieve closure experience regret due to dissatisfaction with their decision process per se rather than their decision outcomes. However, because these conclusions are based on null results, they should be treated very cautiously. Further research is required to determine whether people's beliefs about how to make good decisions affect their experience of regret.

In summary, I found that regret consistently mediated the relations between need/ability to achieve closure and mental health. Overconsideration regret was particularly important in these relations, indicating that interventions targeting this particular cognitive tendency might be useful in weakening the relation between need/ability to achieve closure and mental health. Regret is likely to be more important than decision stress in explaining the relations between the need/ability to achieve closure and mental health because regret is a more ongoing experience, whereas decision stress may dissipate after a decision is made. Further research is required on the role of everyday regret on mental health in order to confidently make this conclusion.

Self-efficacy

Moving beyond purely decision-making variables, I also considered the role of generalised self-efficacy in the relations between need/ability to achieve closure and mental

health. Self-efficacy significantly mediated the relations between need for closure and mental health even after accounting for regret in Study 1 and both regret and decision stress in Study 2. Self-efficacy also mediated the relations between ability to achieve closure and both mental health and wellbeing in Study 1 even after accounting for regret. However, in Study 2, self-efficacy only mediated the relation between ability to achieve closure and wellbeing, possibly because decision stress was a stronger mediator of the relation between ability to achieve closure and mental health.

I did not place a particular focus on the results involving self-efficacy throughout the present thesis because of the high conceptual similarity between the ability to achieve closure and self-efficacy. The ability to achieve closure as measured and conceptualised in the present thesis is a subjective measure. That is, I did not measure the extent to which people are able to make decisions quickly and confidently, but the extent to which they perceive that they are able to do so. Hence, the ability to achieve closure may be conceptualised as a domain-specific measure of self-efficacy in the decision-making space. That is, a high ability to achieve closure could also be described as high decision-making self-efficacy. This conceptual similarity is supported by high correlations between self-efficacy and the ability to achieve closure (ranging from $r = .47$ to $r = .64$, all ps $< .001$). Hence, self-efficacy is likely too proximal a mediator to be informative in explaining the process by which the ability to achieve closure affects mental health.

The utility of self-efficacy as a mediator of the relations between the need for closure and mental health is higher due to better conceptual and empirical distinction between the need for closure and self-efficacy. However, the question of directionality is important. It is possible that a high need for closure results in low self-efficacy because being unable to deal well with

uncertainty (i.e., high need for closure) may lead to a broader sense of being unable to solve problems more generally (i.e., low self-efficacy). On the other hand, it is also possible that feeling ill-equipped to address problems leads to a fear of uncertainty because of a lack of confidence in the ability to address that uncertainty.

The longitudinal approach in Study 5 aimed to resolve this question. This study demonstrated that the need for closure did not longitudinally predict self-efficacy. Self-efficacy also did not longitudinally predict the need for closure. Hence, although these variables are associated cross-sectionally, neither predicts the other over time, possibly because both variables are relatively stable. This may link back the issues discussed earlier regarding attachment style and confidence; it is possible that secure attachment predicts both high self-efficacy and low need for closure. In any case, the lack of longitudinal relations between need for closure and self-efficacy and the conceptual similarity between the ability to achieve closure and self-efficacy suggest that self-efficacy is not a theoretically informative mediator of the relations that I am attempting to understand in this thesis.

Social Factors

A key question of the present thesis was whether social factors known to be related to the need for closure might explain its relation to mental health. Previous research has shown a link between high need for closure and intergroup social processes including prejudice and stereotyping (e.g., Bar-Tal & Labin, 2001; Sun et al., 2016; Van Hiel et al., 2004). With regards to interpersonal phenomena, a high need for closure is associated with less perspective-taking and poorer communication skills (Rubini & Kruglanski, 1997; Webster Nelson et al., 2003). In Study 4, I hypothesised that people who had a high need for closure would engaging in less perspective-taking, which would result in less social support, and the lower social support would

flow on to affect mental health. However, this serial mediation hypothesis was not supported. Although people with a high need for closure reported less perspective-taking, they did not report lower levels of social support. Further, their decreased levels of perspective-taking did not mediate their poorer mental health.

I also considered the roles of perspective-taking and social support in the relation between the ability to achieve closure and mental health. I found that people with a low ability to achieve closure reported lower social support, but not lower perspective-taking. Their lower social support mediated their poorer mental health.

Because the two serial models were not supported, I considered whether my assumption about the relation between perspective-taking and social support was evident in the data. The correlation between perspective-taking and social support suggests that, in general, people who engage in perspective-taking do also have higher levels of social support ($r = .30$, $p < .001$). Hence, it is interesting that people with a high need for closure engage in less perspective-taking but that this lowered perspective-taking does not seem to lead to lower levels of social support.

One potential explanation for this pattern of results is that people with a high need for closure tend to be surrounded by others with a high need for closure, and that this similarity leads to a sense of closeness that is not impeded by a lack of perspective-taking on both parties' parts. Previous research has demonstrated that the need for closure is similar among parents and children (Dhont, Roets, & Van Hiel, 2013). Additionally, people with a high need for closure may be more likely to make friends with other high need for closure people due to their shared aversion to uncertainty. Indeed, several items in the Need for Closure Scale (Webster & Kruglanski, 1994) refer specifically to preferring to spend time with others who prefer certainty (e.g., "I like to have friends who are unpredictable (reversed);" "I don't like to be with people

who are capable of unexpected actions”). Other items in the Need for Closure Scale refer to a preference for friends who are similar to themselves (e.g., “I feel irritated when one person disagrees with what everyone else in a group believes”). Previous research suggests that people with a high need for closure are better able to engage in perspective-taking regarding similar others (Webster Nelson et al., 2003). Hence, although people with a high need for closure have poorer perspective-taking tendencies in general, this may not affect their social support from similar people.

The mediating role of social support in the relation between the ability to achieve closure and mental health is consistent with large amounts of previous research showing that social support is consistently associated with better mental health (e.g., Olstad et al., 2001; Thoits, 2011). However, it is not clear why people with a high ability to achieve closure report higher social support. Perhaps a high ability to achieve closure (largely composed of confidence in decisions that have been made) is simply a reflection of high levels of confidence more generally. As outlined in the previous section on self-efficacy, high ability to achieve closure may be conceptualised as high confidence in a specific domain. Self-confidence is negatively associated with loneliness (Cheng & Furnham, 2002), but the direction of the relation between confidence and social support effect is still unclear. Some researchers assume that social support affects self-confidence (e.g., Freeman & Rees, 2010; Rees & Freeman, 2007), while others assume that self-confidence affects social support (Cheng & Furnham, 2002). Because these studies considering confidence and social-support are cross-sectional, it is difficult to determine the causal order of these effects. Social support was not included in Study 5 of the present body of work, and so I am unable to make any conclusions about the direction of these relations.

Future research is required to investigate the directions and mechanisms of the relations between the ability to achieve closure and social support.

The role of attachment as outlined in earlier sections of the present chapter may be useful in marrying together the disparate approaches to the temporal relation between self-confidence and social support. An attachment approach might suggest that early working models about the self and the world affect both self-confidence and the ability to relate well to others. People with secure attachment learn that others are responsive to their needs and hence will be more motivated to seek out and maintain good social bonds. On the other hand, insecurely attached people cannot trust others to meet their needs and hence will be less likely to establish and maintain relationships. At the same time, secure attachment provides individuals with a secure base from which to investigate the world and build their confidence in encountering new situations and solving problems, whereas insecure attachment does not provide this secure base and likely results in lower confidence (e.g., Kobak & Sceery, 1988). Hence, secure attachment should be associated with both confidence (in general and in decision-making) and social support. A broader view of the causes of individual differences in confidence and social support may help to integrate disparate approaches to these questions.

In summary, the consideration of social factors suggested that people with a high need for closure do not experience less social support, possible because they tend to form social networks with similar others and hence their lack of perspective-taking with regards to dissimilar others does not negatively affect their social relationships. Social support did mediate the relations between the ability to achieve closure and mental health, but perspective-taking did not explain why people with a high ability to achieve closure report more social support. Theoretical links to

attachment theory may provide fruitful avenues for future research explaining why the ability to achieve closure is positively related to social support.

Stressful Events

The final potential mediator investigated in the present body of research was the perception of stressful events. Specifically, I considered whether people with a high need for closure experience more distress in response to everyday stressors, and whether this increased distress may explain their poorer mental health.

Consistent with predictions, in Study 4, I found that people with a high need for closure reported more stress because of background stressors in the past month, and that this stress mediated their poorer mental health. People with a low ability to achieve closure also reported more background stress, which mediated their poorer mental health and wellbeing. However, as outlined in Chapter 6, there remains an important ambiguity about the reasons why people with a high need for closure or low ability to achieve closure report more background stress. Specifically, it is not clear whether these people experience more frequent or severe background stressors, or whether they experience more stress in response to the same background stressors as those with a low need or high ability to achieve closure.

Both of these potential explanations for why people with a high need/low ability report more background stress are theoretically and empirically plausible. Some personality/genetic traits predict poorer decision quality, and this may lead to more frequent or severe background stressors (e.g., Dewberry, Juanchich, & Narendran, 2013). Hence, it is possible that high need for closure or low ability to achieve closure lead to objectively poorer decisions, which in turn result in negative outcomes that affect mental health (the objective decision quality pathway).

On the other hand, previous research has also demonstrated that people with a high need for closure tend to pay more attention to stressors, regardless of whether these stressors are controllable (Sollár & Vanečková, 2012). This increased attention may result in these people experiencing more distress in response to stressors. As outlined above and throughout the thesis, I did not test decision quality in the present body of work. This would certainly be a theoretically relevant and interesting direction for future research. However, the findings across the thesis suggest that subjective feelings about choices and stressors have an important role to play in explaining the relations between need/ability to achieve closure and mental health/wellbeing and should continue to be investigated.

Limitations

Cross-Sectional Mediation

Many of the conclusions outlined above were based on mediation analyses, which aim to clarify the process or mechanism by which a predictor variable acts on an outcome variable. These analyses are therefore explicitly concerned with temporal and causal questions. Mediation analyses should therefore be conducted on longitudinal data in order to determine the order in which each variable affects or is affected by the other variables in the model. However, in the present study, most mediation analyses were conducted on cross-sectional data. Study 5 included measurements at two time points, but ideally longitudinal mediation analyses should be conducted with at least three time points of data (Maxwell, Cole, & Mitchell, 2011). Additionally, a very high attrition rate meant that the number of participants who completed both measurements was quite low (n = 105) and hence this study had low power. Unfortunately, financial and practical constraints associated with the project prevented me from collecting data from more participants or across more time points.

These issues mean that the mediation results reported in the present thesis should be interpreted with some caution. However, I believe these results do provide some preliminary evidence for the proposed models for two reasons: (a) theoretical considerations and (b) longitudinal support for individual mediation pathways (if not the entire mediation model).

Theoretically, I created mediation models based on considerations about the relative stability and historical context of each of the variables. The need and ability to achieve closure were considered predictor variables across most analyses because of their previous conceptualisation as trait individual differences (Bar-Tal, 1994a; Webster & Kruglanski, 1994). Attachment avoidance and attachment anxiety were considered predictor variables in Study 4 because attachment is also conceptualised as being highly stable and as stemming from very early life experiences.

The proposed mediator and outcome variables in the present body of work are less stable and hence it is less clear which should be considered mediators and which should be considered outcomes. The mediator variables were measured "in general" or over the past month, while mental health was usually measured over the past seven days. Hence, from a temporal perspective, we would expect general tendencies or experiences over the past month to affect experiences in the past seven days.

However, although mental health was measured over the past seven days, this measurement may reflect more long-term mental health. So, it is possible that people's mental health affected the proposed mediator variables (e.g., regret or social support). To address this question, I conducted reverse mediation models by swapping the proposed mediator with the proposed outcomes. Most of these cross-sectional reverse models were also significant, making it

difficult to determine the temporal direction of the relations between the proposed mediators and proposed outcomes.

To address the issue of temporal direction, I also tested the longitudinal relations between the proposed predictors, mediators, and outcomes across two waves of data in Study 5. The regression tests showed that several of the proposed mediators longitudinally predicted the proposed outcomes. However, some of the reverse regressions were also significant, showing that the proposed outcomes longitudinally predicted some of the proposed outcomes. Specifically, mental health problems longitudinally predicted decision stress and option/underconsideration regret. Various aspects of wellbeing predicted option/underconsideration regret, action regret, and decision stress.

None of the reverse mediations were significant, but neither were the forward mediations, possible due to the small sample size of the study ($N = 105$). Hence, although it is difficult to draw firm conclusions from these results, they suggest that at least some of the relations between the proposed mediators and the mental health outcomes are bidirectional. This possibility suggests a feedback loop in which the precursors of mental health problems are exacerbated by having poor mental health, and hence reinforce this deterioration in mental health. Additionally, as outlined in Chapter 7, the lack of significant mediation effects in the longitudinal study may be due to the effects in question taking place over a different time lag or at a different development period than those tested in the present research. Further research involving a larger sample size and several waves of data collection is required to make these conclusions.

To draw stronger conclusions without using longitudinal data, some authors have suggested that proposed mediators should be both manipulated and measured when investigating single-mediator models (MacKinnon & Fairchild, 2009; MacKinnon et al., 2007). Due to

financial and time constraints, only one of the proposed mediators was manipulated (decision distress) in the present research. Hence, future research should seek to manipulate the other mediators (e.g., regret) and measure both the mediators and the mental health outcomes in order to provide firmer evidence about the causal relationships in these models.

Another issue with interpreting the results of cross-sectional mediation relates to the fact that many of the proposed mediators were correlated with one another. Hence, it is possible that these mediators operate together serially rather than independently. However, serial mediation is difficult to interpret cross-sectionally. In the present research, serial mediation was tested only in Study 3 because this was the only study in which there were a priori hypotheses regarding the temporal relationship between the two mediator variables (perspective-taking and social support). It is possible that other mediators also operate serially (e.g., stressful events and regret). Future research should consider the theoretical justifications for any proposed serial mediation models and test such models carefully using a combination of experimental and longitudinal research. In the absence of further experimental and longitudinal research, the findings of the present research should be treated as preliminary.

The Effects of the Ability to Achieve Closure as a Covariate

Many mediation models involving the need for closure as a predictor variable became nonsignificant when the ability to achieve closure was included as a covariate. This may have occurred because the ability to achieve closure is closely conceptually and empirically related to many of the mediator variables (e.g., decision stress, self-efficacy, etc.). Perhaps more importantly, the relations between the ability to achieve closure and mental health were larger than the relations between the need for closure and mental health. Hence, accounting for the ability to achieve closure likely reduced the unexplained variance in the relation between the

need for closure and mental health so that there was not much variance left to be explained by the mediator variables. These findings suggest that the ability to achieve closure is a more important predictor of mental health than the need for closure. Hence, it might be more fruitful for future research regarding intervention to focus on ability rather than need in order to have the greatest effect on mental health.

In addition to the relatively large relations between ability to achieve closure and mental health, the ability to achieve closure was also consistently negatively related to the need for closure throughout most studies in the present thesis. Hence, there may be some redundancy in these variables, which may in turn help to explain why the ability to achieve closure "wiped out" the mediation effects in models where the need for closure was a predictor. More theoretical work is required to clarify the expected and empirical relations between the need and ability to achieve closure given their consistent negative relations with one another and similar (though inverted) relations with third variables.

Relevant Additional Variables

In the present set of studies, I focused mainly on four sets of potential mediators: (a) subjective decision-making factors, (b) self-efficacy, (c) social factors, and (d) stressful events. It is not possible for a research program to include every variable that may have a role to play in a set of associations. However, some additional variables are theoretically relevant and hence should be included. In this case, the role of objective decision quality is relevant for several reasons. As outlined in the General Introduction, a high need for closure results in several cognitive biases that are likely to lead to poorer decision quality, including reliance on heuristics and incomplete assessment of all the alternatives (Choi et al., 2008; de Dreu, Koole, & Oldersma, 1999; Klein & Webster, 2000; Mayseless & Kruglanski, 1987). However, very little

research has investigated the extent to which these cognitive biases result in poorer decisions, instead investigating their effects on social variables such as persuasion (e.g., Vermeir, Van Kenhove, & Hendrickx, 2002) and person perception (Heaton & Kruglanski, 1991) or cognitive variables such as search effort (e.g., Vermeir & Van Kenhove, 2005).

