Psychological Antecedents of Suicidal Behavior

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This thesis is submitted in partial fulfilment for the degree of PhD

at the

University of St Andrews

18th July 2013
APPROVALS

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I, Shri Cameron, hereby certify that this thesis, which is approximately 63,099 words in length, has been written by me, that it is the record of work carried out by me and that it has not been submitted in any previous application for a higher degree.

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ABSTRACT

While research highlights a number of risk factors for suicide, not all individuals displaying these characteristics will go on to attempt suicide. Depressed mood is a proximal indicator of suicide, with deterioration in already depressed mood increasing the likelihood of a suicide attempt. The overall aim of this thesis was to empirically test the Cognitive Model of Suicide by Wenzel and Beck (2008). This model proposes that each of the three components, dispositional vulnerabilities, mood disturbance and suicide related cognitions, may influence each other to enhance the propensity for a suicidal crisis. The thesis starts by examining the relationship between two personality characteristics (neuroticism and trait aggression) and current depressed mood, and then focuses on the relationship between suicidality and current depressed mood. Although autobiographical memories have been implied as a possible risk factor for suicidality, meta-analytical studies have highlighted discrepancies between sampling techniques which may limit interpretability. Therefore, the first series of studies aimed to establish a protocol for assessing autobiographical memories. The second and third series of studies aimed to investigate whether the relationships between current depressed mood and specific personality factors (neuroticism and trait aggression) were indirectly influenced by other known risk factors that may affect cognitive processing of information (rumination, overgenerality, impulsivity). Moreover, these studies aimed to determine whether the same cognitive processing factors affected current depressed mood in non-suicidal and suicide attempt groups. The final series of studies aimed to determine whether these risk factors (neuroticism, trait aggression, brooding, impulsivity, and overgenerality) mediated the relationship between suicidality and current depressed...
mood. Findings indicated that compared to the non-suicidal group, individuals in the suicide attempt group was more likely to be influenced by the effects of trait aggression and brooding, and that the combination of these factors were positively associated with current depressed mood. In contrast, neuroticism and impulsivity appeared to influence individuals who had experienced suicidal ideation more than individuals who report never having suicidal thoughts or attempting suicide. Compared to the non-suicidal group, however, neuroticism and impulsivity did not show a significant association for current depressed mood in the suicidal ideation group. Findings supported the Interacting Sub-Systems model and are discussed in relation to the Cognitive Model of Suicide model.
PSYCHOLOGICAL ANTECEDENTS OF SUICIDAL BEHAVIOUR

1. General Introduction

1.1 Introduction to thesis

Over the last 50 years researchers have highlighted numerous risk factors for suicide. In their review of the existing literature, Wenzel and Beck (2008b) suggest that while some studies have advanced understanding of suicidology (e.g. Baumeister, 1990a; Joiner, 2005), the majority of research comes from an exploratory perspective and has highlighted a range of different vulnerability factors that are associated with suicide, rather than the underlying pathology. While some of these risk factors have been incorporated into routine assessments following a suicide attempt, not all individuals displaying these characteristics will eventually attempt suicide (Goldstein, Black, Nasrallah, & Winokur, 1991). As such, existing models of suicide, based on these risk factors, yield a high number of false positives and lack in predicative power (Goldberg, Black, & Winokur, 1991). In order to improve understanding of suicide, Wenzel & Beck (2008) suggest that a unified empirical and theoretical perspective is required in order to better understand how these risk factors inter-relate to affect attempted and completed suicides.

Research shows that having a history of suicide attempts is the strongest indicator of a completed suicide (Suominen et al., 2004). The risk of reattempting suicide is thought to be the greatest in the three months following a recent attempt (Hawton & Fagg, 1988). Data from the 2009-2010 Scottish Suicide Database shows that of the 757 completed
suicides, 21.5% had attended an accident and emergency department in the 3 months prior to completing suicide. The breakdown of these statistics are shown in more detail by Figure 1.1. These statistics indicate that the risk of completion is very high in the aftermath of a suicide attempt which resulted in attendance at an accident and emergency department.

Figure 1.1: Percentages of Fatal Suicides following previous suicide attempt based on the 2009-10 Scottish Suicide Database

Studies indicate that current depressed mood is a proximal indicator of suicide risk (Brent et al., 1993), with deterioration in already depressed mood increasing the likelihood that suicidal ideas will be translated into suicide attempts (Wolfsdorf, Freeman, D'Eramo, Oveholser, & Spirito, 2003; Antypa, Van der Does, & Penninx, 2010). Appleby,
Dennehy, Thomas, Faragher, and Lewis (1999) found that individuals who had eventually died from suicide had continued to communicate suicidal ideas following discharge from a psychiatric hospital. Spirito, Valeri, Boergers, and Donaldson (2003) administered a battery of questionnaires, which included measures of depressed mood over the past week, suicide intent, hopelessness and a family assessment, to adolescents who had recently attempted suicide. Following discharge and receipt of outpatient treatment, they completed the same questionnaires at a three month follow-up. Consistent with Appleby et al. (1999), they indicate that depressive symptoms and poor general family functioning and communication were associated with continuing suicidal ideation and re-attempts three months after a suicide attempt. Furthermore, there was no difference in the amount of treatment received between those who continued to experience suicidal ideation and those who did not. Given that communication and social interactions are thought to be influenced by personality characteristics, it seems logical, then, to consider how specific types of personality may affect current depressed mood and suicidal ideation.

In part, difficulties with predication may be associated with the post-hoc identification of risk factors rather than focusing on the cognitive and emotional processes that may have preceded the recent suicide. Wenzel and Beck (2008b) highlight the fact that the majority of prior research utilizes community samples that have attempted suicide in the past, whereas clinicians are often required to make immediate decisions about suicidal tendencies.
From previous findings it is clear that depressed mood at the point of discharge may be an important factor in determining the probability of future suicide attempts. Understanding what contributes to depressed mood at the point of discharge, however, remains an under researched area. Moreover, little is known about how previously identified risk factors may affect cognitive processing following a recent suicide attempt, and their relationship to current depressed mood.

Clearly, it is not possible to explore, systematically, all the risk factors that have been proposed for suicide, and such an endeavor would not be based on theory. In this thesis, the focus will be on current depressed mood, which is a proximal indicator for suicide and the influence of two particular personality characteristics, namely neuroticism and trait aggression. Neuroticism is defined as an overly emotional response to challenges or difficult situations whereas trait aggression refers to an increased propensity to perceive and react in an overly angry manner. Both of these characteristics are reported to be highly prevalent in suicidal groups and have been associated with current depressed mood (Wenzel & Beck, 2008a; Gvion & Apter, 2011; Dutton & Karakanta, 2013). Both traits have also been shown to predispose individuals to interpreting events in a more negative manner (Chan, Goodwin, & Harmer, 2007a; Bushman, Bonacci, Pederson, Vasquez, & Miller, 2005). For each trait, the direct and indirect impact on current depressed mood was investigated, using mediators that have been highlight by prior research to increase suicide risk. Investigating direct and indirect relationships allows us to determine whether the relationships observed between the factors of interest are a consequence of a direct association between the predictor and outcome variable or a
consequence of other closely related risk factors that may serve as intermediaries in this relationship. Investigating indirect factors also allows for comparisons to be made between mediating factors in order to determine which mediating risk factors have the greatest influence on the direct relationship, and whether this remains the same for different groups and negative mood states.

Statement of Thesis Aims:
The overall aim of this thesis is to, namely, empirically test the theoretical model proposed by Wenzel and Beck (2008b). This is because their model is the only model, to date, which attempts to explain how different risk factors may affect different aspects of cognitive processing and suicidality. The assumptions made by this model are introduced in section 1.2. This is done through the following experimental exploratory analyses:

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<td>The first series of analyses aim to establish a protocol for sampling overgeneralized personal memories. Prior research suggests that suicidal groups show a tendency to recall their personal memories in an overly generalized manner (Williams &amp; Broadbent, 1986b). Research also indicates that personal memories play a role in shaping trait and state characteristics in order to form expectations about future events (Clark &amp; Teasdale, 1985; Conway &amp; Pleydell-Pierce, 2000). Meta-analytical studies, however, indicate that the discrepancies between sampling techniques limit what can be interpreted about the influence of autobiographical memory specificity on pathology (Vreeswijk &amp; Wilde,</td>
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Section 3.2 Do recall instructions, retrieval strategies and timings influence autobiographical memory specificity?

Section 3.3 Does cue valence and response latency influence autobiographical memory specificity?

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The second and third series of exploratory analyses investigate the direct and indirect relationships between current depressed mood and two personality characteristics, neuroticism and trait aggression. Neuroticism refers to a heightened emotional response towards negative events whereas trait aggression refers to the tendency to engage in aggressive behavior or experience angry moods.

In these analyses, autobiographical memory specificity and rumination, which refers a tendency to repeatedly think over past events without taking action, are proposed to be indirect mediators given their association with low mood and suicidality (Williams et al., 2007b). Impulsivity is included as a third mediator in the aggression studies given the close relationship between these constructs. As such, it is expected that each of the indirect factors will exert a positive and additive effect on already depressed mood.
### Neuroticism analyses

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### Trait Aggression analyses

| Section 5.1 | Findings from the NS group |
| Section 5.1.3 | Thematic analysis of transcripts from the NS group |
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### The relationship between suicidality and current depressed mood

The final series of empirical analyses use previously developed model to compare which cognitive factors, -neuroticism, trait aggression, brooding, overgenerality and impulsivity, - have the greatest effect on current depressed mood in three different suicide groups (NS, SI, SA).

To ensure that this model is specific to the effects of current depressed mood, the model is also run replacing current depressed mood with two other negative states as other potential outcome factors.
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<td>Section 6.3</td>
<td>Findings for suicidality-current depressed mood relationship, after controlling for trait aggression and reflection</td>
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<td>Section 6.4</td>
<td>Findings for suicidality-current depressed mood relationship, after controlling for reflection.</td>
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In order to understand the theoretical context to these analyses, the introduction starts by discussing the ‘theoretical model of suicide’: how trait and state factors may influence cognitive processing and suicidal cognitions. Two competing theoretical models (the interacting cognitive sub-systems and the self-memory system) are presented next to provide a broader understanding of how trait, states and autobiographical memories may influence each other. Although there are other models of autobiographical memory, the self-memory and the interacting cognitive sub-systems models are the most commonly used and are able to explain how personality and autobiographical memories may exert a reciprocal effect on each other. This reciprocal interaction between personality and autobiographical memory occurs as a result of three main components, formation of personality characteristics, mood regulation and mood monitoring. Figure 1.2 provides a conceptual overview of these components and their underlying processes.
Each model proposes that novel and re-occurring events help to formulate personality traits. This allows assumptions and expectations about events and situations to be generated. Personality, however, can also influence how these events and situations are appraised, which effects mood regulation and monitoring. A justification for the statistical models used, along with the general methods section, is presenting before the empirical analysis.
1.2 Cognitive Model of Suicide (Wenzel & Beck, 2008)

The Cognitive Model of Suicide by Wenzel and Beck (2008) provides a conceptual framework of understanding how previously identified risk factors may interact to increase the propensity for suicide, as shown in Figure 1.3. Crucially, this is not to say that all individuals displaying these risk factors will go on to attempt suicide. Rather, the cognitive model proposes three components which interact to increase the propensity of a ‘suicidal crisis’ (Wenzel & Beck, 2008).

Figure 1.3: Cognitive model of suicidality (Wenzel & Beck, 2008)

- e.g. pessimistic outlook on life, impulsivity, aggression, problem solving, coping styles
- e.g. severity and intensity of already negative mood, perceived inability to reduce negative mood, hopelessness and helplessness, inability to imagine future events
- e.g. ruminative thinking, poor social problem solving, deficits in autobiographical memory recall, impulsive reactions, difficulties in regulating negative mood, intensity and frequency of negative mood, perceived efficacy at coping
The first component relates to dispositional vulnerabilities that convey a generic risk for increased mood disturbances by affecting the way individuals think or feel about events. These dispositional vulnerabilities could relate to personality characteristics, modes of thinking or information processing biases that may affect already negative mood and how individuals may respond to difficult life events. The second component relates to cognitions associated with mood disturbances. According to this model, having frequent and intense mood disturbance related cognitions over time would increase the likelihood of activating suicide related cognitions, which is the third component. Suicide related cognitions refer to the content of suicidal thoughts and the way that information processing occurs during a suicidal crisis. These cognitions may relate to hopelessness, feelings of defeat, entrapment (Taylor, Gooding, Wood, & Tarrier, 2011) and an inability to imagine future events, irrespective of whether the imagined future is positive or negative (Williams, Ellis, Tyers, & Healy, 1996; Williams, Crane, Barnhofer, & Duggan, 2005). According to this model, determining when the crossover from thinking about suicide to actually attempting suicide depends on individual differences in the ability to tolerate distress. These individual differences depend on the number of underlying dispositional vulnerabilities an individual has, and mood disturbance associated cognitions.

According to this model, this means that individuals who have more dispositional vulnerabilities and mood disturbance related cognitions may feel less able to cope with psychological distress and would have a higher propensity for engaging in suicidal behavior under the context of high life stress. While the cognitive model attempts to
integrate isolated risk factors identified by prior research into a conceptual framework, no empirical studies have been conducted, as yet, to test for these proposed inter-relationships between different factors.

Other models of suicide, such as the interpersonal model of suicide (Joiner Jr, Van Orden, Witte, & Rudd, 2009) or the escape model (Baumeister, 1990b) have been subject to more empirical testing and through studies, have been associated with various risk factors. According to the interpersonal model of suicide, suicidal thoughts arise from a desire for suicide, possibly due to perceptions of not belonging, thwarted goals and being a burden on others. The capacity for attempting suicide, however, gradually develops through exposure and tolerance for pain. Similarly, Baumeister’s ‘escape from the self’ model proposes that suicide represents a means of escaping personal failures, perceived inadequacies and psychological pain. Not all individuals, however, will make the progression from suicidal ideation to suicidal behavior. Likewise, not all individuals showing these risk factors will attempt or experience suicidal ideation. As such, the Cognitive model of Suicide represents the only model, to date, which is able to specify in enough details why some individuals displaying certain risk factors will attempt suicide whereas others may not.
1.2.1 The effects of neuroticism, rumination and overgenerality on current depressed mood and suicidality

Neuroticism can be defined as emotional lability. When confronted with stressors in everyday contexts, individuals rating high on neuroticism, compared to low raters, tend to respond in a highly emotional manner, with this negative mood carrying over onto subsequent tasks (Suls, Green, & Hillis, 1998). According to Eysenck (1967) and Gray (1970b), this is because some individuals, i.e. those rating high on neuroticism, may experience negative emotions more intensely and perceive them to be more negative than others due to an overly sensitive limbic system (Stelmack, 1981), with this emotional arousal taking longer to dissipate following a negative experience. Their studies also indicate that because of this emotional reactivity, individuals rating high on neuroticism have a greater sensitivity to punishment and threats (Corr, 2008), and as such may be more motivated to avoid punishment and perceived threats. In support, a more recent meta-analysis indicates that neuroticism is associated with brain regions responsible for fear learning, responsiveness to aversive stimuli and the regulation of emotions (Servaas et al., 2013).

Studies also show neuroticism to be linked to an increased propensity for developing major depressive disorder (Kendler, Kendler, Gatz, Gardner, & Pedersen, 2006) and suicidality through longitudinal and twin studies (Statham et al., 1998; Fergusson, Woodward, & Horwood, 2000) as well as being implicated in re-admission rates following a previous suicide attempt (Enns, Cox, & Inayatulla, 2003a). More recent twin studies suggest that while cortisol levels and neuroticism have genetic components, they
do not affect each other (Riese, Rijsdijk, Snieder, & Ormel, 2013. Despite this, the authors note that there may be genetic overlaps between neuroticism and heart rate variability and baroflexsensitivity and suggest that high levels of neuroticism may be associated with the cardiac autonomic nervous system. The sensitivity to negative words, however, was thought to be related to environmental influences rather than genetic influences.

Due to the punishment-sensitive aspect of neuroticism (Corr, 2008), it may be that individuals with higher levels of neuroticism would be most likely to appraise distressing events as being intolerable (de Bruin, Rassin, & Muris, 2007) or feel unable to cope when faced with stressful life events (Larsen & Ketelaar, 1991). Alternatively, it may be that individuals rating high on neuroticism may be more likely to appraise events as being negative. For instance, when presented with ambiguous situations, individuals rating high on negative affect are more likely to interpret these as being threatening or negative compared to low raters (Watson & Clark, 1984). Gunthert, Cohen, and Armeli (1999) also indicate that individuals rating high on neuroticism tend to experience emotional distress because of their negative self-appraisals, and that this relationship between stress sensitivity-perceived coping ability could maintain depressed mood in everyday contexts. Recalling negative memories more frequently (Lishman, 1974) may also impact on emotional distress and personal beliefs about emotional tolerance.

As well as contributing to fluctuations in negative mood (Williams, 1990), neuroticism is also associated with increased vulnerability for developing more severe and chronic
episodes of depression (Berlanga, Heinze, Torres, Apiquín, & Caballero, 1999). Similarly, longitudinal studies suggest neuroticism to be a key risk factor that predates the development of depressive disorders (Os & Jones, 1999). Crucially, these longitudinal studies show that neuroticism is associated with increased vulnerability for depression, even after controlling for negative life events, indicating that it is not the life event itself but rather the underlying, negative, appraisal mechanisms that increase vulnerability for depression (Ormel, Oldehinkel, & Brilman, 2001).

In terms of discriminant reliability, Judge, Erez, Bono, and Thoresen (2002) show that neuroticism overlaps with other trait constructs such as self-esteem, locus of control and self-efficacy. The authors suggest that given the commonality between these factors, self-esteem, locus of control and self-efficacy may relate to broader indicators of neuroticism and that neuroticism may represent a hierarchal construct of core negative self-evaluations. Other authors suggest that emotional instability and neuroticism may be related but distinctive constructs (Bagge et al., 2004; Kamen, Pryor, Gaughan, & Miller, 2010). For instance, Miller, Vachon, and Lynam (2009) show that emotional instability may overlap with aggressiveness, impulsivity and anti-social personality characteristics. Moreover, they show that the outward facets of neuroticism, specifically neurotic hostility and impulsivity components, combined with low levels, and anti-social aspects, of agreeableness were able to predict affective stability. The authors also indicate that although neuroticism and emotional stability domains may be expected to overlaps with negative mood states, such as depression and angry, there was no evidence from their data for this or from other emerging data (Kamen et al., 2010). As such, neuroticism and
mood state may be related but remain to be distinct constructs (Bowen, Wang, Balbuena, Houmphan, & Baetz, 2013)

Though there is clear evidence for links between neuroticism and depression, the cognitive mechanisms which underlie this relationship remain poorly understood (Berlanga et al., 1999). This is important because not only has depressed mood been highlighted as a major risk factor prior to a suicide attempt, but depressed mood following a recent suicide attempt has been linked to reattempting suicide (Brent et al., 1993; Goldston et al., 1999). This link between depressed mood and suicidality could relate to a time limited effect of increased depressed mood (Wolfsdorf, Freeman, D’Eramo, Oveholser, 2003) or heightened cognitive reactivity, where suicide related cognitions are reactivated more readily following an increase in already negative mood (Antypa et al., 2010). Both potential explanations are in line with the theoretical predictions made by the cognitive model of suicidality.

Rumination and deficits in autobiographical memory specificity represent two cognitive risk factors that have been observed in suicidal groups and consistently shown to affect depressed mood. Given that rumination, overgenerality and neuroticism occur in psychologically healthy and clinical populations alike, they could, hypothetically, maintain the relationship between neuroticism and depressed mood in groups who report never experiencing suicidal ideation or attempting suicide as well as suicidal groups (SI and SA). The conceptual relationship between these factors is shown in Figure 1.4.
Rumination is defined as repeatedly thinking over past events in a passive manner i.e. without taking action, by focusing on the emotional aspects of an event and comparing oneself to an idealized standard (i.e. ‘I ask myself “Why can’t I handle things better?”’) in the case of brooding, or a reflective problem-focused thinking style e.g. ‘I analyze recent events to try to understand why I am depressed’ (Treynor, Gonzalez, & Nolen-
Hoeksema, 2003). Rumination is thought to increase psychological distress because of several inter-related mechanisms. First, ruminating over past events enhances the likelihood of recalling negative mood congruent thoughts. Second, rumination is shown to reduce the efficacy of problem solving techniques in depressed populations (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008), with poor problem solving increasing suicide risk. In support, studies indicate that suicidal groups tend to produce fewer and more passive solutions to problems (Pollock & Williams, 2004a) and that depressed mood mediates the relationship between efficacy at problem solving and suicidal ideation (Reinecke, DuBois, & Schultz, 2001). Consequently, this increases the likelihood that ruminators, compared to distractors, will provide more negative explanations for personal, imagined difficulties and be more negative about future events (Lyubomirsky & Nolen-Hoeksema, 1995) which may increase feelings of hopelessness (Lam, Schuck, Smith, Farmer, & Checkley, 2003: Eshun, 2000).

According to Barnhofer & Chittka, (2010), rumination also mediates the relationship between neuroticism and depressive symptoms in individuals who had never been depressed and those in remission from depression. There is also evidence from other studies to suggest that combining neuroticism with a ruminative thinking style amplifies negative self-schema and emotional responding (Ciesla, Felton, & Roberts, 2011), resulting in more negative, emotional content (Hervas & Vazquez, 2011). Like neuroticism, rumination has also been associated with a rigid, inflexible thinking style (Davis & Nolen-Hoeksema, 2000). Studies also show that inducing ruminative thinking in individuals with dysphoria results in greater self-criticism and negativity about their
ability to overcome difficult situations, appraising them as being overwhelming and unmanageable (Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky, Tucker, Caldwell, & Berg, 1999b). Collectively, these studies suggest that the relationship between neuroticism and rumination not only increases emotional reactivity but also cognitive reactivity towards stressors, with these heightened responses potentially explaining why neuroticism and rumination may increase the severity of already depressed mood (Nolan, Roberts, & Gotlib, 1998).

Whilst meta-analytical studies on depression consistently find brooding to be a more maladaptive form of ruminative thinking (Watkins, 2008), a systematic review conducted by Morrison and O’Connor (2008) provides a more conflicting picture of the relationship between ruminative thinking styles and suicidality. For instance, in a prospective study using a within subjects community sample (n=232), O’Connor and Noyce (2008) showed that brooding was more strongly related to suicidal ideation at a three month follow up, compared to reflection. Secondly, that brooding, but not reflection, mediated the relationship between self-criticism and suicidality. Surrence, Miranda, Marroquin, and Chan (2009), also using a community sample, investigated differences in rumination styles and suicidal ideation between groups of suicide attempters (n=37), suicide ideators (n=16) and non-suicidal individuals (n=43). Their findings indicate that reflection, but not brooding, significantly indicated suicidal ideation among suicide attempters, with this interaction explaining seven percent of the variance in suicidal ideation scores.
In contrast, Crane, Barnhofer, and Williams (2007) aimed to investigate the effects of increasing, or reducing, an analytical ruminative thinking style, such as brooding, on autobiographical memory specificity in three groups of formerly depressed individuals who had previously attempted suicide (n=10), experienced suicidal ideation (n=11) and individuals who had not experienced suicidal ideation (n=11). The main findings indicate that inducing individuals into an analytical style of thinking reduced the level of detail reported in personal memories in previously depressed individuals who rated high on depressive rumination measures. This is important because other studies suggest that being able to access detailed personal memories allows access to context specific information which may aid problem solving (Pollock & Williams, 2004b). In terms of rumination, although the authors report no main effect, they did observe a significant interaction between group type and scores on the rumination sub-scales. Their findings indicate a trend for the non-suicidal group to rate higher on the reflection subscale compared to suicidal ideators and attempters. While subsequent comparisons within each group indicated a trend for suicide attempters to score higher on brooding compared to reflection subscales, there was no difference between ruminative thinking styles for suicide ideators. The authors conclude that, in contrast, to previous findings the suicidality groups did not rate higher on brooding. Within each group, however, there was a difference in whether individuals engaged in either reflective rumination or brooding with never suicidal individuals rating higher on reflection and suicide attempters on brooding. One explanation for the authors’ non-significant findings may relate to the study being under powered, not having a large enough sample to detect a significant correlation. In their longitudinal study, Miranda and Nolen-Hoeksema (2007b)
observed that the relationship between suicidal ideation and brooding was partially mediated by depression symptoms at baseline, but not reflection. One year later, both brooding and reflection remained significant predictors of suicidal ideation, after controlling for depression.

Given that brooding and reflection represents a focus on either emotions or problems, being able to distinguish which style of ruminative thinking effects the pathway between neuroticism and current depressed mood may have important implications when considering therapeutic interventions. Moreover, though there is evidence for the meditational relationship between neuroticism, rumination and depressed mood, this relationship cannot account for the total observed variance, suggesting that there may be other indirect factors, aside from rumination that maintain the relationship between neuroticism and depressed mood (Roelofs, Huibers, Peeters, & Arntz, 2006).

Overgeneralized personal memories could represent another additional, indirect, mediating factor between neuroticism and current depressed mood because of the links between ruminative thinking, deficits in autobiographical memory specificity and depressed mood. There is evidence to indicate that suicidal groups show a tendency to preferentially recall personal memories in an overgeneralized format (Williams & Broadbent, 1986a). This means that instead of recalling discrete personal memories (e.g. ‘last Sunday, I had a fight with my partner’), such individuals may recall memories for non-descript time-periods (e.g. ‘my partner and I always fight’). While theorists propose that recalling overgeneralized memories could provide a functional benefit, as a means of
passively avoiding distressing emotions (Williams et al., 2007b), a preferentially reliance on this retrieval style is also shown to have its drawbacks in terms of reduced social problem solving skills in suicidal groups and poorer imaginability for future events (Williams et al., 1996), both of which are highlighted as critical contributing factors to attempting suicide.

Given that rumination and overgenerality are both associated with negative thinking patterns, it may be that rumination and overgenerality represent two different cognitive aspects of a shared negative perceptual processing style. Questioning and focusing on past event in a brooding style (e.g. ‘I ask myself “why do I always react this way?”’) combined with accessing only generic, abstract and summative personal memories (e.g. always feeling sad) means that both aspects of the process are likely to interact to increase depressed mood. Thus, it seems feasible that these processes of recalling overgeneralized memories and ruminating would increase current depressed mood in individuals who are most sensitive to negative emotions, as measured by neuroticism.

1.2.2 The effects of trait aggression, rumination, impulsivity and overgenerality on current depressed mood and suicidality

Although the research on the relationship between trait aggression and current depressed mood is limited, studies do show a high degree of comorbidity between aggressive behavior and depressed mood, which has led to suggestions that for certain individuals the expression of aggressive behavior may not only be a precursory indicator of depressed mood, but it may also be the primary source of difficulty that maintains the depressive episode (Van Praag, 1998, 2001). In support, research has shown that
depressive symptoms correlate with proactive aggression scores and bullying (Roland, 2002), spousal aggression (Bland & Orn, 1986) as well as spousal homicide (Belfrage & Rying, 2004). A study conducted by Maiuro, O'Sullivan, Michael, and Vitaliano (1989) indicates that while suicidal and assaultive males both show depression symptoms, the former group was associated with higher ratings for covert hostility whereas the latter showed a preference for overt hostility. Findings by Cautin, Overholser, and Goetz (2001) also support this by indicating that both suicide attempts and depression scores were related to ‘anger in’ scores. Similarly, Bridewell and Chang (1997) suggest that depression and anxiety scores were strongly associated with internalized, or suppressed anger, followed by difficulties in controlling anger. Therefore, these studies suggest that although anger and trait aggression are typically associated with externalized blame, this may not always be the case.

One possible explanation for the relationship between aggression and depressed mood might relate to the effects of rumination, which may enhance feelings of frustration at thwarted or blocked goals. Peled and Moretti (2010) examined the relationship between aggression, sadness rumination and angry rumination. Their findings indicate that sad and angry rumination correlated with each other, and that collectively the two types of rumination were able to predict externally displayed aggression. The authors conclude that sad rumination, which is typical observed in depressed groups, can turn into angry rumination, and that angry rumination may be a preceding factor for aggressive behavior. Therefore, it may be that variations in trait aggression levels, and rumination, may result in cognitive process in which there is a switch between self-blame and externalized
blame for the emotional state (Revitch & Schlesinger, 1981). In support, Vansteelandt and Van Mechelen (2006) suggest that the feelings of sadness and angry may co-occur in response to the same event, for instance, self-blame for an angry situational response. Moreover, the authors suggest that there appears to be no distinctive situational features or appraisals that differentiate between feelings of sadness and anger. As such, it may be that depression is associated with generic emotional reactivity, whether this may be an aggressive or depressive outlook on life, which in turn causes an intensity of emotions (Dutton & Karakanta, 2013). Rumination may add to this relationship between trait aggression and depressed mood by increasing negative self-appraisals as well increasing the likelihood that events are appraised as being overwhelming (Lyubomirsky & Nolen-Hoeksema, 1995).