The research by Colbert and Peters (2002) and McKay et al. (2006) that was reviewed in Chapter 2 touched on the question of decision quality by investigating whether the need for closure is associated with jumping to conclusions, a bias which is likely to result in poorer decisions because it involves relying only on early evidence to make decisions. However, neither set of researchers found a relation between the need for closure and jumping to conclusions. Additionally, although it seems closely associated with decision quality, the jumping to conclusions bias is still not a direct measure of decision quality.

The importance of regret in mediating the relations between the need/ability to achieve closure and mental health suggests that it is important to consider whether regret experienced by high need/low ability people is driven by measurably poorer decisions. It is possible that both the subjective and objective decision-making pathways are responsible for the relations between need/ability to achieve closure and mental health. Future research should therefore consider the role of decision-making quality in the relations between the need/ability to achieve closure and mental health.

The relative importance of decision-making quality compared to subjective feelings about decision-making has important implications for treatment approaches. If people with a high need/low ability to achieve closure make objectively poorer decisions, then clinicians should focus on building good decision-making skills. However, if their decisions are no worse than the

rest of the population, then clinicians may prefer to focus on changing such people's cognition about their decisions after the fact.

Apart from decision-making quality, the effects of need or ability to achieve closure on the subjective interpretation of events may also be relevant to their relations with mental health. Rassin and Muris (2005) found that people who score highly on a measure of indecisiveness were more likely to label ambiguous situations as concerning even after controlling for anxiety, depression, worry-proneness, and intolerance of uncertainty (akin to the need for closure). This suggests another possible pathway between a low ability to achieve closure and poorer mental health. People with a low ability to achieve closure (i.e., high decisiveness) tend to interpret ambiguous events more negatively, and hence may experience more distress in everyday life, which would contribute to poorer mental health. The ability to achieve closure literature and the indecisiveness literature do not overlap, possibly because the conceptualisation of the ability to achieve closure has not always referred to indecisiveness. A clearer theoretical framework for the ability to achieve closure and better integration between the indecisiveness literature and the ability to achieve closure literature could illuminate several other potentially relevant mediators of their relation with mental health.

Sample Size

Several of the studies in the present body of work had smaller sample sizes than I aimed for based on the a priori power analyses, and some analyses were more complex and involved more variables than accounted for with these power analyses. This limitation means that the findings of these studies should be interpreted with some caution. Although null hypothesis statistical testing never allows for the conclusion that there is no effect on the basis that no effect was detected, this conclusion is particularly inappropriate when the sample size meant that power

was low for detecting the sorts of small effects that I expected. Therefore, it is possible that effects which were not significant in the present study do exist but were not detected (i.e., Type II errors). Bayesian mediation analyses would also help address this issue, but these are unfortunately beyond my current level of expertise. Further research on the key findings of the present thesis should ensure that the sample size is appropriate to avoid power issues.

Generalisability to the General Population, Clinical Populations, and Other Cultures

All the studies in the present thesis were conducted with Australian university students as the participants. Study 3 included some non-psychology participants, and Study 5 included participants from four different universities. However, most participants were female psychology students from the same large Australian public university.

This lack of diversity in the samples raises the question of generalisability to the general population. Psychology students tend to have poorer mental health than the general population (Stallman, 2010), and women tend to report poorer mental health than men (Salk et al., 2017). Some occupational groups have higher need for closure than others (Webster & Kruglanski, 1994), but it is not clear whether psychology students have a distinct need/ability to achieve profile compared to other students or the general population. Hence, future research needs to incorporate a larger amount of diversity in order to determine whether the effects found in the present body of work are in some way specific to the population studied or whether they represent broader and more generalisable effects.

The question of generalisability to clinical populations is also relevant. Several of the previous studies investigating the links between the need/ability to achieve closure and mental health focused specifically on clinical populations (Bentall & Swarbrick, 2003; Colbert et al., 2006; Freeman et al., 2006) and others were conducted in the general population (Colbert &

Peters, 2002; Freeman et al., 2005; McKay et al., 2006). Hence, it appears that the need and ability to achieve closure are associated with mental health both for the general population and for certain clinical populations. However, the mechanisms of these effects may differ between populations. Because the present set of studies was conducted entirely on the student population, I cannot draw any conclusions about the mechanisms of these effects in specific clinical populations.

Finally, there is a question of cross-cultural generalisability. Roets and Soetens (2010) suggested that a high need for closure or low ability to achieve closure may not be detrimental to mental health in cultures where individual choices and freedom are not as prioritised as they are in Western societies. Roets et al. (2013) found that Chinese people with a high need for closure perceive choice as both a burden and a blessing, possibly because they consider uncertainty as part of the process of achieving certainty rather than as a state in itself. Hence, high need for closure people from Chinese contexts may not experience negative mental health effects through the decision-making mechanisms identified in the present thesis, since they do not consider choice to be unequivocally negative. Therefore, it should not be assumed that a high need for closure or low ability to achieve closure affect mental health to the same degree or via the same mechanisms across all decision-making or social contexts. The findings of the present body of work should be interpreted narrowly in relation to the cultural context in which they were investigated.

Conclusions

The present research made three key sets of findings: (a) the need and ability to achieve closure mediate the relations between attachment anxiety/avoidance and mental health, (b) regret, decision stress, and stress about everyday stressors mediate the relations of the need and

ability to achieve closure and mental health, and (c) the need and ability to achieve closure longitudinally predict mental ill-health.

Despite broad research interest regarding its effects on other variables, there has been little previous research on the aetiology of the need for closure, and no research on the aetiology of the ability to achieve closure. The present thesis made a novel contribution to this consideration by considering the relations between attachment avoidance/anxiety and the need and ability to achieve closure. The relations between attachment and need/ability to achieve closure suggest that early attachment experiences may shape both people's ability to achieve certainty and their desire to achieve certainty. Additionally, the need for closure and the ability to achieve closure were consistently negatively related to one another throughout the thesis.

These links suggest that the theoretical framework surrounding need and ability should be updated and integrated to provide clear and testable predictions regarding their aetiology, relations with one another, and effects on third variables. A more integrated theoretical framework has the potential to create richer knowledge about the ways in which these two constructs are related and the ways in which they differ. For example, does a low ability to achieve closure increase the perceived benefits of closure and hence increase the need for closure? Is it possible to intervene to change disposition need or ability to achieve closure? Should successful interventions on the need for closure also affect the ability to achieve closure (and vice versa)?

These empirical and theoretical questions have clear practical implications in terms of treatment of mental health problems of those with a high need or low ability to achieve closure. It is important to answer them in order to understand whether it is possible to intervene to change dispositional need/ability to achieve closure. If so, then we also need to understand whether need

and ability can change together and/or affect one another. If interventions to change dispositional need and ability to achieve closure are not effective, then we should focus intervention efforts on the mechanisms of their relations with mental health instead.

The identification of some of these mechanisms forms the most significant contribution of the present thesis. Previous research established the need and ability to achieve closure were associated in opposite directions with mental health but failed to identify any mechanisms for these effects. In the present body of work, I found that (a) stress regarding everyday stressors and (b) subjective decision-making variables, such as regret and decision stress, mediate these relations. Again, further interesting questions are presented by these findings. These variables may relate to one another causally. For example, perhaps increased decision stress leads to poorer decisions, which in turn result in both increased regret and more frequent and/or severe stressful events. These findings highlight the need to understand exactly how the decision-making styles and preferences of those with a high need and/or low ability to achieve closure affect their lives and hence their mental health.

So, what do all these findings mean for our friends Monica and Anne? Monica is plagued by stress about her decisions, and this stress lingers on to become regret about the decisions after she makes them. She also experiences a lot of stress about everyday life events that might not bother other people quite as much. Anne faces the same problems, and additionally struggles with a lack of support from friends and family. Both are likely to experience deterioration in their mental health and wellbeing. So, try not to be to be too irritated when Monica wants to over-plan dinner and Anne is chronically late – there are a lot of struggles happening under the surface.

And if you're wondering whether Monica is a reference to the character from the popular US sitcom *Friends* or a reference to the author of this work, I'll resolve the ambiguity (for the

sake of your mental health). Monica started out as a fictionalised depiction of me. However, her personality, like the present thesis, developed and evolved over time.

References

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). Patterns of attachment: A psychological study of the strange situation. Lawrence Erlbaum.

Anderson, C., & Galinsky, A. D. (2006). Power, optimism, and risk-taking. *European Journal of Social Psychology, 36*(4), 511-536. doi:10.1002/ejsp.324

Ariely, D., & Zakay, D. (2001). A timely account of the role of duration in decision making. *Acta Psychologica*, *108*(2), 187-207. https://doi.org/10.1016/S0001-6918(01)00034-8

Arroyo, A., & Segrin, C. (2011). The relationship between self-and other-perceptions of communication competence and friendship quality. *Communication Studies*, *62*(5), 547-562. https://doi.org/10.1080/10510974.2011.580037

Australian Bureau of Statistics. (2007). National survey of mental health and well-being: summary of results. *Canberra: Australian Bureau of Statistics*. Retrieved from https://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/6AE6DA447F985FC2CA2574EA00122BD6/$File/National%20Survey%20of%20Mental%20Health%20and%20Wellbeing%20Summary%20of%20Results.pdf

Australian Government Department of Health. (2007, May). *What is mental illness?* Retrieved from https://www1.health.gov.au/internet/publications/publishing.nsf/Content/mental-pubs-w-whatmen-toc~mental-pubs-w-whatmen-what

Barlow, F. K. (2019). Nature vs. nurture is nonsense: On the necessity of an integrated genetic, social, developmental, and personality psychology. *Australian Journal of Psychology, 71*, 68-79. https://doi.org/10.1111/ajpy.12240

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of*

Personality and Social Psychology, 51, 1173–1182. https://doi.org/10.1037/0022-3514.51.6.1173

Bar-Tal, D., & Labin, D. (2001). The effect of a major event on stereotyping: Terrorist attacks in Israel and Israeli adolescents' perceptions of Palestinians, Jordanians and Arabs. *European Journal of Social Psychology*, *31*(3), 265-280. https://doi.org/10.1002/ejsp.43

Bar-Tal, Y. (1994a). The effect on mundane decision-making of the need and ability to achieve cognitive structure. *European Journal of Personality*, *8*(1), 45-58. https://doi.org/10.1002/per.2410080105

Bar-Tal, Y. (1994b). Uncertainty and the perception of sufficiency of social support, control, and information. *The Psychological Record*, *44*(1), 13-25.

Bar-Tal, Y. (2010). When the need for cognitive structure does not cause heuristic thinking: The moderating effect of the perceived ability to achieve cognitive structure. *Psychology*, *1*(02), 96-105. https://doi.org/10.4236/psych.2010.12013

Bar-Tal, Y., & Guinote, A. (2002). Who exhibits more stereotypical thinking? The effect of need and ability to achieve cognitive structure on stereotyping. *European Journal of Personality*, *16*(4), 313-331. https://doi.org/10.1002/per.453

Bar-Tal, Y., Kishon-Rabin, L., & Tabak, N. (1997). The effect of need and ability to achieve cognitive structuring on cognitive structuring. *Journal of Personality and Social Psychology*, *73*(6), 1158-1176. https://doi.org/10.1037/0022-3514.73.6.1158

Bar-Tal, Y., Shrira, A., & Keinan, G. (2013). The effect of stress on cognitive structuring: A cognitive motivational model. *Personality and social psychology review*, *17*(1), 87-99. https://doi.org/10.1177/1088868312461309

Bar-Tal, Y., & Spitzer, A. (1999). The effect on coping of monitoring, blunting, and the ability to achieve cognitive structure. *The Journal of Psychology*, *133*(4), 395-412. https://doi.org/10.1080/00223989909599751

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: a test of a four-category model. *Journal of Personality and Social Psychology*, *61*(2), 226-244. https://doi.org/10.1037/0022-3514.61.2.226

Bentall, R. P., & Swarbrick, R. (2003). The best laid schemas of paranoid patients: autonomy, sociotropy and need for closure. *Psychology and Psychotherapy: Theory, Research and Practice*, *76*(2), 163-171. https://doi.org/10.1348/147608303765951195

Berenbaum, H., Bredemeier, K., & Thompson, R. J. (2008). Intolerance of uncertainty: Exploring its dimensionality and associations with need for cognitive closure, psychopathology, and personality. *Journal of Anxiety Disorders*, *22*(1), 117-125. https://doi.org/10.1016/j.janxdis.2007.01.004

Boseley, S. (2018, October 10). World in mental health crisis of 'monumental suffering,' say experts. *The Guardian*. Retrieved from https://www.theguardian.com/society/2018/oct/09/world-mental-health-crisis-monumental-suffering-say-experts

Broomhall, A. G., & Phillips, W. J. (2018). Self-referent upward counterfactuals and depression: Examining regret as a mediator. *Cogent Psychology*, *5*(1), 1416884. https://doi.org/10.1080/23311908.2017.1416884

Brown, T. A., Chorpita, B. F., Korotitsch, W., & Barlow, D. H. (1997). Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. *Behaviour Research and Therapy*, 35(1), 79-89. https://doi.org/10.1016/S0005-7967(96)00068-X

Bruine de Bruin, W., Dombrovski, A. Y., Parker, A. M., & Szanto, K. (2016). Late-life depression, suicidal ideation, and attempted suicide: The role of individual differences in maximizing, regret, and negative decision outcomes. *Journal of Behavioral Decision Making*, *29*(4), 363-371. https://doi.org/10.1002/bdm.1882

Bruine de Bruin, W., Parker, A. M., & Fischhoff, B. (2007). Individual differences in adult decision-making competence. *Journal of Personality and Social Psychology, 92*, 938–956. https://doi.org/10.1037/0022-3514.92.5.938

Buhle, J. T., Silvers, J. A., Wager, T. D., Lopez, R., Onyemekwu, C., Kober, H., ... & Ochsner, K. N. (2014). Cognitive reappraisal of emotion: a meta-analysis of human neuroimaging studies. *Cerebral Cortex*, *24*(11), 2981-2990. https://doi.org/10.1093/cercor/bht154

Cafri, G., Kromrey, J. D., & Brannick, M. T. (2010). A meta-meta-analysis: Empirical review of statistical power, type I error rates, effect sizes, and model selection of meta-analyses published in psychology. *Multivariate Behavioral Research*, *45*(2), 239-270. https://doi.org/10.1080/00273171003680187

Campagna, C. G., & Curtis, G. J. (2007). So worried I don't know what to be: Anxiety is associated with increased career indecision and reduced career certainty. *Journal of Psychologists and Counsellors in Schools*, *17*(1), 91-96. https://doi.org/10.1375/ajgc.17.1.91

Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: the BIS/BAS scales. *Journal of Personality and Social Psychology*, *67*(2), 319-333. https://doi.org/10.1037/0022-3514.67.2.319

Cassidy, J. (1988). Child-mother attachment and the self in six-year-olds. *Child Development*, 121-134. https://doi.org/10.2307/1130394

Cheng, C. (2001). Assessing coping flexibility in real-life and laboratory settings: a multimethod approach. *Journal of Personality and Social Psychology*, 80(5), 814-833. https://doi.org/10.1037/0022-3514.80.5.814

Cheng, C. (2003). Cognitive and motivational processes underlying coping flexibility: A dual-process model. *Journal of Personality and Social Psychology, 84*(2), 425-438. https://doi.org/10.1037/0022-3514.84.2.425

Cheng, H., & Furnham, A. (2002). Personality, peer relations, and self-confidence as predictors of happiness and loneliness. *Journal of Adolescence*, *25*(3), 327-339. https://doi.org/10.1006/jado.2002.0475

Choi, J. A., Koo, M., Choi, I., & Auh, S. (2008). Need for cognitive closure and information search strategy. *Psychology & Marketing*, *25*(11), 1027-1042. https://doi.org/10.1002/mar.20253

Ciarrochi, J., Said, T., & Deane, F. P. (2005). When simplifying life is not so bad: The link between rigidity, stressful life events, and mental health in an undergraduate population. *British Journal of Guidance & Counselling*, *33*(2), 185-197. https://doi.org/10.1080/03069880500132540

Closure [Def. 4]. (n.d.). In Merriam-Webster Online, Retrieved August 28, 2019, from https://www.merriam-webster.com/dictionary/closure

Colbert, S. M., & Peters, E. R. (2002). Need for closure and jumping-to-conclusions in delusion-prone individuals. *The Journal of Nervous and Mental Disease*, *190*(1), 27-31. https://doi.org/10.1097/00005053-200201000-00007

Colbert, S. M., Peters, E. R., & Garety, P. A. (2006). Need for closure and anxiety in delusions: A longitudinal investigation in early psychosis. *Behaviour Research and Therapy*, *44*(10), 1385-1396. https://doi.org/10.1016/j.brat.2005.06.007

Collins, N. L., & Read, S. J. (1990). Adult attachment, working models, and relationship quality in dating couples. *Journal of Personality and Social Psychology*, *58*(4), 644-663. https://doi.org/10.1037/0022-3514.58.4.644

Colzato, L. S., Waszak, F., Nieuwenhuis, S., Posthuma, D., & Hommel, B. (2010). The flexible mind is associated with the catechol-O-methyltransferase (COMT) Val158Met polymorphism: evidence for a role of dopamine in the control of task-switching. *Neuropsychologia*, *48*(9), 2764-2768. https://doi.org/10.1016/j.neuropsychologia.2010.04.023

Connolly, T., & Reb, J. (2005). Regret in cancer-related decisions. *Health Psychology, 24*(4, Suppl), S29–S34. https://doi.org/10.1037/0278-6133.24.4.S29

Connolly, T., & Zeelenberg, M. (2002). Regret in Decision Making. Current Directions in Psychological Science, 11(6), 212–216. https://doi.org/10.1111/1467-8721.00203

Corr, P. J., Hargreaves-Heap, S., Tsutsui, K., Russell, A., & Seger, C. (2013). Personality and social attitudes: Evidence for positive-approach motivation. *Personality and Individual Differences*, *55*(7), 846-851. https://doi.org/10.1016/j.paid.2013.07.012

Corrigan, P. W., & Phelan, S. M. (2004). Social support and recovery in people with serious mental illnesses. *Community Mental Health Journal*, *40*(6), 513-523. https://doi.org/10.1007/s10597-004-6125-5

Costello, A. B., & Osborne, J. W. (July 2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation, 10*(7).

Crawford, J., Cayley, C., Lovibond, P. F., Wilson, P. H., & Hartley, C. (2011). Percentile norms and accompanying interval estimates from an Australian general adult population sample for self-report mood scales (BAI, BDI, CRSD, CES-D, DASS, DASS-21, STAI-X, STAI-Y, SRDS, and SRAS). *Australian Psychologist*, *46*(1), 3-14. https://doi.org/10.1111/j.1742-9544.2010.00003.x

Cutrona, C. E., & Russell, D. W. (1987). The provisions of social relationships and adaptation to stress. In W. H. Jones & D. Perlman (Eds.), *Advances in personal relationships* (Vol. 1, pp. 37-67). Greenwich, CT: JAI Press.

Czernatowicz-Kukuczka, A., Jaśko, K., & Kossowska, M. (2014). Need for closure and dealing with uncertainty in decision making context: The role of the behavioral inhibition system and working memory capacity. *Personality and Individual Differences*, *70*, 126-130. https://doi.org/10.1016/j.paid.2014.06.013

Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology, 10*, 85.

Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44, 113– 126. https://doi.org/10.1037/0022-3514.44.1.113

De Dreu, C. K. (2003). Time pressure and closing of the mind in negotiation. *Organizational Behavior and Human Decision Processes*, *91*(2), 280-295. https://doi.org/10.1016/S0749-5978(03)00022-0

De Dreu, C. K., Koole, S. L., & Oldersma, F. L. (1999). On the seizing and freezing of negotiator inferences: Need for cognitive closure moderates the use of heuristics in negotiation. *Personality and Social Psychology Bulletin*, *25*(3), 348-362. https://doi.org/10.1177/0146167299025003007

Deniz, M. E. (2006). The Relationships among Coping with Stress, Life Satisfaction, Decision-Making Styles and Decision Self-Esteem: An Investigation with Turkish University Students. *Social Behavior & Personality: An International Journal*, 34(9), 1161–1170. https://doi.org/10.2224/sbp.2006.34.9.1161

Derogatis, L. R. (1977). SCL-90: *Administration, Scoring and Procedures Manual-I for the R(evised) Version*. Baltimore: Johns Hopkins University School of Medicine, Clinical Psychometrics Research Unit.

Dewberry, C., Juanchich, M., & Narendran, S. (2013). Decision-making competence in everyday life: The roles of general cognitive styles, decision-making styles and personality. *Personality and Individual Differences*, *55*(7), 783-788. https://doi.org/10.1016/j.paid.2013.06.012

Dhont, K., Roets, A., & Van Hiel, A. (2013). The intergenerational transmission of need for closure underlies the transmission of authoritarianism and anti-immigrant prejudice. *Personality and Individual Differences*, *54*(6), 779-784. https://doi.org/10.1016/j.paid.2012.12.016

Diedenhofen, B., & Musch, J. (2015). cocor: A comprehensive solution for the statistical comparison of correlations. PLoS ONE, 10(4): e0121945. doi: 10.1371/journal/pone.0121945. https://doi.org/10.1371/journal.pone.0121945

Diener, E., Emmons, R., Larsen, J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment, 49*(1), 71-75. https://doi.org/10.1207/s15327752jpa4901_13

Drabant, E. M., Ramel, W., Edge, M. D., Hyde, L. W., Kuo, J. R., Goldin, P. R., ... & Gross, J. J. (2012). Neural mechanisms underlying 5-HTTLPR-related sensitivity to acute stress. *American Journal of Psychiatry*, *169*(4), 397-405. https://doi.org/10.1176/appi.ajp.2011.10111699

Elliot, A. J., Gable, S. L., & Mapes, R. R. (2006). Approach and avoidance motivation in the social domain. *Personality and Social Psychology Bulletin*, *32*(3), 378-391. https://doi.org/10.1177/0146167205282153

Epley, N., Keysar, B., Van Boven, L., & Gilovich, T. (2004). Perspective taking as egocentric anchoring and adjustment. *Journal of Personality and Social Psychology*, *87*(3), 327-339. https://doi.org/10.1037/0022-3514.87.3.327

Evans, N. J., Rae, B., Bushmakin, M., Rubin, M., & Brown, S. D. (2017). Need for closure is associated with urgency in perceptual decision-making. Memory & Cognition, 45(7), 1193-1205. https://doi.org/10.3758/s13421-017-0718-z

Feeney, B. C., & Kirkpatrick, L. A. (1996). Effects of adult attachment and presence of romantic partners on physiological responses to stress. *Journal of Personality and Social Psychology*, *70*(2), 255-270. https://doi.org/10.1037/0022-3514.70.2.255

Feeney, J. A., & Noller, P. (1990). Attachment style as a predictor of adult romantic relationships. *Journal of Personality and Social Psychology*, *58*(2), 281-291. https://doi.org/10.1037/0022-3514.58.2.281

Fitzsimons, G. J. (2008). Death to Dichotomizing. *Journal of Consumer Research, 35*(1), 508. https://doi.org/10.1086/589561

Fleming, S. (2019, Jan 14). *This is the world's biggest mental health problem – and you might not have heard of it.* Retrieved from https://www.weforum.org/agenda/2019/01/this-is-the-worlds-biggest-mental-health-problem/

Fraley, R. C., Hudson, N. W., Heffernan, M. E., & Segal, N. (2015). Are adult attachment styles categorical or dimensional? A taxometric analysis of general and relationship-specific attachment orientations. *Journal of Personality and Social Psychology*, *109*(2), 354-368. https://doi.org/10.1037/pspp0000027

Freeman, D., & Garety, P. A. (1999). Worry, worry processes and dimensions of delusions: an exploratory investigation of a role for anxiety processes in the maintenance of delusional distress. *Behavioural and Cognitive Psychotherapy*, *27*(1), 47-62. https://doi.org/10.1017/S135246589927107X

Freeman, D., Garety, P. A., Bebbington, P., Slater, M., Kuipers, E., Fowler, D., ... & Dunn, G. (2005). The psychology of persecutory ideation II: a virtual reality experimental study. *The Journal of Nervous and Mental Disease*, *193*(5), 309-315. https://doi.org/10.1097/01.nmd.0000161686.53245.70

Freeman, D., Garety, P., Kuipers, E., Colbert, S., Jolley, S., Fowler, D., ... & Bebbington, P. (2006). Delusions and decision-making style: use of the Need for Closure Scale. *Behaviour research and therapy*, *44*(8), 1147-1158. https://doi.org/10.1016/j.brat.2005.09.002

Freeman, D., Garety, P. A., Kuipers, E., Fowler, D., & Bebbington, P. E. (2002). A cognitive model of persecutory delusions. *British Journal of Clinical Psychology*, *41*(4), 331-347. https://doi.org/10.1348/014466502760387461

Freeman, P., & Rees, T. (2010). Perceived social support from team-mates: Direct and stress-buffering effects on self-confidence. *European Journal of Sport Science*, *10*(1), 59-67. https://doi.org/10.1080/17461390903049998

Gable, S. L. (2006). Approach and avoidance social motives and goals. *Journal of Personality*, *74*(1), 175-222. https://doi.org/10.1111/j.1467-6494.2005.00373.x

Gable, S. L., Reis, H. T., & Elliot, A. J. (2000). Behavioral activation and inhibition in everyday life. *Journal of Personality and Social Psychology*, 78, 1135–1149. https://doi.org/10.1037/0022-3514.78.6.1135

Gaudiano, B. A., Young, D., Chelminski, I., & Zimmerman, M. (2008). Depressive symptom profiles and severity patterns in outpatients with psychotic vs nonpsychotic major depression. *Comprehensive psychiatry*, *49*(5), 421-429. https://doi.org/10.1016/j.comppsych.2008.02.007.

Garety, P. (1991). Reasoning and Delusions. *British Journal of Psychiatry, 159*(S14), 14-18. https://doi.org/10.1192/S0007125000296426

Gatt, J. M., Burton, K. L., Schofield, P. R., Bryant, R. A., & Williams, L. M. (2014). The heritability of mental health and wellbeing defined using COMPAS-W, a new composite measure of wellbeing. *Psychiatry Research*, *219*(1), 204-213. https://doi.org/10.1016/j.psychres.2014.04.033

Germeijs, V., & Verschueren, K. (2011). Indecisiveness: Specificity and predictive validity. *European Journal of Personality, 25*(5), 295–305. https://doi.org//10.1002/per.786

Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science, 293*, 2105-2108. https://doi.org/10.1126/science.1062872

Hayes, A. F. (2013). *Methodology in the social sciences. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach.* Guilford Press.

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd ed.). New York; Guilford Press.

Haynes, G. A. (2009). Testing the boundaries of the choice overload phenomenon: The effect of number of options and time pressure on decision difficulty and satisfaction. *Psychology and Marketing, 26*(3), 204-212. https://doi.org/10.1002/mar.20269

Heaton, A. W., & Kruglanski, A. W. (1991). Person perception by introverts and extraverts under time pressure: Effects of need for closure. *Personality and Social Psychology Bulletin*, *17*(2), 161-165. https://doi.org/10.1177/014616729101700207

Heinz, A., Smolka, M. N., Braus, D. F., Wrase, J., Beck, A., Flor, H., ... & Weinberger, D. R. (2007). Serotonin transporter genotype (5-HTTLPR): effects of neutral and undefined conditions on amygdala activation. *Biological Psychiatry*, *61*(8), 1011-1014. https://doi.org/10.1016/j.biopsych.2006.08.019

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science*, *241*(4865), 540-545. https://doi.org/10.1126/science.3399889

Inbar, Y., Botti, S., & Hanko, K. (2011). Decision speed and choice regret: When haste feels like waste. *Journal of Experimental Social Psychology*, *47*(3), 533-540. https://doi.org/10.1016/j.jesp.2011.01.011

Irwin, J. R., & McClelland, G. H. (2003). Negative consequences of dichotomizing continuous predictor variables. *Journal of Marketing Research*, *40*(3), 366-371. https://doi.org/10.1509/jmkr.40.3.366.19237

Iyer, A., Jetten, J., Tsivrikos, D., Postmes, T., & Haslam, S. A. (2009). The more (and the more compatible) the merrier: Multiple group memberships and identity compatibility as predictors of adjustment after life transitions. *British Journal of Social Psychology*, *48*(4), 707-733. https://doi.org/10.1348/014466608X397628

Janis, I. L., & Mann, L. (1977). *Decision making: A psychological analysis of conflict, choice, and commitment*. Free Press.

Jaśko, K., Czernatowicz-Kukuczka, A., Kossowska, M., & Czarna, A. Z. (2015). Individual differences in response to uncertainty and decision making: The role of behavioral inhibition system and need for closure. *Motivation and Emotion*, *39*(4), 541-552. https://doi.org/10.1007/s11031-015-9478-x

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five Inventory--Versions 4a and 54*. Berkeley, CA: University of California, Berkeley, Institute of Personality and Social Research. https://doi.org/10.1037/t07550-000

Kahneman, D., & Tversky, A. (1982). Variants of uncertainty. *Cognition*, *11*(2), 143-157. https://doi.org/10.1016/0010-0277(82)90023-3

Kenny, D. A., & Judd, C. M. (2014). Power anomalies in testing mediation. *Psychological Science, 25*, 334-339. https://doi.org/10.1177/0956797613502676

Kessler, R. C., & McLeod, J. D. (1985). Social support and mental health in community samples. In S. Cohen & S. L. Syme (Eds.), *Social Support and Health* (pp. 219-240). San Diego, CA, US: Academic Press.

Keyes, C. L. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, *73*(3), 539-548. https://doi.org/10.1037/0022-006X.73.3.539

Klein, C. T., & Webster, D. M. (2000). Individual differences in argument scrutiny as motivated by need for cognitive closure. *Basic and Applied Social Psychology*, *22*(2), 119-129. https://doi.org/10.1207/S15324834BASP2202_5

Kobak, R. R., & Sceery, A. (1988). Attachment in late adolescence: Working models, affect regulation, and representations of self and others. *Child Development*, *59*, 135-146. https://doi.org/10.2307/1130395

Kocovski, N. L., Endler, N. S., Rector, N. A., & Flett, G. L. (2005). Ruminative coping and post-event processing in social anxiety. *Behaviour Research and Therapy, 42*, 971-984. https://doi.org/10.1016/j.brat.2004.06.015

Kossowska, M., & Bar-Tal, Y. (2013). Need for closure and heuristic information processing: The moderating role of the ability to achieve the need for closure. *British Journal of Psychology*, *104*(4), 457-480. https://doi.org/10.1111/bjop.12001

Kossowska, M., Dragon, P., & Bukowski, M. (2015). When need for closure leads to positive attitudes towards a negatively stereotyped outgroup. *Motivation and Emotion*, *39*(1), 88-98. https://doi.org/10.1007/s11031-014-9414-5

Kossowska, M., Szumowska, E., Dragon, P., Jaśko, K., & Kruglanski, A. W. (2018). Disparate roads to certainty processing strategy choices under need for closure. *European Review of Social Psychology*, *29*(1), 161-211. https://doi.org/10.1080/10463283.2018.1493066

Kraines, M. A., Krug, C. P., & Wells, T. T. (2017). Decision justification theory in depression: regret and self-blame. *Cognitive Therapy and Research*, *41*(4), 556-561. https://doi.org/10.1007/s10608-017-9836-y

Kruglanski, A. W. (1990a). Lay epistemic theory in social-cognitive psychology. *Psychological Inquiry, 1*(3), 181-197. https://doi.org/10.1207/s15327965pli0103_1

Kruglanski, A. W. (1990b). Motivations for judging and knowing: Implications for causal attribution. In E. T. Higgins & R. M. Sorrentino (Eds.), *The handbook of motivation and cognition: Foundation of Social Behavior* (Vol. 2, pp. 333-368). New York: Guilford Press

Kruglanski, A. W., & Freund, T. (1983). The freezing and unfreezing of lay-inferences: Effects on impressional primacy, ethnic stereotyping, and numerical anchoring. *Journal of Experimental Social Psychology*, *19*(5), 448-468. https://doi.org/10.1016/0022-1031(83)90022-7

Kruglanski, A. W., & Mayseless, O. (1988). Contextual effects in hypothesis testing: The role of competing alternatives and epistemic motivations. *Social Cognition*, *6*(1), 1-20. https://doi.org/10.1521/soco.1988.6.1.1

Kruglanski, A. W., Peri, N., & Zakai, D. (1991). Interactive effects of need for closure and initial confidence on social information seeking. *Social Cognition*, *9*(2), 127-148. https://doi.org/10.1521/soco.1991.9.2.127

Kruglanski, A. W., & Webster, D. M. (1996). Motivated closing of the mind: “seizing” and “freezing.” *Psychological Review, 103*(2), 263-283. https://doi.org/10.1037/0033-295X.103.2.263

Kruglanski, A. W., Webster, D. M., & Klem, A. (1993). Motivated resistance and openness to persuasion in the presence or absence of prior information. *Journal of Personality and Social Psychology*, *65*(5), 861-876. https://doi.org/10.1037/0022-3514.65.5.861

Landman, J. (1987). Regret and elation following action and inaction: Affective responses to positive versus negative outcomes. *Personality and Social Psychology Bulletin*, *13*(4), 524-536. https://doi.org/10.1177/0146167287134009

Lawrence, A. A. (2003). Factors associated with satisfaction or regret following male-to-female sex reassignment surgery. *Archives of Sexual Behavior*, *32*(4), 299-315. https://doi.org/10.1023/A:1024086814364

Lee, S. H., & Cotte, J. (2009). Post-purchase consumer regret: Conceptualization and development of the PPCR scale. ACR North American Advances, 36, 456-462.