Another component in the relationship between trait aggression and current depressed mood may be impulsivity. Trait aggression and impulsivity are considered to be key features of suicidal behavior. There is some contention, however, as to whether these personality characteristics represent a unitary dispositional vulnerability towards suicide (Mann, Waternaux, Haas, & Malone, 1999b; Mann & Currier, 2009; Seroczynski, Bergeman, & Coccaro, 1999) or whether each personality characteristic represents a different dimension of vulnerability (Critchfield, Levy, & Clarkin, 2004). Perround et al. (2009) found that individuals diagnosed with major depressive disorder and a past history of suicide attempts had higher impulsivity and lifetime aggression ratings compared to individuals with major depressive disorder who had never attempted suicide, implying a link between aggression, impulsivity and depression. Keilp et al. (2006) conducted one of
the few studies which collectively investigated the impact of impulsivity and trait aggression on suicidal groups. Their findings indicate that trait aggression remains to have the strongest predictive power when comparing individuals who have attempted suicide versus non-attempters, after controlling for borderline personality disorder diagnosis.

In part, this overlap between trait aggression, impulsivity and negative mood may relate to serotonergic pathways. Studies show that in individuals who were already predisposed to aggressive behavior, depletion of serotonin levels were associated with increased aggression and decreased co-operation (Cleare & Bond, 1997). In contrast, higher levels of serotonin were associated with decreased hostility and more pro-social behavior in these individuals (Cleare & Bond, 1997). As well as being associated with suicidality and depressed mood, low levels of serotonin have been shown to increase angry outbursts in a subset of depressed groups (Fava et al., 2000) and reduce levels of effortful control (Carver, Johnson, & Joormann, 2008). Figure 1.5 provides a diagrammatic representation of these overlaps.
The association between impulsivity, aggression and suicidality could be explained by differences in effortful control, which is a key feature of impulsivity. According to cognitive models, information can be processed in an impulsive and reactive manner, with interpretation of events based on current situational cues and schematic associations, or in a more reflective, logical and deliberative manner (Epstein, 1994). While individuals may
have a tendency for one processing style over the other, this information processing
tendency can be overcome by increased effortful control (Carver et al., 2008).

Studies show that low levels of effortful control indirectly strengthen the relationship
between rumination and depressive symptoms (Verstraeten, Vasey, Raes, & Bijttebier,
2009). Similarly, research suggests that impulsive aggression is more likely in individuals
who have difficulties with effortful control and tend to ruminate over their angry
thoughts (Denson, Pedersen, Friese, Hahm, & Roberts, 2011). Given that trait aggression
is a reliable predictor of reactive aggression (Bettencourt & Miller, 1996), it may be that
the overlap between aggressive behavior and depression could be due, in part, due to
these difficulties with effortful control, which is facet of impulsivity (Rothbart, Ellis,
Rosario Rueda, & Posner, 2003). As such, these studies imply that only does effortful
control exert an influence on how information is processed but it may also play a role in
regulating emotions and behavior (Barkley, 1997, Muraven & Baumeister, 2000 and
Vohs, Baumeister, & Ciarocco, 2005), with specific cognitive constructs, such as
rumination and impulsivity, exerting extra demands on levels of effortful control.

While studies show overlaps between trait aggression, impulsivity and rumination
(Rusting & Nolen-Hoeksema, 1998: Konecni, 1974), few studies have considered the
impact of trait aggression on autobiographical memory specificity, and whether memory
accessibility may indirectly affect the relationship between trait aggression and current
depressed mood. There is evidence to suggest that individuals who have a propensity for
aggressive behavior are able to recall more detailed, anger associated cognitions
Anderson & Bushman, 2002; Berkowitz, 1983, Berkowitz, 1993c; Huesmann & Guerra, 1997) and memories faster than those without this predisposition (Todorov & Bargh, 2002a). Moreover, rumination has been shown to intensify angry feelings, and increase the propensity of angry behavior, due to prolonged exposure to mood congruent information (Bushman et al., 2005). These studies suggest that autobiographical memories could represent an important factor in maintaining this internal negative mood.

Only one study conducted by Wenzel and Jordan (2005), to our knowledge has explored the effect of trait aggression on personal memories. This study, however, was conducted using a psychologically healthy population. Wenzel and Jordan (2005) findings indicated that individuals rating high on trait anxiety and aggression judged their retrieved memories as being more negative but there was no difference in terms of specificity, time taken to recall a memory and the emotional content of the reported memories compared to low scorers.

Notwithstanding, regardless of how memory accessibility is enhanced, what is clear is that the probability of aggressive behavior or angry feelings can be intensified or maintained through a series of additional cognitive mechanisms, such as rumination and impulsivity, which may also affect autobiographical memories. Firstly, ruminative thinking may exacerbate any interpretative bias by capturing attention for hostile contextual cues and repeatedly thinking things over in a passive manner. This increased self-focus may maintain aggressive behavior over time. Secondly, variations within an individual’s ability to exert effortful control over these automatic cognitions will
determine if an expression of anger is displayed (Eisenberg & Spinrad, 2004, Posner & Rothbart, 2000). Rather than looking at the relationship between trait aggression and autobiographical memory in terms of moderation, as Wenzel et al. (2005) did, the proposal here is to analyze the relationship between trait aggression and current depressed mood to determine whether rumination, impulsivity and / or overgenerality mediate the relationship between trait aggression and current depressed mood. As such, the focus is not on how the relationship occurs, which is the case in moderation studies, but rather why a relationship between trait aggression and current depressed occurs and what maintains it.

Given that rumination, impulsivity and overgenerality are associated with mood disturbances, we expect that the indirect effects of these mediating variables will be most apparent in individuals who have attempted suicide compared to the non-suicidal (defined as no history of suicide ideation or attempts). It is expected that different personality traits (e.g. neuroticism and trait aggression) will change the mediating pathway for current depressed mood.

1.2.3 Overlaps between trait aggression and neuroticism

Hennig, Reuter, Netter, Burk, and Landt (2005) conducted a factor analytical study of the Buss–Durkee Hostility Inventory (Buss & Durkee, 1957). Their findings indicated that the overlaps between neuroticism and trait aggression could be subdivided into Neurotic Hostility or Aggressive Neurotic, with the former showing lower levels of
serotonergic activity. The authors suggest that the low levels of serotonergic activity in aggressive neurotics may relate to emotional instability without feelings of guilt, with guilt being a feature of neuroticism. Similarly, Siegel and Crockett (2013) suggest that serotonin may be involved in the activation or inhibition of behavior when presented with aversive situations, moral reasoning and pro-social behavior, though this may depend on underlying personality characteristics. Low levels of serotonin, in combination with personality characteristics that would be more likely to endorse harm, are thought to increase the endorsement of harm and show blunted responses to moral decision making. In contrast, personality characteristics that may enhance withdrawal-related emotions, such as guilt or disgust, would be less likely to engage in harmful actions to others (Ugazio, Lamm, & Singer, 2012).

These overlaps have also been observed in other studies (e.g. Greenberg et al., 2000) and suggest that some facets of neuroticism and aggression may overlap to form a reactive type of aggression, which is likely to be incited under provocation or under stressful conditions (Bettencourt, Talley, Benjamin, & Valentine, 2006). As such, in each of the analyses, either neuroticism or trait aggression is controlled for, in order to ensure that the overlaps between neuroticism and trait aggression do not influence the findings.
I.3.1 Theoretical Models of Autobiographical Memory

Rather than being an independent store, neuropsychological data suggests that autobiographical memories are integrated within multiple neural networks and show overlaps with semantic and episodic memory (Tulving, 2002). For instance, searches for autobiographical information and retrieval have been associated with left lateral prefrontal cortex, information monitoring with the ventromedial prefrontal cortex and self-referential processing with the medial prefrontal cortex (Cabeza & St Jacques, 2007). Similarly, neuropsychological data indicate that brain regions involved in the processing of emotion vary as a consequence of certain personality characteristics (e.g. Cremers et al., 2010; Kramer, Buttner, Roth, & Munte, 2008). As such, it is feasible that personality constructs and autobiographical memories may influence each other.

Two competing models of autobiographical memory are presented to provide a contextual understanding of how personality characteristics, personal memories and mood states may affect each other. These models are the interactive cognitive sub-systems and the self-memory systems model.

Each model proposes that personality characteristics and autobiographical memories may influence each other in a reciprocal manner, through a series of positive and negative feedback loops. As a result of this interaction, personality characteristics can influence
autobiographical memory through encoding, retrieval or attentional processes, which in turn can influence mood states.

The main differences between the two models are that:

- The interacting cognitive sub-systems model suggests that positive and negative memories should be processed in a similar manner. Personality characteristics which increase self-focus and focus on emotional aspects, however, may influence the level of contextual detail that may be encoded. Consequentially, it may be more difficult to determine similarities and differences between events when memories have been processed based on experiential emotional themes.

- The self-memory system, in contrast, suggests that previously stored memories are aligned to personal goals, subjective expectations about a life should be lived and how the life is actually being experienced. In order to maintain a coherent sense of self, memories that conflict with personal goals should show reduced accessibility. In particular, this may apply to some types of event specific negative memories that may be too distressing, or conflict with personal goals. As such, during retrieval, a search for event specific information may be aborted prematurely at an overgeneral level.

### 1.3.1 The Interacting Cognitive Subsystems (ICS: Teasdale & Barnard, 1993)

Unlike the Self Memory Systems model which is discussed next, the interacting cognitive sub-systems model does not imply that trait-state congruent recall will always happen, or that trait-state congruent recall will occur for all emotions. Rather, the interacting cognitive sub-systems model suggests that retrieval will occur in a similar manner for all
emotions. As such, retrieval would depend on the level of detail and the number of different salient features that were associated with a given emotion during encoding. That is, the different types of sensory codes attached to an emotion, information about the circumstances under which an emotion is expressed and the exceptions to this. These features depend on the sub-system used to process the event, which, in turn, relies on underlying trait characteristics. This means that depending on encoding differences, trait-state congruent recall could be enhanced or decreased (Clark & Teasdale, 1985).
Moreover, according to this model, memories that are consistent with the individual’s beliefs about their own traits and current mood state would not only have a higher probability of being retrieved but they would be more likely to be incorporated into mood- or trait-dependent schematic models. As such, unlike the self-memory systems models, the interacting cognitive sub-systems model propositions suggest that trait characteristics such as neuroticism and trait aggression should affect memory recall in the same manner.

The interacting cognitive sub-systems model suggests that this process arises because of two interactive sub-systems, the implication and propositional cognitive sub-systems. Both sub-systems are responsible for detecting patterns from lower order sensory codes, transforming these into higher order codes and then event meanings. Each sub-system, however, processes different types of information. The implicational subsystem processes contextual details, such as emotional contexts and schematic relationships, and is responsible for detecting differences between events. This, for instance, may include conditions under which specific emotions are, and are not, expressed. In contrast, the propositional subsystem is responsible for experiential processing (e.g. emotions and cognitions associated with feelings of anger or loss). Thus, the overall function of these sub-systems is to transform detailed lower level codes, from the primary senses, into event meanings through a series of interactions, as shown in Figure 1.6
Crucially, according to this model, each sub-system has the ability to exert dominance over the processing cycle. This dominance, of one sub-system over the other, depends on underlying trait and state characteristics of the individual. This means that one sub-system can assume an executive role, depending on personality traits and current mood, to create a distinctive emphasis to the memory. For example, if the implication subsystem dominated the processing cycle then information would be processed according to event specific details i.e. what makes this event different from other events. Information would then be passed to the propositional subsystem which would add to it the subjective event experience. This would produce specialized self-schemas associated with the experienced event which contains detailed information about the context, for instance, how it differed from other events as well as how the person felt or experienced that event.
In contrast, if the propositional subsystem dominated the processing cycle then lower level codes would be processed only according to their general subjective themes (Teasdale, Taylor, Cooper, Hayhurst, & Paykel, 1995). This means that when these subjective codes are passed to the implicational sub-system, they are processed without context specific details. In other words, events are given a generic subjective meaning. For individuals who have a have a pre-dispositional tendency towards viewing situations in a negative manner, this may mean that the event is processed and remembered based on the emotional experience of that event.

These personal memories would then be categorized as being consistent or inconsistent with previously held self-schemas (Teasdale & Barnard, 1993, p50) i.e. ‘this is typical or not typical of me’ by the representational subunit. The representational subunit uses contextual and emotional discrepancies between current and previous memories to highlight rules and exceptions to events i.e. ‘this is typical/ not typical of me under this context’. This produces a more specialized self-schema for a particular event which, in turn, may help with decision making or problem solving.
Having detailed, specialized self-schemas, in turn, influences the level of detail recalled in autobiographical memories (Eldridge, Barnard, & Berkerian, 1994). If events were only processed according to experiential details, which would be the case if the propositional subsystem dominated the processing cycle, then these undifferentiated or generalized, self-schema would not contain rule exceptions. These generalized self-schemas, in turn, would be evident in retrieval as overgeneralised autobiographical memories, defined as personal memories for an event which lasts longer than 24 hours (i.e. ‘I always feel sad’ vs ‘I felt sad last Saturday when my team lost at football’).

In summary, the interactive cognitive sub-systems model suggests that autobiographical memories are processed via two mutually exclusive sub-systems that transform lower order sensory information into higher order codes. The level of detail assigned to processed memories determines autobiographical memory specificity. Meanings are derived by associating events with emotional responses, and the conditions under which these emotional responses occur based on prior knowledge. This suggests that the meanings ascribed to emotions are individualistic. Different individuals may attach different meanings to different emotions and as such, different levels of detail. The level of detail contained in autobiographical memories allows general and specialized self-schemas to develop, which combine to form trait and state characteristics. These traits and states subsequently influence the encoding and retrieval of autobiographical memories. While, the interacting cognitive sub-systems model proposes that there should be no difference between the way positive and negative memories are retrieved, the processing of event meanings is dependent on previously held trait and states self-
schemas. Under conditions of increased rumination or emotional sensitivity, this may lead to personal memories being processed according to less detailed self-schemas (Watkins & Teasdale, 2001). A consequence of these undifferentiated self-schemas would be overgeneralized autobiographical memories.

The effects of neuroticism, trait aggression, rumination and autobiographical memory specificity on depressed mood

According to Eysenck (1967) and Gray (1970a), neuroticism is a personality characteristic that is associated with a restrictive behavioral repertoire, avoidant coping and increased self-focus (Rogers, Kuiper, & Kirker, 1977; Markus, 1977; Kuiper & Rogers, 1979). Being more self-focused, according to the interactive cognitive sub-systems, means that events meanings would only be processed according to their subjective meaning rather than containing more detailed information as to what kinds of events do and do not provoke certain types of emotions. Having a lack of detailed contextual information, in turn, may affect the types of behavioral and coping strategies used under stressful conditions (Eysenck, 1967) as well as problem solving efficacy. Therefore, hypothetically, the limited behavioral repertoire associated with neuroticism could be a due to a lack of experience because of an avoidant coping style or a difficulty in recalling event specific memories, or a combination of both.

Moreover, when feeling depressed, research shows that individuals rating high in neuroticism are likely to respond to this by ruminating over the causes and consequences of the event in a passive manner and engage in negative thinking patterns (Lau, Segal, &
Williams, 2004; Scher, Ingram, & Segal, 2005), irrespective of prior depression history (Teasdale, 1988). Crucially, while ruminating may reflect an attempt to solve the causes of low mood, it is still a passive process, which, without action may have limited success. Ruminative thinking is also associated with reduced autobiographical memory specificity which is thought to be consequence of undifferentiated self-schemas, produced by an analytical self-focus (Watkins & Teasdale, 2001; Watkins, Teasdale, & Williams, 2000, Watkins & Teasdale, 2004). This means that recalled memories are not likely to contain sufficient contextual detail that may help the individual to identify what strategies worked in the past and how this event differs from other similar events. Instead the individual is likely to class the event according to a generic category, such as ‘this is typical or atypical of me’.

A similar interpretation bias is shown by individuals rating high on trait aggression measures. Individuals rating high on trait aggression have been shown to misinterpret ambiguous situations as being intentionally hostile (Tremblay & Belchevski, 2004). Like neuroticism, trait aggression is also associated with rigidity in behavioral responses (Bylsma, Vingerhoets, & Rottenberg, 1998) and rumination. Ruminative attention has been shown to intensify angry feelings and increase the propensity for aggressive behavior as a consequence of the prolonged focus on negative information caused by rumination (Bushman et al., 2005). Increased rumination has also been linked to thinking about thwarted goals or unresolved personal memories (Martin & Tessler, 1989) and been shown to maintain an internal state of anger (Berkowitz, 1993b).
Social cognitive theories of trait anger and aggression propose that the way a memory is cognitively processed determines the reaction that follows from that memory. According to the social information processing (Dodge & Crick, 1990) this is a two stage process. The first stage involves attending and encoding hostile cues and the second stage involves creating a generic interpretation of the situations. Therefore, either process could potentially produce generalized self-schemas in the same way that interaction between neuroticism and rumination may.
1.3.2 Self Memory Systems (SMS: Conway & Pleydell-Pierce, 2000)

Like the interactive cognitive sub-systems model, the self-memory systems model also uses two interactive components to explain how autobiographical memories are processed. These subsystems are the working self and the conceptual self, as shown in Figure 1.7. The conceptual self-stores autobiographical memories according to hierarchal relationships. These relationships range from broad abstract concepts to event specific details, organized into three knowledge bases (see Barsalou, 1988; Burt, Kemp, & Conway, 2003; Conway & Tacchi, 1996; Conway & Bekerian, 1987; Lancaster & Barsalou, 1997a).

![Figure 1.7: Pictorial representation of the self-memory systems model (adapted from Conway & Pleydell-Pierce, 2000)](image-url)
In contrast, the working self organizes information about personal goals (Baddeley & Wilson, 1986; Conway & Rubin, 1993). Like the interacting cognitive sub-systems model, the self-memory systems model suggests that autobiographical memories are stored based on thematic relationships, with event specific information (Conway, 2005) produced by an interaction between the conceptual and working selves.

The self-memory systems model deviates from the interacting cognitive sub-systems model, however, by proposing that personal memories are organized based on temporally ordered, thematic, relationships. This suggests that during retrieval, memories from similar time periods should be recalled together. For instance, for an individual with a bias for negative emotional material, this would mean that events (e.g. Events that happened around my first holiday; events that happened around when I broke up with my girlfriend) from the same time period should be recalled together, regardless of whether they are associated with positive or negative feelings. The interacting sub-systems model, however, suggests personal memories are thematically linked.
This suggests that retrieval would accompany underlying themes associated with personal memories (e.g. my first holiday > independence; when I broke up with my girlfriends > difficulties with relationships), with differences in personality characteristics determining how memories are thematically grouped. In terms of the thesis aims, this suggests that biases in autobiographical memory could relate to having more negative experiences within specific timeframes (e.g. different types of relationship difficulties during year X) or having more salient thematic categories of memories (e.g. times people have let me down). Differentiating between these may be important when considering clinical interventions.

**Working self**

(Conway, 2005; see also Baddeley & Wilson, 1986)

According to the self-memory system model, the working self organizes current and previously held personal goals. Like the interactive cognitive sub-systems model, the self-memory system model suggests that personality characteristics shape and organize personal goals via a series of positive and negative feedback loops, based on reinforced and non-reinforced personal experiences (Baddeley & Wilson, 1986; Carver & Scheier, 2002). Depending on current goals, this means that accessibility for specific events could be either enhanced or inhibited. Unlike the interacting cognitive sub-systems model, the self-memory system model states that the primary function of an autobiographical memory base is to regulate memory accessibility. Doing so ensures that coherence between the working and conceptual self is maintained (Burgess & Shallice, 1996).
The autobiographical memory knowledge base stores personal memories based on hierarchical relationships from socially derived, schematic information, which make up the conceptual self (Singer, 1995; Nolen-Hoeksema, Grayson, & Larson, 1999; Klien & Loftus, 1993; Bowlby, 1982). The conceptual self is made up of three knowledge bases, each representing a different level of detail, as shown in Figure 1.8. These are the lifetime periods, general events and event specific knowledge bases. The conceptual self, in turn, links into the working self’s goals.
Figure 1.8: Model of the conceptual self (adapted from Conway & Pleydell-Pearce, 2000)
The ‘lifetime period knowledge base’ contains the most abstract information. This includes information about specific life stages, such as self-evaluations and mini-histories (Pillemer, 1988: Singer & Salovey, 1993: Singer, 1995: Bluck, 2003: Bluck & Habermas, 2001: Robinson, 1976). Storing abstract information allows general themes about different self-perspectives to emerge, i.e. the self as a parent, an academic, a friend etc. Attached to each different self-perspective is an idealized life story, which represents ‘how things should be’ along with its associated personal goals. Each different life story, in turn, is associated with more detailed information which is stored in the other two subordinate knowledge bases, the general events knowledge base and event specific knowledge base (Barsalou, 1988: Williams, 1996: Burt et al., 2003: Conway & Tacchi, 1996).

The ‘general events knowledge base’ provides conceptual information associated with goal attainment. This is reflected through the inclusion of self-defining memories (Singer & Salovey, 1993) and evaluations of first experiences (Robinson, 1976). Records of previous ‘working selves’ and their associated memories are also stored within the general events knowledge base (Conway, 2005). In evolutionary terms, generic memories contain the optimal level of contextual detail, which can cue more detailed event information, without being too specific or abstract (Barsalou, 1988: Conway & Rubin, 1993). As generic memories are aligned to specific goals and time-periods, retrieval should involve ‘clusters’ of similar event categories being recalled.
Event specific details are stored within the tertiary knowledge base (see Baddeley, 2000). This knowledge base differs from lifetime periods and general events in two respects. Unlike the other knowledge bases, episodic memories are not stored in pre-determined categories. Secondly, event specific memories are stored separately from the conceptual self (Conway & Rubin, 1993; Conway & Pleydell-Pierce, 2000; Conway, 2005). As a result of not being stored in categories, retrieval occurs through repeated, elaborative searches. However, compared to the other two memory bases, very little is known about how event specific memories are formed. There also appears to be ‘fuzziness’ around the beginning, and ending, of event specific memories which could, potentially, contribute to a difficulty in recalling event specific information (Conway, 2009).

*Retrieval and Overgeneralized Recall*

According to the self-memory systems model, during retrieval, memories are reconstructed from their general themes, which are neither too specific nor abstract. This prevents overloading the systems with excessive detail and, as such, serves an evolutionary advantage (Conway, Meares, & Standart, 2004). This can occur either by automatic or effortful retrieval. The retrieval process starts by generating a task criteria based on internally or externally generated cues. This provides the initial framework, parameters and cues, to begin the search for a personal memory. Gradual elaboration on previously recalled general memories should eventually provide access to more detailed, event specific memories (Conway & Pleydell-Pierce, 2000). This, however, would depend on the pre-existing goal hierarchies within the working self (Conway & Tacchi, 1996).
In order to maintain coherence between the different selves, memories that are in direct competition with the working-self goals are expected to show reduced accessibility. This would produce preferential recollection of overgeneralized memories. In support, trauma studies show associations between avoidance measures and overgeneralized recall, generalizable to a range of trauma experiences (McNally, Lasko, Macklin, & Pitman, 1995). Further, studies show that distressing memories, which are linked to current and future self-images (Kangas, Henry, & Bryant, 2005; Maccallum & Bryant, 2008), also show reduced specificity (Golden, Dalgleish and Mackintosh, 2007). More recently, a study by Maccallum & Bryant, (2008) indicates significant relationships between grief related autobiographical memories and reduced specificity.

The influence of Neuroticism, Trait Aggression, ruminative brooding on negative mood

The self-memory systems model proposes that autobiographical memories are reconstructions of previously stored memories. This means that the reconstruction process occurs during retrieval and requires inferences to be drawn from current and prior learning experiences in order to make decisions about future behaviors. As such, personality traits can affect the reconstruction process by including extraneous event details not present in the original memory record (Klein, Loftus, Trafton, & Fuhrman, 1992; Klien, Cosmides, Tooby, & Chance, 2002). These surplus details are thought to reflect currently active goals. In support, a study conducted by McAdams, (1982) found that autobiographical memory narratives of highly emotionally sensitive individuals reflected themes congruent with trait-specific personal goals. Similarly, studies on
aggression indicate that individuals rating high in trait aggression may be faster at recognizing or accessing hostile or anger related thoughts (Todorov & Bargh, 2002b). This may could be due to stronger connections between angry and hostile memories (Berkowitz, 1993b), or it may that angry or hostile memories are linked to a large range of other memories, including those that are not angry or hostile (Meier, Robinson, & Wilkowski, 2007).

Accordingly, neuroticism or trait aggression could also influence the encoding of events considered highly salient. These salient memories would become integrated into personal goals. This means that during retrieval, memories will be reconstructed to reflect these new personal goals. In turn, this would modify memories previously stored within the autobiographical knowledge base, and the conceptual self (Sutin & Robins, 2005). As autobiographical memories are used to process new memories, any changes to personal goals would influence subsequent event encoding. This would create scripts about specific events, patterns of responding and expectations based on trait predispositions (Sutin & Robins, 2005). Scripts are used to govern social interactions as well as the formation of different roles and self-identities (Conway & Pleydell-Pierce, 2000). Memories conflicting with previously held scripts or life stories are expected to show reduced specificity.

In summary, the self-memory systems model proposes that autobiographical memories are hierarchically organized based on temporal and thematic relationships. These relationships range from broad thematic information derived from lifetime periods to
event specific information. Generic memories, which contain conceptual information, provide the optimal level of information to initiate the retrieval search. As general memories are accessed first, retrieval involves the gradual elaboration of internally or externally generated cues. These cues provide the search criteria and direct the retrieval search towards more, or less, detailed memories. The self-memory systems model differs from the interacting cognitive sub-systems model in three respects. First, the self-memory systems model suggests that personal memories are subject to executive control. Second, personal memories are unconscious and organized according to personal goal hierarchies. This implies that personal goals should be inherent in retrieved content. Finally, accessibility of personal memories can be enhanced or inhibited based on currently active goal hierarchies. Mediating accessibility ensures coherence between the two sub-systems and helps to maintain a stable sense of self. Accordingly, memories that conflict with personal goals may be more difficult to recall, providing another possible explanation for overgeneralized recall.

1.3.3 Summary of theoretical models

To summarize, both perspectives of autobiographical memory organization overlap on some aspects. For instance, both models imply that autobiographical memories are reconstructed based on personal goals. Also, both models propose that retrieval is an elaborative process involving the refinement of previously accessed material. Despite this, each model makes specific assumptions about autobiographical memories, and about why traits such as neuroticism, trait aggression and rumination may influence autobiographical memory specificity and depressed mood.
In terms of the thesis aims, the interacting cognitive sub-systems model suggests that different personality characteristics will result in memories being thematically grouped according to the underlying self-schemas, and that the meanings given to events are individual specific. This suggests that ‘typically’ happy memories may overlap with angry or sad memory content depending on what meaning the person has given them (e.g. my brother’s birthday > he always gets the attention). These thematic groupings would also include events that are consistent and inconsistent with these underlying schemas (e.g. times he got extra attentions vs. times I got extra attention). The level of detail, however, contained in these memories may vary depending on the level of self-focus, which would determine the type of sub-system was used to process the memory. This suggests that neuroticism, trait aggression and ruminative thinking may affect memory specificity because of the increased self-focus on emotions and the subjective experience of an event, with reduced memory specificity occurring as a consequence of these generalized self-schemas. As such, according to the interacting cognitive sub-systems model, reduced memory specificity may occur in clinical and psychologically healthy populations alike. The experiential focus on emotions and memories, however, would determine how detailed personal memories were.

In contrast, the self-memory systems model suggests that autobiographical memories are organized based on temporal hierarchies, with memory accessibility determined by currently active goals, which are determined by underlying traits. This means that goal congruent memories would be more accessible. Memories which conflict with the function and goals of a specialized autobiographical memory knowledge base, however,
should show reduced accessibility. Given that the primary aim of the self-memory system model is to maintain coherence between the different selves, individuals who have attempted suicide would be expected to show the greatest amount of internal conflict compared to NS and SI groups, and therefore reduced accessibility for event specific information. Also, as negative memories should be the most distressing, this model implies that reduced specificity should be more evident when presented with negative cue words with this effect exerting the strongest impact in the SA group.
Section 2.0: General Methods
Unless stated otherwise, the methods are as follows for all analyses

2.1 Participants

Suicide Ideators (SI) and Non-Suicidal (NS) Groups: Participants for both groups were recruited from local universities and the community via word of mouth and local posters (age range: 18-55). Given that older adults tend to recall more overgeneral memories as a function of cognitive decline, we chose to exclude individuals over 55 (Piolino et al., 2010). The inclusion criteria stipulated that only participants without neuropsychological (e.g. epilepsy/brain-injury), learning difficulties (e.g. dyslexia) or substance misuse difficulties could participate. Additionally, participants were asked to take part only if they had good understanding of English, defined as late secondary schooling level. Assessment of the inclusion criteria was verbally conducted by asking participants if any of these criteria apply to them. As the analyses were conducted across two different universities, twelve participants received course credits in line with recruitment procedures (University of St Andrews). This group was made up of undergraduates (60%), postgraduates (8%), university staff (10%) and members of the general public (22%).

Suicide Ideation was determined by participants’ responses to the suicide ideation items on the Beck’s Depression Inventory (BDI) and the Eysenck Personality Questionnaire (EPQ-R short-scale; Eysenck & Eysenck, 1975), which were given as part of another analysis. The BDI asks participants to rate whether they had thought about killing themselves within the last week on a scale of 0-3, with 0 indicating ‘I don’t have any thoughts about killing myself’ and 3 indicating ‘I would kill myself if I had the chance’. The Eysenck Personality Questionnaire, in contrast, asked participants ‘if they have ever wished they were dead’, with a dichotomous yes or no response. Participants who endorsed suicidal ideation items on either
the Beck’s Depression Inventory or Eysenck Personality Questionnaire-Revised were
allocated to the SI group, retrospectively.