Lemmer, G., & Gollwitzer, M. (2017). The “true” indirect effect won't (always) stand up: When and why reverse mediation testing fails. *Journal of Experimental Social Psychology*, *69*, 144-149. https://doi.org/10.1016/j.jesp.2016.05.002

Leykin, Y., Roberts, C. S., & DeRubeis, R. J. (2011). Decision-making and depressive symptomatology. *Cognitive Therapy and Research*, *35*(4), 333-341. https://doi.org/10.1007/s10608-010-9308-0

Livi, S., Kruglanski, A. W., Pierro, A., Mannetti, L., & Kenny, D. A. (2015). Epistemic motivation and perpetuation of group culture: Effects of need for cognitive closure on trans-generational norm transmission. *Organizational Behavior and Human Decision Processes*, *129*, 105-112. https://doi.org/10.1016/j.obhdp.2014.09.010

Love, K. M., & Murdock, T. B. (2004). Attachment to parents and psychological well-being: an examination of young adult college students in intact families and stepfamilies. *Journal of Family Psychology*, *18*(4), 600-608. https://doi.org/10.1037/0893-3200.18.4.600

Lovibond, S. H., & Lovibond, P. F. (2004). Manual for the Depression Anxiety and Stress Scales. Psychology Foundation Monograph, Sydney Australia.

MacKinnon, D. P., & Fairchild, A. J. (2009). Current directions in mediation analysis. *Current Directions in Psychological Science, 18,* 16-20. doi: 10.1111/j.1467-8721.2009.01598.x

MacKinnon, D. P., Fairchild, A. J., Fritz, M. S. (2007). Mediation Analysis. *Annual Review of Psychology, 58,* 593-614.

Majer, J. M., Beasley, C., & Jason, L. A. (2017). Suicide attempts and personal need for structure among ex-offenders. *International Journal of Offender Therapy and Comparative Criminology*, *61*(3), 334-346. https://doi.org/10.1177/0306624X15595981

Mancini, F., D'Olimpio, F., Del Genio, M., Didonna, F., & Prunetti, E. (2002). Obsessions and compulsions and intolerance for uncertainty in a non-clinical sample. *Journal of Anxiety Disorders*, *16*(4), 401-411. https://doi.org/10.1016/S0887-6185(02)00133-0

Mann, L., Burnett, P., Radford, M., & Ford, S. (1997). The Melbourne Decision Making Questionnaire: An instrument for measuring patterns for coping with decisional conflict. *Journal of Behavioral Decision Making*, *10*(1), 1-19. https://doi.org/10.1002/(SICI)1099-0771(199703)10:1%3C1::AID-BDM242%3E3.0.CO;2-X

Marazziti, D., Consoli, G., Picchetti, M., Carlini, M., & Faravelli, L. (2010). Cognitive impairment in major depression. *European Journal of Pharmacology*, *626*(1), 83-86. https://doi.org/10.1016/j.ejphar.2009.08.046

Markus, H. R., & Schwartz, B. (2010). Does choice mean freedom and well-being? *Journal of Consumer Research*, *37*(2), 344-355.

Maunder, R. G., & Hunter, J. J. (2001). Attachment and psychosomatic medicine: developmental contributions to stress and disease. *Psychosomatic Medicine*, *63*(4), 556-567. https://doi.org/10.1097/00006842-200107000-00006

Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological methods*, *12*(1), 23-44. https://doi.org/10.1037/1082-989X.12.1.23

Maxwell, S. E., Cole, D. A., & Mitchell, M. A. (2011). Bias in cross-sectional analyses of longitudinal mediation: Partial and complete mediation under an autoregressive model. *Multivariate Behavioral Research, 46*, 816–841. https://doi.org/10.1080/00273171.2011.606716

Maxwell, S.E. & Delaney, H.D. (1993). Bivariate Median Splits and Spurious Statistical Significance. *Psychological Bulletin*, *113*, 181–90. https://doi.org/10.1037/0033-2909.113.1.181

Mayseless, O., & Kruglanski, A. W. (1987). What makes you so sure? Effects of epistemic motivations on judgmental confidence. *Organizational Behavior and Human Decision Processes*, *39*(2), 162-183. https://doi.org/10.1016/0749-5978(87)90036-7

McKay, R., Langdon, R., & Coltheart, M. (2006). Need for closure, jumping to conclusions, and decisiveness in delusion-prone individuals. *The Journal of Nervous and Mental Disease*, *194*(6), 422-426. https://doi.org/10.1097/01.nmd.0000221353.44132.25

Meyers, S. A., & Landsberger, S. A. (2002). Direct and indirect pathways between adult attachment style and marital satisfaction. *Personal Relationships*, *9*(2), 159-172. https://doi.org/10.1111/1475-6811.00010

Mikulincer, M. (1997). Adult attachment style and information processing: Individual differences in curiosity and cognitive closure. *Journal of Personality and Social Psychology, 72*(5), 1217–1230. https://doi.org/10.1037/0022-3514.72.5.1217

Milgram, N., & Tenne, R. (2000). Personality correlates of decisional and task avoidant procrastination. *European Journal of Personality*, *14*(2), 141-156. https://doi.org/10.1002/(SICI)1099-0984(200003/04)14:2%3C141::AID-PER369%3E3.0.CO;2-V

National Health and Medical Research Council (Australia). (2007). *National statement on ethical conduct in human research*. Retrieved from https://www.nhmrc.gov.au/about-us/publications/national-statement-ethical-conduct-human-research-2007-updated-2018#block-views-block-file-attachments-content-block-1

Neuberg, S. L., & Newsom, J. T. (1993). Personal need for structure: Individual differences in the desire for simpler structure. *Journal of Personality and Social Psychology*, *65*(1), 113-131. https://doi.org/10.1037/0022-3514.65.1.113

Nikitin, J., & Freund, A. M. (2008). The role of social approach and avoidance motives for subjective well-being and the successful transition to adulthood. *Applied Psychology*, *57*, 90-111. https://doi.org/10.1111/j.1464-0597.2008.00356.x

Nolan, K. A., Bilder, R. M., Lachman, H. M., & Volavka, J. (2004). Catechol O-methyltransferase Val[158]Met polymorphism in schizophrenia: differential effects of Val and Met alleles on cognitive stability and flexibility. *American Journal of Psychiatry*, *161*(2), 359-361. https://doi.org/10.1176/appi.ajp.161.2.359

Olstad, R., Sexton, H., & Søgaard, A. J. (2001). The Finnmark Study. A prospective population study of the social support buffer hypothesis, specific stressors and mental distress. *Social Psychiatry and Psychiatric Epidemiology, 36*(12), 582-589. https://doi.org/10.1007/s127-001-8197-0

Pek, J., & Flora, D. B. (2017). Reporting Effect Sizes in Original Psychological Research: A Discussion and Tutorial. *Psychological Methods*. https://doi.org/10.1037/met0000126

Peters, E. R., Joseph, S. A., & Garety, P. A. (1999). Measurement of delusional ideation in the normal population: introducing the PDI (Peters et al. Delusions Inventory). *Schizophrenia Bulletin*, *25*(3), 553-576. https://doi.org/10.1093/oxfordjournals.schbul.a033401

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*(4), 717-731. https://doi.org/10.3758/BF03206553

Preacher, K. J., & Kelley, K. (2011). Effect size measures for mediation models: quantitative strategies for communicating indirect effects. *Psychological Methods*, 16(2), 93-115. https://doi.org/10.1037/a0022658

Prokopcáková, A. (2015). Personal need for structure, anxiety, self-efficacy and optimism. *Studia Psychologica*, *57*(2), 147-162. https://doi.org/10.21909/sp.2015.02.690

Pyszczynski, T., Greenberg, J., Solomon, S., Arndt, J., & Schimel, J. (2004). Why Do People Need Self-Esteem? A Theoretical and Empirical Review. *Psychological Bulletin, 130*(3), 435–468. https://doi.org/10.1037/0033-2909.130.3.435

Rassin, E., & Muris, P. (2005). Indecisiveness and the interpretation of ambiguous situations. *Personality and Individual differences*, *39*(7), 1285-1291. https://doi.org/10.1016/j.paid.2005.06.006

Ree, M. J., French, D., MacLeod, C., & Locke, V. (2008). Distinguishing cognitive and somatic dimensions of state and trait anxiety: Development and validation of the State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA). *Behavioural and Cognitive Psychotherapy*, *36*(3), 313-332. https://doi.org/10.1017/S1352465808004232

Rees, T., & Freeman, P. (2007). The effects of perceived and received support on self-confidence. *Journal of Sports Sciences*, *25*(9), 1057-1065.

Richter, L., & Kruglanski, A. W. (1998). Seizing on the latest: Motivationally driven recency effects in impression formation. *Journal of Experimental Social Psychology*, *34*(4), 313-329. https://doi.org/10.1006/jesp.1998.1354

Richter, L., & Kruglanski, A. W. (1999). Motivated search for common ground: Need for closure effects on audience design in interpersonal communication. *Personality and Social Psychology Bulletin*, *25*(9), 1101-1114. https://doi.org/10.1177/01461672992512004

Roese, N. J. (1997). Counterfactual thinking. Psychological Bulletin, 121(1), 133-148. https://doi.org/10.1037/0033-2909.121.1.133

Roese, N. J., Epstude, K. A. I., Fessel, F., Morrison, M., Smallman, R., Summerville, A., ... & Segerstrom, S. (2009). Repetitive regret, depression, and anxiety: Findings from a

nationally representative survey. *Journal of Social and Clinical Psychology*, *28*(6), 671-688. https://doi.org/10.1521/jscp.2009.28.6.671

Roets, A., & Hiel, A. V. (2008). Why some hate to dilly-dally and others do not: The arousal-invoking capacity of decision-making for low-and high-scoring need for closure individuals. *Social Cognition*, *26*(3), 333-346. https://doi.org/10.1521/soco.2008.26.3.333

Roets, A., Kruglanski, A. W., Kossowska, M., Pierro, A., & Hong, Y. Y. (2015). The motivated gatekeeper of our minds: New directions in need for closure theory and research. In *Advances in Experimental Social Psychology* (Vol. 52, pp. 221-283). Academic Press. https://doi.org/10.1016/bs.aesp.2015.01.001

Roets, A., & Soetens, B. (2010). Need and ability to achieve closure: Relationships with symptoms of psychopathology. *Personality and Individual Differences*, *48*(2), 155-160. https://doi.org/10.1016/j.paid.2009.09.013

Roets, A., & Van Hiel, A. (2007). Separating ability from need: Clarifying the dimensional structure of the need for closure scale. *Personality and Social Psychology Bulletin*, *33*(2), 266-280. https://doi.org/10.1177/0146167206294744

Roets, A., & Van Hiel, A. (2011a). Allport's prejudiced personality today: Need for closure as the motivated cognitive basis of prejudice. *Current Directions in Psychological Science*, *20*(6), 349-354. https://doi.org/10.1177/0963721411424894

Roets, A., & Van Hiel, A. (2011b). Item selection and validation of a brief, 15-item version of the Need for Closure Scale. Personality and Individual Differences, 50(1), 90-94. https://doi.org/10.1016/j.paid.2010.09.004

Roets, A., & Van Hiel, A. (2011c). The role of need for closure in essentialist entitativity beliefs and prejudice: An epistemic needs approach to racial categorization. *British Journal of Social Psychology*, *50*(1), 52-73. https://doi.org/10.1348/014466610X491567

Rubin, M. (2015). *Outline for Honours Research Project - 2016.* Unpublished manuscript, University of Newcastle, Australia.

Rubin, M. (2016). The Perceived Awareness of the Research Hypothesis Scale: Assessing the influence of demand characteristics. Figshare. doi:10.6084/m9.figshare.4315778A

Rubin, M., Evans, O., & Wilkinson, R. B. (2016). A longitudinal study of the relations among university students' subjective social status, social contact with university friends, and mental health and well-being. *Journal of Social and Clinical Psychology*, *35*(9), 722-737. https://doi.org/10.1521/jscp.2016.35.9.722

Rubin, M., Watt, S. E., & Ramelli, M. (2012). Immigrants' social integration as a function of approach–avoidance orientation and problem-solving style. *International Journal of Intercultural Relations, 36*(4), 498-505. https://doi.org/10.1016/j.ijintrel.2011.12.009

Rubini, M., & Kruglanski, A. W. (1997). Brief encounters ending in estrangement: Motivated language use and interpersonal rapport in the question–answer paradigm. *Journal of Personality and Social Psychology, 72*(5), 1047–1060. https://doi.org/10.1037/0022-3514.72.5.1047

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, *52*(1), 141-166. https://doi.org/10.1146/annurev.psych.52.1.141

Salk, R. H., Hyde, J. S., & Abramson, L. Y. (2017). Gender differences in depression in representative national samples: Meta-analyses of diagnoses and symptoms. *Psychological Bulletin*, 143(8), 783-822. https://doi.org/10.1037/bul0000102

Santos, P. J. (2001). Predictors of Generalized Indecision Among Portuguese Secondary School Students. *Journal of Career Assessment, 9*(4), 381–396. https://doi.org/10.1177/106907270100900405

Saroglou, V., Kempeneers, A., & Seynhaeve, I. (2003). Need for closure and adult attachment dimensions as predictors of religion and reading interests. *One hundred years of psychology and religion*, 139-154.

Schoemann, A. M., Boulton, A. J., & Short, S. D. (2017). Determining power and sample size for simple and complex mediation models. *Social Psychological and Personality Science, 8,* 379-386. https://doi.org/10.1177/1948550617715068

Schwartz, B. (2000). Self-determination: The tyranny of freedom. *American Psychologist*, 55, 79–88. https://doi.org/10.1037/0003-066X.55.1.79

Schwartz, B., Ward, A., Monterosso, J., Lyubomirsky, S., White, K., & Lehman, D. R. (2002). Maximizing versus satisficing: Happiness is a matter of choice. *Journal of Personality and Social Psychology*, *83*(5), 1178-1197. https://doi.org/10.1037/0022-3514.83.5.1178

Schwarzer, R., & Jerusalem, M. (1995). Generalised Self-efficacy scale. In J. Weinman, S. Wright, & M. Johnston*, Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35-37). Windsor, UK: NFER-NELSON.

Selig, J. P., & Preacher, K. J. (2009). Mediation models for longitudinal data in developmental research. *Research in Human Development*, *6*(2-3), 144-164. https://doi.org/10.1080/15427600902911247

Shah, J. Y., Kruglanski, A. W., & Thompson, E. P. (1998). Membership has its (epistemic) rewards: need for closure effects on in-group bias. *Journal of Personality and Social Psychology*, *75*(2), 383-393. https://doi.org/10.1037/0022-3514.75.2.383

Shaver, P. R., & Brennan, K. A. (1992). Attachment styles and the" Big Five" personality traits: Their connections with each other and with romantic relationship outcomes. *Personality and Social Psychology Bulletin*, *18*(5), 536-545. https://doi.org/10.1177/0146167292185003

Simpson, J. A., Rholes, W. S., & Phillips, D. (1996). Conflict in close relationships: An attachment perspective. *Journal of Personality and Social Psychology*, *71*(5), 899-914. https://doi.org/10.1037/0022-3514.71.5.899

Slade, M. (2010). Mental illness and well-being: the central importance of positive psychology and recovery approaches. *BMC Health Services Research*, *10*(1), 26. https://doi.org/10.1186/1472-6963-10-26

Snibbe, A. C., & Markus, H. R. (2005). You Can't Always Get What You Want: Educational Attainment, Agency, and Choice. *Journal of Personality and Social Psychology, 88*(4), 703–720. https://doi.org/10.1037/0022-3514.88.4.703

Sollár, T., & Vanečková, J. (2012). Need for closure, ability to achieve closure and monitoring-blunting cognitive coping style. *Studia Psychologica, 54*(2), 137-142.

Stallman, H. M. (2010). Psychological distress in university students: A comparison with general population data. *Australian Psychologist*, 45(4), 249-257. https://doi.org/10.1080/00050067.2010.482109

Sun, S., Zuo, B., Wu, Y., & Wen, F. (2016). Does perspective taking increase or decrease stereotyping? The role of need for cognitive closure. *Personality and Individual Differences*, *94*, 21-25. https://doi.org/10.1016/j.paid.2016.01.001

Taris, T. W., & Kompier, M. (2003). Challenges in longitudinal designs in occupational health psychology. *Scandinavian Journal of Work, Environment & Health*, *29*(1), 1-4. https://doi.org/10.5271/sjweh.697

Terrill, A. L., Gjerde, J. M., & Garofalo, J. P. (2015). Background stress inventory: Developing a measure of understudied stress. *Stress and Health*, *31*(4), 290-298. https://doi.org/10.1002/smi.2554

Thoemmes, F. (2015). Reversing arrows in mediation models does not distinguish plausible models. *Basic and Applied Social Psychology*, *37*(4), 226-234. https://doi.org/10.1080/01973533.2015.1049351

Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *Journal of Health and Social Behavior*, *52*(2), 145-161. https://doi.org/10.1177/0022146510395592

Thompson, M. M., Naccarato, M. E., Parker, K. C., & Moskowitz, G. B. (2013). The personal need for structure and personal fear of invalidity measures: Historical perspectives, current applications, and future directions. In G. B. Moskowitz (Ed.), *Cognitive Social Psychology* (pp. 25-45). Psychology Press.

Topper, M., Emmelkamp, P. M., Watkins, E., & Ehring, T. (2017). Prevention of anxiety disorders and depression by targeting excessive worry and rumination in adolescents and young adults: a randomized controlled trial. *Behaviour Research and Therapy*, *90*, 123-136. https://doi.org/10.1016/j.brat.2016.12.015

Torges, C. M., Stewart, A. J., & Nolen-Hoeksema, S. (2008). Regret resolution, aging, and adapting to loss. *Psychology and Aging, 23*(1), 169-180. https://doi.org/10.1037/0882-7974.23.1.169

Van Hiel, A., & Mervielde, I. (2002). Effects of ambiguity and need for closure on the acquisition of information. *Social Cognition*, *20*(5), 380-408. https://doi.org/10.1521/soco.20.5.380.21124

Van Hiel, A., Pandelaere, M., & Duriez, B. (2004). The impact of need for closure on conservative beliefs and racism: Differential mediation by authoritarian submission and authoritarian dominance. *Personality and Social Psychology Bulletin*, *30*(7), 824-837. https://doi.org/10.1177/0146167204264333

Van Laethem, S., Mestdagh, S., & Vanderheyden, K. (2003). *Personality correlates of the Melbourne conflict decision-making styles: Contribution of need for cognition and need for closure.* Paper presented at the 16th Annual Conference of the International Association for Conflict Management (IACM), Melbourne, Australia. Retrieved from https://doi.org/10.2139/ssrn.399580

Vermeir, I., & Van Kenhove, P. (2005). The influence of need for closure and perceived time pressure on search effort for price and promotional information in a grocery shopping context. *Psychology & Marketing*, *22*(1), 71-95. https://doi.org/10.1002/mar.20047

Vermeir, I., Van Kenhove, P., & Hendrickx, H. (2002). The influence of need for closure on consumer's choice behaviour. *Journal of Economic Psychology*, *23*(6), 703-727. https://doi.org/10.1016/S0167-4870(02)00135-6

Ware, J. E. (1976). Scales for measuring general health perceptions. *Health Services Research*, *11*(4), 396-415.

Watkins, M. W. (2000). *Monte carlo PCA for parallel analysis [computer software].* State College, PA: Ed & Psych Associates.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063

Webster, D. M., & Kruglanski, A. W. (1994). Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology, 67*(6), 1049-1062. https://doi.org/10.1037/0022-3514.67.6.1049

Webster Nelson, D., Klein, C. T., & Irvin, J. E. (2003). Motivational antecedents of empathy: Inhibiting effects of fatigue. *Basic and Applied Social Psychology*, *25*(1), 37-50. https://doi.org/10.1207/S15324834BASP2501_3

Weintraub, K. (2018, May). Blue or white dress? Why we see colours differently. *National Geographic*. Retrieved from https://www.nationalgeographic.com.au/science/blue-or-white-dress-why-we-see-colours-differently.aspx

Whiteford, H. A., Degenhardt, L., Rehm, J., Baxter, A. J., Ferrari, A. J., Erskine, H. E., ... & Burstein, R. (2013). Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *The Lancet*, *382*(9904), 1575-1586. https://doi.org/10.1016/S0140-6736(13)61611-6

Wolfe, J. B., & Betz, N. E. (2004). The relationship of attachment variables to career decision-making self-efficacy and fear of commitment. *The Career Development Quarterly*, *52*(4), 363-369. https://doi.org/10.1002/j.2161-0045.2004.tb00952.x

World Health Organization. (2001). *Mental disorders affect one in four people*. Retrieved from https://www.who.int/whr/2001/media_centre/press_release/en/

World Health Organization. (2018, March 22). *Depression*. Retrieved from https://www.who.int/news-room/fact-sheets/detail/depression

Yzerbyt, V. Y., Muller, D., Batailler, C., & Judd, C. M. (2018). New recommendations for testing indirect effects in mediational models: the need to report and test component paths. *Journal of Personality and Social Psychology, 115(6),* 929-943. https://doi.org/10.1037/pspa0000132

Zou, G. Y. (2007). Toward using confidence intervals to compare correlations. *Psychological methods*, *12*(4), 399-413. https://doi.org/10.1037/1082-989X.12.4.399

APPENDIX A

STUDY 1: EXPERIMENTAL RESULTS AND NONSIGNIFICANT MEDIATORS

As outlined in Chapter 3, I considered whether decision-making context moderates the relations between the need/ability to achieve closure and state anxiety. In the present study, participants chose their preferred activity from a list of either three or nine activities and were instructed either to decide quickly or to think carefully. I then measured their state anxiety. I hypothesised that the relations between state anxiety and the need and the ability to achieve closure would be stronger when participants had to choose quickly or from many options. The methodology is described in more detail in Chapter 3.

In addition to the results of the experimental aspect of the study, this Appendix also includes the statistics relating to nonsignificant mediators of the relations between the need/ability to achieve closure and mental health.

Results

Effects of Experimental Manipulations on State Anxiety

Study 1 involved two experimental manipulations: decision time (fast/slow) and choice overload (high/low). I expected that participants would experience more state anxiety if they were in the fast decision time and/or the high choice overload conditions as opposed to the slow decision time and/or low choice overload conditions. I also expected that the effects of the suboptimal experimental conditions (i.e., high choice overload and/or fast decision time) would be most pronounced for participants who were high in the need for closure and/or low in the ability to achieve cognitive structure.

I conducted two-way ANOVAs to examine the main effect of each experimental manipulation and their interaction on state anxiety. There was no main effect of choice overload

condition on overall state anxiety (p = .526). However, there was a significant main effect of decision time on overall state anxiety, $F(1, 316) = 11.61$, $p = .001$, such that participants in the slow decision time condition reported less state anxiety ($M = 2.94$, $SE = 0.09$) than participants in the fast decision time condition ($M = 3.37$, $SE = 0.09$). There was no interaction between decision time and choice overload to predict overall state anxiety ($p = .230$).

Therefore, it appears the choice overload manipulation did not have the expected effect, since there was no main effect of choice overload condition on state anxiety. However, the decision time manipulation did have the expected effects on state anxiety. People in the fast decision time condition reported significantly more state anxiety.

Interactions Between Experimental Conditions and Trait Measures on State Anxiety

I investigated the interactions between the experimental variables and the trait variables (i.e., the ability to achieve closure and the need for closure) on state anxiety using PROCESS Model 3. It is important to note that the effects reported from PROCESS Model 3 are conditional effects. That is, the effects of one variable are conditional effects when the other variables are set at zero (i.e., at the mean when the other variables are mean centred or, when the other variables are dichotomous, averaged across groups). Similarly, two-way effects obtained through PROCESS Model 3 are conditional effects when the third variable is set at zero. Where there is no three-way interaction, the two-way interaction effects at the mean of the third variable are representative of the two-way interaction effects across the whole sample. The interactions between decision time, choice overload, and the need for closure were analysed separately from the interactions between decision time, choice overload, and ability to achieve closure. All variables were mean centered prior to the computation of interaction terms for these analyses.

Interactions between need for closure, choice overload condition, and decision time condition on state anxiety. I conducted a moderation analysis using PROCESS Model 3 to investigate the conditional effects and interactions between the experimental manipulations (choice overload and decision time) and need for closure. The pattern of conditional effects and conditional two-way interaction effects in the PROCESS Model 3 analysis were consistent with the effects of choice overload, decision time, and need for closure on state anxiety found through the earlier analyses. Specifically, consistent with the positive correlation between need for closure and state anxiety reported in Chapter 3, there was a positive conditional effect of need for closure on state anxiety, $b = 0.59$, $SE = 0.11$, $t(310) = 5.55$, $p < .001$, 95% CI [0.38, 0.80]. Consistent with the two-way ANOVAs reported above, there was also a significant negative conditional effect of decision time on state anxiety such that people who were asked to think carefully reported less anxiety than people who were asked to decide quickly, $b = -0.33$, $SE = 0.12$, $t(310) = -2.79$, $p = .006$, 95% CI [-0.57, -0.10]. Also consistent with the ANOVAs reported above, there was no significant effect of choice overload on anxiety, and no significant interaction between decision time and choice overload conditions on anxiety (all *p*s > .46).

These conditional effects were qualified by a significant three-way interaction between need for closure, decision time, and choice overload on state anxiety, $b = 0.95$, $SE = 0.42$, $t(310) = 2.25$, $p = .025$, 95% CI [0.12, 1.78]. I examined this three-way interaction further by investigating the two-way interaction between choice overload condition and decision time condition at low (-1 *SD*), mean, and high (+1 *SD*) levels of need for closure. The interaction between choice overload and decision time was not significant at mean or high levels of need for closure (*p*s > .27), but it was significant at low levels of need for closure, $b = -0.53$, $SE = -0.68$, $F(1, 310) = 4.17$, $p = .04$. When participants had a low need for closure and were in the low

choice condition, there was no significant effect of decision time condition on anxiety (p = .868). However, when participants had a low need for closure and were in the *high* choice condition, there was a significant negative effect of decision time on anxiety, b = -0.69, SE = 0.26, t = -2.68, p = .008, 95% CI [-1.19, -0.18]. In other words, being asked to choose quickly produced more anxiety than being asked to think carefully, but only when participants had a low need for closure and needed to choose from many options. This is contrary to expectations: I predicted that people with a *high* need for closure would experience increased anxiety in the suboptimal conditions (i.e., high choice overload and fast decision time) compared to the optimal conditions (low choice overload and slow decision time).

It should be noted that, although the time pressure manipulation was intended as a way of making the decision-making situation more difficult, this manipulation is commonly used to manipulate state need for closure. Specifically, high time pressure is used to promote a high need for closure. This manipulation is particularly likely to be effective in promoting a high need for closure among those with a low dispositional need for closure because there is more potential for their need for closure to increase. Hence, we can interpret these results by considering decision time as a state need for closure manipulation (rather than a decision difficulty manipulation).

From this perspective, the finding that high time pressure resulted in higher anxiety only for those who had (a) a low dispositional need for closure and (b) many options to choose from suggests that high state need for closure results in higher anxiety when the decision-making context involves many options. This is consistent with the prediction that people with a high need for closure should experience more anxiety when the decision-making situation is difficult.

Interactions between ability to achieve closure, choice overload condition, and decision time condition on state anxiety. Next, I considered the effects of ability to achieve

closure, decision time condition, and choice overload condition on state anxiety. I expected that the effects negative effect of ability to achieve closure on state anxiety would be stronger when participants had to decide quickly and/or decide from many options.

Consistent with the correlations reported in Chapter 3, the PROCESS Model 3 analysis testing the effects of ability to achieve closure and the experimental manipulations on state anxiety demonstrated that there was a significant effect of ability on state anxiety, b = -0.82, SE = 0.07, t = -12.07, p < .001, 95% CI [-0.95, -0.68]. In line with the two-way ANOVAs reported earlier, decision time was also a significant negative predictor of state anxiety, such that participants who were asked to think carefully reported less anxiety than participants who were asked to answer quickly, b = -0.29, SE = 0.10, t = -2.79, p = .006. 95% CI [-0.49, -0.09]. There were no other significant effects or interactions (all ps ≥ .385). Hence, contrary to predictions, there was no evidence that decision time or choice overload condition interacted with the ability to achieve closure to predict state anxiety.

Nonsigificant Mediation Analyses

Several mediation tests in Study 1 showed nonsignificant indirect effects. All the mediation tests in Study 1 were exploratory, and so the nonsigificant effects are reported here to in order to save space in Chapter 3. However, in subsequent studies, the mediation tests were confirmatory and hence they are all reported in the main text for transparency.

Regret and maximisation were both nonsignificant mediators of the relations between the ability to achieve closure and DASS, as shown in Table A.1 below.

Table A.1

Nonsignificant Mediators of the Relation Between Ability to Achieve Closure and DASS

Mediator	Effect type	b (SE)	95% CI	CSIES	t	p

Regret	Total	-8.14 (0.73)	-9.58, -6.69	-	-11.11	< .001
	Direct	-7.63 (0.88)	-9.37, -5.90	-	-8.67	< .001
	Indirect	-0.50 (0.51)	-1.50, 0.40	N/A	-	-
Maximisation	Total	-8.17 (0.73)	-9.60, -6.74	-	-11.22	< .001
	Direct	-8.08 (0.77)	-9.60, -6.56	-	-10.43	< .001
	Indirect	-0.09 (0.28)	-0.66, 0.45	N/A	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

As shown in Table A.2, regret and openness were non-significant mediators of the relation between the ability to achieve closure and satisfaction with life.

Table A.2

Nonsignificant Mediators of the Relation Between Ability to Achieve Closure and SWL

Mediator	Effect type	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Regret	Total	0.80 (0.10)	0.61, 0.98	-	8.66	< .001
	Direct	0.80 (0.11)	0.57, 1.01	-	7.06	< .001
	Indirect	0.00 (0.07)	-0.14, 0.14	N/A	-	-
Openness	Total	0.79 (0.09)	0.61, 0.97	-	8.10	< .001
	Direct	0.77 (0.09)	0.58. 0.95	-	8.10	< .001
	Indirect	0.02 (0.02)	-0.02, 0.07	N/A	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

As shown in Table A.3, regret and openness were also nonsignficant mediators of the relation between the ability to achieve closure and state anxiety.