Ninety participants were identified who self-reported never experiencing suicidal ideation or
attempting suicide, and twenty six participants who reported experiencing suicidal ideation
either within the last week or sometime in the past. This procedure for identifying suicidal
ideation has been employed in other studies (e.g. Miranda & Nolen-Hoeksema, 2007a).

Gender and age categories are displayed in Table 2.1 for all three groups.

<table>
<thead>
<tr>
<th>Gender</th>
<th>% of participants in each age category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Non-suicidal</td>
<td>51</td>
</tr>
<tr>
<td>Suicidal Ideation</td>
<td>17</td>
</tr>
<tr>
<td>Suicide Attempt</td>
<td>33</td>
</tr>
</tbody>
</table>

*Table 2.1: Gender and Age categories for all three groups*

Suicide Attempt (SA) Group: The SA group was recruited from a local NHS accident and
emergency department (NHS Tayside) after a recent suicide attempt. Assessment of the
inclusion criteria was judged by lead clinicians to ensure that individuals who were neuro-
psychologically compromised either in the short or long term (e.g. brain damage, still under
the influence of drugs etc), in acute psychological distress or met the criteria for acute
psychotic disorder at the point of review were not invited to take part. This ensured that
individuals were not acutely or severely distressed and were able to make a decision
regarding consent.
Additionally, participants were verbally asked to take part only if they were aged between 18-55, had good understanding of English, defined as late secondary schooling level, and no neurological (e.g. brain injury, epilepsy) or learning impairments (e.g. learning disabilities or dyslexia), in line with the inclusion criteria for the community groups.

During the testing period, one hundred and eight individuals, meeting the inclusion criteria, were admitted into a local NHS accident and emergency department (NHS Tayside) following a recent suicide attempt during spring-summer 2010 and 2011. These were identified by the Liaison Psychiatric Nursing service during routine reviews, which were typically conducted within 1-6 hours following admission into the ward. Similar timings have been employed in previous research and adhere to NICE clinical good practice guidelines, which state that psychosocial assessments must be completed within 48 hours following an episode on suicidal behavior. This timescale has also been employed by previous studies in suicidology and autobiographical memory research (e.g. Dale, Power, Kane, Stewart, & Murray, 2010; Williams & Broadbent, 1986a) with no adverse effects reported on the autobiographical memory test measure. Of the one hundred and eight interested individuals that were eligible and invited to take part, eighty agreed to completing the study (33 males and 47 females) indicating a 74% response rate.

Table 2.2 displays the most frequent background characteristics for individuals who presented at the accident and emergency department during spring and summer 2010, which was retrospectively obtained.
<table>
<thead>
<tr>
<th>Age Categories</th>
<th>18-25</th>
<th>26-33</th>
<th>34-41</th>
<th>42-49</th>
<th>50-55</th>
<th>55+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Poisoning</td>
<td>25</td>
<td>33</td>
<td>100</td>
<td>90</td>
<td>100</td>
<td>82</td>
</tr>
<tr>
<td>Cutting</td>
<td>25</td>
<td>33</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>50</td>
<td>34</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nature of Self Harm (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definite Intent</td>
</tr>
<tr>
<td>Means of self-harm</td>
</tr>
<tr>
<td>Unsure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suicidal Intent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definite Intent</td>
</tr>
<tr>
<td>Means of self-harm</td>
</tr>
<tr>
<td>Unsure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>% within the last 7 days</td>
</tr>
</tbody>
</table>

Table 2.2. Background characteristics for individuals presenting at a local accident and emergency ward during Spring-Summer 2010 (n=127)

The majority of individuals presenting during this period (spring-summer 2010) had no prior history of suicidal behavior (48%), some reported one previous episode (19%) whereas others were recorded to have two- three repeated attempts (17.3%). A smaller number of individuals were recorded to have 4-20 repeated suicide attempts (14%). In terms of mental health, the majority of individuals had been diagnosed with depression (31%), substance misuse issues (25.4%), adjustment/personality disorders (20%), bipolar (3%) and schizophrenia (1.4%). A smaller number of individuals were recorded as having no prior psychiatric history (19%)

2.2 Measures

The Eysenck Personality Questionnaire (EPQ-R short-scale; Eysenck & Eysenck, 1975):

Participants were presented with 12 items from the neuroticism EPQ-R short scale and asked
to respond to each item using either a yes or no answer. Internal consistency for the suicidal, \( \alpha = 0.8 \), and never suicidal group was good, \( \alpha = .78 \). To establish test-retest reliability, a sub-sample of the NS group completed the neuroticism scale twice, once at the start this study and again 12 weeks later. Test-retest reliability was established as \( \tau (12) = .75, p < .01 \), one-tailed, suggesting that neuroticism scale was reliably able to measure the construct over time.

**The Aggression Questionnaire (AQ: Buss & Perry, 1992):** The scale presents 29 items, reflecting four dimensions of physical aggression, verbal aggression, hostility and anger. Ratings are based on 5-point scale, with increasing scores indicating higher levels of trait aggression. The scale has good internal consistency, \( \alpha = .89 \) in the SA group.

**The Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991):** The RRS measures the tendency to repeatedly thinking things over in a depressive manner across three sub-domains of brooding, depression and reflection. The scale has 22 items with scoring based on a 4-point scale. The depression subscale was excluded given potential overlaps between depressive thinking and mood. Brooding and reflective rumination were measured by five items each and analyzed separately. Internal consistency for the SA group ranged between \( \alpha = 0.82-0.86 \), with the community samples (NS and SI) ranging between \( \alpha = 0.75-0.87 \), for brooding and reflection subscales, respectively.

**The Profile of Mood States (PoMS):** The Profile of Mood States Questionnaire is a standardized measure, used by clinicians and researchers, to assess mood severity across six subscales (tension, depression, anger, vigor, fatigue and confusion), based on how participants felt “right now”. Participants are asked to rate 65 adjectives, describing each
category of mood based on a five-point scale. Only the depression sub-scale (17 items) was used for analysis in this study, which had an internal consistency of $\alpha = 0.85$ in the SA sample and $\alpha = 0.96$ in the community groups (NS and SI). As with the neuroticism scale, a sub-sample of the NS completed the depression sub-scale twice, at the start of the study and 12 weeks later. Test-retest reliability was calculated using interclass correlations which indicated good reliability (.71) with 95% confidence intervals varying between .08 and .91. The profile of mood states has been employed by other researchers for use in suicidal groups (e.g. Nakao, Yamanaka, & Kuboki, 2002: Keilp et al., 2010: Salkovskis, Atha, & Storer, 1990: Williams & Broadbent, 1986a).

*Barratt Impulsivity Scale (BIS-11; Barratt, 1994)*: The scale measures three sub-domains of non-planning, behavioral and cognitive impulsivity using 30 items rated on a 4 point Likert scale. Internal consistency for the full scale was good, $\alpha = 0.86$ for the SA group.

*Revised Ways of Coping Scale (Folkman & Lazarus, 1988)*: The ways of coping scale is a process measure, rather than a trait indicator, of coping styles. It assesses 8 sub-domains of confrontational coping, distancing, self-controlling, seeking social support, accepting responsibility, escape avoidant coping, planful problem solving and positive re-appraisal coping styles. The scale has 66 items, with ratings based on a 4 point Likert scale. In line with the instruction manual, participants were asked to think of difficult situations that they had been in and to identify the coping strategies used. Factor loadings are reported to range between 0.66-0.79 for each of the sub-scales (Rexrode, Peterson, & O’Toole, 2008).

*Autobiographical Memory Test (AMT; Williams & Broadbent, 1986a)*: 
Selection of cue words: Williams et al., (2007a) have suggested that repeatedly using the same types of cues within the autobiographical memory test may prove to be problematic as specific characteristics within the cues themselves may lead to findings that are replicated across studies using the same type of cues. In contrast, using different, and more diverse, cues may help to establish overgenerality as a robust phenomenon that occurs, independently of the cue word used. For this reason, a separate preliminary study analysis was conducted to select happy, sad and angry cues, the latter being examples of two distinctly negative emotions, and emotionally neutral words as a control cue category.

In the preliminary analysis, participants from a separate NS population (n=21) were given 86 emotional cue words to rate based on how well each word described happy, sad and angry emotions using a five-point scale. Higher scores indicated stronger agreement. In addition to this, participants were asked to identify which cue words they considered to be emotionally neutral. As the words were originally taken from Paivio, Yuille, & Madigan, (1968), they had been previously matched for concreteness, imaginability and vividness. Participants who took part in the preliminary study were advised that they would be ineligible to take part in future studies on the same topic.

As Williams et al., (2007a) report no significant correlations between the number of cues used and effect size, the three highest rating words from each category were used within subsequent analyses to prevent overloading participants with too many cues. These were presented in the following order: happy, grief, destroy, doctor, furious, love, sadness, world, unhappy, rage, bouquet, happiness. The words were designed to measure different facets of each emotion. For instance, happy referred to feelings of success whereas happiness referred
to a state of contentment and wellbeing. Checking against the content of reported memories ensured that this assumption was correct for the majority of the sampled population.

Instructions: The instructions for the autobiographical memory test stated that participants’ should respond to each cue word with a specific personal memory that they remembered being involved in that had occurred within the last one to five years. Setting these parameters served two purposes. First, theory suggests that memories that are over a year old are more deeply embedded into the autobiographical memory hierarchy (Singer & Bonalume, 2010), and therefore into self-schemas. Secondly, having predefined parameters prevented the age of the memory acting as a confounding factor for the diverse age ranges of participants (Piolino et al., 2010). Additional instructions advised participants that the reported memory reported did not need to be salient or personally significant and that while their responses would be timed they should not worry about the timings when giving their answer. Participants were also asked to differentiate between being unable to recall a memory and not wishing to disclose that memory. Only six participants, out of one hundred and ninety six participants that took part in the studies, chose not to disclose a personal memory for some cue words. The most common reason given was that the memory felt too personal to share.

A specific memory was defined as an event which lasted no longer than 24 hours and occurred at a particular place. To ensure participants understood instructions, the researcher provided an example of specific memory to a neutral cue (house). If participants recalled a memory that they had reported earlier, then they were asked to think of a different memory associated with the given cue. Twelve words (3 happy, 3 sad, 3 angry and 3 emotionally neutral) were read aloud in total, with a single prompt provided if the memory related to a non-descript time-period.
Recall and coding: Three researchers, two of whom were blind to the study aims, rated fourteen percent of the transcripts based on the definition of specific and overgenerality used. Cronbach’s alpha was established as 0.84 for specific memories and 0.77 for overgeneral. An omission was recorded if no narrative was provided or if a semantic association was described (e.g. ‘My sister went to the hospital/ ‘the twin towers collapsing’). As shown in Table 2.3, omissions were most common within the SA group followed by the NS group. Omissions were excluded from the studies.

<table>
<thead>
<tr>
<th>Group Type</th>
<th>Sum</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
<td>94</td>
<td>1</td>
<td>1.4</td>
<td>0-6</td>
</tr>
<tr>
<td>SI</td>
<td>25</td>
<td>.96</td>
<td>1.8</td>
<td>0-6</td>
</tr>
<tr>
<td>SA</td>
<td>172</td>
<td>2</td>
<td>1.8</td>
<td>0-7</td>
</tr>
</tbody>
</table>

Table 2.3: Rates of omission for the autobiographical memory test in all three groups

In total, the community groups (NS and SI) recalled 703 (501 specific and 202 overgeneral) memories compared to a total of 764 for the suicide attempt group (436 specific and 328 overgeneral). In line with other research, the percentage of overgeneral and specific memories recalled was used to standardize responses across participants (Anderson, Goddard, & Powell, 2010).

2.3 Procedure

After receiving NHS medical (IRAS) and university ethical approval, participants were met individually to give them details about the study, including inclusion criteria and participation rights. As part of this, participants in the suicide attempt group were advised that consenting to take part in the study would not affect their medical or psychiatric care and that all information would be kept anonymous and confidential. Individuals who met the inclusion
criteria were given a written copy of the participant information sheet and asked to sign a consent form if they agreed to take part.

Before beginning the study, participants were asked to provide basic demographic information (gender and age group). The age groupings were based on 5 year intervals (e.g. 18-22, 23-27) to ensure that participants’ measures could not be traced back to their medical records via age or date of birth.

Participants were then presented with a packet of questionnaires containing the Neuroticism Scale from the Eysenck Personality Questionnaire-Revised, Rumination Response Scale, Bartlett’s Impulsivity Scale, Ways of Coping and Profile of Mood States questionnaires, which were completed in one sitting. The autobiographical memory test was administered next. All participants received a verbal and written debriefing following completion of the study.
2.4   Rational for Statistical Techniques

There are two main categories of indirect path analysis, moderation and mediation. Moderation attempts to explain how, and under what conditions, a relationship between the predictor and outcome variable may occur. Mediation, in contrast, seeks to explain why a relationship between predictor and outcome variable occurs and is a different kind of relationship. Within mediation and moderation analysis there are also other sub-categories, such as moderated mediation, which is when the mediated effect between the predictor and outcome variable occurs only under certain conditions, or mediated moderation. As prior research suggests that certain relationships exist between personality, thinking styles, memory and mood, the focus of this thesis is on explaining why three specific relationships occur. These are the relationships between neuroticism-current depressed mood, trait aggression- depressed mood, and suicidality-current depressed mood. Therefore, only mediational analyses are used to explore why these relationships occur.

2.4.1 Traditional methods of assessing indirect paths

Figure 2.1 Diagrammatic representation of simple mediation model
Traditional methods of analyzing indirect effects, otherwise known as the casual steps approach, have typically involved a series of regression analysis in order to determine whether a relationship between a predictor and outcome variable is mediated by a third factor (Baron & Kenny, 1986b), as shown in Figure 2.1. The first regression typically involves estimating the direct effect of the predictor on the outcome variable, giving path c’. Next, path a is estimated by X predicting M. The third regression involves M predicting Y, and a final analysis with X and Y predicting M, to give path c. According to Baron and Kenny (1986), if path c does not reach significance after accounting for the effect of the mediator then full mediation can be claimed. If path c remains significant, then it can be said that the mediator partially mediates this relationship. In the equation shown in Figure 2.1, C represents the total effect, C’ represents the direct effect and ab represents the indirect effect.

More importantly, according to the causal steps approach proposed by Barron and Kenny (1986), the first three steps in this sequence require to be significant before mediation is claimed. The requirement for a significant direct effect between x and y, however, has been strongly contested by other researchers (e.g. MacKinnon, Krull, & Lockwood, 2000b; Shrout & Bolger, 2002). For example, MacKinnon (et al., 2000; see Mathieu & Taylor, 2006a also) argue that the effect of the predictor on the outcome could occur as a result of multiple mediators, moderated mediation or mediated moderation. As such, rather than being referred to these types of analyses as mediational, the authors argue that these types of analyses should be referred to as indirect path analysis as it is the effect of the predictor on the outcome via its indirect effect, whether that is mediational, a contextual factor or a combination of both, that is being investigated.
Indirect paths may also act in opposite directions and therefore show opposite signs. This is called a suppression effect with indirect factor 1 and indirect factor 2 canceling each path out. A suppression effect may result in a total effect, or a total indirect effect, that is not distinguishable from zero, even though there may evidence for specific indirect effects (MacKinnon, Krull, & Lockwood, 2000a; Preacher & Hayes, 2008a). As such, in contrast to traditional approaches, tests of indirect effect do not presume that there will be a direct relationship between X and Y variables, but rather the predictor and outcome variables become related as a result of the intervening variable (Zhao, Lynch, & Chen, 2010; Mathieu & Taylor, 2006b).

Other critiques of the traditional casual steps approach (Barron and Kenny, 1986) relate to power issues and increased probability for a type 2 error. Simulation studies have shown that using a step wise regression based approach to estimating mediation is the least likely method to detect any indirect effects (Fritz & MacKinnon, 2007; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002b). Methodologists also raise issues about how estimation biases can be controlled for when individual paths are tested using inter-correlated mediators (see Hayes, 2009; Preacher & Hayes, 2008b). Given that each statistical analysis is associated with a probable error margin, the more null hypotheses that are needed to be rejected, the more likely a type 2 error will be (Hayes, 2009). One means of reducing the likelihood of a type 2 error would be to concurrently test all direct and indirect pathways simultaneously.

2.4.2 The Sobel Test

The Sobel test represents another means of testing mediational effects by testing the paths a and b, and their corresponding standard errors, to derive a p value based on a normal
distribution. Unless there is a large sample size, the distribution of the ab pathway is likely to
be skewed, resulting in low statistical power (MacKinnon, Warsi, & Dwyer, 1995).

2.4.3 Concurrent analysis of indirect paths
In contrast to traditional approaches, tests of indirect effects allow more complex models to
be tested concurrently and therefore reduce some of the biases associated with the casual
steps approach (Barron and Kenny, 1986). Furthermore, it allows researchers to test
competing hypothesis within the same model. For instance, one such hypothesis may involve
investigating whether the indirect effect of one factor on the relationship between the
predictor and outcome variable differs from the indirect effects of another factor. Or, it may
involve testing whether the total effect is a result of the cumulative indirect effect of factors 1
and 2. As such, it allows the researcher to distinguish between the specific indirect effects,
which may otherwise overlap (West & Aiken, 1997).

In sections 4 and 5, a multiple mediation model is used to examine the effects of multiple
mediators on the relationship between the predictor and outcome variable. In multiple
mediation pathways, the indirect effect of one factor is conditional on other factors also being
present in the model. This means that the indirect pathway between X-M-Y may differ from
the pathway between X-M1-M2-Y.

2.4.4 Bootstrapping (Preacher & Hayes, 2008b; Hayes, 2009)
Bootstrapping involves taking the sample size as a typical representation of the population
but one that is repeated with replacements, usually between 1000-5000 times, to mimic the
originally sampling process. This means that the new sample is based on the original sample
size but allows any cases, once drawn, to be resampled until the required sample size has
been reached. Completing this iterative procedure will produce estimates of the confidence intervals. Using the macros supplied by Preacher and Hayes, however, bootstrapping can be used to provide estimates of the indirect effect size. Bootstrapped estimates using this procedure are ordinarily positioned, based on lowest to highest indirect effect to produce percentile based confidence intervals for the indirect effect. As percentile based bootstraps are based on the estimation of indirect effect sampling distribution, they are non-parametric. If 0 is not included in the lower and upper estimates, then the researcher is able to claim with 95% certainty that indirect effect is not 0 and thought to lay between x and y confidence intervals.

Using the bootstrap method may produce slightly different result to the original, un-bootstrapped indirect effect due to the resampling of data. As a result of this, researchers, advocate applying a correction for this bias. Empirical studies conducted by Briggs (2006), Williams (2004) and MacKinnon, Fritz, Williams, and Lockwood (2007) suggest that compared to the causal steps approach or the sobel test, applying a bias corrected (BC) or bias corrected and accelerated (BCa) bootstrap may reduce the probability of type 1 errors especially in small to moderate samples.
Section 3: Establishing a protocol of measuring autobiographical memory specificity
3.1 Introduction

Research suggests that groups associated with depression and trauma tend to preferentially recollect abstract overgeneralized autobiographical memories. Overgeneralized memories refer to a collection of personal events that lasts longer than a 24 hour period. This overgeneral memory bias is typically assessed through the autobiographical memory test, where participants are asked to recall a specific memory in response to a cue word. The autobiographical memory test requires each memory record to be checked against the task parameters, in this case the cue word, in order to provide a ‘correct’ response based on the instructions given. As the recall instructions ask participants to recall a specific memory, the ‘correct’ response would be to recall a memory which occurred in a time period lasting no longer than a 24 hour period. In order to do this, according to the interacting sub-systems and self-memory models presented earlier, participants would need to iteratively search through their memory records based on the cue word given, gradually refining the searches until a memory fitting the task requirements (e.g. a memory occurring within a 24hr period) is recalled (Williams et al., 2007b; Conway & Pleydell-Pierce, 2000).

The CaR-FA-X model (Williams et al., 2007b) suggests that there are three distinctive process which may underlie a tendency to recall overgeneralized personal memories; capture and rumination, functional avoidance and reduced executive control. According to this model, cue words used within the autobiographical memory task may tap into self-schematic information, which in turn activates ruminative thinking. During this process resources that are allocated to cognitive processing are ‘captured’ resulting in reduced working memory capacity. The functional avoidance element of this process refers to a tendency for some individuals to passively avoid recalling event specific memories in order regulate their
emotions. Reduced executive control refers to deficits in executive resources which constrain the retrieval search.

It may be that during the retrieval search, some individuals recall an abundance of negative emotional material and become fixated on the negative memories to produce a ‘mnemonic interlock’. Recalling excessive emotional material would further affect the capacity of working memory capacity. As such, recalling excessive generically negative material, in combination with the task requirements of the autobiographical memory test, may increase the cognitive load on executive processes. Due to the pressure on executive processes, this may result in memories not being careful checked against the search criteria (Dalgleish et al., 2007) and the retrieval search being terminated prematurely (Philippot, Schaefer, & Herbelle, 2003; Raes et al., 2006). Terminating the retrieval search for negative cues at an overgeneral level may also prevent individuals from recalling distressing event specific memories, which would serve a functional advantage (Williams et al., 2007b). As such, the tendency to preferentially recall overgeneralized memories could be a result of goal neglect processes, a functional avoidance of negative emotions, or a combination of both.

Findings by Debeer, Raes, Williams, Craeynest, and Hermans (2013) indicate no significant differences in memory specificity between individuals who were ‘punished’ for recalling specific memories and those who were not. The authors suggest that, despite the lack of evidence for the functional avoidance component of this model, future studies may wish to focus consider whether this retrieval strategy is retrospectively applied. Emerging studies have also begun to look at how the interpretation of events effect self-growth (Lilgendahl, McLean, & Mansfield, 2012) as well as the impact of positive and negative reasoning on
psychological wellbeing (Banks & Salmon, 2012), implying a more complicated relationship between personality, event interpretation and functional avoidance.

While meta-analytical studies support the proposition that some groups may be more likely to recall personal memories in an overgeneralized manner, with this tendency to recall overgeneralized memories being more consistent in groups affected by depression or low mood (Vreeswijk & Wilde, 2004), the meta-analytical studies also highlight a number of inconsistencies between sampling methods which may limit what can be confidently interpreted by prior findings (Vreeswijk & Wilde, 2004: Moore & Zoellner, 2007). For instance, Vreeswijk and Wilde (2004) report that some studies find that a higher number of overgeneral memories are recalled when participants are presented with positive cue rather than negative cues (e.g. Williams & Scott, 1988; McNally, Litz, Prassas, Shin, & Weathers, 1994), while other report the opposite effect (e.g. Jones et al., 1999). Likewise, findings on cue latency indicate that some studies report that participants take longer to recall memories in response to positive words whereas others show the opposite effect (e.g. Williams & Scott, 1988). Vreeswijk and Wilde (2004) also note that there are some studies that find no effect of overgenerality at all (e.g. Kuyken & Dalgleish, 1995).

Based on their meta-analysis of fourteen studies, Vreeswijk and Wilde (2004) conclude that clinical groups were less specific than the control groups, and that these findings related to both positive and negative cues. The authors, however, suggest that the manner of presenting cues, timings given to respond, diagnosis of depressed mood and audio recording responses were moderators of performance on the autobiographical memory test. They also acknowledge that their findings could be a positively biased due to the limited number of studies that are published which do not show an overgeneral memory bias.
Similarly, Moore and Zoellner (2007) reviewed twenty four studies that examined the relationship between overgenerality and trauma. The authors conclude that it is difficult to confidently assume that overgenerality is associated to trauma given the wide variation in how the autobiographical memory test is applied (e.g. word characteristics, cue presentation, administration of the autobiographical memory test, how responses and omissions are recorded) and trauma responses are recorded. These variations may result in individuals not understanding the requirements of the task, experimenter bias or motivational factors as well as difficulty in comparing findings between studies.

Following a review of 38 studies which investigated different processes within the CaR-FA-X model, Sumner (2012) concluded that further research is required to better understand how the different processes interact with each other. The author gives the example that cues that retrieve self-schematic information may be more likely to ‘capture’ cognitive processes during retrieval, and consequently be related to increased overgenerality. Findings from prior studies, however, provide conflicting information as to whether self-relevant cues are related to greater or reduced overgenerality. In relation to the functional avoidance element, the author notes that while retrieval of overgeneralized memories is associated with short term reduction in emotional distress, further studies are required to ascertain whether the retrieval of more or less distressing event specific memories are likely to be avoided as a strategy for managing negative emotions. Moreover, while the author finds evidence for a relationship between deficits in executive control and memory specificity, this relationship does not appear to be affected by mood states.
In sum, meta-analytical studies show that some groups, associated with depressed mood rather than trauma, show a more consistent overgeneral memory bias. Due to wide variation in the way that the autobiographical memory test is applied, however, it is difficult to compare studies. These methodological variations, in turn, limit what can be confidently interpreted by prior research findings. To date, few studies have compared how variations in the administration of the autobiographical memory test, memory content and differences in retrieval strategies may affect the number of overgeneral memories recalled (see Griffith et al., 2012, for further discussion on methodological limitations).

The following analyses aim to establish a suitable method for assessing the frequency of overgeneralized recall given that reduced memory specificity is considered to a risk factor for suicidality. The first analysis investigates whether recall instructions, response timings and retrieval strategies influence the number of overgeneral memories recalled. The second analysis examines the effect of cue valence and latency on overgenerality.
3.2: Effects of Recall instruction, retrieval strategies and timing on the retrieval of overgeneralized memories

Theoretical models of autobiographical memory propose that autobiographical memories are hierarchically organized based on thematic knowledge abstracted from event specific information (Barsalou, 1988, Conway & Bekerian, 1987). Cues within different knowledge levels enable access to subordinate or superordinate nodes (Conway & Pleydell-Pierce, 2000; Linton, 1987). While memories for general and specific event memories are related to the same time period, research shows that some groups show a difficulty in accessing the latter (Anderson & Conway, 1993). This suggests that there may be something unique about specific memories, which may be related to the underlying organization, retrieval difference or cues used to initiate the memory search. The reconstructive nature of autobiographical memories, combined with the inconsistencies between prior findings, suggest a need for a pragmatic approach to understanding why some individuals may find it more difficult to recall specific memories. As such, this pragmatic approach may require elements of quantitative and qualitative research methods in order to determine what might be underlying the retrieval of overgeneralized memories.

Autobiographical memory researchers predominantly employ an adapted version of the Crovitz technique to prompt participants to recall specific memories in response to a stimulus word (Crovitz & Shiffman, 1974). The cue words represent task parameters to help guide the retrieval search through associated autobiographical experiences (Conway & Rubin, 1993). By doing this, the autobiographical memory task is thought to increase cognitive load on executive processing functions.
While cued recall, compared to free recall (Galton, 1879), offers a more quantifiable means of sampling autobiographical memories, it also limits understanding about the underlying organization of autobiographical memories and differences between retrieval strategies (Brewer, 1988). For instance, some researchers suggest that individuals that may preferentially recall overgeneralized memories may be focusing the retrieval search on specific time frames (McCormack, 1979), which may be more accessible (Tversky & Kahneman, 1973). Free recall, critics argue (Galton, 1879), provides a more spontaneous means of retrieval through the gradual elaboration of previously recalled themes. Free recall also provides an ecologically valid opportunity to examine retrieval strategies and event attributions by highlighting underlying memory organization (Puff, 1979).

In either recall technique, the cue words used to start the retrieval search need to contain enough predictive information in order to allow the individual to distinguish between similar classes of events (Tulving & Donaldson, 1972; Reiser, Black, & Abelson, 1985; Reiser, 1986). Some theorists propose that cue words relating to the central element of an event would be more likely to result in event specific recall (Schank, Abelson, & Schank, 1977), whereas others argue that activity based cue words (Reiser, 1986) or temporal cues (Conway & Bekerian, 1987) are more likely to allow access to the optimal amount of contextual detail.

The autobiographical memory test, however, tends to use emotional cue words because these words are thought to tap into self-relevant information, which in turn can prime or reinforce a ruminative responses (Dalgleish et al., 2003; Watkins & Teasdale, 2001). Critics (e.g. Reiser et al., 1985; Reiser, 1986) suggest that because emotions can occur across a range of different situations, emotional cues are less likely to be able distinguish between similar classes of events and lack predictive power.
Other factors have been shown to affect retrieval and response latencies, such as low frequency events or memories related to goal failures (Barsalou, 1988). Memories relating to goal failures are also more likely to result in ruminative responses (Roberts, Watkins, & Wills, 2013). Moreover, some individuals may switch between different categories of memory organization, known as pivoting (Lancaster & Barsalou, 1997b). Collectively, studies suggest that the types of cue used, differences between retrieval strategies and the types of memories activated could potentially influence memory specificity.

Anderson and Conway (1993) also suggest that during free recall, individuals use a mixture of different retrieval strategies, which may involve directing the search based on thematically or temporally associated event details. The authors report that using thematic associations to drive the memory search was associated with shorter response times and recall of personally relevant, distinctive event details. Using personal themes to initiate the memory search may allow participants to search for contextual details within a subset of memories that represent the overall theme or deviations (Conway, 1992a, Robinson, 1992). Having choices over which retrieval strategy to use, however, may also increase the constraints on working memory. Therefore, one explanation for preferentially recalling overgeneralized memories may be that some individuals tend to use one type of retrieval strategy over another which may be more effective, or it may be that individuals that recall more specific memories are more directive in the strategies that they use.