Table A.3

Nonsignificant Mediators of the Relation Between Ability to Achieve Closure and State Anxiety

Mediator	Effect type	*b* (*SE*)	95% CI	CSIES	*t*	*p*
Regret	Total	-0.83 (0.07)	-0.96, -0.70	-	-12.50	< .001
	Direct	-0.76 (0.08)	-0.92, -0.60	-	-9.46	< .001
	Indirect	-0.07 (0.05)	-0.17, 0.03	N/A	-	-
Openness	Total	-0.83 (0.07)	-0.96, -0.70	-	-12.43	< .001
	Direct	-0.82 (0.07)	-0.95. -0.68	-	-11.99	< .001
	Indirect	-0.01 (0.02)	-0.05, 0.02	N/A	-	-

Note. *b* = unstandardised regression coefficient. *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014).

Discussion

The analyses on the experimental aspect of the studies demonstrated that the predictions were not fully supported. As expected, people with a high need for closure or low ability to achieve closure reported more state anxiety after the decision task. I expected that these people would experience relatively more state anxiety when they were in the suboptimal decision-making conditions (high choice overload and fast decision time) compared to the optimal decision-making conditions (low choice overload and slow decision time).

Contrary to predictions, the ability to achieve closure did not interact with the decision-making conditions to predict state anxiety. There was a significant three-way interaction between

choice overload, decision time, and need for closure on state anxiety. However, the interaction was not in the expected direction. I predicted that people with a *high* need for closure would experience the most anxiety in these suboptimal decision-making conditions. Instead, participants with a *low* need for closure experienced relatively higher anxiety in the fast decision time and high choice overload condition was unexpected.

This unexpected result may have occurred because people with a high need for closure are generally very anxious about decision-making situations. Hence, there may be a ceiling effect whereby their anxiety does not increase due to high choice or time pressure because it is already quite high. On the other hand, people with a low need for closure are less likely to have high anxiety in decision-making situations generally. Hence, the introduction of suboptimal decision-making conditions (i.e., high choice overload and little time to think) has the potential to increase their anxiety. The idea that people with a high need for closure are less sensitive to decision-making contexts because of their already high levels of distress in these situations is explored further in Chapter 5, where I consider the interaction between need for closure and decision importance on decision stress.

In previous research, time pressure has been used as a manipulation of state need for closure (e.g., Heaton & Kruglanski, 1991). However, no studies have considered whether this method of manipulating need for closure interacts with pre-existing dispositional need for closure. The fact that dispositional need for closure interacted with decision time pressure to predict state anxiety in the present study suggests that the use of this manipulation should be combined with measures of dispositional need for closure to better understand the effect of time pressure on people with high or low dispositional need for closure.

APPENDIX B

STUDY 2: EXPERIMENTAL RESULTS AND ADDITIONAL MODERATORS

Apart from the moderators reported in Chapter 4, I investigated two additional decision-making variables as potential moderators of the relation between the need for closure and mental health. The first was decision responsibility. People with a high need for closure are likely to find decision-making stressful due to its inherent uncertainty. However, decision-making may be even more consequential for individuals' mental health if they also believe that they are highly responsible for the outcomes of their decisions. On the other hand, feeling less responsible these outcomes may protect individuals from some of the effects of a high need for closure on their mental health. I therefore tested whether decision responsibility moderated the relation between need for closure and mental health or state anxiety.

Another factor that may protect people with a high need for closure from mental health problems is the extent to which they continue to feel stressed after making a decision. People with a high need for closure tend to feel anxious during decision-making (e.g., Roets & Van Hiel, 2008), but if they can let go of this stress and experience relief when the decision is made, then the decision-making stress may be less impactful on their mental health. On the other hand, if they do not experience relief, then decision-making stress may continue and therefore impact their longer-term mental health. I expected that decision relief would moderate the relation between need for closure and mental health such that that the relation is stronger for people who are low on decision relief and weaker for people who are high on decision relief. As above, I tested this moderation both for DASS scores and for state anxiety scores.

Finally, I investigated a potential moderator of the relation between the need for closure and mental health that is unrelated to decision-making: perceptions of world stability. People

who have a high need for closure dislike uncertainty and unpredictability. Therefore, it seems plausible that having a high need for closure will be worse for the mental health of people who perceive the world to be unstable and unpredictable than for the mental health of people who perceive the world as predictable. I hypothesised that the relation between the need for closure and mental health would be stronger for people who perceived the world as chaotic and weaker for people who perceived the world as stable. I did not expect an effect for state anxiety because beliefs about world stability are conceptually distant from decision-making.

I tested whether world beliefs moderated the relation between the ability to achieve closure and mental health. The ability to achieve closure is partially about the ability to structure one's own life (Roets & Soetens, 2010). People with a low ability to structure their life may experience poorer mental health if they also feel that the world is not highly structured because this impedes their ability to structure their own life.

I also tested generalised self-efficacy, trait regret, and social class as moderators of the relations between need and ability to achieve closure and mental health and wellbeing. Because these results were either nonsignificant or inconsistent with the results of Study 1 (reported in Chapter 3), they are reported here (rather than in Chapter 4) for the sake of brevity. The measurement of these variables is reported in Chapter 4.

Finally, this Appendix reports the results of the experimental manipulation undertaken in Study 2. The methodology of this aspect of the study is reported in Chapter 4.

Method

I created four items to measure decision responsibility regarding important decisions made over the past month: "I feel responsible for the decisions I have made," "I don't think I

should be held responsible for every decision that I made (R)," "I feel that the bad decisions I've made are my fault," and "I don't feel entirely responsible for the decisions that I made (R)."

To measure decision relief, I asked participants to report the extent to which they felt better after having made an important decision in the past month. The four items measuring this construct were "after making a decision, I usually felt much calmer," "after making a decision, I frequently felt more stressed than I did before (R)," "after making a decision, I generally felt relieved," and "after making a decision, I tended to feel tense" (R).

Finally, I measured perceptions of world stability with four items: "the world is generally an unstable place (R)," "things usually happen in a pattern," "the world is generally routine and structured," and "things tend to happen in a random and chaotic way (R)."

Results

Reliability. Two of the three new aggregate measures had Cronbach αs below the threshold of acceptable (≥ .70). The world stability measure had an α of .64 and the decision responsibility measure had an α of .58. Due to the lower reliability of these measures, results involving these variables should be interpreted with some caution.

Table B.1

Key Variables: Means, Standard Deviations, and Cronbach Alphas

Variable	*M*	*SD*	α
Decision responsibility	5.30	0.82	.58
Decision relief	4.74	1.04	.78
World stability	3.74	1.00	.64

Note. The decision responsibility, decision relief, and world stability scores were obtained by averaging participants' responses to the relevant items on a 7-point scale between *strongly disagree* (1) and *strongly agree* (7).

Missing data. The survey website was set up to flag missing responses and prevent participants from continuing until they completed each item, and so there should have been no missing data. However, there was a small amount of missing data in the world stability measure (7 missing responses), possibly due to a technical error with the survey website.

Exploratory factor analyses.

Decision responsibility. Due to the low reliability of this measure, I checked whether the removal of any items would improve the Cronbach α. I found that removing the item "I feel that the bad decisions I've made are my fault" improved the Cronbach α from .58 to .66. Given this substantial improvement in reliability, I removed this item from the scale and conducted a principal axis exploratory factor analysis on the three remaining items measuring perceived responsibility for decisions (Kaiser-Meyer-Olkin = .65, Bartlett's test of sphericity $p < .001$). Only one factor had an eigenvalue larger than one. A parallel analysis showed that only the first factor had an eigenvalue larger than the corresponding factor in the simulated dataset (1.24 and 1.10 respectively). I therefore specific the extraction of one factor using the Promax method (Kappa = 3) and found that all three items loaded ≥ .54 on the extracted factor, which explained 41.45% of the variance.

Decision relief. I conducted a principal axis exploratory factor analysis on the four items measuring relief after decision-making over the past month (Kaiser-Meyer-Olkin = .68, Bartlett's test of sphericity $p < .001$). Only one factor had an eigenvalue greater than one, and a parallel analysis (Watkins, 2000) showed that only the first factor in the real dataset had an eigenvalue larger than the corresponding factor in the simulated dataset (2.38 and 1.16 respectively). I

specified the extraction of one factor using the Promax method (Kappa value = 3) and found that all four items loaded ≥ .59 on the extracted factor, which explained 63.09% of the variance.

World stability. Because world stability had a low Cronbach α, I checked whether the removal of any items would improve the measure's reliability. However, none of the items would result in a better Cronbach α if removed. Hence, I conducted a principal axis exploratory factor analysis on all four items. The analysis showed that only one factor had an eigenvalue greater than one (Kaiser-Meyer-Olkin = .63, Bartlett's test of sphericity $p < .001$), and a parallel analysis showed that only this factor had an eigenvalue larger than the corresponding factor in the simulated dataset (1.93 and 1.16 respectively). I therefore specified the extraction of one factor using the Promax method (Kappa = 3). All four items loaded ≥ .48 onto the extracted factor, which explained 32.60% of the variance.

Main Analyses

Moderators of the relation between the need for closure and DASS. I checked whether the moderators tested in the previous study (trait regret, maximisation, self-efficacy, and social class) moderated the relation between the need for closure and DASS scores in the present study. Consistent with the previous study's findings, PROCESS Model 1 analyses showed that none of these variables were significant moderators of the relation between need for closure and DASS scores (all *p*s > .098).

I hypothesised that decision responsibility, decision relief, and perceptions of world stability would moderate the relations between the need for closure and mental health. Contrary to hypotheses, PROCESS Model 1 analyses showed that none of the interactions between need for closure and the potential moderators were significant (all *p*s > .197).

Moderators of the relation between the need for closure and state anxiety. In Study 1, trait regret significantly moderated the relation between the need for closure and state anxiety such that the relation was stronger when regret was high and weaker when regret was low. However, in the present study, there was no significant moderation effect of trait regret (p = .076). Consistent with the previous study, trait maximisation, generalised self-efficacy, and social class did not moderate the relation between need for closure and state anxiety (ps > .211).

I hypothesised that decision responsibility and decision relief would moderate the relation between need for closure and state anxiety. PROCESS Model 1 showed that decision relief moderated the relation between the need for closure and state anxiety. When decision relief was low, the relation between need for closure and state anxiety was nonsignificant (p = .433). The relation between the need for closure and state anxiety became significant at mean levels of decision relief, b = 0.37, SE = 0.12, t = 3.12, p = .002, 95% CI [0.14, 0.61]. The effect was significant and larger at high levels of decision relief, b = 0.62, SE = 0.17, t = 3.57, p < .001, 95% CI [0.28, 0.96]. This finding is contrary to predictions. I hypothesised the relation between need for closure and mental health should be weaker for those who experience high levels of decision relief because they should not continue to feel anxious or stressed after decision-making. However, this moderation became nonsignificant when log transformed age was added as a covariate (p = .067) and when the seven outliers were included in the analysis (p = .178).

Decision responsibility did not moderate the relation between the need for closure and state anxiety (p = .723).

Moderators of the relation between the need for closure and SWL. In the previous study, I found that trait regret significantly moderated the relation between need for closure and

satisfaction with life. However, in the present study, none of the hypothesised moderator variables (regret, maximisation, self-efficacy, social class) moderated this relation (all *p*s > .186).

I hypothesised that decision responsibility, decision relief, and world stability beliefs would moderate the relation between the need for closure and satisfaction with life. However, none of these moderation effects were significant (all *p*s > .384).

Moderators of the relation between the ability to achieve closure and DASS. I tested whether the relation between ability to achieve closure and DASS was moderated by any of the variables tested in the previous study (regret, maximisation, self-efficacy, social class). Consistent with the results of the previous study, none of these variables moderated the relation between ability to achieve closure and DASS (*p*s > .568).

I hypothesised that decision responsibility and decision relief would moderate the relation between the ability to achieve closure and DASS. Neither variable significantly moderated this relation (*p*s > .561).

Moderators of the relation between the ability to achieve closure and state anxiety. The previous study did not identify any significant moderators of the relation between the ability to achieve closure and state anxiety as measured after the choice task. In the present study, regret, maximisation, and social class did not moderate the relation between the ability to achieve closure and state anxiety (*p*s ≥ .168).

However, contrary to the previous study's results, self-efficacy moderated this relation in the expected direction ($p = .047$). The negative relation between the ability to achieve closure and state anxiety was significant at all levels of self-efficacy. The size of the relation became larger as self-efficacy increased (low self-efficacy, $b = -0.51$, $SE = 0.13$, $t = -3.93$, $p < .001$; median self-efficacy, $b = -0.67$, $SE = 0.10$, $t = -6.87$, $p < .001$; high self-efficacy, $b = -0.77$, $SE =$

0.11, t = -6.99, p < .001). However, this moderation effect became nonsignificant when transformed age, PARH, or the need for closure were included as covariates (ps > .054).

I hypothesised that decision responsibility and decision relief would moderate the relation between ability to achieve closure and state anxiety, but these hypotheses were not supported (p > .059).

Moderators of the relation between the ability to achieve closure and SWL. I tested whether there were any moderators of the relation between the ability to achieve closure and satisfaction with life. Consistent with the previous study, maximisation and social class did not moderate this relation (ps > .286). Contrary to the previous study's results, regret also did not moderate this relation (p = .901). Also contrary to the previous study's results, self-efficacy moderated the relation between ability to achieve closure and mental health (p = .049). At low levels of self-efficacy, the relation between ability to achieve closure and satisfaction with life was not significant (p = .639). However, at median levels of self-efficacy, there was a small positive relation between ability to achieve closure and satisfaction with life, b = 0.24, SE = 0.11, t = 2.32, p = .021, and this relation became larger at high levels of self-efficacy, b = 0.35, SE = 0.12, t = 2.97, p = .003. However, the moderation effect became non-significant when social class or PARH were added as covariates (p = .067 and p = .058 respectively).

I hypothesised that decision responsibility and decision relief would moderate the relation between ability to achieve closure and satisfaction with life, but these hypotheses were not supported (ps > .147).

Effects of experimental manipulations on state anxiety and decision appraisal. An independent samples t-test showed that there was no difference in the amount of time taken between the fast and slow decision conditions (p = .452). However, the group means of time

taken are likely to be inaccurate. Several participants entered their time taken in an incorrect format, making it impossible to determine actual time taken (n = 22). Additionally, there was no way to check whether participants who did enter a correctly formatted time calculated their time taken correctly (or at all). As demonstrated below, despite the failure of the manipulation check, the decision time manipulation had the expected effects on decision appraisal and state anxiety, suggesting that even if participants did not objectively take longer in the slow decision time condition, the instructions to take their time may have led to their feeling subjectively less rushed.

Consistent with the Study 1 results, a two-way ANOVA on the experimental conditions showed that only the decision time manipulation showed the expected effect on state anxiety, $F(1, 204) = 4.40$, $p = 0.037$, such that participants in the slow decision time condition reported less state anxiety ($M = 2.85$, $SE = 0.11$) than participants in the fast decision time condition ($M = 3.19$, $SE = 0.11$). Consistent with the previous study's findings, there was no main effect of choice overload and no interaction between choice overload and decision time on state anxiety (ps > .276).

When the need for closure was added as a predictor in PROCESS Model 3, only the need for closure and the interaction between need and decision time were significant predictors of state anxiety. Consistent with the correlations, need for closure was significantly positively associated with state anxiety, $b = 0.39$, $SE = 0.14$, $p = .004$, 95% CI [0.12, 0.66]. This main effect was qualified by an interaction between the need for closure and decision time. However, in PROCESS Model 1, this interaction was not significant ($p = .218$). Contrary to the previous study's results, there was no three-way interaction between need for closure, decision time, and choice anxiety ($p = .424$).

Consistent with the correlations and the results of the previous study, when ability to achieve closure, decision time, and choice overload were analysed as predictors of state anxiety through PROCESS Model 3, the ability to achieve closure was a significant predictor of state anxiety, $b = -0.72$, $SE = 0.09$, $p < .001$, 95% CI [-0.89, -0.55]. However, contrary to the previous study's results, this was qualified by a significant three-way interaction between ability to achieve closure, decision time, and choice overload on state anxiety ($p = .024$; all other ps $\geq .232$). I hypothesised that the negative relation between the ability to achieve closure and state anxiety would be strongest when choice overload was high and decision time was fast. This is because ability to achieve closure should be most predictive of state anxiety when the conditions of decision-making are least optimal; when decision-making conditions are optimal, even people with a lower ability to achieve closure should be able to cope well with the decision-making situation. However, despite the presence of a significant three-way interaction, the negative effect of ability to achieve closure on state anxiety was significant at all combinations of decision time (fast or slow) and choice overload (high or low; all ps $\leq .021$).