In summary, from a review of previous literature it may be that some individuals use different forms of retrieval depending on task requirements. Understanding the differences between retrieval strategies may highlight anomalies between recall specificity and event salience, which may otherwise remain undetected. For instance, specific memories may relate to
shorter insignificant events whereas overgeneralized may contain longer, personally salient memories. Cued recall is subjectively reported as being difficult and may disrupt natural means of reminiscing (Tulving & Donaldson, 1972). Free recall, while being a more natural means of remembering, may, however, increase cognitive load on working memory due to having multiple means of retrieving a memory. To date, few studies have compared the effects of different recall instructions on overgenerality. Therefore, the aim of this analysis was to establish whether:

1. overgeneralised recall will differ according to the type of recall instruction given (cued, free or non-directive free recall).
2. some cues (positive, negative and neutral) may elicit more overgeneralised memories than others.
3. The frequency of overgeneral memories may differ depending on the time constraints in the autobiographical memory test.
3.2.1 Procedure and Results

Procedure:

A sub sample of individuals within the NS group (n=65) were given three different types of recall instructions. Allocation to each condition was quota based so that the first person received free recall instructions, the next cued recall instructions and so forth for all participants. In the free recall and non-directive recall conditions, participants were told the recall test would be timed, which would be recorded discretely, but the timing did not matter for them. In contrast, participants in the cued recall condition were advised that they would be given 60 seconds to recall a specific memory. A response failure was determined as the failure to recall any memory, recorded as an omission and excluded from the analysis.

Participants were given a definition of a specific memory ‘something that happened within a 24 hour period that you were involved’ and an example of a specific memory using the cue word ‘so for the cue word ‘house’, you might say the day that you moved into your house or the day you bought some furniture for your house’. Before beginning the test, participants were asked if they understand what a specific memory was and given a further opportunity to ask questions. If participants requested, they were given two additional cue words (doll or shoe). During the autobiographical memory test participants were given a single prompt, ‘can you be more specific?’

The recall instructions differed depending on whether participants were in the free, cued directive and cued recall conditions. Participants in the free recall instruction task were given the following instructions ’What I would like you to do for the next 2-3 minutes is tell me about events that you were involved in between 1 and 5 years ago. Please describe the events that you were involved in and most importantly, describe the exact order in which they come
to mind. When an event comes into mind describe it immediately, then the next and so forth. Continue to describe the events that you were involved in the last year for the full 2-3 minutes.’ (Reproduced from Barsalou, 1988, p199-204). The instructions for the non-directive free recall conditions were ‘For the personal memory test I would like you to talk about a personal memory associated with the word………(provide cue word)’. In contrast, participants in the cued recall condition were given the following instructions ‘Can you recall a specific memory involving the word (cue word given)’.

**Results:**

Figure 3.1 shows descriptive data for the number of autobiographical memories recalled in response to each instruction type.

![Graph showing percentage of specific and overgeneral memories recalled](image)

*Figure 3.1: Percentage of specific and overgeneral memories recalled in response to recall instructions*
Given the uneven groups, a Kruskal-Wallis was used to test for differences between the three groups. Findings indicated that there were significant differences between the type of recall instruction given and the percentage of overgeneral (\(H(2) = 10.3, p < .01\)) and specific memories recalled (\(H(2) = 10.3, p < .01\)). A series of Mann-Whitney tests were carried to investigate these differences further, with a Bonferroni correction applied at the 0.017 level.

For overgeneral memories, findings indicate that there was no significant differences between cued recall (n=49) and free recall (n=14) (\(U=266.5, p > 0.05\)), or between free recall and non-directive free recall (n=24) (\(U=163, p > 0.05\)). Compared to the cued recall condition however, individuals in the non-directive free recall group were found to recall more overgeneral memories (\(U=304, p < 0.01\)). Similar findings were observed for specific memories, with individuals in the cued recall condition recalling more specific memories than those in the non-directive free recall condition (\(U=304, p < 0.01\)).

A post-hoc power analysis was conducted on the significant findings for the cued and non-directive recall instructions based on an alpha level of 0.05. The power analysis indicated the Mann-Whitney had a power level of 0.95, with a large effect size (0.69) observed for the differences between these two groups. This suggests that despite the small sample sizes in each group, there was enough power in the test to detect significant differences.

In terms of timings, findings indicated that there was no difference between the timed and untimed conditions and the number of overgeneral compared to specific memories (\(U=154, ns\)).
Content Analysis of transcripts for each type of recall instruction

In order to investigate the effect of cue words further, the reported memory content was categorized as containing positive, negative, mixed or no emotions. The mixed emotion category was defined as references to positive and negative emotions within the same memory (e.g. ‘I felt sad but happy when I left home for the first time’) whereas the no emotion category referred to explicit statements made by the participant (e.g. ‘I didn’t feel anything’ or ‘I have no emotions attached to that particular memory’).

As shown in Table 3.1, the majority of memories reported are congruent with the type of cue presented. Interestingly, there were small numbers of memories that did not correspond to the cue word given. For instance, when given a happy cue word, 10% of the reported memories fell into negative or mixed emotional categories. For sad cue words, 8% of reported memories fell into either positive, mixed or no emotion categories. This trend for non-congruent emotional memories was most evident, however, when participants were given an angry or a neutral cue word. When presented with an angry cue word, 24% of the reported memories fell into one of the other three categories. This rose to 42% when participants were presented with a supposedly emotionally neutral cue word. This suggests that although cue words within the autobiographical memory test are designed to tap into and elicit specific types of emotions, this may not always be the case. Some types of words, such as angry or emotionally neutral, may trigger memories that overlap on emotional content or are related to no emotional memories at all.
<table>
<thead>
<tr>
<th>Memory content total in %’s</th>
<th>Cue word Category</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Happy</td>
</tr>
<tr>
<td>Positive</td>
<td>71</td>
</tr>
<tr>
<td>Negative</td>
<td>1</td>
</tr>
<tr>
<td>Mixed</td>
<td>9</td>
</tr>
<tr>
<td>Neither</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 3.1: The percentage of emotionally positive, negative, mixed and no emotional memories reported in response to each cue word category in the non-suicidal group.

When looking across all participants, the descriptive data indicated that some participants recalled more emotionally negative content, which was overgeneralized, than others, as shown in Figure 3.2.
In contrast, as shown in Figure 3.3, the number of specific emotional negative memory content appeared to be more consistent across participants than the percentage of negative overgeneral memories recalled.
In terms of memory specificity, analyzing the contents of the transcripts suggested that being unable to recall specific events, defined as a memory for a short period of time which lasts for less than 24 hours, could be due to an exhaustive search of related autobiographical memory records. When participants were unable to recall a specific memory, there was a pattern of recalling a closely related theme followed by retrieval of related topics. Few non-specific responses were due to an inability to recall a memory. Frequency, salience and centrality of events were not investigated in this study but could be investigated by future studies as potential variables that may affect recall.

Memories for non-specific time periods, i.e. overgeneral memories, were shorter and more fragmented. Overgeneralized memories appeared to focus on the repercussions that an event
had on the individual and were more likely to be reported when emotive cues were used to initiate the memory search. In contrast, specific recall followed use of more diverse cues, such as actor, location and action. Content analysis of specific memories indicated that there were more references to other people’s feelings and the impact that the event had on other people as well as themselves. These differences were more apparent following the presentation of sad and angry cue words. Although, salient negative events were reported more frequently following the recall of an overgeneralized memory, there appeared to be no observable difference in emotional intensity between overgeneral and specific recall.

Figure 3.4: Percentage of text units making reference to each descriptor at the start of recall per participant (n=63)
A total of 63 transcripts used in the content analysis of retrieval strategies. Coding was inductively applied to initial references used to initiate the memory search. For instance, if the memory related to a funeral and the participant started describing the memory by referring to a person (e.g. my aunt’s funeral) then this was coded as ‘actor’. If the description of the memory started with an emotion (e.g. I felt overwhelmed at my aunt’s funeral) then this was coded as ‘emotion’.

As shown in Figure 3.4, the main differences between specific and overgeneral memories related to the variety of different descriptors used to start the retrieval search. While specific recall was associated with using a more diverse range of descriptors and was more likely when participants used objects, locations, events, actors and actions descriptors to initiate the memory search compared to overgeneral recall. In contrast, overgeneral recall was associated with using more restricted descriptors to start the retrieval search, namely self, time and emotions.
3.2.2 Discussion

These analyses aimed to investigate whether recall instructions, response times and retrieval strategies affected the number of overgeneralized memories recalled. Findings indicate that participants were more likely to report overgeneral memories when given instructions for non-directive free recall compared to cued recall. Setting, or not setting, a time limit did not appear to effect memory specificity.

Findings also suggest that while the majority of the cue words elicited emotionally congruent memories, this was not always the case. In particular, angry and emotionally neutral cue words appeared to elicit either opposite, mixed or no emotions. In terms of memory specificity, the main differences between specific and overgeneral memories appeared to relate to the range of different strategies used to initiate the memory search. Specific memories were more likely to contain the participant’s emotional response as well as other peoples’ responses. Specific memories were also more likely to be reported when the participant started the search with a specific person, or relationship, in mind (actor), what happened in a broad range of events which was narrowed down to one specific example (action and events e.g. ‘times I have been to a funeral > my aunt’s funeral’). Overgeneral memories, in contrast, appeared to be more self-focused and fragmented. They tended to be reported following a more restricted search, usually focusing on self, time or emotional aspects (e.g. times I have felt sad). Examining the range of overgeneralized negative memory content across all participants suggests that some groups of individuals may have predisposition towards recalling more overgeneralized negative memory content than others. This is investigated further in sections 4 and 5.
Analysis of the underlying memory content indicated that different individuals may use different strategies, or different starting points, for the memory search and this was not always congruent with the type of cue word given. As such, the findings obtained from these analyses are more consistent with the interacting sub-systems model which suggests that the meanings given to events is individualistic and that the search strategies depend on the level of detail that memories have encoded within them.

Given the widespread use of the cued recall method in the literature and to allow comparisons between research findings, subsequent analyses in this thesis will use the cued recall method to sample autobiographical memories. As timing had no effect on the probability on recalling an overgenerality participants in subsequent studies are advised that ‘their responses would be timed but timing was not important for them’. Making participants aware that their responses are timed is likely to increase cognitive load and therefore allow our studies to be comparable to other research within the field.
3.3: The effect of cue valence and retrieval latency on the number of overgeneral memories reported

According to prior theories (e.g. Williams et al., 2007b), negative cues within the autobiographical memory test are thought to activate generalized self-schematic information, which in turn primes or reinforces ruminative responses. As such, negative cues should elicit longer response latencies and more overgeneralized memories. Meta-analytical studies, however, highlight inconsistencies between findings on cue valence and response latency (Vreeswijk & Wilde, 2004; Moore & Zoellner, 2007). Prior studies using the autobiographical memory test have predominately used sad cue words as examples of negative emotions. In this thesis, angry words are used to investigate whether an overgeneral memory bias extends to other types of negative emotions.

Therefore, these analyses aim to determine whether overgenerality is associated with:

1. different types of negative cue words are associated with overgenerality. In particular, this study aims to investigate whether an overgeneral memory bias applies to angry words as well as sad words.
2. longer response latencies
3. the valence of the reported memory content.
3.3.1 Results

Table 3.2 and Figure 3.5 show the number of specific and overgeneral memories recalled in response to each cue word category for all participants in the non-suicidal group.

<table>
<thead>
<tr>
<th>Cue word Categories</th>
<th>Overgeneral</th>
<th>Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D</td>
</tr>
<tr>
<td>Happy</td>
<td>.46</td>
<td>.6</td>
</tr>
<tr>
<td>Sad</td>
<td>.71</td>
<td>.9</td>
</tr>
<tr>
<td>Angry</td>
<td>.36</td>
<td>.6</td>
</tr>
<tr>
<td>Neutral</td>
<td>.5</td>
<td>.5</td>
</tr>
</tbody>
</table>

Table 3.2: The effect of cue valence on memory specificity in non-suicidal groups (n=65)

When examining the number of specific memories reported across all cue words, findings indicate that happy cues (MDN: 2.79) are most likely to elicit a specific memory compared to sad (MDN: 2.38), angry (MDN: 2.38) and angry cue words (MDN: 2.44) ($\chi^2 (3) = 11.48$, p < .01). In contrast, when examining the number of overgeneral memories across all cue-word categories, sad (MDN: 2.77) and neutral cues (MDN: 2.58) were most likely to elicit overgeneralized memories compared to angry (MDN: 2.23) and happy cue words (MDN: 2.42).
Figure 3.5: Total number of specific and overgeneral memories recalled based on cue word category for the non-suicidal group

**Latency effects**

As shown in Table 3.3, the time taken to recall a specific memory appeared to differ between cue word categories ($\chi^2 (3) = 13.8$, $p < 0.05$). With a Bonferroni correction applied at the 0.017 level, these results were followed using pair wise comparisons. Findings indicate there were no significant difference between the time taken to recall a specific memory in response to happy and angry cue word ($U = -.037$, *ns*). Likewise, no significant differences were found between angry-sad ($U = -.60$, *ns*) or between angry-neutral cue words ($U = -.36$, *ns*). Happy, sad and angry cue word categories remained non-significant when timed and untimed conditions were taken into consideration. There was a trend, however, for longer response
latencies when participants were presented with angry cues under untimed conditions 

\[(U=0.00, p = .055)\].

<table>
<thead>
<tr>
<th>Cue word Category</th>
<th>Mean response (secs)</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>32.6</td>
<td>13.5</td>
<td>13-57</td>
</tr>
<tr>
<td>Sad</td>
<td>36.6</td>
<td>15.2</td>
<td>15-66</td>
</tr>
<tr>
<td>Angry</td>
<td>45.9</td>
<td>17.7</td>
<td>22-82</td>
</tr>
<tr>
<td>Neutral</td>
<td>30.6</td>
<td>9.6</td>
<td>14-57</td>
</tr>
</tbody>
</table>

Table 3.3: Response times across cue word categories for the NS group across timed and untimed conditions (n=24)

Content analysis indicated that all four cue word categories resulted in the recall of emotional memories. Happy and angry cue words elicited more distinctive or infrequent events compared to neutral and sad memories. While recalling distinctive or infrequent events may explain why happy cue words elicit more specific memories, this does not seem to apply to angry cue words. It may be that although angry cue words also elicit distinctive memories but these memories may be more likely to thematically grouped to a sequence of events. Sad cues, however, frequently contained self-reflections for extended events, which appeared to diverge into related themes. A number of participants also recalled memories that related to the resolution of goal obstruction when they were given happy or angry cue words. This suggests that there may be overlaps between emotive content for happy cues and angry memories and that the word cue may not always prime the corresponding emotion for all participants.
3.3.2 Discussion

There were two aims of these analyses. The first aim was to determine whether cue valence was associated with overgeneral recall. The second aim was to investigate whether negative cue words were associated with longer response latencies. Findings indicate that happy cue words, compared to other cue word categories, were more likely to produce specific memories. In contrast, sad and neutral words were more likely to result in overgeneralized recall, compared to happy and angry cue words. Although, response latencies did not significantly differ across cue word categories, there was a tendency for angry cue words to produce longer response latencies under untimed conditions.

Content analysis indicated that happy and angry cue words were more likely to produce memories relating distinctive events (defined as one off events or special occasions) or memories relating to goal resolution or obstruction. In contrast, sad cue words tended to elicit self-reflections which were closely associated with other similar events or experiences. Therefore, it may be that the differences between memory valence and memory specificity may relate to the underlying content. It may be that while some types of cue words are more likely to trigger emotional self-reflections and tap into negative self-schemas, as suggested by the CaR-FA-X model, not all emotional cues will tap into self-relevant information. Future studies may wish to examine whether specific groups of individuals, e.g. those predisposed to having a more negative outlook in life, recall common themes in response to each the cue word categories.
Section 4: The Effect of Neuroticism on Current Depressed Mood
4.1. Findings from the NS group

People tend to respond to stress and negative events in different ways, with some responding more readily and intensely to stress than others. Given that neuroticism, rumination and overgeneral memories have all been shown to affect mood regulation and monitoring in psychologically healthy and clinical groups alike, this analysis aims to determine:

1. whether there is a direct relationship between neuroticism and current depressed mood in individuals who self-report never experiencing suicidal ideation.
2. If this relationship between neuroticism and current depressed mood is mediated by ruminative thinking and overgenerality.
3. if findings indicate that the relationship was mediated by a form of ruminative thinking, the models will be repeated to determine which type of rumination, brooding or reflection exerted the greatest impact on the relationship between neuroticism, overgeneral memories and current depressed mood.
4. State anger is controlled for in each model, given overlaps between angry mood and neuroticism (Clark & Watson, 1988).
5. Transcripts from a sub-sample of the population rating high in trait neuroticism are also analyzed to determine if there any emerging common themes for this group.
4.1.2 Results

Age and Gender

Given the large, unequal group sizes, age and gender effects were investigated using Mann Whitney non-parametric tests. Findings indicate that gender did not affect the number of overgeneral memories recalled ($U=865.5$, ns), neuroticism ($U=939$, ns), brooding ($U=819$, ns), or current depressed mood scores, ($U=808$, ns).

Age (in five year age bands) was found to affect neuroticism ($H (4) =15.8, p = .002$) and the percentage of overgeneral memories recalled ($H (4) =11.9, p = .018$), as shown in figure 4.1. To investigate these results further, pair-wise comparisons between the youngest (18-25) and oldest (50+) were carried out as they would represent the most extreme differences. Findings indicate no significant differences between the youngest and oldest participant groups in relation to overgenerality ($U = 23$, ns) and neuroticism ($U = 67$, ns). Due to confidentiality reasons exact ages were not able to be obtained.
Participants were divided into high, medium and low neuroticism groups based on standardized Z scores. So, z scores of 1 or above were allocated to the high neuroticism group and z scores of -1 or below were allocated to the low neuroticism group. Positive ($U = 312, \text{ns}$), negative ($U = 308, \text{ns}$) and mixed memory content ($U = 296, \text{ns}$), did not differ between high ($n = 26$) and low neuroticism groups ($n = 29$). High and low neuroticism groups did not differ on the number of overgeneral memories reported in response to happy ($U = 327, \text{ns}$), sad ($U = .371, \text{ns}$), angry, ($U = 331, \text{ns}$) or emotional cue words either ($U = 346, \text{ns}$).
**Exploratory analysis: Correlations**

Pearson’s Correlation Coefficients were used to determine direct inter-relationships between factors. Neuroticism was predicted to positively correlate with brooding, depressed mood and overgenerality. As seen in Table 4.1, the majority of the findings were in the expected direction, with the exception of the current depressed mood-overgeneral recall and neuroticism-overgeneral recall relationships which were negatively associated with each other.

<table>
<thead>
<tr>
<th></th>
<th>Neuroticism</th>
<th>Brooding</th>
<th>Depressed Mood</th>
<th>Overgenerality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroticism</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brooding</td>
<td>.40**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressed Mood</td>
<td>.38**</td>
<td>.39***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overgenerality</td>
<td>-.198*</td>
<td>.12</td>
<td>-.197*</td>
<td></td>
</tr>
</tbody>
</table>

**Descriptive data**

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroticism</td>
<td>6 (3)</td>
</tr>
<tr>
<td>Brooding</td>
<td>9.5 (3)</td>
</tr>
<tr>
<td>Depressed Mood</td>
<td>4 (6)</td>
</tr>
<tr>
<td>Overgenerality</td>
<td>4 (4)</td>
</tr>
</tbody>
</table>

**Table 4.1: Correlational and Descriptive Data for Neuroticism, Brooding, Depressed mood and Overgeneralized recall in the Non-Suicidal (NS) group**

Barnhofer & Chittka, (2010) noted a possible overlap between worry items on the neuroticism scale and the brooding measure. Therefore, to improve discriminate validity, the analysis was re-run excluding the worry items from the neuroticism scale. The majority of findings remained the same with overgenerality and neuroticism continuing to be negatively correlated with each other ($r (100) = -.17$, $p < .05$).

**Exploratory Analysis: Indirect Effects**
The relationship between neuroticism (X) and current depressed mood (Y) was hypothesized to be positively mediated by brooding (M1) and overgenerality (M2). To test this, Hayes, Preacher, & Myers, (2010) MED3C macro for SPSS was used. This macro allows all indirect paths to be tested concurrently and, therefore, reduce limitations associated with the Baron & Kenny, (1986) method (Hayes, 2009). This type of statistical analysis has been used by others within the autobiographical memory field (e.g. Debeer, Hermans, & Raes, 2009). In contrast to traditional approaches, tests of indirect effect do not assume a direct relationship between variables, but rather the predictor, intervening and outcome variables will become related as a result of the indirect effect between them (Zhao et al., 2010; Mathieu & Taylor, 2006b)

In the interest of simplicity, only significant paths are shown in Figure 4.2. Paths a1 and a2 represent the standardized regression weights for the relationship between neuroticism (X) and each of the intervening variables, brooding (m1) and overgeneral memories (m2). Conversely, paths b1 and b2 estimate the strength of each intervening variables from neuroticism and

---

**Figure 4.2: The Indirect Effects of Brooding and Overgeneralized Memories on the Relationship between Neuroticism and Depressed Mood in the never suicidal group**

In the interest of simplicity, only significant paths are shown in Figure 4.2. Paths a1 and a2 represent the standardized regression weights for the relationship between neuroticism (X) and each of the intervening variables, brooding (m1) and overgeneral memories (m2). Conversely, paths b1 and b2 estimate the strength of each intervening variables from neuroticism and
current depressed mood (Y). Following recent suggestions on testing for indirect effects (Hayes, 2009), a bias corrected bootstrap with 5000 resamples was used to derive 95% confidence intervals in order to establish a less biased estimate of the indirect effects of models presented.

Path C ($\beta = .34, p < .01$) represents the direct relationship between neuroticism and current depressed mood whereas path C’ shows the effect of neuroticism on depressed mood after controlling for brooding and the proportion of overgeneral memories recalled. As the strength of path C’ is reduced but still marginally significant, this suggests that although including the two mediators reduces the direct effect between neuroticism and current depressed mood, it does not fully mediate it. Based on bias corrected and accelerated (bca) bootstrap confidence intervals, the true indirect effect was thought to lie between 0.03-0.29. Interestingly while paths a2 and b2 (Figure 4.2) indicate that neuroticism is negatively associated with overgeneral memories and that overgenerality is negatively associated with current depressed mood, there is a positive cumulative impact of both factors on current depressed mood.

As before, the analysis was repeated excluding the worry items from the neuroticism scale, while still controlling for reflective rumination, to prevent any overlaps between worry items on the neuroticism and brooding scales (Barnhofer & Chittka, 2010). Findings remained significant and the pattern of findings remained unchanged.

It could also be speculated that a further overlap between depressed mood and other negative mood states, such as anger, may exist. Moreover, these overlaps between negative mood states could potentially confound findings on the relationship between neuroticism and depressed mood. To test this, the analysis was repeated, but this time controlling for reflective rumination
and angry mood state. Though findings remained similar path C’ was no longer significant (β = .11, ns).

Based on 95% BCA bootstrapped confidence intervals, the true indirect effect for the entire model, after controlling for worry, angry mood and reflection, was thought to lie between 0.01-0.22 with the total indirect effect explaining 40% of the observed variance (adjusted $R^2 = .40$, $F(5, 95) = 14.27, p < .001$). The individual effects of brooding and overgenerality on the total indirect direct effect was calculated by dividing each ab path by the total effect (path C) to produce the ratio of indirect to total effect (Hayes et al., 2010). This indicated that brooding explained twenty five percent whereas overgenerality accounted for twenty percent of the total indirect effect.

**Alternative models**

Given that research indicates overlaps between neuroticism, rumination, overgenerality and depressed mood, a number of other potential models were tested in addition to the one reported above, as shown in Table 4.2. Comparison of different multiple mediation models was done using the adjust $R^2$ statistic, which measures the effect size for mediated effect, as well as the upper and lower confidence intervals for the indirect effects.
Of all the alternative models presented, model B appears the most promising as it accounts for the largest mediated effect size. Given that C' is still significant in model B, this implies that the relationship between neuroticism and brooding can only be partially explained by the combined indirect effects of depressed mood and overgenerality. The analysis for model B was repeated two further times, controlling for reflective rumination on each occasion.

As with the original model, the first re-run excluded worry items for the neuroticism scale ($adjusted R^2 = .49, F (4, 96) = 25.4, p < .001$), with findings remaining similar and C' remaining marginally significant ($\beta = .16, p = .046$). The second re-run of model excluded
worry items from the neuroticism scale, but this time controlled for current angry mood and reflection. When angry mood and reflection were controlled for, as well as the worry items on the neuroticism scale, findings indicated that the combined indirect effect of indirect effect of current depressed mood and overgenerality were no longer significant ($\beta = -.18$, $p = .12$).
4.1.3 Thematic analysis of transcripts

Procedure

The thematic analysis and coding was done before the trait measures were scored. This was to limit any interpretation biases. Once the thematic analysis had been completed, trait measures were scored and transcripts from participants rating high on trait neuroticism (n=13), defined as a Z score of 1 or above, were analyzed further.

All memories were categorized into specific and overgeneralized recall initially and then subdivided into positive and negative memories, followed by salient and non-salient memories depending on whether the participant explicitly stated that this memory was important for them.

After this, memories were inductively coded based on recurring themes that emerged based on the semantic interpretation of narrative accounts. These codes were categorized and defined within a codebook, which was subsequently employed to establish the ecological validity of constructs coded, shown in Table 4.3. The primary objective of the data was to explore specific themes and patterns of responding. Thematic coding was a reflexive and iterative process, which was discussed within supervision sessions and reviewed after 12 months. Reviewing abstracted codes with other individuals ensured that themes abstracted remained grounded in the original narrative accounts provided and limited interpretational biases by the researcher.

Open coding was applied to the semantic themes that emerged in participants’ responses. Defining these inductive codes within a codebook helped to organized the interpretation of subsequent transcripts (Crabtree & Miller, 1999). Using inductive, open coding served a further advantage in that it allows the abstracted codes to be closely matched to the narratives reported
by the participants, and as such provided a bottom up approach of analysis where no specific hypothesizes are projected onto the narrative accounts.

The main codes relate to an overall theme within the memory whereas the sub codes relate subdivisions of that memory (i.e. is the surprising memory a good or bad memory). The additional codes relate to references to different classes of events that might fall into this category (e.g. starting university was a positive experience because I felt accepted). The description of the codes relate to underlying themes or references that participants have made which can be used to define how the coding could be applied. For instance, in the example of starting university, the participant might recall a need to fit in that they did not experience in secondary school, whereas the university experience allowed them an opportunity to fit in with social peers and this made them feel happy.
<table>
<thead>
<tr>
<th>Main Codes</th>
<th>Sub-codes</th>
<th>Additional Sub-codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surprising Events</td>
<td>Positive; Negative</td>
<td></td>
<td>Events appraised as expected or unexpected.</td>
</tr>
<tr>
<td></td>
<td>Memories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptance</td>
<td>Positive Memories</td>
<td>Owning; new starts,</td>
<td>Need for acceptance; struggle for this and achieving a sense of self</td>
</tr>
<tr>
<td></td>
<td></td>
<td>belonging; just being;</td>
<td>contentment</td>
</tr>
<tr>
<td></td>
<td>Negative Memories</td>
<td>being believed; reunited;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>proud</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mixture of Emotions</td>
<td>Tired; impact on self and others, deaths; personally salient memories</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alone; unhelpful;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>uncomfortable; closeness</td>
<td></td>
</tr>
<tr>
<td>Personal Goals</td>
<td>Achievement Failure</td>
<td>Hesitancy</td>
<td>Striving for goal attainment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unfairness</td>
<td></td>
<td></td>
<td>contextual details for the event; appraising why the event happened and who might have caused it (internal vs. external causes)</td>
</tr>
<tr>
<td>Thinking</td>
<td>Frequent thinking;</td>
<td></td>
<td>References to strategies</td>
</tr>
</tbody>
</table>
Table 4.3: Thematic analysis of main and sub-codes for individuals rating high on neuroticism

| active avoidance; uncertainty; detachment; guilt | for regulating thoughts |

Key themes were identified based on references to certain underlying themes that were reported during the autobiographical memory test. To avoid mis-interpretation, themes were reviewed and reflected upon with other researchers to ensure that they did match participants’ responses. Equal weighting was given to repeated and single references to themes. This means that if the participant repeatedly brought up themes of feeling alone in different memories (e.g. feeling alone when starting a new job; feeling alone after a bereavement), these were recorded as separate examples of the ‘alone’ theme.

Themes were subsequently organized into a hierarchal relationship reflecting emerging themes using the software program, Nud*ist. When a new theme was observed, all the previously coded transcripts were re-analyzed based on the new code (Boyatzis, 1998). This process was repeated for all transcripts within the selected population until coding was saturated. Reflexive thoughts were detailed within memos and the logbook.

During this process, similarities between participant responses and specific areas of contention were beginning to emerge. These areas of contention highlighted clustered themes, which were divided into related sub-themes. Positive and negative memory content appeared to relate to a continuum of clustered themes, depending on whether a personal goal or expectation was met or not. Given the subjective nature of applying coding, fabricated themes may be unintentionally identified. This was minimized through a reflective process of diary keeping.
and supervision, developing clear criteria for the identification of codes to be rated by an independent supervisor and ensuring that all themes were inductively abstracted. Unfortunately, it was not possible to conduct a member check of the generate themes due to time constraints. (e.g. a large number of participants had become untraceable throughout the course of this study etc.)

**Results**

Content analysis indicated that individuals who rated high on neuroticism and rumination appeared were more likely to focus on the impact of a negative event or report trying to avoid a memory. Individuals who rated high on either neuroticism or rumination tended to provide shorter and more fragmented accounts of the remembered event compared to low raters.

When retrieving a memory, individuals rating high on neuroticism measures tended to use a more restricted range of descriptors to recall a memory compared to low raters. These were mainly descriptors that focused on emotions (e.g. ‘sad….when have I felt sad’). Individuals in the high rating group were also more likely to report self-evaluations and how the event impacted them, whereas low raters frequently referred to how the event effected other people as well as themselves. This is consistent with other research which suggests that high levels of neuroticism are associated with an increased self-focus.

The analysis also indicated that individuals rating high on neuroticism were more likely to recall memories that related to themes of self-acceptance and acceptance by social peers, suggesting that these themes were personally important goals. Looking at the range of positive and negative memories indicated that high-raters were more likely to make references to having difficulty in coping with, or knowing how to respond to, negative events. In general, positive
memories seemed to reflect feelings of belonging or being present in the moment, whereas negative memories seemed to reflect a perceived betrayal and need for new beginnings.

Examples of these themes are shown in Table 4.4.

<table>
<thead>
<tr>
<th>Clustered Themes</th>
<th>Sub-Themes</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing vs. avoidance</td>
<td>Subjective perception of unexpected events.</td>
<td>‘it was so strange that I didn’t pick up how serious it was, you know, my boyfriend knew that he was going that day (referring to death of boyf’s father), and wasn’t worried, he was more worried about what would happen after…it just seemed like a another day that…’</td>
</tr>
<tr>
<td>Belonging vs. rejection</td>
<td>Feelings of loneliness and reflections about why situations triggered mixed emotions.</td>
<td>‘last year…(we) went on holiday with my family in Italy and again, it was really good because it’s a big family and getting everyone together like…at one time is quite…it doesn’t happen often…so yeah, it was good, it was two weeks we had together..(brief laughter).’</td>
</tr>
<tr>
<td></td>
<td>Self-reflections on impact for self and others.</td>
<td>‘Oh yeah…erm…(pause)…hmmm…(pause) …(pause)…erm when a few years ago,…been in a situation with a ..some people from football and one day and erm…for some reason quite a few of the guys turned on me and gave me a little bit of a hard time……ganging</td>
</tr>
<tr>
<td>ownership of a longed for ‘thing’</td>
<td>up sort of..... a bullying type thing and suppose felt sort of destroyed after that. Thought I was one of the guys getting a long with them and erm...to get that mad me feel a bit destroyed.’</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.4: Themes abstracted using inductive coding from transcripts belonging to individuals rating high on neuroticism (n=13)
4.1.4 Discussion

Though neuroticism is a known risk factor for developing depressive symptoms (Ormel et al., 2001), little is known about the mechanisms that underlie the relationship between neuroticism and depressed mood in NS groups. While previous studies indicate a positive relationship between neuroticism, rumination and current depressed mood, there is evidence to suggest that the relationship between neuroticism and current depressed mood cannot be fully accounted for by the indirect effects of rumination alone. Therefore, overgenerality was proposed as an additional indirect factor that may maintain this relationship given that prior research has highlighted close associations between rumination, depressed mood and overgenerality (Williams et al., 2007b).

The key findings from this analysis show that the overall indirect effects, based on the C prime statistics, indicate that brooding and the proportion of overgeneral memories positively strengthened the relationship between neuroticism and depressed mood, as shown in Figure 4.1. This positive association remained after controlling for worry items on the neuroticism scale, reflective rumination and current angry mood. When examining the impact of individual mediating factors, neuroticism was observed to be negatively associated with overgenerality. Overgenerality was found to be negatively associated with current depressed mood (path b2) but this path became non-significant when angry mood was included as an additional covariate. Each finding is discussed in turn.

Previous research indicates individuals rating high on neuroticism tend to respond to low mood with a ruminative brooding thinking style (Barnhofer & Chittka, 2010) and that ruminative brooding and overgenerality is positively related to depressed mood (Dalgleish et al., 2007). Unlike these studies, this analysis specifically recruited individuals who self-reported having no
prior suicidal intent/ suicide attempt or psychologically ill health (NS). The purpose of this was to examine why some individuals are more likely to experience current depressed mood than others, using a personality characteristic that is common to psychologically healthy and clinical populations alike. Although, the overall findings imply agreement with previous findings, closer inspection on individual paths indicate a possible suppressing effect of overgenerality on the relationship between neuroticism and current depressed mood (see MacKinnon et al., 2000b for discussion of suppression effects).

Although this suppressing effect may appear contradictory, other studies on psychologically healthy groups show similar findings. Verwoerd, Jong, and Wessel (2008), for instance, show that neuroticism is associated with frequently recalling intrusive memories, which tend to be highly detailed personal memories, following the induction of aversive event (Muris, 2006a; Muris, de Jong, & Engelen, 2004).

Findings from the thematic analysis add to these findings by indicating that when individuals rating high on neuroticism are asked to recall a specific memory, they tended to employ a restricted range of descriptors to start the retrieval search compared to low raters. The thematic analysis highlighted frequent references to a need to belong, difficulties in managing and knowing how to respond to negative events. Positive and negative memories appeared to be on a continuum based on whether personal goals (i.e. belonging, loneliness, rejection, betrayal) were achieved or not. Roberts et al. (2013) shows that activating resolved or unresolved personal memories triggers ruminative responses, which in turn, is likely to increase unwanted intrusive ruminative thoughts. As such, it may be that individual levels of neuroticism are related to recalling fewer overgeneral memories which, in turn, is associated negatively with current depressed mood. Combining ruminative thinking with individual levels of neuroticism
may mean that resolved and unresolved personal goals are activated with exerts a positive impact on current depressed mood. While exploring this relationship in greater detail was out of the remit of this analysis, other studies may wish to explore whether neuroticism is related to recalling more negative, highly detailed intrusive memories and how this relates fluctuations in negative mood in healthy populations.

In this respect, perhaps recalling more detailed memories could provide contextual or examples of past situations which may help to reduce general current depressed mood, potentially explaining the negative association between overgenerality and current depressed mood (path b2) in psychologically healthy populations. This would be consistent with other studies which suggest that recalling specific, detailed memories is important for effective social problem solving (Williams, 2007). Interestingly, after controlling for angry mood, path b2 was no longer significant. This could suggest that while recalling more detailed memories may be negatively associated with current depressed mood, other negative mood states, such as angry mood, may exert the opposite effect on this in psychologically health groups. It also suggests that there may be something specific about depressed mood that differs from angry mood, although both are forms of negative mood. This is important as previous research on overgenerality has predominately focused on depressogenic thinking patterns with overgenerality proposed as a possible means of reducing negative affect. Few studies, however, consider the impact of other negative mood states, such as anger or aggression, which may overlap or affect current depressed mood.

Crucially, unlike other studies who fail to replicate the relationship between overgenerality, brooding and low mood in normative populations (e.g. Sumner, Griffith, & Minekaa, 2010), this analysis indicates that this relationship can occur in a specific sub-population of
emotionally sensitive individuals are not currently showing any psychopathology, albeit in different directions. It may be that some of the previous research has sought to investigate a different type of indirect relationship between neuroticism, overgeneral memories and depressed mood (e.g. Roberts, Carlos, & Kasdan, 2006; Chan, Goodwin, & Harmer, 2007). Rather than investigating which cognitive mechanisms underlie the relationship between neuroticism and current depressed mood, which was the focus of this analysis, these moderation studies seek to explain the how the relationship between depressed mood and overgenerality occurs under different conditions of neuroticism. While these moderation studies indicate no significant relationships between neuroticism, overgenerality and depressed mood, another study using a meditational framework has shown that the relationship between neuroticism and overgenerality is mediated by sub-clinical levels of negative mood (e.g. Kuyken & Dalgleish, 2011).

Differences between findings in NS groups could also, potentially, be a result of statistical techniques, such as using split-group moderators (MacCallum, Zhang, Preacher, & Rucker, 2002) or differences within the focus of the research question. For instance, it may be that neuroticism does not function as a contextual variable but rather subtle differences within different levels of neuroticism may be positively, or negatively, associated with current depressed mood but only as a consequence of specific indirect factors, as suggested by the findings obtained by this analysis.

In summary, the findings obtained here indicate that in a NS population, the relationship between neuroticism and current depressed mood is indirectly affected by brooding and overgenerality, with each mediator exerting a positive or negative affect on levels of current depressed mood. Although out with the remit of this analysis, it would be interesting to
examine the content of the reported personal memories to see if reported memories fit
descriptions of involuntary, intrusive memories or positive personal memories.
4.2 The effect of neuroticism on current depressed mood in recent suicide attempts (SA)

While prior research highlights theoretical connections between neuroticism, rumination, overgenerality and depressed mood, no study to date has investigated the indirect effect of these variables on the relationship between neuroticism and current depressed mood in individuals who have recently attempted suicide. Rumination has been conceptualized as a means of thinking through problems, albeit in a passive way. Brooding is thought to relate to thinking through problems by focusing on the emotional aspects of an event, whereas reflection relates to thinking about contextual factors (Watkins, 2008). Given discrepancies between previous findings in suicidal groups, identifying which style of rumination effects the relationship between neuroticism and depressed mood could help to identify whether this relationship occurs as a result of focusing on contextual or emotional factors associated with an event.

This analysis, therefore, aims to

- determine whether there is a direct relationship between neuroticism and current depressed mood
- Secondly, if findings indicate that there is a direct relationship between neuroticism and current depressed mood, we expect that this relationship between neuroticism and depressed mood will be positively mediated by overgenerality and ruminative brooding, but not reflective rumination.
- Angry mood, impulsivity and escape avoidant coping are controlled for in each model as they have been shown to overlap with neuroticism.
4.2.1 Results

Exploratory Analysis: Correlations

Table 4.5 displays the means, standard deviations and Pearson’s correlation coefficient for neuroticism, rumination, low mood, coping and memory specificity variables. Neuroticism was found to significantly correlate with both forms of rumination (brooding and reflection), behavioral impulsivity, escape avoidant coping and depressed mood, with only current depressed mood negatively correlating with the memory specificity.

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<td>6.</td>
<td>.23'</td>
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<td>.27**</td>
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<td>7.</td>
<td>.46**</td>
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<td>.54**</td>
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Descriptive data

<table>
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<tr>
<th>Mean (SD)</th>
<th>9 (3)</th>
<th>44 (23)</th>
<th>16(4)</th>
<th>13(4)</th>
<th>78(15)</th>
<th>19(7)</th>
<th>34(18)</th>
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**p < .01; *p < .05

Table 4.5: Correlational and Descriptive data for personality, mood and memory for the SA group

Key relationships from the correlational analysis, under different levels of neuroticism, are shown in Figure 4.3. This suggests that individuals with rating low to medium, based on z scores, on neuroticism are more likely to recall overgeneralized memories. While low raters also appear to rate higher on brooding, compared to the other two categories, high neuroticism
scores are positively associated with current depressed mood. An analysis of indirect effects is used to investigate what factors might be maintaining the relationship between neuroticism and overgenerality occurs.

![Graph showing changes in overgenerality, brooding, and current depressed scores based on different levels of neuroticism](image)

**Figure 4.3: Changes in overgenerality, brooding and current depressed scores based on different levels of neuroticism**

**Exploratory Analysis: Indirect Effects**

The strongest model from section 4.1 was chosen to allow comparisons to be made between never suicidal and suicide attempt groups. As with the NS group, the MED3C macro was used (Hayes et al., 2010) to concurrently test all paths. To reduce any bias, bootstrapped confidence intervals are reported for the model.
In the model presented, impulsivity, escape avoidant coping and reflection are entered into the macro as covariates and as such, controlled for in the model presented in Figure 4.4. These variables were entered into the model given their strong association with suicidality, and as such could represent, potentially, confounding variables. In the model, paths a1 and a2 show the standardized regression weights between neuroticism for each of the mediating variables, percentage of overgeneralized memories recalled (m1) and brooding (m2). Paths b1 and b2, in contrast, show the relationship between each mediating variables and depressed mood. Following recent suggestions on testing for indirect effects (Hayes, 2009), a bias corrected bootstrap with 5000 resamples was used to derive 95% confidence intervals in order to establish a more accurate measures of the indirect effects presented.

Path C (β = .30, p < .01) represents the direct relationship between neuroticism and depressed mood whereas path C’ shows the effects of neuroticism on depressed mood after controlling for both mediating variables. As path C’ is no longer significant this suggests that the inclusion of the two mediators reduces the direct effect between neuroticism and depressed mood, with the
indirect effect for this relationship ranging between 0.02-0.27, based on 95% bias corrected and accelerated confidence intervals. Fifty percent of the observed variance between neuroticism and depressed mood was accountable to the indirect effects of brooding and the percentage of overgeneral memories recalled (adjusted \( R^2 = .50, F (7, 68) = 11.67, p < .001 \)).

To examine the influence of each mediating variable on the total indirect direct effect, the ratio of indirect to total effect was calculated by dividing each ab path by the total effect (path C) (Hayes et al., 2010). This indicated that seventy percent of the total indirect effect was explained by brooding and fourteen percent by overgenerality. The model was re-run but this time controlling after controlling for worry items on the neuroticism scale and the significantly confounding effects of escape avoidant coping (\( \beta = 0.34, p < .01 \)) and impulsivity (\( \beta = 0.26, p < .05 \)). Findings remained similar.

As prior research show discrepancies in previous findings between rumination and suicidality, the analysis was repeated replacing brooding with reflection as a possible mediator, controlling for brooding. This would help to determine whether the observed relationship occurred as a general consequence of ruminative thinking or if it was solely a consequence of a brooding thinking style. As before, impulsivity and avoidant coping were controlled for. Findings for the full multiple mediation model, with reflection and overgeneralized recall as mediators, were not significant.

*Alternative models*

In addition to the model reported above, a number of other theoretically feasible models were tested, shown in Table 4.6. Comparison of different multiple mediation models was done using the adjust \( R^2 \) statistic, which measures the effect size for mediated effect, and confidence intervals of the indirect effects.
<table>
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<tr>
<th>Models</th>
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<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
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<tr>
<td><strong>Adj. R²</strong></td>
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<td>.42</td>
<td>.41</td>
<td>.41</td>
<td>.32</td>
<td>.32</td>
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<td><strong>M1 Sig. Paths</strong></td>
<td>Path A: β = .27, p &lt; .05</td>
<td>Path A: β = .46, p &lt; .01</td>
<td>Path A: β = .52, p &lt; .01</td>
<td>Path A: β = .32, p &lt; .01</td>
<td>Path A: NS</td>
<td>Path A: NS</td>
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<td>Path B: β = .38, p &lt; .01</td>
<td>Path B: β =</td>
<td>Path B: β1 = .25, p &lt; .05</td>
<td>Path B: b1 = .29, p &lt; .01</td>
<td>NS</td>
<td>Path B: b1 = .42, p &lt; .01</td>
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<tr>
<td><strong>M1 BCA 95% CI</strong></td>
<td>-.004 - .28</td>
<td>.07 - .31</td>
<td>.02 - .27</td>
<td>.009 - .20</td>
<td>-.08 - .11</td>
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<td><strong>M2 Sig. Paths</strong></td>
<td>Path A: β = .36, p &lt; .01</td>
<td>Path A: β = .21, p &lt; .05</td>
<td>Path A: β = .25, p &lt; .05</td>
<td>Path B: β = .29, p &lt; .05</td>
<td>NS</td>
<td>Path A: NS</td>
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<td></td>
<td>Path B: β = .31, p &lt; .05</td>
<td>Path B: β =</td>
<td>Path B: β = .25, p &lt; .05</td>
<td>Path B: b1 = .29, p &lt; .05</td>
<td>NS</td>
<td>Path B: b1 = .29, p &lt; .05</td>
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<tr>
<td><strong>M2 BCA 95% CI</strong></td>
<td>-.11 - .02</td>
<td>-.05 - .31</td>
<td>-.002 - .13</td>
<td>-.05 - .03</td>
<td>-.02 - .10</td>
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<td><strong>M1 + M2</strong></td>
<td>β = .36, p &lt; .01</td>
<td>β = .52, p &lt; .01</td>
<td>β = .27, p &lt; .05</td>
<td>β = .32, p &lt; .01</td>
<td>NS</td>
<td></td>
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<tr>
<td><strong>M1 + M2 BCA 95% CI</strong></td>
<td>-.08 - .02</td>
<td>-.03 - .03</td>
<td>-.01 - .05</td>
<td>-.02 - .02</td>
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Table 4.6: Alternative Multiple Mediation Models for the Suicide Attempt Group
Of all the alternative models, model D explains the most variance. According to this model, the relationship between brooding and neuroticism is indirectly mediated by the cumulative effect both depressed mood and overgeneral recall (path a3). The model was re-run a further two times. First to control for worry item on the neuroticism scale \((\text{adjusted } R^2 = .42, F (4, 71) = 14.8, p < .001)\) and then to control for impulsivity and escape avoidant coping, \((\text{adjusted } R^2 = .42, F (4, 71) = 10.1, p < .001)\) which may potentially confound findings. Findings remained similar. Compared to model D, however, the original model had a stronger effect size. Given that confidence intervals for the cumulative indirect effect in model D include a 0 suggests that this indirect effect should be interpreted with caution.
4.2.2 Discussion

The findings from this analysis indicated that neuroticism is directly associated with current depressed mood, with overgenerality and brooding, but not reflection, positively mediating this relationship. Interestingly, the findings obtained here also indicate that although there was no direct relationship between neuroticism and overgeneralized recall, the two factors become related through a multiple mediational framework. In terms of variance, the first model suggests that fifty percent of the observed variance between neuroticism and depressed mood can be accounted for by the cumulative indirect effect of brooding and overgenerality. Although, the majority of this indirect effect was accounted for by brooding, overgenerality still accounted for fourteen percent of this indirect effect over and above the effects of brooding. Entering the percentage of overgeneral memories recalled in response to negative cue words, as opposed to overgeneral memories for all cue words, did not explain any additional variance. This suggests that the percentage of overgeneralized memories recalled remained similar for happy, sad, angry and emotional neutral cues. Although the current findings remained after controlling for the covariates, significant effects of escape avoidant coping and a general effect of impulsivity, but not its separate sub-scales (attentional, non-planning and motor), were observed.

Based on the data collected, these findings indicate that repeatedly thinking about the emotional aspects of a problem, rather than reflecting on the problem, in an abstract manner may have a greater association with already depressed mood. These findings are consistent with prior research on depression which suggests that focusing on emotional aspects of past events in a self-critical manner is more maladaptive than passively problem solving, as is the case in reflective rumination (Watkins & Teasdale, 2004). Due to the cross sectional nature of this analysis, it is not possible to imply causality. Future studies, using induction techniques perhaps, may wish to explore this relationship further.
4.3 *The effect of Neuroticism on current depressed mood who have experienced Suicidal Ideation (SI)*

The aim of this exploratory analysis was to determine whether the relationship between neuroticism and current depressed mood is mediated by brooding and overgenerality.
### 4.3.1 Results

**Exploratory Analysis: Correlations**

Inter-relationships between neuroticism, rumination, current depressed mood and overgenerality variables, and descriptive data, are shown in Table 4.7. Neuroticism was found to significantly correlate with brooding and overgenerality. Both brooding and reflection correlated with current depressed mood. No direct relationship between neuroticism and current depressed mood was observed.

<table>
<thead>
<tr>
<th></th>
<th>1 Neuroticism</th>
<th>2 Overgenerality</th>
<th>3 Brooding</th>
<th>4 Reflection</th>
<th>5 Dep. Mood</th>
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<td>5</td>
<td>.19</td>
<td>.04</td>
<td>.44*</td>
<td>.40**</td>
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</table>

**Descriptives**

| Mean (SD) | 8 (2.8) | 23 (23.8) | 11.8 (4.1) | 12 (3.9) | 11 (13.7) |

* Significant at the .05 level; ** significant at the .01 level

*Table 4.7: Correlational and descriptive data for SI group (n=26)*

**Exploratory Analysis: Indirect Effects**
Even though a direct effect between neuroticism and current depressed mood was not observed, the previously employed model was used to examine whether the indirect effects brooding and overgenerality would cause neuroticism and current depressed mood to be related.

Path C ($\beta = .06, \text{ns}$) represents the direct relationship between neuroticism and depressed mood whereas path C' ($\beta = -0.19, \text{ns}$) shows the effects of neuroticism on depressed mood after controlling for both mediating variables. As path C' is reduced and changes direction, this suggests that one of the mediators may exert a suppressing effect on this pathway. As shown in Figure 4.5, findings suggest that only brooding significantly mediates the relationship between neuroticism and current depressed mood. This implies that while there is no direct relationship between neuroticism and current depressed mood, they can become related as a consequence of ruminative brooding but not overgenerality. Alternatively, these findings may be a result of sampling issues. Bias corrected and accelerated bootstrapped confidence intervals suggest that the indirect effect of brooding may range between .02 and .66 based on 5000 repetitions.

**Figure 4.5: The mediating effects of brooding and overgenerality on the relationship between neuroticism and current depressed mood in the SI group**

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<td>$a_1$</td>
<td>.51, $p &lt; .01$</td>
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<td>$b_1$</td>
<td>.49, $p &lt; .01$</td>
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<td>$a_2$</td>
<td>.40, ns</td>
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<td>$b_2$</td>
<td>.05, ns</td>
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</table>
4.3.2 Discussion

Unlike the analyses on data from the NS and SA groups, findings from this analysis indicated no direct relationships between neuroticism and current depressed mood. Correlational findings, however, indicated that associations between neuroticism-brooding, neuroticism-overgenerality and brooding-current depressed mood. The analysis of indirect effects indicated that neuroticism and current depressed mood could become associated with each other as a result of ruminative brooding. Given the suppressing effects and small sample size, however, future studies may wish to investigate this relationship further using a larger sample.

One explanation for these findings may be that, as participants for this group were recruited from the community, they may not be currently experiencing suicidal ideation or experience of suicidal ideation might have been in the distant past. Alternatively, it may be due to the measures may not being sensitive enough to capture this relationship (i.e. floor effects). Table 6.1 (section 6.2.1) indicates that while individuals who have experienced suicidal ideation (mean: 11) rate higher than the NS group (mean: 4), their depression scores remain lower than the SA group (mean: 34). This implies that, unlike the other groups, while neuroticism may not directly impact current depressed mood at sub-depression thresholds, it may continue to indirect exert an influence via the relationship between brooding and current depressed mood.

Research by Balazs et al. (2013) shows that individuals with threshold, or sub-threshold levels, of depression were three times more likely to experience suicidal ideation than non-anxious adolescents and nine times more likely compared to non-depressed participants. In terms of our findings, this research implies that even low levels of depressed mood may have
the propensity to increase suicidal ideation. This is interesting because the results suggest that although the suicidal ideation group rated lower on current depressed mood than the suicide attempt group, they still rated higher on current depressed mood measures compared to the NS group. As such, it would be interesting to examine similarities and differences between variables associated with current depressed mood for each group (section 6) to see if similar findings remain.

Research by Enns, Cox, and Inayatulla (2003b) add to this by indicating that neuroticism continued be a significant predictor of depressed mood and suicidal ideation one year after the initial suicide ideation or attempt. According to Suls and Martin (2005), this indirect relationship between neuroticism, ruminative brooding and current depressed mood may occur as a result of several inter-related mechanisms. First, neuroticism is shown to be associated with reporting more daily hassles, with this mood spilling over onto other tasks. The authors show that while old problems were associated with negative mood, new problems were more likely to increase negative mood. Moreover, individuals rating higher on neuroticism were likely to respond to these problems by using emotion focused coping techniques (e.g. disengagement, day dreaming etc). While individuals rating low on neuroticism also employed these types of strategies, they were only used in response to challenging stressors. The authors suggest that the use of emotional-focused strategies indicates that individuals rating higher on neuroticism may find it more difficult to cope with everyday problems. The thematic analysis (section 4.1.3) also supported this perceived difficulty in managing negative situations. The combination of neuroticism and ruminative thinking has been shown to amplify negative self-schematic information and increase the likelihood of emotionally responding to an event (Ciesla et al., 2011). Therefore, these studies suggest that neuroticism may influence suicidal
ideation by activating negative self-schematic information and increasing the likelihood of emotional responding, with brooding enhancing these processes.

In sum, while the current analysis did not find a direct relationship between neuroticism and current depressed mood in the SI group, the analysis of indirect effects indicated that neuroticism and current depressed mood can become related due to indirect effect of ruminative brooding. Prior research suggests that neuroticism relates to difficulties in managing daily problems and that while old problems may be associated with negative mood, current problems are likely to be associated with increased negative mood. Given that the current sample has been collected from a community group, where the suicidal ideation may occurred in the past, it may be that, hypothetically, individuals in this sample were not experiencing any significant problems. The relationship between neuroticism and brooding, however, suggests that if problems were encountered, there would be an increased tendency for individuals with a past history of suicidal ideation to approach these problems in an emotion focused manner. This collective relationship between neuroticism and brooding, in turn, is positively associated with current depressed mood. Sub-threshold, or threshold, levels of depressed mood are thought to increase the propensity of reactivating suicidal ideation. Due to the cross-sectional nature of this study, future studies may wish to conduct a longitudinal study to explore these assumptions further.
Section 5: The effect of impulsivity, rumination and overgenerality on the relationship between trait aggression and current depressed mood
5.1. The effect of trait aggression on current depressed mood in NS groups

While a plethora of research exists on the relationship between neuroticism and depressed mood, the relationship between trait aggression and current depressed mood remains under-explored. There is evidence to suggest that for some individuals the expression of aggression may not only be a precursor to depressed mood, but also the primary maintaining factor of depressed mood (Van Praag, 1998, 2001). Similarly, other studies indicate that angry outbursts are common in a specific subset of depressed patients (Fava et al., 2000). Given that trait aggression relates to an increased propensity for angry and hostile behavior and mood, it may be that variations in trait aggression may be associated with current depressed mood, but this may differ from the neuroticism-current depressed mood pathway.

Therefore, these analyses propose to extend and add to previous findings by:

1. establishing whether there is a direct relationship between trait aggression and depressed mood in individuals who self-report never experiencing suicidal ideation and have never attempted suicide (NS).
2. whether this relationship between trait aggression-depressed mood is mediated by brooding, overgenerality and impulsivity
3. whether this pathway applies to equally to depressed and angry moods.

- As there has been much debate about the effect of gender on trait aggression, gender differences are also investigated to limit any potential confounding effects (Knight, Guthrie, Page, & Fabes, 2002).
• Transcripts from individuals rating high on trait aggression are also analyzed to determine if there are any commonalities between reported themes.
5.1.2 Results

Exploratory analysis: Correlations

Given that there is a strong relationship between aggression and neuroticism (Burton, Hafetz, & Henninger, 2007), partial correlations were used to determine inter-relationships between measures, after controlling for neuroticism. As seen in Table 5.1, brooding and rumination correlated with each other and negatively with overgeneral memories. Overgenerality was found to correlate with escape avoidant coping. Although non-significant, there was a trend for trait aggression to be positively associated with current depressed mood (Pr = (22) .34, p = 0.07).

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<thead>
<tr>
<th></th>
<th>1 Trait Aggression</th>
<th>2 Brooding</th>
<th>3 Reflection</th>
<th>4 O G</th>
<th>5 Dep. Mood</th>
<th>6 Ang. Mood</th>
<th>7 Beh. Imp</th>
<th>8 Escape Avoid. Coping</th>
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</table>
A 2 tailed power analysis was carried out using the trait aggression-current depressed mood correlational value (.4) based on an alpha level of 0.05. The analysis indicated that 59 participants were required to achieve a power level of 0.95. This suggests that after controlling for neuroticism, the analysis did not have enough power to detect any significant differences.

Theoretically, trait aggression and current depressed mood scores were assumed to be related to each based on a continuum of high to low scores, with the non-suicidal group rating lowest on current depressed mood and the clinical group rating the highest. Figure 5.1 provides a visual representation of this relationship.

Figure 5.1: The relationship between trait aggression and current depressed mood for all groups.
When the correlational analysis was repeated (Table 5.2) using data from all three groups, findings indicated that trait aggression positively correlated with brooding, behavioral impulsivity, escape avoidant coping, current depressed and current angry mood. Overgenerality only correlated with current depressed mood and reflective rumination.