Discussion

Moderation

The results of the moderation analyses were somewhat inconsistent with the previous study. Although regret moderated the relations of both the need and ability to achieve closure and satisfaction with life in the previous study, it did not moderate these relations (or any others) in the present study. Only two variables significantly moderated any relevant effects. First, self-efficacy moderated the relation between ability to achieve closure and satisfaction with life and the relation between the ability to achieve closure and state anxiety. In both cases, the positive effects of the ability to achieve closure became larger as self-efficacy increased. Hence, the

ability to achieve closure appears to be particularly good for mental health when a high ability is accompanied by high levels of self-efficacy. The conceptual relations between the ability to achieve closure and self-efficacy are discussed further in the General Discussion (Chapter 8).

Second, decision relief moderated the relation between the need for closure and state anxiety. The effect of need for closure on state anxiety became stronger as decision relief increased. The direction of this effect was unexpected. People with a high need for closure and who experience high levels of decision relief should report relatively *low* levels of state anxiety after the decision-task (compared to those who experience low levels of decision relief) because they should be feeling relief (rather than continued stress).

Perhaps this result occurred because decision relief is a proxy for how stressful the decision-making process was. That is, people who do not experience high levels of stress during decision-making would not report high levels of relief (i.e., stress reduction) afterwards due to a floor effect. On the other hand, people who do experience high levels of stress during decision-making are able to experience a reduction in their stress levels and hence report feeling relief after a decision has been made. Despite feeling less stressed than they were during the decision, those with a high need for closure may still experience residual distress and hence report relatively high state anxiety.

Effects of the Experimental Conditions

The effects of the experimental conditions and their interactions with each other and with the need and ability to achieve closure were slightly different in the present study compared to Study 1. As in the previous study, there was a significant interaction between the need for closure and decision time on state anxiety, such that the need for closure had a stronger effect on state anxiety when participants were asked to decide quickly. However, the three-way interaction

between need for closure, decision time, and choice overload found in Study 1 was not replicated in the present study.

There was a three-way interaction between need for closure, decision time, and choice overload on state anxiety in the present study (but not in the previous study). However, the effect of the ability to achieve closure was significant in all combinations of the decision conditions, and so this interaction may not represent a meaningful difference between the effects of the ability to achieve closure on state anxiety in different conditions. The lack of consistency in results between this study and the previous study suggests that caution is required when interpreting these results.

APPENDIX C

STUDY 3: EXPERIMENTAL MANIPULATION OF THE NEED FOR CLOSURE

Roets and Van Hiel (2008) found that people with a high dispositional need for closure experienced more decision stress during an uncertain decision-making task. In the present study, I aimed to test the same hypothesis using a novel experimental manipulation of the need for closure. I attempted to separately manipulate each aspect of the need for closure as represented by the five subscales of the Need for Closure Scale (i.e., discomfort with ambiguity, closedmindedness, need for decisiveness, need for order, and preference for predictability).

Method

Vignettes

Participants were randomly assigned to either one of five experimental conditions or a control (low need for closure) condition. In each experimental condition, participants read a short vignette describing a situation in which one aspect of the need for closure was not fulfilled. For example, in the closedmindedness vignette, the story described a situation in which a firmly held belief was threatened. Each story also highlighted the costs of lacking that aspect of closure. Participants were then asked to write two to three sentences about the negative aspects of the situation that was described, focusing on their own feelings. In order to increase engagement in the task, participants were told that they would be asked to recall their feelings about the situation later in the survey. They were also instructed not to focus on solving the problem, but rather on how they felt about it.

Participants then completed a manipulation check. One item from each of the five Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994) subscales was used in the manipulation check. The items were adapted to capture participants' state (rather than

trait) need for closure. Participants were therefore asked to respond to the items in relation to their feelings at the time of the survey.

The items for the manipulation check were selected based on an exploratory factor analysis performed on the Study 1 Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994) data. The highest loading item from each subscale was chosen as the manipulation check for most of the subscales. However, the highest loading item from the discomfort with ambiguity subscale was not suitable to be adapted for a state-based response, and so the second-highest loading item was selected. The manipulation check items were "if I were to go into a new situation now, I would enjoy its uncertainty" (preference for predictability); "if I had to think about a problem now, I would want to consider as many different options as possible" (closedmindedness; reversed); "at the moment, I would feel uncomfortable if someone's meaning or intention were unclear to me" (discomfort with ambiguity); "at the moment, I want to have everything clear and well-structured" (need for order); and "if I had a lot of time to make a decision now, I would feel compelled to decide quickly" (need for decisiveness).

Results

A one-way ANOVA manipulation check revealed that participants in the experimental conditions did not report higher levels of any individual aspect of state need for closure (all *p*s $\geq .107$). Additionally, participants in the experimental conditions did not have a higher total state need for closure than participants in the control condition ($p = 339$), and did not report higher levels of negative decision appraisal or any type of regret about their decision-making (all *p*s $\geq .410$). One-way ANOVAs also revealed that the groups did not differ on state anxiety or

negative affect (all *p*s ≥ 616). However, there was a significant effect of manipulation condition on positive affect, $F(5,243) = 2.69$, $p = .022$.

I further explored this effect using LSD post-hoc tests. These analyses showed that there were no differences in positive affect between people in the control condition and people in any of the high need for closure conditions (all *p*s ≥ .069). Hence, my hypotheses were not supported; people in the control condition did not have higher positive affect than people in the high need for closure conditions. The only significant differences between groups occurred because people in the high ambiguity condition ($M = 20.09$, $SD = 6.28$) had significantly lower positive affect than those in the closedmindedness ($M = 26.29$, $SD = 8.66$), decisiveness ($M = 24.52$, $SD = 8.72$), or predictability ($M = 24.00$, $SD = 7.41$) conditions. There was no difference between the ambiguity condition and the order ($M = 23.02$, $SD = 6.86$) or control ($M = 23.31$, $SD = 8.32$) conditions. All other differences were nonsignificant (all *p*s ≥ .061). Hence, it appears that the ambiguity vignette (which described a situation in which it was not clear how to submit an assignment) was particularly harmful for the positive affect for participants, perhaps because it reminded them of a real-life situation they had experienced.

A sensitivity power analysis demonstrated that an ANOVA on six groups with total of 249 participants has .90 power to detect an effect size of Cohen's f = .26. According to Cafri, Kromrey, & Brannick (2010), the median effect size in psychology is $r = .16$, which can be converted to f = .25. However, the effect of the novel need for closure manipulation is likely to be relatively small since dispositional need for closure may be difficult to overcome and the manipulation was aimed at increasing specific facets of the need for closure rather than need for closure more generally. Hence, this study was probably underpowered for detecting an effect.

Future research attempting to manipulating the facets of the need for closure separately should involve larger sample sizes.

APPENDIX D

STUDY 4: COPING FLEXIBILITY

Coping Flexibility

I considered coping flexibility as a cognitive factor that may mediate the relation between the need/ability to achieve closure and mental health. Coping flexibility is the ability to choose an appropriate coping strategy to manage stressful situations (Cheng, 2001). It is important for people to choose appropriate strategies and to shift between strategies because different situations require different coping strategies. For example, problem-focused coping (which attempts to address the source of the stressor) is useful in reducing anxiety when a stressful situation is controllable, but increases anxiety in uncontrollable stressful situations (Cheng, Hui & Lam, 1999). People who tend to use the same strategy to cope with all stressful situations, or who choose coping strategies at random, have poorer mental health than people who can vary their choice of coping strategy depending on the situation (e.g., Cheng, Lau, & Chan, 2014).

The need for closure is associated with poorer discriminative ability (i.e., the ability to assess the characteristics of a situation and adjust behaviour to manage these characteristics) and poorer coping flexibility, which in turn result in higher anxiety (Cheng, 2003). In the present study, I sought to replicate the finding that coping flexibility mediates the relation between the need for closure and mental health problems.

Coping flexibility may also be related to the ability to achieve closure. People with poor coping flexibility tend to continue to use the same coping strategies regardless of how successful those strategies are, and this may be due to a low ability to achieve closure. That is, people who are unable to achieve certainty in their decisions may be unable to make and follow through on

decisions to change their coping style. Hence, I also tested whether coping flexibility mediated the relation between the ability to achieve closure and mental health.

I also included measures of death anxiety, social identity and similarity, self-esteem, and the need for belonging. The analyses using these measures were exploratory and not connected with the need or ability to achieve closure. Hence, these measures and their associated analyses are not reported in the present thesis.

Method

I used the 10-item Coping Flexibility Scale (Kato, 2012) to measure the extent to which participants were able to stop using ineffective coping strategies and switch to more effective strategies (e.g., "If I have failed to cope with stress, I think of other ways to cope"). The scale has good reliability and discriminant and convergent validity (Kato, 2012).

Results

The Coping Flexibility Scale had acceptable reliability ($\alpha = .83$) and its skewness and kurtosis scores fell between ±2.00. As shown in Table D.1, coping flexibility was positively related to the ability to achieve closure and satisfaction with life and negatively related to DASS. There was no significant relation between coping flexibility and the need for closure, and hence I did not test whether coping flexibility mediated the relation between the need for closure and mental health.

Table D.1

Correlations Between Coping Flexibility and the Predictor and Outcome Variables

	Coping Flexibility
NFCS	-.10
AACSS	.17**
DASS	-.21**
SWL	.19**

Note: NFCS = Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994). AACSS = Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004). SWL = Life Satisfaction Scale (Diener et al., 1985).

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

Mediation Analyses

I tested whether coping flexibility mediated the relations between the ability to achieve closure and either DASS or satisfaction with life. The total effect of the ability to achieve closure on DASS (b = -7.23, SE = 0.75, t = -9.62, $p < .001$, 95% CI [-8.71, -5.75]) was slightly larger than the direct effect (b = -7.07, SE = 0.76, t = -9.29, $p < .001$, 95% CI [-8.57, -5.57]. However, the indirect effect was not significant, b = -0.16, SE = 0.15, 95% CI [-0.57, 0.03].

The total effect of the ability to achieve closure on satisfaction with life (b = 0.56, SE = 0.09, t = 6.30, $p < .001$, 95% CI [0.39, 0.74] was slightly larger than the direct effect (b = 0.53, SE = 0.09, t = 5.87, $p < .001$, 95% CI [0.35, 0.71]. The indirect effect was significant, indicating a significant mediation effect of coping flexibility, b = 0.03, SE = 0.02, 95% [0.00, 0.10] CSIES = .02.

Discussion

Coping flexibility mediated the relation between the ability to achieve closure on satisfaction with life, but did not mediate the relation between any other relevant relations. This finding suggests that people with a high ability to achieve closure are better able to vary their coping strategies when they are not successful, possibly due to their ability to decisive about choosing another strategy. Previous research has shown that people with depression have poorer coping flexibility than non-depressed people (Gan, Zhang, Wang, Wang, & Shen, 2006). Hence, it is possible that there is a bidirectional relation between mental health and coping flexibility.

The lack of relation between the need for closure and coping flexibility in the present research is unexpected because this association has been shown in previous research. Further research is required to determine when and under what circumstances people with a high need for closure report different levels of coping flexibility.

APPENDIX E

STUDY 5: PHYSICAL HEALTH, NONSIGNIFICANT MEDIATORS, AND REVERSED MODELS

This Appendix has three main aims. First, to investigate the relations of the need and ability to achieve closure with physical health. Second, to test decision relief and world instability as mediators of the relations between the need/ability to achieve closure and mental health. Third, to detail the reversed models of the mediation analyses described in Chapter 7. Each of these aims is explained in more detail below.

Relations Between Need/Ability to Achieve Closure and Physical Health

I considered the possibility that, apart from their relations with mental health, the need and ability to achieve closure may also be related to physical health. A person with a high motivation for closure may be less likely to improve their eating habits or to engage in new forms of exercise because of their preference for predictability. People with a high need for closure may therefore have poorer eating and/or exercise habits than people with a low need for closure, who may be more motivated to try different things. Similarly, a person with a low ability to achieve closure may be less able to stick to a decision to eat healthier or exercise more due to their relative difficulty in achieving certainty in their decisions compared to people with a high ability to achieve closure.

Need and ability to achieve closure may also affect physical health through their effects on mental health. People with mental health problems tend to experience more physical health problems, due at least partly to poorer health behaviours (e.g., Robson & Gray, 2007; Thornicraft, 2011). Therefore, the need and ability to achieve closure may affect health behaviours both independently and through their effects on mental health. Consequently, I

investigated whether need/ability to achieve closure predicted physical health and considered mental health as a potential mediator of these relations.

Mediations of Longitudinal Relations by Decision Relief and World Instability

I included the measures of decision relief and world instability that were first reported in Appendix B. These variables did not moderate the relations between the need or ability to achieve closure in Study 2. However, I added them to the present study to check for potential mediation effects. People with a high need for closure may tend to view the world as more unpredictable as time goes on because their discomfort with any level of uncertainty leads them to focus more on the occurrence of unusual or unpredictable events. This perception may then lead to poorer mental health due to their discomfort with this unpredictability. Regarding decision relief, people with a low ability to achieve closure may experience less relief after making decisions because they continue to ruminate on whether they made the right choice, and this continued rumination may negatively affect their mental health. Hence, I tested whether perceptions of world instability and decision relief mediated the relations between the need or ability to achieve closure and mental health.

Reversed Models of Mediation Models Tested in Chapter 7

As outlined in Chapter 7, I also tested reversed models in which the proposed mediators and the proposed outcomes switched places to provide more information about the temporal order of the relations between the need/ability to achieve closure, mental health, and the proposed mediators.

Method

Measures

I measured physical health over the past month with the current health items of the Health Perceptions Questionnaire Form II (Ware, 1976). Items include "I am somewhat ill," and "my health is excellent" (reversed). The scale has excellent internal consistency (average $r = .92$) and test-retest reliability ($r = .81$) and good construct and predictive validity (Ware, 1976).

I also included the measures of decision relief and world instability that were first used in Study 2 (see Chapter 4 for measurement details).

Results

Table E.1 shows the descriptive statistics and Cronbach αs for physical health, decision relief, and world instability in each wave. All measures had acceptable reliability (i.e., $\alpha \geq .70$) except for world instability in Time 1 ($\alpha = .63$).

Table E.1

Key Variables: Means, Standard Deviations, and Cronbach αs.

Variable	Time 1 *M* (*SD*)	Time 1 α	Time 2 *M* (*SD*)	Time 2 α
Physical health	3.93 (1.21)	.90	3.81 (1.24)	.91
Decision relief	4.89 (1.15)	.88	5.01 (1.04)	.86
World instability	4.47 (1.02)	.63	4.43 (1.12)	.78

Table E.2 shows the correlations between the Time 1 predictors and mediators and the Time 2 mediators and outcomes for variables not included in the main analyses.

Table E.2

Correlations Between Time 1 Predictors and Mediators and Time 2 Mediators and Outcomes

	W2 SE	W2 OUR	W2 OR	W2 SR	W2 AIR	W2 BS	W2 DS	W2 DR	W2 WS	W2 DASS	W2 CW	W2 PH
W1 NFCS	-.26**	.31**	.34**	.45**	.36**	.24**	.41**	-.10	.09	.40**	-.24**	-.21**
W1 AACSS	.57**	-.53**	-.58**	-.58**	-.45**	-.51**	-.56**	.46**	-.21*	-.47**	.63**	.43**
W1 SE	.71**	.50**	-.31**	-.39**	-.46**	-.41**	-.36**	.37**	-.35**	-.47**	.62**	.30**
W1 OUR	-.40**	.62**	.31**	.45**	.56**	.42**	.33**	-.43**	.13	.38**	-.59**	-.44**
W1 OR	-.41**	.33**	.59**	.45**	.28**	.41**	.47**	-.24*	.18	.43**	-.44**	-.31**
W1 SR	-.44**	.65**	.54**	.67**	.49**	.44*	.53**	-.41**	.07	.38**	-.49**	-.38**
W1 AIR	-.57**	.56**	.28**	.36**	.59**	.41**	.31**	-.46**	.27**	.37**	-.58**	-.42**
W1 BS	-.41**	.43**	.31**	.39**	.36**	.66**	.40**	-.40**	.29**	.50**	-.57**	-.47**
W1 DS	-.44*	.33**	.51**	.67**	.21**	.46**	.61**	-.30**	.30**	.47**	-.47**	-.30**
W1 DR	.31**	-.19	-.16	-.20*	-.18	-.34**	-.14	.41**	-.00	-.21*	.32**	.40**
W1 WS	-.20**	.19	.21*	.13	.22*	.36**	.39**	-.21*	.59**	.36**	-.34**	-.33**

Note. NFCS = Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994). AACSS = Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). SE = Self-efficacy (Schwarzer & Jerusalem, 1995). OUR = option/underconisderation regret (Lee & Cotte, 2009). OR = overconsideration regret (Lee & Cotte, 2009). SR = Schwartz regret (Schwartz et al., 2002). AIR = action/inaction regret. BS = background stress (Terrill et al., 2015). DS = Decision stress. DR = Decision relief. WS = world stability. DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004). CW = COMPAS-W (GATT et al., 2014). PH = physical health (Ware, 1976).