<table>
<thead>
<tr>
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<th>1</th>
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<tbody>
<tr>
<td>1. Trait Aggression</td>
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<tr>
<td>2. Brooding</td>
<td>.26*</td>
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<tr>
<td>3. Reflection</td>
<td>.13</td>
<td>.24*</td>
<td></td>
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<tr>
<td>4. OG (%)</td>
<td>-.09</td>
<td>-.10</td>
<td>.2*</td>
<td></td>
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<td></td>
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<tr>
<td>5. Current Depressed</td>
<td>.35**</td>
<td>.48**</td>
<td>.02</td>
<td>.26*</td>
<td></td>
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<tr>
<td>Mood</td>
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<tr>
<td>6. Current Angry Mood</td>
<td>.42**</td>
<td>.3**</td>
<td>-</td>
<td>.13</td>
<td>.53**</td>
<td></td>
<td></td>
<td></td>
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<td>.10</td>
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<tr>
<td>7. Behavioural</td>
<td>.38**</td>
<td>.22*</td>
<td>-</td>
<td>.01</td>
<td>.44**</td>
<td>.23*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impulsivity</td>
<td></td>
<td></td>
<td>.09</td>
<td></td>
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<tr>
<td>8. Escape Avoidant</td>
<td>.26*</td>
<td>.33**</td>
<td>.08</td>
<td>.08</td>
<td>.45**</td>
<td>.28**</td>
<td>.41**</td>
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<tr>
<td>Coping</td>
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</table>

*Table 5.2: Correlational analysis for all three groups, controlling for neuroticism (n= 89)*
5.1.3 Thematic analysis of transcripts for individuals rating high on trait aggression in the NS group

Table 5.3: Themes abstracted using inductive coding from the NS, high trait aggression group (n=13)

<table>
<thead>
<tr>
<th>Main Codes</th>
<th>Sub-codes</th>
<th>Additional Sub-codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Let down</td>
<td>Leaving</td>
<td>Frustrated</td>
<td>Being let down by others, self or combination of both. Sub-code of leaving relates to physical departure from situation.</td>
</tr>
<tr>
<td>Other people’s</td>
<td></td>
<td></td>
<td>Vivid descriptions of arguments by parents and other significant individuals in early life.</td>
</tr>
<tr>
<td>arguments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unfairness</td>
<td>Thwarted goals</td>
<td></td>
<td>Attributions regarding other individuals’ actions and the impact on self</td>
</tr>
<tr>
<td>Pre-emptive</td>
<td></td>
<td></td>
<td>Predicating course of future events and own role in this.</td>
</tr>
<tr>
<td>thoughts</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As with the previous thematic analysis, high and low trait aggression groups were determined using Z scores. Individuals with a Z score of 1 and above were included in the thematic analysis but only if they scored low on neuroticism, defined as a z score of 0 or below. The primary and sub-codes are shown in Table 5.3.
Summary of themes

Themes for individuals rating high on trait aggression in the NS group (Table 5.4) reflect perceptions of being let down by others; being unfairly criticized; own passivity; and feelings of not being ‘good enough’. These themes were unique to this trait aggression group.

<table>
<thead>
<tr>
<th>Clustered Themes</th>
<th>Sub-Themes</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being let down by others</td>
<td>Getting what is deserved</td>
<td>‘Leaving school…by the end of sixth year I’d fallen out with around half of my teachers…I’d completely fallen out with them…I ended up just hating them, in the end I had to get away from them…pretty much they hated me…when I got my results…I passed…..which I don’t think he liked, which made me even happier…’</td>
</tr>
<tr>
<td>Unfairness of others</td>
<td>Impact on Self (passivity)</td>
<td>I remember my dad was really angry at me because he thought I was messing my sister about…he just started shouting…shouting at me…I actually remember…I don’t know how it…but it always comes back to me…I think it’s because I didn’t say anything back and I didn’t defend myself…I was so surprised that he was doing this..</td>
</tr>
<tr>
<td>Predicating future events</td>
<td>Not being good enough</td>
<td>erm starting college art course err…quite old…and it’s not (pause)… that acceptable still to be going later in life when you should be consolidating your career into university… however college…it was college.it still lives with me…because I got myself a little bit of a reputation.</td>
</tr>
</tbody>
</table>

Table 5.4: Examples of themes abstracted using inductive coding in individuals rating high on trait aggression in the NS group.
Moreover, any mentions of goal loss were attributed to either unfairness of others’ actions or perceiving their own self not being ‘good enough’. Compared to thematic analysis of other groups (e.g. high neuroticism and high rumination groups), only the aggression group population reported their thoughts about future events as well as recalling vivid early arguments between salient caregivers.

**Individual differences**

Although the study was not powered to explore gender differences (there were only 28 men and 32 women, and participants had not been selected to make these comparisons), where there were differences, men rated higher than women, but only for trait aggression (U=164.5, p = 0.002), and confrontational coping (U=116, p = 0.02).
5.1.4 Discussion

Findings from the first correlational analysis indicated both types of rumination (brooding and rumination) were negatively associated with overgeneral memories. While findings did not reach statistical significance, there was a trend for trait aggression to be associated with current depressed mood. A post-hoc power analysis indicated that, after controlling for neuroticism, there was not enough power in the study to detect any significant differences using the non-suicidal group only. As the relationship between trait aggression and current depressed mood was thought to be based on a continuum, with the NS group rating lowest on current depressed mood and the SA group rating highest, data from all three groups were amalgamated into one correlational matrix. Key findings from this analysis indicated that trait aggression positively correlated with brooding, behavioral impulsivity, escape avoidant coping, current depressed and current angry mood. Current depressed mood, in turn, correlated with overgenerality, impulsivity and escape avoidant coping. The correlational analysis also indicated inter-relationships between brooding, current depressed mood, impulsivity, trait aggression and escape avoidant coping.

Research on aggression shows that rumination can increase angry feelings (Rusting & Nolen-Hoeksema, 1998) and that expressing aggressive behaviors may reduce feelings of frustration and angry in the short term (Bushman et al., 2005; Bushman, Baumeister, & Philips, 2001). Studies also show that dysphoric ruminators are more likely to blame themselves for their problems, less likely to put plans into action and feel less in control of the situation (Lyubomirsky, Tucker, Caldwell, & Berg, 1999a). Collectively, this suggests that engaging in ruminative thinking while feeling depressed is likely to result in greater difficulty in managing negative emotions (Nolen-Hoeksema & Jackson, 2001).
According to Selby, Anestis, and Joiner (2008), high levels of rumination and catastrophic thinking may increase psychological distress. High levels of psychological distress, in turn, may increase the propensity of using impulsive behaviors which may reduce distress in the short term (Tice, Bratslavsky, & Baumeister, 2001). Catastrophizing can be defined as ruminative thinking about the future. Although future oriented rumination was not measured, the thematic analysis indicated that individuals rating high on trait aggression were more likely to include negative expectations about the future compared to low raters and individuals rating high on neuroticism.

To summarize, findings from the correlational analysis indicate positive associations between trait aggression, ruminative thinking, impulsivity and current depressed mood. One explanation for these inter-relationships may be that, when feeling depressed, individuals may use ruminative thinking as a means of problem solving by either focusing on emotional or the contextual situation. Given that rumination is also associated with self-blame, pessimism and not putting solutions into action, the success of any generated plans may be limited. While impulsive actions or behavior may provide one solution for reducing distress in the short-term, they might not be as adaptive in the long term. Individual differences in trait aggression may maintain this negative cycle by expressing angry behavior, maintaining angry feelings through rumination, or directing the anger inwards. These potential inter-relationships are considered next through an analysis of direct and indirect effects.
5.2. The effect of trait aggression on current depressed mood in individuals who have recently attempted suicide

Trait aggression, impulsivity, rumination and overgenerality are shown to be key risk factors which may increase the propensity for suicidal behavior. Research also shows overlaps between these factors via their influence on mood monitoring and regulation. Despite this, it is unclear how they may collective influence current depressed mood.

Therefore, these analyses aim to:

- Establish whether there is a direct relationship between trait aggression and depressed mood in individuals who have recently attempted suicide (SA).
- Determine whether this relationship between trait aggression-depressed mood is mediated by brooding, overgenerality and impulsivity
- Investigate whether this pathway applies to equally to current depressed and angry moods.
5.2.1 Results

Exploratory Analysis: Correlations

Table 5.6 shows partial correlations for the SA group only. Like the combined analysis (Table 5.2), trait aggression positively correlated with brooding, impulsivity, escape avoidant coping as well as current depressed and angry moods. Current depressed mood correlated with current angry mood, brooding, impulsivity and escape avoidant. The main difference between the combined and suicide attempt correlational analyses relates to overgenerality. While the combined analysis indicated positive inter-relationships between overgenerality-current depressed mood and overgenerality-reflection, analyzing only the suicide attempt data analysis did not replicate these findings. The analysis was sufficiently powered to detect significant differences between variables.

<table>
<thead>
<tr>
<th></th>
<th>1 Trait Aggression</th>
<th>2 Brooding</th>
<th>3 Reflection</th>
<th>4 OG</th>
<th>5 Dep. Mood</th>
<th>6 Ang. Mood</th>
<th>7 Beh. Imp</th>
<th>8 Esc. Avoid. coping</th>
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<tbody>
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<td>1.</td>
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*significant at the 0.05 level  **significant at the 0.01 level

Table 5.6: Correlational data for measures (SA group)
Exploratory Analysis: Indirect Effects

Researchers suggest that for some individuals anger or aggression may maintain depressed mood. This analysis proposes to test whether individual variations of trait aggression are linked to current depressed mood and whether brooding, impulsivity and overgenerality may indirectly maintain this relationship. The first series of analyses uses data from the SA group. The second series of analyses use data from all three groups (NS, SI and SA). To test these paths concurrently (see MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002a; Hayes, 2009 for discussion on this issue), Preacher & Hayes, (2008) INDIRECT macro was used, controlling for neuroticism and reflection. This technique has also been adopted by others (e.g. Debeer et al., 2009; Raes et al., 2006) within the autobiographical memory field. Following recent suggestions on testing for indirect effects (Hayes, 2009), a bias corrected bootstrap with 5000 resamples was used to derive 95% confidence intervals in order to establish a more accurate representation of the indirect effects presented.

Figure 5.2: The mediating effects of overgenerality, impulsivity and brooding on the relationship between trait aggression and depressed mood in suicidal groups.
Findings for the total model indicate a good fit of data, \( (F(6, 68) = 9.7, p > 0.01, \text{ adjusted } R^2 = 0.41) \). Path C, \((\beta = 0.20, p < 0.01)\), represents the relationship the direct relationship between trait aggression and depressed mood whereas path C’, \((\beta = 0.09, \text{ ns})\), shows the effect of trait aggression on depressed mood after controlling for each of the proposed mediators (Figure 5.2). Based on 95% bias corrected confidence intervals, the total indirect effect is thought to be between \(-0.005\) and \(-0.33\). The total indirect effect of impulsivity was shown to account for 9% of the variance, \((\beta = 0.09; \text{ bca CI} 0.02 \text{ -} 0.2)\). Brooding, in contrast, accounted for 4%, of the observed variance \((\beta = 0.04; \text{ bca CI} 0.005\text{ -} 0.09)\) with overgenerality accounting for the least (2%) \((\beta = -0.03; \text{ bca CI} -0.10 \text{ -} 0.004)\).

Contrasting the effects of each mediator indicated that both brooding and impulsivity exerted a greater effect on this relationship compared to the percentage of overgeneral memories recalled. This suggested that overgenerality did not explain any additional variance over and above that explained by brooding and impulsivity. There were no significant effects of gender on this model. Similarly, interactions between each set of mediators, impulsivity-overgenerality, brooding-overgenerality, impulsivity-brooding, did not explain any additional variance.

To explore the effect of behavioral impulsivity further, the model was repeated using the behavioral impulsivity subscales, attentional impulsivity, motor impulsivity and non-planning impulsivity. Only attentional (Path a: \(\beta = 0.08; p < 0.01\); Path b \(\beta = 0.93; p < 0.05\)) and non-planning impulsivity (Path a: \(\beta = 0.05, p < .05\); Path b \(\beta = 0.65, p < .05\)) were found to have a significant effect on the model. When angry mood replaced depressed mood as the outcome variable, the entire model was insignificant.
Alternative models for the suicide attempt group

A number of theoretically feasible alternative models were tested and examined for model fit statistics, as shown in Table 5.7.

<table>
<thead>
<tr>
<th>Models</th>
<th>A Predictors</th>
<th>B Predictors</th>
<th>C Predictors</th>
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<tbody>
<tr>
<td></td>
<td>X: Brooding</td>
<td>X: Imp.</td>
<td>X: OG</td>
</tr>
<tr>
<td>Mediators</td>
<td>M1: Trait Aggression</td>
<td>M1: Trait Ag.</td>
<td>M1: Trait Ag.</td>
</tr>
<tr>
<td></td>
<td>M2: Impulsivity</td>
<td>M2: Brooding</td>
<td>M2: Brooding</td>
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<tr>
<td></td>
<td>M3: OG</td>
<td>M3: OG</td>
<td>M3: Imp.</td>
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<tr>
<td>Adjusted R²</td>
<td>.42</td>
<td>.42</td>
<td>.42</td>
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<tr>
<td>F</td>
<td>11.7</td>
<td>11.7</td>
<td>11.17</td>
</tr>
<tr>
<td>M1 Significant Paths</td>
<td>Path A: β = .23, p &lt; .05</td>
<td>Path A: β = .51, p &lt; .01</td>
<td>NS</td>
</tr>
<tr>
<td>Path B: NS</td>
<td>.05 - .15</td>
<td>Path B: NS</td>
<td></td>
</tr>
<tr>
<td>M2 Significant Paths</td>
<td>Path A: β = .19, p &lt; .05</td>
<td>Path A: β = .26, p &lt; .05</td>
<td>Path A: NS</td>
</tr>
<tr>
<td>Path B: β = .37, p &lt; .01</td>
<td>Path B: β = .29, p &lt; 0.1</td>
<td>Path B: β = .29, p &lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>M2 BCA 95% CI</td>
<td>.001 - .21</td>
<td>-.003 - .19</td>
<td>-.10 - .02</td>
</tr>
<tr>
<td>M3 Significant Paths</td>
<td>Path A: NS</td>
<td>Path A: NS</td>
<td>Path A: NS</td>
</tr>
<tr>
<td>Path B: β = .23, p &lt; .05</td>
<td>Path B: β = .23, p &lt; 0.1</td>
<td>Path B: β = .04, p &lt; 0.1</td>
<td></td>
</tr>
<tr>
<td>M3 BCA 95% CI</td>
<td>-.11 - .02</td>
<td>-.14 - .02</td>
<td>-.11 - .02</td>
</tr>
</tbody>
</table>

Table 5.7: Alternative models for the SA group, controlling for neuroticism

While models b and c account for similar levels of observed variance, they do not account for the relationship between intermediate factors as well as the original model presented.

Alternative Model: Combined analysis of all three groups

As shown in Figure 5.3, the direct and indirect paths remained similar when data from all three groups was combined (F (6, 85) = 15.06, p > 0.01, adjusted $R^2 =0.48$). The direct relationship between trait aggression and current depressed mood was found to be significant (Path C: $β= .34$, p < .01) but not when the mediating effects were taken into account (path C': $β= 0.17$, ns).
Impulsivity ($\beta = 0.12; 95\% \text{ BCA CI } = 0.04 - 0.23$) and brooding ($\beta = 0.09; 95\% \text{ BCA CI } = 0.03 - 0.2$) continued to account for the largest amount of variance, with impulsivity accounting for 12% and brooding accounting for 9% of the observed variance.

**Figure 5.3: Trait aggression and current depressed mood mediational analysis using data from all three groups**
5.2.2 Discussion

Findings from the indirect analysis indicate that the relationship between trait aggression and current depressed mood was positively mediated by brooding and impulsivity (non-planning and attentional) but not overgenerality. Overgenerality, it appears, may be more closely related to current depressed mood rather than trait aggression. Neuroticism and reflection were included in the analysis as potential covariates and as such, their potential effects were controlled for.

This pattern of result is consistent with other research which suggests that brooding over events is likely to activate negative self-schematic information, enhance self-blame and pessimism as well as decrease the likelihood of putting any plans into action (Lyubomirsky et al., 1999a). As such, these collective underlying processes may increase the already distressed state (Selby et al., 2008). Impulsive actions or behaviors, in turn, may serve as a short term solution to reducing distress (Tice et al., 2001). Given that ruminative brooding is related to inaction and impulsivity to short term reduction of distress, neither strategy is likely to successfully reduce current depressed mood. This analysis adds to the existing body of work by suggesting that the relationship between trait aggression and current depressed mood is maintained by these facets of brooding and impulsivity. Critically, the models show that this relationship only occurred for depressed mood, and not angry mood, implying that perhaps the combination of brooding and impulsivity may contribute to inwardly directed aggression as opposed to outwardly directed aggression. These assumptions, however, would need to be tested further.

Though the correlational analysis indicated inter-relationships between the variables investigated and escape avoidant coping, escape avoidant coping was not investigated in the analysis of indirect effects for two reasons. First, overgenerality may affect how events are
cognitively processed, whereas escape avoidant coping represents a means of coping. As this analysis focused on factors which may affect cognitive processing of events, it seemed more logical to investigate how overgenerality contributed to this relationship. Secondly, though overgenerality appears to be a consistent feature of suicidal groups, it is not clear how it may affect the relationship between trait aggression and current depressed mood.

Findings from the indirect analysis suggest that overgenerality appears to be a feature, or more closely associated with current depressed mood, than trait aggression. This is important as previous research on overgenerality has predominately focused on the effects of depressogenic thinking and the impact of trait characteristics that may enhance the propensity for this type of thinking. While trait aggression is also likely to predispose individuals to thinking more negatively and ruminating, compared to low raters, few studies have considered the relationship between trait aggression, overgenerality and current depressed mood.
5.3 General Discussion

Although suicidality has been associated with trait aggression, rumination, impulsivity and overgenerality, the interdependency of these variables has not previously been explored. Moreover, emerging theories propose that, for some people, expressions of aggression may be evidence of current depressed mood, although direct evidence for this relationship is still sparse (Van Praag, 1998, 2001). In Section 1.2.2, it was hypothesized that this type of aggression-driven depression would be most evident individuals rating higher on levels of trait aggression. This chapter has explored this relationship in two groups: individuals who report never experiencing suicidal ideation or attempting suicide (NS); and those have recently attempted suicide (SA). As trait aggression and depressed mood are shown to be key factors for probable suicidality, even after controlling for borderline personality disorder diagnosis (Keilp, 2006), the present analyses sought to establish whether the relationship between aggression and depressed mood could be explained by cognitive processes such as brooding, impulsivity and overgenerality. The analyses also investigated whether the same mediating variables affected other negative moods, such as anger, or whether the model was specific to depressed mood.

Findings for the NS study indicated inter-relationships between rumination (brooding and reflection) and overgenerality as well as overgenerality and escape avoidant coping. A power analysis indicated that after controlling for the effects of neuroticism, the analysis was underpowered. Theoretically, trait aggression and current depressed mood may occur in a continuum with the NS group scoring lowest and the SA group scoring highest (Figure 5.1). Using data from all three groups, a subsequent correlational analysis was conducted. Findings from this analysis indicated that trait aggression positively correlated with brooding, behavioral impulsivity, escape avoidant coping, current depressed and current angry mood. Current depressed mood, in turn, correlated with current angry mood, brooding, impulsivity and escape
avoidant coping. Findings from the correlational analysis remained similar when only data from the SA group was used.

The relationship between trait aggression and current depressed mood was explored further using tests of indirect effects. Findings indicate that impulsivity and brooding exerted the strongest effect on the relationship between trait aggression and current depressed mood. Specifically, these impulsivity components were related to attentional and non-planning impulsivity. When investigated further, the data suggested that brooding and impulsivity each exerted a separate effect on depressed mood rather than a cumulative effect. Overgeneral memories, in contrast, were found to affect depressed mood and did not vary with individual levels of trait aggression. The analysis remained similar when data from all three groups were combined. These findings remained after controlling for reflective rumination, neuroticism and gender. When angry mood was used as an outcome variable, the model did not reach statistical significance. This suggests that these inter-relationships are specific to current depressed mood, and not current angry mood.

These findings suggest that the relationship between trait aggression and depressed mood occurs as a result of the separate effects of each vulnerability factor, with brooding and impulsivity varying as a consequence of levels of trait aggression and overgenerality being specifically related to depressed mood rather than other equally negative emotions such as trait aggression. According to cognitive based explanations of suicide, individual differences in cognitive processing may exacerbate negative mood by influencing event appraisal and emotional regulation. This means that the likelihood of an event being appraised as being inescapable would increase with emotional distress, initiating a ‘suicidal crisis’ (Wenzel & Beck, , 2008). This level of emotional distress, however, varies with the number of underlying
dispositional vulnerabilities. As such, individuals with fewer dispositional vulnerabilities may be able to tolerate more emotional distress before a suicidal crisis is activated and vice versa. The findings from the suicide attempt study suggest that both impulsivity and brooding represent independent vulnerability factors which mediate the relationship between trait aggression and depressed mood, with overgenerality being a function of depressed mood rather than varying as a result of trait aggression.

Some studies show that individuals who have attempted suicide tend to have more difficulty in inhibiting their responses, with a tendency to make more cognitive errors, taking into consideration any brain damage that may have been potentially caused by previous suicide attempts (Dougherty et al., 2004). Not all studies observe this relationship between impulsivity and suicidality, implying that impulsivity may be related to a broader set of related features that affect suicidality (Wenzel & Beck, 2008b). Mann, Waternaux, Haas, & Malone, 1999a) investigated the relationship between aggression and impulsivity in individuals who had previously attempted suicide and those who had not. Their findings suggest that individuals who had attempted suicide display a pattern of dis-inhibitory responses compared to non-attempters. This is also consistent with research on emotional and behavioral dys-regulation which indicates that psychological distress may increase the propensity of impulsive behaviors as a means of reducing distress (Tice et al., 2001). Keilp et al. (2006), however, suggest that while impulsivity does play an important role, trait aggression remains to have the strongest predictive power when comparing individuals who have attempted suicide versus non-attempters, after controlling for borderline personality disorder diagnosis. Sections 6.2 and 6.4 explore the effects of trait aggression on the relationship between suicidality and current depressed mood.
It may be that repeated brooding over the emotional aspects of an event may create an attentional fixation on what the individual perceives the problem to be (Fawcett, Clark, & Busch, 1993; Joormann, Dkane, & Gotlib, 2006). Studies have also shown that ruminative thinking is associated with maintaining angry feelings (Bushman et al., 2005), pessimism, self-blame and activation of negative self-schematic information (Lyubomirsky et al., 1999a).

It may be that in isolation, brooding may not create suicidal thoughts but when other dispositional vulnerabilities are included, such as impulsivity, it may increase already negative mood. Having difficulties with non-planning and attentional impulsivity also suggests that individuals may find it difficult to select alternative responses for coping with the situation and may be more likely to engage in impulsive behaviors in order to reduce this negative effect. This tendency towards impulsivity may be exacerbated by focusing only on the emotional aspects of an event, self-blame, pessimism and comparing oneself to an idealized standard. In this sense, impulsivity and brooding could represent separate pathways which affect the information and cognitive processing styles, as well as mood regulation, which may increase already depressed mood in individuals who have recently attempted suicide.

According to the data, overgenerality appeared to be a function of depressed mood rather than varying with levels of trait aggression. Recalling more overgeneralized and abstract representations of past events suggests that individuals may have difficulty in recalling situation-specific contextual information, which, in turn may reduce social problem solving skills in suicidal groups and imaginability for future events (Williams et al., 1996). This suggests that in suicidal groups there may be three distinct pathways that contribute to depressed mood. Two of these, brooding and impulsivity, are linked to levels of trait aggression whereas overgenerality appears to only be related to depressed mood.
Section 6: The direct and indirect relationships between suicidal groups and current depressed mood
6.1 Introduction

While theoretical models of suicidality propose that suicide risk increases with the cumulative effect of multiple vulnerability factors (Beautrais, Joyce, & Mulder, 1999; Wenzel & Beck, 2008b), few studies have researched the collective or even cumulative impact of more than a few different vulnerability factors in this group. Moreover, much of the research on suicidality employs individuals with a past history of suicidal behavior and the findings are compared to a ‘psychologically healthy’ control group. Comparing individuals who have attempted to individuals who have experienced suicidal ideation and those have no reported experience of either, as done here, may highlight reveal subtle cognitive differences between groups. Furthermore, there is the potential to identify whether there is a suicide continuum, with these groups representing different points of progression along it, as suggested by Beck’s model of suicide. The timing of the suicide attempt may also be another important factor. Potentially, cognitive processes following an immediate suicide attempt may differ from those who may have attempted suicide in the distant past. For instance, individuals may reappraise events following discharge from hospital, or through therapeutic interventions the cognitive processes that may have been active shortly following a suicide attempt may differ from those in a community-based sample.

In the following analyses, the effect of suicidality on current depressed mood is investigated by comparing and contrasting direct and indirect effects across three groups: individuals who have never experienced suicidal ideation or attempted suicide (NS), those that have experienced suicidal ideation (SI) and those who have recently attempted suicide (SA). Brooding, impulsivity and overgenerality are used in the subsequent analyses as mediators.
1. Section 6.2 investigates the indirect relationship between suicidality and current depressed mood using trait aggression as an additional mediator, controlling for neuroticism.

2. In section 6.3, neuroticism is included as an additional mediator, with the effects of trait aggression controlled for.

3. Finally, in section 6.4 the collective impacts of trait aggression and neuroticism are examined in addition to the mediators listed above.
6.2. The effect of trait aggression, impulsivity, brooding and overgenerality on the relationship between suicidality and current depressed mood

This analysis investigates the relationship between suicidality and current depressed mood, using brooding, impulsivity, overgenerality and trait aggression as mediators of this relationship. Reflection and neuroticism are included in the model as covariates given the potential for overlaps. The model was re-run two times, with current depressed mood replaced by either current angry mood or current negative mood. This was done to determine whether the observed findings were specific to current depressed mood, or associated with negative mood in general. Compared to the NS group, the SA group is expected to be most influenced by trait aggression and impulsivity whereas SI are thought to be more effected by the effects of brooding and impulsivity. Moreover, these patterns are only expected to be significant when current depressed mood is employed as an outcome variable. Although the focus of the thesis is not on gender, nor is the analysis powered to conduct a gender specific study, it is acknowledged that gender could be function as a confounding variable.
6.2.1 Results

*Exploratory analysis: Correlations*

Descriptive statistics for all three groups are shown in Table 6.1. SI and SA groups appear to rate higher on the majority of measures compared to the NS group, as would be expected. There are, however, some exceptions to this. Confrontational coping and problem solving coping style ratings appear to stay relatively similar across all three groups. The percentage of overgeneral memories recalled, in contrast, appears to be higher in the NS and SA groups compared to the SI.
<table>
<thead>
<tr>
<th>Trait</th>
<th>NS Group (n =89)</th>
<th>SI (n=26)</th>
<th>SA (n =78)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Aggression</td>
<td>62</td>
<td>12.6</td>
<td>72</td>
</tr>
<tr>
<td>Brooding</td>
<td>9</td>
<td>3.1</td>
<td>12</td>
</tr>
<tr>
<td>Reflection</td>
<td>9</td>
<td>3.6</td>
<td>12</td>
</tr>
<tr>
<td>Overgeneral Memories (%)</td>
<td>31</td>
<td>29.1</td>
<td>23</td>
</tr>
<tr>
<td>Current Depressed mood</td>
<td>4</td>
<td>5.7</td>
<td>11</td>
</tr>
<tr>
<td>Behavioral Impulsivity</td>
<td>43</td>
<td>29.7</td>
<td>68</td>
</tr>
<tr>
<td>Current Angry mood</td>
<td>3</td>
<td>4.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Confrontational Coping</td>
<td>10</td>
<td>3.5</td>
<td>11</td>
</tr>
<tr>
<td>Escape Avoidant Coping</td>
<td>11</td>
<td>5.8</td>
<td>16</td>
</tr>
<tr>
<td>Problem Solving Coping</td>
<td>13</td>
<td>4.4</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 6.1: Descriptive Statistics for Personality, Mood and Memory Variables for NS, SI and SA groups
Given unequal sample sizes, a Kruskal Wallis was used to determine if any of these differences were statistically significant using a Bonferoni correction applied at the 0.017 level. Findings indicate a significant difference between all measures across all three groups with only ratings on the confrontational coping scale remaining similar across all three groups, \( H(2) = 4.5, \text{ ns} \). Compared to the other two groups, individuals in the SA group had significantly higher ratings on measures of:

- behavioural impulsivity \( (H(2) = 84.11, \ p < .01) \),
- brooding \( (H(2) = 76.2, \ p < .01) \),
- reflection \( (H(2) = 34.5, \ p < .01) \),
- trait aggression \( (H(2) = 39.9, \ p < .01) \),
- escape avoidant coping \( (H(2) = 33.9, \ p < .01) \),
- current depressed mood \( (H(2) = 103.9, \ p < .01) \)
- and angry mood \( (H(2) = 54.4, \ p < .01) \).

Interestingly, although overall individuals in the SA groups recalled the highest percentage of overgeneral memories, individuals in the SI group recalled fewer overgeneral memories compared to those in the NS group \( (H(2) = 21.4, \ p < .01) \). As expected, individuals in the NS group rated highest on problem solving coping, with the SA group rating lowest on this measure, \( (H(2) = 10.1, \ p < .01) \) and the SI group did not differ from either of the other groups.

*Exploratory Analysis: Gender effects*

An ANOVA was used to investigate any potential gender differences, which could have exerted a confounding effect on the results. There were no statistically significant gender effects on any measure when analyzed with and ANOVA, and nor did gender interact with
group type. Nevertheless, observations of the graphs revealed gender effects that may be predicted, as shown in Figure 6.1.
**Figure 6.1: Gender Differences across groups**

*Exploratory Analysis: Indirect Effects*

Hayes and Preacher (2012) MEDIATE macro was used to concurrently test multiple mediating pathways using a multi-categorical predictor.
This involves:

- Predicting $X \rightarrow Y$ (Omnibus of total effects)
- Predicting $X \rightarrow Y$, including group type but not mediators (test of total effects)
- Predicting $X \rightarrow M_1 \rightarrow M_2 \rightarrow M_X \rightarrow Y$, including group type but not mediators
- Predicting $X \rightarrow M_1 \rightarrow M_2 \rightarrow M_X \rightarrow Y$, including mediators but not group type
- Predicting $X \rightarrow M_1 \rightarrow M_2 \rightarrow M_X \rightarrow Y$, including group type and mediators (test of direct effects)

The conceptual diagram for this model is shown in Figure 6.2. To allow comparisons between groups, individual paths were tested using the NS group acting as the reference group. The MEDIATE macro for SPSS also calculates percentile based bootstraps based on 1000 repetitions. These bootstrapped estimates are used in the models to provide a more accurate estimate of the indirect effects reported. The terms ‘predictor’ and ‘outcome’ variable used within this section are not meant to imply causality, which would not be possible due to the cross-sectional nature of the data (please see section 8.3 for further discussion on this). They are, however, used as the authors of the paper intended to represent independent (predictor) and dependent (outcome) variables in statistical terminology. Therefore, any references to outcome variables are solely meant to describe the dependent variable and not imply causality.
Figure 6.2: Conceptual model for multiple mediating model

The test of total effects estimates the significant effect of group type on current depressed mood, after controlling for neuroticism and reflective rumination, excluding the indirect effects of the mediators (path \( c' \): \( F(4,133) = 42.71, p < .01, R^2 = .56 \)). The omnibus test of total effects, in contrast, tests whether the predictor variable (x) can affect the outcome (Y) variable without specifying the difference between group means, which may have caused that effect. In the case of a multi categorical predictor variable, the change of \( R^2 \) indicates an improved fit of the model by the inclusion of the groups (\( F(2,133) = 39.00, p < .01, R^2 = .26 \)) controlling for mediators and covariates. This suggests that 26% of the observed variance in this mediational pathway is attributable to group type. In terms of group effects, compared to the NS group, the SA was a better predictor of current depressed mood (\( \beta = 1.01, p < .01 \)). No significant differences were observed between NS and SI groups as predictors of current depressed mood.
Following the inclusion of the mediators and controlling for confounding factors, the test of
direct effect shows that path C still remains significant \((F(8,129) = 31.62, p < .01, R^2 = .66)\) even when group type is taken into consideration \((F(2,129) = 5.97, p < .01, R^2 = .03)\). When looking at individual group type, only path c for the SA group remained significant \((\beta = .50, p < .01)\) suggesting that other direct or indirect factors may exert additional effect on this group other than those investigated.

In terms of individual mediator effects, compared to the non-suicidal group, brooding
measures had a greater influence on individuals in the SA group \((\beta = .7, p = < .01)\), with brooding significantly influencing current depressed mood, \((\beta = .24)\). Upper and lower confidence intervals indicate that the true indirect effect of this mediator lay between 0.06 and 0.5, with brooding accounting for around 56% of the observed variance, \(F(4,167) = 42.83, p < .01, R^2 = .56\). Brooding ratings did not appear to significantly differ in its association with individuals in the NS and SI groups.

Likewise, compared to the NS group, overgenerality appeared to only significantly influence individuals in the SA group, \((\beta = .74, p = < .01)\), and significantly affect current depressed mood \((\beta = .1, CI = 0.02-0.21)\), explaining 8% of the overall observed variance \((F(4,167) = 2.8, p < .05, R^2 = .08)\).

In terms of impulsivity, findings indicate that compared to the non-suicidal group suicidal ideators rated 1.01 units higher on the behavioral impulsivity measure \((\beta = 1.01, p < .01)\) whereas suicide attempters rated 0.5 units higher \((\beta = .46, p < .05)\), with impulsivity accounting for approximately 59% of the variance \((F(4,167) = 49.48, p < .01, R^2 = .59)\). No
significant differences were observed between groups when looking at the effect of impulsivity on current depressed mood.

Trait aggression appeared to significantly influence individuals in the SA group compared to the NS group ($\beta = .64$, $p < .01$), with trait aggression exerting a greater impact on current depressed mood ($\beta = .13$, CI = .02 - .28). Trait aggression was found to account for 36% of the observed variance ($F (4,167) = 19.18$, $p < .01$, $R^2 = .36$).

**Effect of Covariates**

Neuroticism and Reflection were included in the model as potential covariates. The omnibus test of total effects, indicated that only neuroticism exerted a significant effect on current depressed mood ($\beta = .28$, $p < .01$). In terms of individual mediating pathways, findings indicate a positive association between brooding and neuroticism ($\beta = .31$, $p < .01$) as well as brooding and reflection ($\beta = .25$, $p < .01$). Similarly, findings indicate positive associations between trait aggression and neuroticism ($\beta = .25$, $p < .01$) as well as trait aggression and reflection ($\beta = .19$, $p < .05$). Reflection was found to have a further significant impact on impulsivity ($\beta = .23$, $p < .01$).

**Alternative models**

In addition to the model above, two further viable models were tested. Current depressed mood was replaced with current angry mood in model 2 and current negative mood in model 3. Current negative mood related to the combined current depressed mood and current angry mood scores. Repeating the analysis helped to determine whether the mediational pathways reported above remained similar for different types of current mood outcomes.
Model 2: Angry Mood as outcome

The test of total effects indicates that this model explained less of the observed variance compared to the model with current depressed mood as the outcome variable (path c’: $F(4,133) = 13.49, p < .01, R^2 = .29$). Compared to the NS group, SA group membership was a better predictor of current angry mood ($\beta = .73, p < .01$) after excluding mediators and controlling for covariates. Though the omnibus test change in $R^2$ indicates an improved fit following the inclusion of the groups ($F(2,133) = 10.4, p < .01, R^2 = .11$), compared to the previously presented models, the model fit is weaker, with only 11% of the observed variance attributable to group type.

Following the inclusion of the mediators, path C remained significant ($F(8,129) = 11.81, p < .01, R^2 = .42$) with the omnibus test of direct effects supporting the null hypothesis that there was no significant effect of group type on the relationship between mediating variables and current angry mood ($F(2,129) = .65, ns, R^2 = .006$).

Model 3: Negative mood as outcome

When negative mood was entered as an outcome variable, the omnibus test of total effects indicated that this model explained less of the observed variance compared to the model with current depressed mood as the outcome variable but more than the current angry mood model (path c’: $F(4,133) = 37.73, p > .01, R^2 = .53$). Like the other two models the omnibus test change in $R^2$ indicates an improved fit following the inclusion of the groups ($F(2,133) = 32.9, p < .01, R^2 = .23$). The change in $R^2$ indicates that negative mood as an outcome is able account for more of the group variance, similar to the depressed mood model. As before, compared to the NS, only SA group membership was found to be a significantly better predictor of current negative mood ($\beta = .73, p < .01$).
Path C remained significant following the inclusion of mediators ($F(8,129) = 30.62, p < .01, R^2 = .81$) and group type ($F(2,129) = 4.34, p < .01, R^2 = .02$). More specifically, only the $c'$ path for the suicide attempt group remained significant following the inclusion of mediators, ($\beta = .44, p < .05$), suggesting that the possibility that additional variables may affect the relationship between suicide attempt and current negative mood other than those measured by this model.
6.2.2 Discussion

The first aim of this analysis was to investigate the impact of trait aggression, impulsivity, brooding and overgenerality on the relationship between suicidality and current depressed mood, while controlling for reflection and neuroticism. The second aim was to investigate whether this pathway was specifically associated with current depressed mood. This was done by testing two other competing models with current angry mood and current negative mood as outcome variables as the dependent variable. Given prior research findings, it was predicted that the relationship between attempting suicide and current depressed mood would be most affected by variations in aggression and impulsivity. In contrast, the relationship between suicidal ideation and current depressed mood was expected to be more effected by brooding and impulsivity. Findings do not support these hypothesises.

Findings indicate that when current depressed mood or current negative mood were used as outcome variables, 30% of the observed variance between suicidality and the outcome variable was attributable to group type, after controlling for mediators and potentially confounding variables. More specifically, compared to the NS reference group, only membership to the SA group functioned as a significant predictor of current depressed or negative mood. No significant differences were observed between NS and SI groups as predictors of current depressed or negative mood. When current angry mood as an outcome variable (as a dependent variable), the model fit decreased with the analysis indicating that group membership did not predict current angry mood after mediators were included in the analysis.

Compared to the NS reference group, impulsivity, brooding and trait aggression appeared to influence individuals in the SA group most, with the percentage of overgeneral memories
only accounting for 8% of the observed variance between suicidal groups and the outcome variable. Only impulsivity significantly influenced individuals in the SI group more strongly, compared to the NS group. Comparing beta weights indicated that this influence of impulsivity on the SI group remained, even compared to SA group membership. With the exception of impulsivity, all other mediators appeared to exert a significant impact on the outcome variable.

This pattern of data implies three possibilities. First, that the specific constellation of mediating variables have a specific impact on current depressed or a combination of current depressed and angry mood, rather than current angry mood in isolation. Secondly, other than self-reported ratings in impulsivity, there appears to be little difference in the influence that these cognitive measures had on the association between SI and NS groups and current depressed mood. This could be due to heterogeneity in the SI group, with suicidal ideation in the distant past for some members of the group and therefore levels of current depressed mood may have not been as severe compared to when individuals had been currently experiencing suicidal ideation. In support, descriptive data suggests a seven point difference between ratings on the current depressed measure between the NS and the SI group.

Therefore, it may be that individuals who have experienced suicidal ideation in the distant past show a similar cognitive processing profile to the NS group, whereas those who have experienced suicidal ideation in the more recent past i.e. last week, may show a profile more similar to individuals within the SA group, potentially due to differences in current depressed mood and or activation of mood congruent cognitions. These findings may have an important impact given that studies may recruit participants which vary between their previous experiences of suicidal ideation, ranging from the past week to past year. Therefore,
future studies may wish to explore whether the timing of the ideation or attempt affects self-report measures.

Third, these findings suggest that compared to NS individuals, SA are more influenced by impulsivity, brooding and trait aggression, with only brooding and trait aggression exerting the strongest influence on current depressed or negative mood. Although, overgenerality has been highlighted as a risk factor for suicidality, the findings obtained here suggest that other variables are able to account for more of the variance between suicidality and current depressed mood.
6.3. The effect of neuroticism, impulsivity, brooding and overgenerality on the relationship between suicidality and current depressed mood

This analysis investigates the indirect effects of neuroticism, impulsivity, brooding and overgenerality on the relationship between suicidality and current depressed mood. Reflection and trait aggression are entered into the model as covariates to constrain any potential confounding effects of these variables. As before, current angry mood and current negative mood were used as outcome models in subsequent analyses to determine whether the findings relate to a specific effect of current depressed mood, or whether the same mediating pathway affects current angry mood. Brooding, neuroticism and impulsivity are expected to have the strongest indirect effect in the SA group. Given that overgenerality has been associated with difficulties in managing negative emotions and current depressed mood, overgenerality is expected to have a greater indirect effect on the suicidality-current depressed mood pathway but only for the SI and SA groups.
6.3.2 Results

As expected, the mean for neuroticism scores in the NS group (Mean: 6; SD: 3.4), were significantly lower than those for the SI (Mean: 8.6; SD: 2.7) and SA groups (Mean: 9.3; SD: 2.7; \( H(2) = 38.5, p < .01 \)). Given the unequal sample sizes, findings were followed up using 3 Mann Whitney tests, and a Bonferroni correction applied at the level of 0.0167. Compared to the NS group, the SI group rated significantly higher on the neuroticism measure (\( U = 676, p < .01 \)). Likewise, the SA group rated significantly higher on the neuroticism measure compared to the NS group (\( U=1684.5, p < .01 \)). No significant differences in neuroticism scores were observed between the SI and SA groups. Descriptive statistics for brooding, overgenerality, impulsivity and current depressed mood are reported in Table 6.1.

*Exploratory Analysis: Indirect paths*

As before, three separate models were tested with current depressed mood, current angry mood and current negative mood as an outcome (or dependent) variable in each model. For each analysis, trait aggression and reflection were entered into the model as covariates.

When current depressed mood was entered into the model as an outcome variable, the analysis indicated that there was a significant effect between suicidality and current depressed mood (\( F(4,133) = 44.01, p < .01, R^2 = .57 \) after excluding mediators and controlling for covariates (path C)). The change in the \( R^2 \) statistic indicated an improved fit following the inclusion of groups (\( F(2,133) = 29.89, p < .01, R^2 = .19 \)). As in the previous analysis, the non-suicidal group was included in the model as a reference group to allow comparisons between pathways. The model indicated the suicide attempters rated 0.84 points higher on current depressed mood compared to the non-suicidal ideation group and, as such, were better
predictors of this relationship. No significant differences were observed between the NS and SI groups as predictors of current depressed mood.

Following the inclusion of the mediators, path C’ still remained significant \( (F(8,129) = 31.62, p < .01, R^2 = .64) \) even after including group type \( (F(2,129) = 5.97, p < .01, R^2 = .03) \). Again, as with the previous aggression analysis (section 6.2.1), only path c’ for the suicide attempt group remained significant following the inclusion of mediators \( (\beta = .50, p < .05) \). This suggests that other unmeasured factors may influence this pathway, or the possibility of individual and group level differences.

In terms of individual indirect pathways, the findings indicate that compared to the NS group, brooding exerted a greater influence on the SA group \( (\beta = .57, p < .01) \) with brooding scores in the SA having a greater influence on current depressed mood compared to the NS group \( (\beta = .20, CI = .005 - .42) \). Brooding was found to account for 36% of the overall observed variance in this indirect relationship \( (F(4,133) = 38.04, p < .01, R^2 = .53) \). There was no difference between the influence of brooding on NI and SI groups.

Similarly, findings indicate that SA group differed on the percentage of overgeneral memories recalled compared to the NS group \( (\beta = .78, p < .01) \), with overgenerality accounting for 7% of the observed variance \( (F(4,133) = 2.7, p < .05, R^2 = .07) \). Overgenerality in the SA, compared to the NS group, was also found to significantly influence current depressed mood \( (\beta = .12, CI = .02 - .23) \). The influence of overgenerality did not appear to significantly differ between NS and SI groups.
As before, impulsivity appeared to exert the strongest influence on SI groups, compared to
the NS, with individuals in the SI group rating 1.07 units higher on the impulsivity, ($\beta = 1.07, p < .01$) and individuals in the SA group rating 0.42 units higher ($\beta = .42, p < .05$).

Impulsivity was able to account for 60% of the variance in this indirect pathway ($F (4,133) = 49.89, p < .01, R^2 = .60$). Relative to the NS group, there appeared to be little difference between each of the groups and their impact of impulsivity on current depressed mood.

Neuroticism appeared to have a greater influence on the SA group, compared to the NS group ($\beta = .54, p < .01$) with neuroticism accounting for 30% of the observed variance ($F (4,133) = 14.51, p < .01, R^2 = .30$). The mediating effect of neuroticism on current depressed mood did not differ between SA, SI and NS groups.

**Model 2: Current Angry Mood as Outcome**

Findings indicate a significant relationship between suicide groups and current angry mood (path $c'$; $F (4,133) = 20.59, p >.01, R^2 = .38$) with model fit improving following the inclusion of the groups ($F (2,133) = 4.88, p < .01, R^2 = .04$). Compared to the NS group, current angry mood scores did not significantly differ between SI or SA groups. This suggests that while there may be a relationship between suicide groups and current angry mood, in general, there is no significant effect of one group type over the other on current angry mood scores.

Although path $C'$ remained significant following the inclusion of the mediators ($F (8,129) = 11.81, p < .01, R^2 = .42$) but failed to reach significance levels following the addition of group type ($F (2,129) = .65, ns, R^2 = .006$).
Model 3: Negative mood as outcome

Findings indicate a significant relationship between suicide group type and current negative mood (path c’; $F (4,133) = 44.4, p < .01, R^2 = .57$) with the change in $R^2$ indicating an improved fit following the inclusion of the groups ($F (2,133) = 23.43, p < .01, R^2 = .15$). Comparing fit statistics suggests that this model account for similar levels of variance compared to the current depressed mood model but more than the angry mood model.

Compared to the NS group, only the SA group was a significantly better predictor of current negative mood scores ($\beta = 0.74, p < .01$).

Following the inclusion of mediators, path c’ remained significant ($F (8,129) = 30.61, p < .01, R^2 = .66$, even after controlling for group type ($F (2,129) = 4.35, p < .05, R^2 = .02$). More specifically, as with previous models, only path c’ for the suicide attempt group remained significant ($\beta = .44, p < .05$).


6.3.2 Discussion

As with section 6.2, this analysis aimed to explore the impact of neuroticism, impulsivity, brooding and overgenerality on the relationship between suicidality and current depressed mood, while controlling for reflection and aggression. In order to ascertain whether this model is specific to the effects of current depressed mood, two further models were tested using current angry mood and current negative mood as outcome variables.

As expected, neuroticism scores were highest in the SA group. Interestingly, however, there was no significant difference between neuroticism scores for NS and SI groups. Given that variations in neuroticism relate to difficulties in regulating and managing negative mood, individuals in the SI and SA groups would be expected to rate higher on neuroticism scores compared to the NS group, with the suicide attempters at the extreme end of the continuum. The data, however, indicates that while there was a difference between NS and SA on neuroticism scores, no difference was observed between SI and NS groups. One explanation for this may be that although individuals in the SI group may show difficulties with emotional regulation, the extent of this difficulty may not be as severe or as intense as those who have recently attempted suicide. Eysenck (1975) proposed that the effects of neuroticism are only typically observed under conditions of stress. Therefore, it may be that individuals in the SI group were not currently experiencing any stress. As such, it may be that individuals in this group are able to functionally manage their moods sufficiently to allow them to carry on with the tasks required by their everyday life. In support, the cognitive model of suicide suggests that the cross over from suicide related cognitions into suicidal behavior is dependent on the perceived ability to manage the situation or negative mood. As such, the propensity for hopelessness, and suicidal behavior, is likely to increase with different levels
of predispositional vulnerability factors which may affect the way that emotions are managed, perceived and coped with.

The path analyses indicated that the relationship between SA and current depressed mood was strongly influenced by brooding and neuroticism, compared to the NS group, with overgenerality accounting for around 7% of the observed variance in this relationship. In contrast, no differences were observed between NS and SI groups, with the exception of impulsivity. Compared to the NS group, findings indicate that impulsivity had the greatest influence on the SI group, followed by the SA group. No differences, however, were observed between the impact of impulsivity on current depressed mood between NS and SI groups. This suggests that impulsivity may be a key feature of SI and SA group types rather than current depressed mood, with individuals who have experienced suicidal ideation being most influenced by variations in behavioral impulsivity, compared to members of the NS group.

Prior research has also shown that the combination of rumination and neuroticism increases negative self-schemas, resulting in more emotionally negative content (Ciesla et al., 2011; Hervas & Vazquez, 2011b). These findings add to this body of work by suggesting that a pessimistic outlook combined with a tendency to passively ruminate over the emotional aspects of past events is positively associated with levels of current depressed mood. Moreover, compared to NS, this relationship appears to have the greatest impact on individuals who have recently attempted suicide.

In summary, key findings from this analysis indicate that compared to NS groups, SI are most influenced by variations in impulsivity, but the effects of impulsivity on current depressed mood remain similar to the effects seen in the NS group. Compared to the NS group, the
relationship between SA and current depressed mood was most strongly influenced by the indirect effects of brooding and neuroticism, with overgenerality playing a nominal role in this relationship.
6.4. The effect of trait aggression, neuroticism, impulsivity, brooding and overgenerality on the relationship between suicidality and current depressed mood.

Findings from this study are reported based on three different models with different outcome factors in a similar manner to sections 6.2 and 6.3. In this analysis, however, both neuroticism and trait aggression as included as mediators alongside impulsivity, brooding and overgenerality. Reflection was the only variable to be included as a covariate in each of the models presented.
6.4.1 Result

As before, findings indicate a significant association between suicidality and current depressed mood (path $c'\,; F (3,134) = 47.37, p >.01, R^2 =.51$) with the inclusion of group type improving the overall fit of the model ($F (2,134) = 49.13, p < .01, R^2 =.36$). Compared to the NS group, SA was a better predictor of current depressed mood ($\beta =1.03, p < .01$) as shown in Figure 6.3. No differences were observed between NS and SI group type as predictors of current depressed mood.

Following the inclusion of the mediators, and after controlling for reflection, path $c'$ still remained significant ($F (8,129) = 31.62, p < .01, R^2 =.66$), even after controlling for group type ($F (2,129) =5.97, p < .01, R^2 =.03$). Specifically, as with the previous analyses in this section (sections 6.2.1 & 6.3.2), only path $c'$ for the SA group remained significant following the inclusion of mediators ($\beta = .50, p < .05$).
In terms of individual indirect effects, compared to the NS group, brooding exerted the strongest influence on the SA group ($\beta = .72$, p < .01) with brooding accounting for 50% of the observed variance ($F (3,134) = 45.06$, p < .01, $R^2 = .50$). Compared to the NS group, only brooding scores in the SA group were associated with current depressed mood ($\beta = .25$, CI = 0.06-0.48).

Similarly, overgenerality had a greater influence on the SA group compared to the NS group ($\beta = .75$, p < .01) with overgenerality accounting 7% of the observed variance ($F (3,134) = 3.56$, p < .05, $R^2 = .07$). Overgenerality scores in the SA group had a greater impact on current depressed mood compared to the NS group, ($\beta = .10$, CI = 0.02- 0.22). No significant differences were observed for indirect effect of overgenerality between NS and SI groups.

As before, compared to the NS group, impulsivity continued to exert the strongest influence on the SI group ($\beta = 1.09$, p < .01) followed by the SA group ($\beta = .46$, p <.05). Impulsivity was shown to account for 60% of the observed indirect effect ($F (3,134) = 66.47$, p < .01, $R^2 = .6$). Despite this, the indirect effect of impulsivity on current depressed mood did not differ between each of the three groups. Findings for the suicidal ideation group are shown in Figure 6.4.
Neuroticism was found to influence the SI group more strongly compared to the NS group ($\beta = .60$, $p < .01$) with neuroticism accounting for 25.5% of the observed variance ($F (3,134) = 66.47, p < .01, R^2 = .6$). In contrast, the SA group appeared to be more influenced by trait aggression compared to the NS group ($\beta = .66$, $p < .01$). Trait aggression was found to account for 32% of the observed variance ($F (3,134) = 21.16, p < .01, R^2 = .32$). However, of the two traits, only trait aggression scores in the SA group, compared to the NS group, influenced current depressed mood, ($\beta = .13$, CI = 0.02- 0.28).

**Model 2: Current Angry Mood as Outcome**

Path C still remained significant when current angry mood was included as an outcome variable ($F (3,134) = 14.7, p > .01, R^2 = .25$) with the inclusion of the group type improving the overall model fit ($F (2,134) =14.9, p < .01, R^2 = .17$). More specifically, only the SA group was found to be a better predictor of current angry mood compared to the NS group ($\beta$...
=.75, p < .01). Path c’ still remained significant following the inclusion of the mediators, but did not reach significance following the inclusion of group type (F (2,129) =.65, ns, $R^2 =.006) did not reach significance levels. As such, these findings support the null hypothesis that group type does not affect the relationship between suicidality and current angry mood once the mediating effects are accounted for.

Model 3: Negative mood as outcome
Replacing current angry mood with current negative mood, provided a significant association between suicidality and current negative mood (F (3,134) = 41, p < .01, $R^2 =.48$) with differences between group means improving the fit of the model (F (2,134) =42, p < .01, $R^2 =.33$). Both the current depressed mood and current negative mood model appear to account for similar levels of variance between group types based on the change in $R^2$ statistics. As with the prior models, the SA group remained a better predictor of current negative mood ($\beta = 1.00, p < .01$).

Likewise, overall path c’ remained significant following the inclusion of mediators (F (8,129) = 30.61, p < .01, $R^2 =.66$) and group type (F (2,129) = 4.35, p < .05, $R^2 =.02$). As before, this related to path c’ for the suicide attempt group ($\beta = .44, p < .05$).
6.4.2 Discussion

The aim of this analysis was to investigate the indirect impacts of brooding, impulsivity, overgenerality, trait aggression and neuroticism on the relationship between suicidality and current depressed mood. The model was repeated using angry mood and negative mood as outcome factors in order to determine whether different indirect pathways mediated the relationship between suicidality and current depressed mood compared to suicidality and current angry mood. Key findings indicate a significant overall association between suicidality and current depressed mood. Compared to the NS group, membership of the SA group remained to be a better predictor of current depressed mood. Following the inclusion of mediators and after controlling for reflection, pathway c’ still remained significant indicating that other possible factors may exert a stronger impact on the relationship between suicide attempt and current depressed mood.

Compared to the NS group, the SA group appeared to be more influenced by the effects of brooding and trait aggression, which collectively explained 82% of the observed indirect effect between suicide attempt and current depressed mood. Interestingly, although suicidal groups have been reported to show an overgeneral memory bias, findings indicate that overgenerality only accounted for 7% of the variance between SA and current depressed mood.

Few differences were observed, in contrast, between the NS and the SI groups. Findings indicate that, compared to the NS group, behavioral impulsivity and neuroticism had a strongly influence on the SI group. Moreover, when taking the SA group into account, by comparing beta weights across all three groups, impulsivity and neuroticism remained to
have the greatest impact on the SI group. The indirect effects of impulsivity and neuroticism on current depressed mood, however, did not differ between groups.
6.5 General Discussion for Section 6

Neuroticism, aggression, brooding, overgenerality and impulsivity have all been highlighted as key risk factors for increasing the propensity of suicidal behavior. Despite this, few models are accurately able to ascertain which risk factors exert the greatest influence on suicidality. The cognitive model of suicide attempts to provide a theoretical framework for integrating and understanding how these risk factors may influence mood disturbance and suicide related cognitions to increase the propensity for suicidal behavior. These proposed inter-relationships, however, require to be empirically tested. Moreover, although suicide risk has been shown to be highest in the short term after a recent suicide attempt, few studies consider the impact of these risk factors on already negative mood. Therefore, the aims of sections 6.2-6.4 were two fold. First, the indirect relationship between suicidality and current depressed mood was investigated using brooding, impulsivity and overgenerality as mediators of this relationship. In section 6.2, trait aggression was included as an additional mediator, while holding neuroticism and reflection levels constant. In section 6.3, trait aggression and levels of reflection were controlled for, while exploring the additional mediating effects of neuroticism. In section 6.4, only reflections levels were held constant, with trait aggression and neuroticism included in the analysis as additional mediators.

Findings from section 6.2 indicate that when neuroticism and reflection levels are controlled for, brooding and trait aggression exert the strongest influence on the SA group, compared to the NS group, with brooding and trait aggression scores in the SA group being positively associated with current depressed mood scores. This was contrary to expectations given that prior research has frequently highlighted impulsivity and aggression as the critical risk factors for suicidality (e.g. Keilp et al., 2006: Fawcett et al., 1993). While overgenerality also
influenced the SA-current depressed mood relationship, overgenerality explained less of the observed variance compared to the other two factors.

Impulsivity was shown exert a greater influence in the SA and SI groups compared to the NS group, with its strongest effect being on the SI group. The indirect relationship between impulsivity and current depressed mood, however, did not vary across groups. Other than the influence of impulsivity, few differences were observed between NS and SI groups.

The pattern of results obtained from section 6.3 show similar findings. Specifically that the relationship between SA and current depressed mood was most strongly influenced by brooding and neuroticism, with overgenerality only accounting for a nominal amount of variance. As before, impulsivity had the greatest influence on the SI group, followed by the SA group. The effects of impulsivity on current depressed mood, however, remained similar across all three groups.

When both neuroticism and trait aggression were included into the model, findings indicate that compared to the NS group, trait aggression and brooding exerted the strongest influence on the SA group, with overgenerality explaining 7% of the observed variance. In contrast, impulsivity and neuroticism exerted the most influence on the SI group, compared to the NS group. The influence of neuroticism and impulsivity on current depressed mood, however, remained similar across all three groups. Model fit was found to be poorer across all three studies when angry mood was included as an outcome variable, suggesting that the indirect pathways investigated may be specific to levels of current depressed moods.
Effects of Impulsivity

Prior research on impulsivity appears to present conflicting results, with some researchers proposing that impulsivity and aggression to be a unitary vulnerability factor for suicidality (Mann et al., 1999b), whereas others suggest that trait aggression and impulsivity represent different types of suicide risk (Critchfield et al., 2004). These findings, however, suggest that while impulsivity is also associated with suicide attempts, the effects of impulsivity are greatest in the suicidal ideation group. Given that the majority of prior studies employ community samples who have previously attempted suicide, one explanation for this finding may be that the cognitive profile of individuals who have attempted suicide in the past may be similar to suicide ideators. Alternatively, it may be that impulsivity and trait aggression are associated with suicide attempts in different ways, or the relationship differs before and after a suicide attempt. For example, findings from these studies show that in the SA group, only trait aggression exerted a significant influence on current depressed mood, compared to the NS group. These differences may relate to the fact that our measures were taken following a recent suicide attempt. As such, impulsivity may exert a bigger impact on cognitive processing and current depressed mood immediately before the suicide attempt.