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

Time 1 need for closure was not related to the novel mediators (decision relief and world instability). All other correlations involving the novel mediators or novel outcome (physical health) were significant.

Relations Between the Need/Ability to Achieve Closure and Physical Health

I tested whether the need or ability to achieve closure longitudinally predicted physical health and then tested for mediations of these relations. The logic behind the analytical approach used here is outlined in Chapter 7.

Test 1. I conducted Test 1 with physical health as the outcome variable and found that physical health was not predicted by the need for closure (p = .287), but was predicted by ability to achieve closure, b = 0.24 (SD = 0.11), t = 2.13, p = .036 (although when entering both need and ability together as predictors, the effect of ability on physical health also became nonsignificant). Hence, I tested for mediators of the relation between the ability to achieve closure and physical health.

Test 2. Test 2 determined whether the proposed predictor variable (the ability to achieve closure) predicted the proposed mediator variables. This test was conducted in Chapter 7 and showed that the ability to achieve closure longitudinally predicted option/underconsideration regret (b = -0.34, SE = 0.11, t = -3.18, p = .002), overconsideration regret (b = -0.50, SE = -0.32, t = -3.03, p = .003), Schwartz regret (b = -0.32, SE = -.14, t = -2.30, p = .024), and decision stress (b = -0.35, SE = 015, t = -2.43, p = .017). The ability to achieve closure did not longitudinally predict any other proposed mediators (all ps ≥ .092).

In addition to the proposed mediators from Chapter 7, I also considered whether mental health mediated the relation between the ability to achieve closure and physical health. Test 2 for this model corresponds to Test 1 in Chapter 7, which demonstrated that the ability to achieve

closure longitudinally predicted COMPAS-W composure (b = 1.36, SE = 0.46, t = 2.95, p = .004), own worth (b = 1.79, SE = 0.69, t = 2.61, p = .011), and satisfaction (b = 2.88. SE = 0.97, t = 2.98, p = .004). Ability to achieve closure did not longitudinally predict DASS scores or any other wellbeing subscales (all ps ≥ .115).

Hence, I retained option/underconsideration regret, overconsideration regret, Schwartz regret, decision stress, COMPAS-W composure, COMPAS-W own worth, and COMPAS-W satisfaction as potential mediators of the relation between the ability to achieve closure and physical health.

Test 3. Test 3 investigated whether the proposed mediator variables predicted the outcome variable. As outlined in Chapter 7, I only tested mediators that were significantly associated with at least one predictor variable in Test 2.

Physical health was longitudinally predicted by option/underconsideration regret (b = -0.23, SE = 0.10, t = -2.48, p = .015), overconsideration regret (b = -0.15, SE = 0.07, t = -2.23, p = .028), Schwartz regret (b = -0.18, SE = 0.08, t = -2.21, p = .030), COMPAS-W composure (b = 0.05, SE = .02, t = 2.38, p = .019), and COMPAS-W satisfaction (b = 0.03, SE = 0.01, t = 1.99, p = .049). Decision stress and COMPAS-W own worth did not predict physical heath (ps ≥ .083).

Test 4. Test 4 involved checking whether the effect size of the predictor on the outcome variable is smaller when controlling for the proposed mediator(s) than the effect size when not controlling for the mediator(s). As outlined in Chapter 7, I only tested models where Tests 1-3 showed that the predictor was significantly longitudinally related to the mediator and outcome and that the mediator was significantly longitudinally related to the outcome.

As shown in Table E.3, Test 4 showed that the effect of the ability to achieve closure on physical health became smaller and nonsignificant when controlling for any of the proposed

mediators (option/underconsideration regret, overconsideration regret, Schwartz regret, COMPAS-W composure, or COMPAS-W satisfaction) compared to Test 1 in which these potential mediators were not controlled for.

Table E.3

Comparison of Effect Sizes and P-Values Between Test 1 and Test 4

Test 1 Predictor		Proposed Mediator	Test 4 Predictor	
b	*p*		*b*	*p*
0.24	.036	Option/underconsideration regret	0.13	.320
		Overconsideration regret	0.09	.526
		Schwartz regret	0.11	.243
		COMPAS-W composure	0.13	.366
		COMPAS-W satisfaction	0.17	.255

Note. Predictor = the ability to achieve closure. Outcome = physical health.

However, as shown in Table E.4, PROCESS Model 4 analyses showed that none of the potential mediation models had significant indirect effects. Hence, there were no significant mediators of the relation between the ability to achieve closure and physical health.

Table E.4

PROCESS Model 4 Analyses of Potential Mediation Models

Proposed mediator	Indirect effect (*SE*)	95% CI	CSIES
Option regret	0.09 (0.06)	-0.03, 0.22	N/A
Overconsideration regret	0.13 (0.10)	-0.05, 0.34	N/A
Schwartz regret	0.12 (0.10)	-0.06, 0.32	N/A
COMPAS-W composure	0.11 (0.09)	-0.07, 0.29	N/A
COMPAS-W satisfaction	0.06 (0.09)	-0.13, 0.23	N/A

Note. Predictor = the ability to achieve closure. Outcome = physical health.

Reverse Test 1. To investigate the possibility that the causal order is reversed, and that physical health causes changes in need or ability to achieve closure, I conducted reversed versions of Test 1 to see whether physical health longitudinally predicted need or ability to achieve closure when controlling for Time 1 need/ability. However, physical health did not longitudinally predict need or ability to achieve closure (ps $\geq .424$), and therefore it is more likely that ability/need for closure are predictors of physical health rather than vice versa.

World Instability and Decision Relief as Mediators of the Relations Between the Need/Ability to Achieve Closure and Mental Health

The second aim of the analyses in this Appendix was to test whether the measures of world instability or decision relief mediated the relations between the need or ability to achieve closure and mental health. Test 1 for these mediations corresponds to Test 1 in the main text (Chapter 7), which showed that both the need and ability to achieve closure longitudinally predicted COMPAS-W composure. Additionally, the need for closure longitudinally predicted DASS scores, and the ability to achieve closure longitudinally predicted COMPAS-W own worth and satisfaction.

Test 2 showed that neither the need for closure nor the ability to achieve closure longitudinally predicted world instability and the need for closure also did not predict decision relief ($ps \geq .729$). However, the ability to achieve closure did longitudinally predict decision relief, $b = 0.39$, $SE = 0.10$, $t = 3.77$, $p < .001$.

Hence, in Test 3, I tested whether decision relief longitudinally predicted any of the outcome variables predicted by the ability to achieve closure (i.e., COMPAS-W composure, own worth, and satisfaction). These tests showed that decision relief did not longitudinally predict

composure (*p*s ≥ .195). However, decision relief did longitudinally predict own worth, $b = 1.03$, $SE = 0.50$, $t = 2.06$, $p = .041$.

Test 4 showed that the effect of the ability to achieve closure on own worth was weaker (and nonsignificant) when controlling for decision relief ($b = 1.44$, $SE = 0.75$, $t = 1.92$, $p = .058$) than when not controlling for decision relief ($b = 1.79$, $SE = 0.69$, $t = 2.61$, $p = .011$). However, the PROCESS Model 4 analysis showed no significant indirect effect of decision relief, 95% CI [-0.24, 0.99].

Therefore, neither decision relief nor world instability mediated the relations between the need/ability to achieve closure and mental health.

Reversed Models of Mediation Models Tested in Chapter 7

The final aim of this appendix is to show the results of reversed mediation tests from Chapter 7. In the reverse tests below, the proposed mediator and proposed outcome variables are switched (e.g., need for closure → DASS → decision stress).

Test 1 for these reverse mediation models indicates a regression in which need or ability are the predictor variables and the proposed mediators in the main analyses are the outcome variables. This corresponds to Test 2 in the main analyses, and therefore these tests have already been conducted. The tests showed that the need for closure significantly predicted all the regret measures except for underconsideration regret, and that the ability to achieve closure predicted all of the regret measures except for inaction regret. Both need and ability also predicted decision stress.

Test 2 for the reverse mediation models indicates a regression in which need or ability predict mental health, wellbeing, or physical health. This corresponds to Test 1 in the main analyses, which showed that the need for closure predicted DASS and COMPAS-W composure,

and that the ability to achieve closure predicted COMPAS-W composure, own worth, satisfaction, and physical health.

Test 3 for the reverse mediation models indicates a regression model in which DASS, COMPAS-W, or physical health predict the originally proposed mediator variables. I therefore conducted a series of regression analyses to investigate Test 3. These analyses showed that DASS did not longitudinally predict overconsideration regret, Schwartz regret, or action/inaction regret (all *p*s ≥ .195). However, DASS did longitudinally predict decision stress, $b = 0.02$, $SE = 0.01$, $t = 2.05$, $p = .043$, and option/ underconsideration regret, $b = .02$, $SE = 0.01$, $t = 6.07$, $p = .048$.

I repeated the Test 3 analyses with the relevant COMPAS-W subscales (composure, own worth, and satisfaction) as the predictors. COMPAS-W composure predicted decision stress, $b = -0.06$, $SE = .03$, $t = -2.13$, $p = .036$. However, it did not predict option/underconsideration regret, overconsideration regret, Schwartz regret, or action/inaction regret (*p*s ≥ .076).

Own worth predicted option/underconsideration regret, $b = -0.04$, $SE = 0.02$, $t = -2.32$, $p = .022$, but did not predict overconsideration regret, Schwartz regret, action/inaction regret, or decision stress (*p*s ≥ .056).

Satisfaction predicted option/underconsideration regret, $b = -0.03$, $SE = 0.01$, $t = -2.92$, $p = .004$, but did not predict overconsideration regret, Schwartz regret, action/inaction regret, or decision stress (*p*s > .056).

Finally, I conducted the Test 3 analyses with physical health as the predictor. I only considered the measures which were significantly predicted by ability to achieve closure in Test 1 of the reverse mediation models. Physical health predicted overconsideration regret, $b = -0.23$,

SE = 0.11, *t* = -2.19, *p* = .031, but did not predict any other tested regret measures or decision stress (all *p*s ≥ .111).

Together, Tests 1, 2, and 3 for the reversed mediations demonstrated the possibility for the mediation models outlined in Table E.5. As shown the table, Test 4 demonstrated that the effect sizes of the predictors on the outcomes were smaller when controlling for the proposed mediator than in Test 1 when the proposed mediator was not controlled for. However, despite being smaller, most of the effects of the predictors were still significant even after controlling for the proposed mediators.

To check whether the indirect effects of reversed model mediators were significant, I used PROCESS Model 4. As shown in Table E.6, none of the PROCESS Model 4 analyses showed significant indirect effects, suggesting that none of the reverse mediations were significant.

Table E.5

Comparison of Effect Sizes and p-Values Between Test 1 and Test 4 for Reverse Mediation Models

Predictor	Outcome	Test 1 Predictor		Proposed mediator	Test 4 Predictor	
		b	*p*		*b*	*p*
NFCS	Decision stress	0.44	.007	DASS	0.38	.024
				Composure	0.37	.025
	Action/inaction regret	0.41	.007	Composure	0.46	.004
AACSS	Decision stress	0.35	.017	Composure	-0.27	< .001
	Action/inaction regret	-0.12	.345	Composure	-0.20	.211
	Option/underconsideration regret	-0.34	.002	Own worth	-0.32	.008
				Satisfaction	-0.28	.036
	Overconsideration regret	-0.50	.003	Physical health	-0.37	.046

Note. NFCS = Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994). AACSS = Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004). For Test 4, the predictor and proposed mediators were entered as predictor variables along with the Time 1 measure of the outcome variable as a control variable. The Test 1 column refers to the effect of the predictor on the outcome without controlling for the proposed mediator/s. If the Test 4 effect size is smaller than the Test 1 effect size, then there is provisional evidence for a mediation effect.

Table E.6

PROCESS Model 4 Analyses of Potential Reverse Mediation Models

Predictor	Proposed mediator	Outcome	Indirect effect (*SE*)	95% CI	CSIES
Need for closure	DASS	Decision stress	0.06 (0.04)	-0.01, 0.17	N/A
	Composure	Decision stress	0.04 (0.05)	-0.02, 0.17	N/A
		Action/inaction regret	-0.02 (0.04)	-0.11, 0.07	N/A
Ability to achieve closure	Composure	Decision stress	-0.09 (0.09)	-0.29, 0.09	N/A
		Action/inaction regret	-0.06 (0.11)	-0.17, 0.26	N/A
	Own worth	Option/underconsideration regret	-0.06 (0.05)	-0.15, 0.03	N/A
	Satisfaction	Option/underconsideration regret	-0.09 (0.07)	-0.23, 0.06	N/A
	Physical health	Overconsideration regret	-0.09 (0.09)	-0.29, 0.07	N/A

Note. NFCS = Need for Closure Scale (revised; Roets & Van Hiel, 2007; Webster & Kruglanski, 1994). AACSS = Ability to Achieve Cognitive Structure Scale (Bar-Tal, 1994a). DASS = Depression Anxiety Stress Scales (Lovibond & Lovibond, 2004). *SE* = standard error. 95% CI = the upper and lower 95% confidence intervals; SEs and CIs for indirect effects are bootstrapped. Bootstrap sample size = 5,000. If CI are both positive or negative, then the indirect effect is significant at $p < .05$. CSIES = completely standardised indirect effect size. The CSIES is reported only for significant indirect effects. When considering standardised mediation effects, a small effect = .01, a medium effect = .09, and a large effect = .25 (Kenny & Judd, 2014)

Discussion

Relations Between Need/Ability to Achieve Closure and Physical Health

The tests regarding physical health showed that the ability to achieve closure longitudinally predicted physical health (and not vice versa). Tests 1-3 provided preliminary evidence for option/underconsideration regret, overconsideration regret, Schwartz regret, and COMPAS-W composure and satisfaction to mediate these relations. However, none of the indirect effects were significant in PROCESS, possibly due to low power.

I am hesitant to interpret the mediations involving regret because I tested these for the sake of completeness rather than because I had an a priori theoretical reason to believe that they might play a role in these relations. However, the evidence for mediations involving wellbeing (i.e., composure and satisfaction) is interesting because of previous research demonstrating that people with poorer mental health also tend to have poorer physical health. Hence, it seems plausible that the effects of ability to achieve closure on wellbeing have flow-on effects for physical health.

Mediations of Longitudinal Relations by Decision Relief and World Instability

There was preliminary evidence that decision relief mediated the relation between the ability to achieve closure and own worth, suggesting that people with a high ability to achieve closure experience more relief after their decisions and this mediates their higher own-worth. However, again, the mediation effect in PROCESS was not significant. In addition, the construct of decision relief is highly proximal to the ability to achieve closure, because some ability to achieve closure items refer to continued rumination after decision-making (e.g., “Even after I have reached a decision, I continue to think about the pros and cons in order to make sure that I

did not make a mistake;" Bar-Tal, 1994). Therefore, it is not clear that decision relief is a meaningful mechanism of the relation between the ability to achieve closure and wellbeing.

Reversed Models of Mediation Models Tested in Chapter 7

Finally, this Appendix reported the reverse mediations models corresponding to the forward models reported in Chapter 7. Tests 1-3 for the reverse models indicated evidence that several mental health outcomes mediated the relations between the need for closure and decision stress and/or regret outcomes. Hence, it is possible that the relations between mental health, regret, and decision stress are bidirectional such that poorer mental health is both a predictor of and outcome of experiencing poorer mental health.