Findings also show that although impulsivity and neuroticism had the greatest impact on the SI group, the indirect effects of impulsivity and neuroticism on current depressed mood did not vary across all three groups. Therefore, it may be that individuals within the SI group are more able to function in a similar manner to those in the NS group on a daily basis. However, given that, individuals who have experienced suicidal ideation in the past were more likely to be influenced by neuroticism and impulsivity, compared to NS individuals, they may find it more difficult to regulate their emotions, think through consequences and respond to difficult situations (Zermatten, Van der Linden, d'Acremont, Jermann, & Bechara,
As such, it may that the cognitive profile for suicidal ideators may only be similar to the NS group when no active thoughts of suicidal thoughts are present, whereas under conditions of active suicidal ideation the profile of this group may, hypothetically, be more similar to those in the SA group.

In support, researchers suggest that under normal circumstances, anxiety may inhibit impulsive behavior. Individuals rating high on neuroticism, however, show the opposite relationship with impulsivity. That is, heightened anxiety and worry levels typically associated with neuroticism enhance the probability of impulsive behaviors as a means of reducing short term distress. In the long term, however, these impulsive behaviours may increase negative affect (Carver & Miller, 2006; Fetterman, Robinson, Ode, & Gordon, 2010).

It may be that in the SI group, the impulsivity component refers to difficulties with effortful control. Effortful control relates to two different components: an ability to manage attention, in relation to new information or to tasks that require sustained attention, as well as the ability to suppress behavior in appropriate situations. Difficulties in effortful control have been linked to neuroticism (Muris, 2006b) as well as depressogenic thinking via serotonergic pathways (Rothbart, Ellis, & Posner, 2004; Carver, Johnson & Joorman, 2009). To explore these further, future studies may wish to repeat this study with individuals who are currently experiencing suicidal ideation compared to those who have experienced suicidal ideation in the past.

**Effects of Trait Aggression**

In contrast to expectations, findings indicate that the relationship between SA and current depressed mood is most strongly influenced by a combination of trait aggression and
brooding, with trait aggression and brooding significantly influencing current depressed mood, compared to the NS group. There is evidence to indicate that ruminating passively over past goal failures or unresolved generic memories (Martin & Tesser, 1989) may maintain an internal state of anger (Berkowitz, 1993a: Rusting & Nolen-Hoeksema, 1998). Similarly, studies also show that dysphoric individuals tend to be more self-critical and negative about their own coping abilities at managing difficult situations (Lyubomirsky & Nolen-Hoeksema, 1995), with these negative self-appraisals possibly contributing to passivity typically associated with rumination (Watkins, 2008).

Recalling overgeneral memories may add to this negative processing cycle by either limiting imaginability for future events or impairing social problem skills by not being able to access context specific information (Williams et al., 2007b). Given that overgenerality only accounted for a nominal amount of variance compared to the other indirect factors, it may be that recalling overly generic memories, as such, could potentially represent a by-product of this cognitive processing style for recent suicide attempters or it may be the factor which keeps perpetuating this cycle of depressogenic thinking.

Based on the data and prior research, it may be that the recent suicide attempt could be conceptualized as a means of escape from themselves, a perceived injustice or a difficult environment that is believed to be unfair (Baumeister, 1990b) or too effortful. In support, findings from thematic analysis of transcripts indicate that individuals rating higher on trait aggression were more likely to recall generic content around themes of fairness, blame and suspicion around other people’s motivations (section 5.2). Similarly, content analysis of suicide notes frequently contain themes of anger at someone, interpersonal problems and weariness at continued struggles (Ho, Yip, Chiu, & Halliday, 1998; O'Connor, Sheehy, &
O'Connor, 1999), although it is not possible to determine whether the content of these notes relates to a predisposition towards aggression or not. As such, future studies may wish to consider how specific trait characteristics, such as trait aggression, influence attributional style and rational for suicide attempts, and whether this remains the same immediately following a suicide attempt or changes with time.

Given the cross-sectional nature of this study, there are limitations as to what can be predicted without employing a prospective model. As such, findings from these studies highlight specific areas of research that future studies may wish to explore further. Nevertheless, the key findings of this study indicate that the relationship between suicide attempt and current depressed mood appears to be most influenced by brooding and trait aggression, with overgenerality accounting for a small amount of variance in this relationship, compared to the NS group. In contrast, individuals in the SI group appear to be more influenced by neuroticism and impulsivity effects. The effects of impulsivity and neuroticism on current depressed mood, however, do not appear to differ between group types. Moreover, findings indicate that these pathways are specific to current depressed mood or a combination of current depressed and angry mood, rather angry mood in isolation. Findings from this study could be used as specific cognitive targets for therapeutic interventions or prevention programs.

Key findings from section 6.2 indicate that when neuroticism and reflection are controlled, the overall combination of impulsivity, brooding and trait aggression account for most of the observed variance between suicidality and current depressed mood. Considering each group, however, indicates suggests that the indirect effects of impulsivity, brooding and trait aggression are positively related to current depressed (model 1) and negative moods (model
3) in the suicide attempt group. Conversely, the SI group appears to be more affected by the combination of impulsivity, brooding and overgenerality, with brooding and overgenerality being positively related to current depressed or negative mood.

Section 6.3 indicates that, when trait aggression and reflection are held constant, a similar pattern emerges in that impulsivity, brooding and neuroticism variables are able to account for most of the observed variance between suicidal groups and current depressed or negative mood. For the SA group, overgenerality as well as brooding and impulsivity accounted for most of the variance in the relationship between suicide attempts and current depressed mood. The SI group, in contrast, appeared to be most affected by brooding, impulsivity and neuroticism, when depressed or negative mood was used an outcome variable.

In section 6.4 both neuroticism and trait aggression were included as mediators as well as brooding, impulsivity and overgenerality. Only reflection was controlled for. Overall, findings indicate that impulsivity and brooding explained the greatest amount of variance across all there groups as before, followed by trait aggression, irrespective of outcome variable. More specifically, brooding, trait aggression and overgenerality were found to account for most of the variance between SA and current depressed or negative mood. Neuroticism appeared to have greater influence than trait aggression on the SI group, with the indirect relationships between brooding, impulsivity and neuroticism accounting for most of the variance when current depressed or negative mood was used as an outcome variable.

These sets of findings indicate that individuals in the SI and SA groups are influenced by different personality and cognitive processing factors which may indirectly account for levels of current depressed or general negative mood. The findings also indicate that different
mediating factors affect current depressed and angry moods and that these relationships may differ between SI and SA groups. This suggests that while prior research on suicidality highlights anger or aggression as a risk factor, each of these factors may affect individuals who have thought about suicide and those who have recently attempt suicide in different ways. Moreover, the findings obtained here indicate that trait aggression can be positively related to current depressed mood, and that this relationship is mediated by brooding and impulsivity. The data also implies that individuals in the SA group are more affected by trait aggression rather than neuroticism. Findings also suggest that the SI group was indirectly effected by neuroticism, impulsivity and brooding. Only brooding, however, was positively associated with current depressed or negative mood.

Another interesting aspect of the data is that while prior research has indicated that suicidal groups show a tendency to recall their personal memories in an overly general format (Williams, 2007), it is not known what to extent does this overgeneral memory bias affect different suicidal groups or how strong this effect is. Findings imply that, in comparison to other known risk factors, overgenerality accounts for a nominal amount of variance between suicidal groups and current depressed mood. Given that prior research has indicated poor predictability of suicide models (Goldston et al., 1999), these findings indicate the importance of considering the direct and indirect influence of multiple known risk factors across different suicidal groups. Broader implications of these findings for each group are discussed next.

Studies have shown that ruminating over past events can maintain internal feelings of anger, in certain types of individuals. Studies have also shown that brooding by focusing on the emotional aspects of an event in a self-critical manner may relate to increases in already
depressed mood. According to the capture and rumination hypothesis, some individuals may be more likely to be caught up in a repetitive trap of negative thinking, which in part may be influenced by the tendency to recall more overly generic memories (Williams, 2007). Research has also shown that intolerance to rule frustration, requirement for fairness can lead to feelings of anger (Bernard & Cronan, 1999), and that these beliefs about intolerance for rule frustration correlate with measures of trait aggression (Fives, Kong, Fuller, & DiGiuseppe, 2011).

Therefore, it may be that trait aggression may affect the relationship between suicide attempt and current depressed mood via the tendency to make evaluative judgments about fairness and blame. As such, combining this tendency to make judgments about others with a tendency to ruminate in a passive and self-critical manner, drawing on generic examples from previous memories, is likely to increase fluctuations of current depressed mood. In individuals who have recently attempted suicide it may be the perception that the world is unfair or unjust that may have driven the suicide attempt.

In support, Ho, Yip & Halliday (1998) analyzed 154 suicide notes in Hong Kong. Of these suicide notes, 44% contained references to anger towards someone that they felt treated them unjustly, interpersonal problems, weariness over struggling. However, their findings indicated that the most common themes reported in suicide notes were related to forgiveness and perceived hopelessness. Similar findings have been reported in other studies examining the content of suicide notes (Gottschalk & Gleser, 1960).

In contrast, for individuals who have thought about suicide in the past, it may be the combination of a pesstimestic outlook, as opposed to an angry or hostile one, combined with
a self-critical and passive focus on emotion aspects of previous events that may drive the suicidal ideations. Combining this with a difficulty in effortful control over thoughts, and a likelihood for impulsive actions, suggests that such individuals may experience increases in already depressed mood via feelings of not being in control of their own, negative thoughts, and attempting to find a way of managing these (Verstraeten et al., 2009). Ruminating in a passive manner could be seen as a possible means of problem solving by focusing on the negative aspects of an event (Watkins, 2008), but as it is a passive form of thinking, without any action, it may only serve to increase negative mood.
7.0 General Discussion
The primary aim of this thesis was to empirically test the theoretical model proposed by Wenzel and Beck (2008b). The cognitive model of suicide, in contrast to other models of suicidality, draws together numerous, previously identified, risk factors in order to explain how dispositional vulnerabilities, such as trait characteristics, may influence cognitions associated with depressed mood. Moreover, the model also attempts to explain why cognitions associated with depressed mood may activate suicidal ideation and translate into suicide attempts. It proposes that the crossover from suicidal ideation into suicide attempt may relate to individual levels of distress tolerance. As such, the model provides a sound theoretical underpinning for the proposed inter-relationships between risk factors, based on prior empirical research.

Current depressed mood was selected as an outcome factor because prior research shows that the risk for a fatal suicide is highest following a previous attempt (Goldston et al., 1999; *Scottish Suicide Database 2012 report: 2009-2010 data*, 2012). Despite this, factors which effect depressed mood at the point discharge remain under researched. This thesis sought to explore the influence of two personal characteristics – namely, trait aggression and neuroticism – on current depressed mood. These characteristics have been shown to predispose individuals to having a more negative outlook on life (Chan et al., 2007a; Bushman et al., 2005). For each trait, the direct relationship between the trait characteristic and current depressed mood, as well as indirect relationships with other mediating variables, were investigated. This was to establish whether the relationship between the trait characteristic and current depressed mood was a consequence of other closely related risk factors, such as rumination, overgenerality and impulsivity. Examining multiple indirect relationships also meant that competing theories could be statistically test, as identified by
prior studies. The second aim was to explore whether these variables were associated with the relationship between suicidality and current depressed mood.

### 7.1 Summary of main findings

<table>
<thead>
<tr>
<th>Sampling Autobiographical Memories</th>
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<tbody>
<tr>
<td>Given that meta-analytical studies (Vreeswijk &amp; Wilde, 2004; Moore &amp; Zoellner, 2007) highlight discrepancies between autobiographical memory sampling techniques, the first series of studies aimed to establish a protocol for assessing autobiographical memory specificity. In section 3, the analyses aimed to establish whether autobiographical memory specificity was influenced by:</td>
</tr>
<tr>
<td>• The type of recall instruction given to participants (cued, free or non-directive free recall).</td>
</tr>
<tr>
<td>• Types of retrieval strategies used and memory content</td>
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<tr>
<td>• Whether the procedure was timed or untimed</td>
</tr>
<tr>
<td>• The type of cue word used to elicit the memory (happy, sad, angry or emotionally neutral)</td>
</tr>
<tr>
<td>• Response latency</td>
</tr>
</tbody>
</table>

Section 3.2

Key findings indicate that, compared to the cued recall condition, individuals in the non-directive free recall condition recalled more overgeneralized personal memories. There were no significant differences between the number of overgeneral memories recalled when comparing cued and free recall conditions or free recall and non-directive recall conditions. Applying, or not applying, time constraints to the recall procedure did not appear to affect the number of overgeneral memories reported.
The main differences between specific and overgeneral memories appeared to relate to the range of different strategies used to initiate the memory search. For instance, specific memories were more likely to contain the participant’s emotional response as well as other peoples’ responses compared to overgeneral memories. Specific memories were also more likely to be reported when the participant started the search with a specific person, or relationship, in mind (actor), what happened in a broad range of events which was narrowed down to one specific example (action and events e.g. ‘times I have been to a funeral > my aunt’s funeral’). Overgeneral memories, in contrast, appeared to be more self-focused and fragmented in the transcribed interviews. They also tended to be reported following a more restricted search, usually focusing on self, time or emotional aspects (e.g. times I have felt sad).

Findings on cue words indicated that although the majority of the cue words elicited emotionally congruent memories, this was not always the case for all word categories. Angry and emotionally neutral cue words appeared to elicit either opposite, mixed or no emotions.

Section 3.3 Key findings indicated that there were no significant differences between cue type and response latency. Analysis of the transcribed interviews, however, indicated that happy and angry cue words were more likely to produce memories relating distinctive events (defined as one off events or special occasions) or memories relating to goal resolution or obstruction. Sad cue words tended to elicit self-reflections which were closely associated with other similar events or experiences.
Effects of personality on current depressed mood in different groups

The next series of analyses examined the effect of two personality characteristics (neuroticism and trait aggression) on current depressed mood. Brooding and overgenerality were proposed to mediate the relationship between trait and current depressed mood. Data for each group (NS, SI, SA) was analyzed separately. A number of theoretically-feasible competing models were also tested.

There were some exceptions to this, however. In section 5, impulsivity was included as a third mediator given the close relationship between impulsivity and trait aggression. The trait aggression and current depressed mood model was analyzed using data from all three groups.

Neuroticism as a predictor of current depressed mood

Section 4.1

Key findings from the analysis indicated that brooding and overgenerality positively strengthened the relationship between neuroticism and current depressed mood in the NS group. This positive association remained after controlling for worry items on the neuroticism scale, reflective rumination and current angry mood. Analysis of individual paths, however, indicated that neuroticism was negatively associated with overgenerality. In turn, recalling overgeneral memories was negatively related to current depressed mood.

Section 4.1.3

Thematic analysis of the interview transcripts indicated that individuals rating high on neuroticism in the NS group tended to employ a restricted range of descriptors to start the autobiographical retrieval search, compared to low raters. Certain themes were apparent in this group, regardless of what type of cue word was presented. These themes related to a ‘need to belong’, difficulties in managing and knowing how to respond to negative events. The memories appeared to be judged as positive or negative, by participants, depending on
whether a specific personal goal was achieved or not. For instance, whether the memory related to being accepted or rejected by social peers.

| Section 4.2 | Like the analysis from the non-suicidal group, key findings from the suicide attempt group indicated that, overall, overgenerality and brooding indirectly mediated the relationship between neuroticism and current depressed mood. Analysis of individual paths, however, indicated that although there was no direct relationship between neuroticism and overgeneralized recall, the two factors become related through a multiple mediational framework. The majority of this indirect effect was accounted for by brooding, with overgenerality accounting for fourteen percent of observed variance over and above the effects of brooding. Entering the percentage of overgeneral memories recalled in response to negative cue words, as opposed to overgeneral memories for all cue words, did not explain any additional variance. |

| Section 4.3 | Unlike findings from the NS and SA groups, findings from the SI group indicated that there were no direct relationships between neuroticism and current depressed mood. Correlational findings did indicate significant associations between neuroticism-brooding, neuroticism-overgenerality and brooding-current depressed mood. The analysis of indirect effects indicated that neuroticism and current depressed mood could become associated with each other as a result of ruminative brooding. As a result of suppression effects and smaller sample size, it may be that these analyses were under powered and require a larger sample. |

| Trait Aggression as a predictor of current depressed mood |

| Section 5.1 | When neuroticism was controlled for, correlational findings from the NS group indicated that both types of rumination (brooding and rumination) were negatively associated with overgeneral memories. While findings did not reach |
statistical significance, there was a trend for trait aggression to be associated with current depressed mood. A post-hoc power analysis indicated that, there was not enough power in the study to detect any significant differences using the data-set for the NS group only, after controlling for neuroticism.

As the relationship between trait aggression and current depressed mood was thought to be based on a continuum, with the NS group rating lowest on current depressed mood and the SA group rating highest, data from all three groups were amalgamated into one correlational matrix. Key findings from this analysis indicated that trait aggression positively correlated with brooding, behavioral impulsivity, escape avoidant coping, current depressed and current angry mood. Current depressed mood, in turn, correlated with overgenerality, impulsivity and escape avoidant coping. The correlational analysis also indicated inter-relationships between brooding, current depressed mood, impulsivity, trait aggression and escape avoidant coping.

Section 5.1.3

This analysis examined the interview transcripts from individuals rating high on trait aggression in the NS group. Participants that rated high on neuroticism and trait aggression were removed from the analysis. Key findings indicate certain key themes which were unique to this group, such as being unfairly criticized and being a passive recipient of events that happened. Comments regarding goal loss were attributed by participants to external (e.g. other people acting unfairly) or internal causes (e.g. perceiving themselves as not being good enough).

Furthermore, compared to individuals rating high on neuroticism, individuals who rated high on trait aggression included references to future events in their memories as well as describing in vivid detail arguments between salient
Section 5.2

After controlling for neuroticism, findings from the SA group indicated that the relationship between trait aggression and current depressed mood was positively mediated by brooding and impulsivity (non-planning and attentional) but not overgenerality. Overgenerality, it appears, may be more closely related to current depressed mood rather than trait aggression. Findings remained similar when data from all three groups (NS, SI and SA) was entered into the model.

Summary

The main difference between the neuroticism-current depressed mood relationship and the trait aggression-current depressed mood relationship appeared to relate to overgenerality. Overall, the analysis of indirect effects indicated that overgenerality strengthened the relationship between neuroticism and current depressed mood whereas this relationship was not observed when trait aggression was used as a predictor.

In terms of memory content, individuals rating high on neuroticism and those rating high on trait aggression differed on how events were perceived and appeared to have different underlying personal goals. Individuals rating high on neuroticism tended to report themes which reflected a desire to belong to social groups as well as reporting difficulties in responding to negative events. In contrast, transcripts from the high trait aggression group reflected themes of unfairness and not being good enough. Only transcripts from the NS group were analyzed due to time constraints.

The relationship between suicidality and current depressed mood

The final series of studies systematically compared the effects of trait aggression and neuroticism on the relationship between suicidality and current depressed mood using the...
previously mentioned mediators (brooding, overgenerality and impulsivity). In the final analysis both trait aggression and neuroticism were included as mediators along with the other variables. Data from the NS, SI and SA groups were included in these analyses.

| Section 6.2 | After controlling for neuroticism and reflection, 30% of the observed variance could be attributed to group type (non-suicidal, suicidal ideation, suicide attempt), but only when current depressed or negative mood was used as an outcome variable. No significant differences were observed between SI and NS groups as predictors of current depressed mood. In contrast, belonging to the suicide attempt was a better predictor of current depressed, compared to the non-suicidal reference group. The relationship between impulsivity, brooding and trait aggression had a greater influence on the SA group compared to the non-suicidal group, with the percentage of overgeneral memories only accounting for 8% of the observed variance between group type and current depressed mood. In contrast the relationship between impulsivity and suicidal ideation had a greater influence on the SI group compared to the NS group. Comparing beta weights for all three groups suggested that impulsivity may have the strongest influence on the SI group, even when taking into account impulsivity ratings in the SA group. |
| Section 6.3 | Similarly, after controlling for trait aggression and reflection, there were no significant differences between SI and NS groups as predictors of current |
depressed mood. In contrast, belonging to the suicide attempt was a better predictor of current depressed compared to the non-suicidal, reference group. The relationship between brooding and neuroticism had a greater influence on individuals belonging to the suicide attempt group compared to the non-suicidal group. Overgenerality only accounted for a nominal amount of observed variance between SA and NS membership.

Section 6.4

Findings remained similar when both neuroticism and trait aggression were both included in the analysis in addition the previously mentioned mediators. Compared to the NS group, SA group membership remained a better predictor of current depressed mood.

Compared to the NS group, brooding and trait aggression exerted the strongest influence on the SA group, collectively explaining 82% of the observed indirect effect between SA and current depressed mood. Interestingly, although suicidal groups have been reported to show an overgeneral memory bias, findings indicate that, compared to the NS group, overgenerality only accounted for 7% of the variance between suicide attempt and current depressed mood.

In contrast, behavioral impulsivity and neuroticism were found to have a stronger influence on the SI group compared to the NS. This relationship remained when taking into account beta weights from the suicide attempt group. No significant differences were observed between NS and SI as predictors of current depressed mood.
7.2 How do these findings relate to theoretical models?

Models of autobiographical memory- the interacting cognitive sub-systems (Teasdale & Barnard, 1993) and self-memory systems (Conway & Pleydell-Pierce, 2000)- propose that personality characteristics and autobiographical memories may exert a reciprocal effect on each other through a series of positive and negative feedback loops (Carver & Scheier, 2002). Through this reciprocal interaction, personality could influence how autobiographical events are encoded, processed or remembered which, in turn, may affect mood and schematic information.

According to the interacting cognitive sub-system model, positive and negative memories are processed in a similar manner. Differences between memory specificity relate to how the memory is processed and which sub-system dominated the processing cycle. Some personality characteristics (i.e. neuroticism and brooding) may increase self-focus and focus on emotional themes. According to the interacting cognitive sub-systems model, this means that individuals with these characteristics would be more likely to process their events based on their experiential emotional themes with the propositional sub-system dominating the processing cycle. In contrast, the self-memory system model proposes that memories are stored in temporal hierarchies, which are aligned to personal goals stored within the conceptual self. The primary aim of the conceptual self is to maintain a coherent sense of self. Memories which conflict with personal goals, therefore, may be reconstructed to fit in with personal goals, contain extraneous details or show reduced specificity.

Findings from sections 3.2 and 3.3 indicate that cue type (happy, sad, angry or emotionally neutral) or memory content did not affect memory specificity. The main difference between specific and overgeneral related to the range and diversity of cues used to start the retrieval
search. Similarly, findings from sections 4.1 and 4.2 showed negative or positive associations with overgenerality, respectively, suggesting that positive and negative memories were processed in a similar manner albeit in different directions depending on the group type. These findings lend support to the interacting cognitive sub-systems model.

In the NS group, the thematic analysis (sections 4.1.3 & 5.1.3) indicated different core themes for high neuroticism and trait aggression groups. For the high neuroticism group, the valence of the memory was categorized on a continuum of positive to negative depending on whether the personal goal was achieved or not. For example, one theme was ‘a desire to belong’, with those memories related as ‘positive’ being characterized by feelings of social inclusion; memories that were related as ‘negative’ were characterized by social exclusion. In contrast, the high trait aggression group focused on having personal goals thwarted due to internal or external causes. According to the self-memory system model, memories which conflict with personal goals or are distressing should show reduced specificity. As shown by the correlational analyses in sections 4.1 & 5.1, this was not observed.

7.3 The Capture Rumination and Functional Avoidance Model

Reduced specificity, according to the Capture and Rumination, Functional Avoidance Model (Williams et al., 2007b), could be a result of three distinctive processes: capture and rumination, functional avoidance and reduced executive control. According to this model, cue words used within the autobiographical memory task may tap into self-schematic information, which in turn activates ruminative thinking. During this process resources that are allocated to cognitive processing are ‘captured’ resulting in reduced working memory capacity. The functional avoidance element of this process refers to a tendency for some individuals to passively avoid recalling event specific memories in order regulate their
emotions. Reduced executive control refers to deficits in executive resources which constrain the retrieval search.

Findings indicate that while the majority of cue words elicited emotionally congruent memories, this was not the case for all cue word categories (section 3.2.2). Angry and emotionally neutral cue words tended to elicit mixed or opposite emotional responses. Moreover, memories for distinctive events were more likely to be reported following the presentation of happy and angry cue words. Only sad cue words were found to elicit self-reflections on related events (section 3.3.2). This suggests that the emotions and detail attached to an event are individual specific, as suggested by the interacting cognitive sub-system model, and not all cue word categories may tap into self-schematic information.

Neuroticism and trait aggression are two personality characteristics which are known to predispose individuals towards a pessimistic outlook and are associated with difficulties in regulating emotions. Therefore, given these difficulties in regulating emotions and a tendency for negative self-schematic information (Chan et al., 2007a; Bushman et al., 2005), neuroticism and trait aggression could be theoretically linked to overgenerality. Findings from section 4.1 indicate overall overgenerality and brooding positively mediated the relationship between neuroticism and current depressed mood. When examining individual paths, however, a negative relationship between neuroticism and overgenerality in the NS group was observed. The relationship between neuroticism and overgenerality differed in the SA group, however, with overgenerality being indirectly associated with neuroticism. This suggests that although overgenerality may be a factor in the relationship between neuroticism and current depressed mood, it may not be a key factor and the influence of overgenerality may only be evident in clinical groups. This could be because the effects of neuroticism may
only be evident under conditions of high stress or strain (Eysenck, 1975). In support, no significant relationship was observed between trait aggression and overgenerality (5.2.2) when investigating the relationship between trait aggression and current depressed mood. Moreover, in all three analyses of indirect effects (sections 4.1, 4.2, 5.2), overgenerality explained the least amount of variance between the personality characteristic and current depressed mood. These patterns of findings suggest that overgenerality may be associated with other factors, possibly only evident in clinical pathologies which show emotional labiality, rather than being associated with pessimistic dispositional tendencies.

Section 6 explored the relationship between suicidality and current depressed mood using the previously identified variables (trait aggression, neuroticism, brooding, impulsivity and overgenerality). While research shows that suicidal groups tend to recall their personal memories in an overgeneralized format (Williams & Broadbent, 1986a), findings from section 6 indicated that overgeneral recall accounted for a nominal amount of observed variance compared to other mediating factors (e.g. trait aggression, neuroticism, brooding, impulsivity) when examining the suicidality-current depressed mood relationship. These findings suggest that while overgenerality may exert some influence on current depressed mood, the effects of overgenerality may be smaller compared to other cognitive variables. As such, it may be that overgenerality is a by-product of a negative cognitive processing style for recent suicide attempters or it may be the factor which keeps perpetuating this cycle of depressogenic thinking in certain clinical groups.

7.4 The Cognitive Model of Suicide

The cognitive model of suicide proposes that underlying dispositional vulnerabilities may increase the likelihood of activating mood disturbance related cognitions under conditions of high stress. In turn, mood disturbance related cognitions increase the propensity for suicide
related cognitions (e.g. hopelessness, negative thoughts about the future). Unlike other
types, this does not assume that all individuals displaying these risk factors will show mood
disturbance related cognitions, or suicidal ideation. Rather, it is the combination, and number,
of underlying vulnerabilities which increase the propensity for mood disturbance related
cognitions. The crossover from suicide related cognitions to a suicide attempt is thought to be
dependent on individual levels of distress tolerance, which are determined by personality
characteristics.

7.4.1 Findings from Section 4-5

Findings from thematic analysis (5.1.3) indicated that individuals rating high on trait
aggression were more self-critical, focused on beliefs about fairness and causes of an event
and were more likely to make judgments about future events compared to the high
neuroticism group. While the thematic analysis only sampled participants from a non-suicidal
population, similar qualitative findings have also been observed when examining suicide
notes. For instance, the content of suicide notes have been observed to frequently contain
themes of anger at someone, interpersonal problems and weariness at continued struggles (Ho
et al., 1998; O'Connor et al., 1999). One potential explanation for this may be that activating
mood disturbance related cognitions may increase the propensity for covert, or inwardly
directed aggression. As such, suicide attempts may conceptualized as a need for escape from
themselves, a perceived injustice, interpersonal problems or a situation that is felt to be too
difficult to manage (Baumeister, 1990b). In order to this investigate this, however, further
studies are needed to determine whether there are thematic similarities, or differences, in
event appraisals styles between different suicide groups, and whether the propensity to
outwardly or inwardly express anger differs according to depressed mood.
7.4.2 Findings from Section 6

Findings from section 6 indicate that, compared to the non-suicidal group, the relationship between suicide attempts and current depressed mood appears to be most strongly influenced by brooding and trait aggression, with overgenerality accounting for a nominal amount of the observed variance. In contrast, the SI group appears to be most strongly influenced by neuroticism and impulsivity. The effects of neuroticism and impulsivity on current depressed mood, however, do not differ between SI and the NS group.

7.4.2.1 Suicide Attempt Group

Findings for the suicide attempt group suggests that rumination and trait aggression exerts a greater influence on the suicide attempt group compared to the non-suicidal (NS) group, with rumination and trait aggression being positively associated with current depressed mood. While it is not possible to imply causality, prior research suggests that these inter-relationships may occur because of several related mechanisms. For instance, rumination may activate cognitions relating to self-blame and perceived inability to manage difficult situations while differing levels of trait aggression may enhance the propensity for feelings of frustration.

In support, rumination has been shown increase angry feelings (Rusting & Nolen-Hoeksema, 1998) as well as amplifying psychological distress (Selby et al., 2008). Moreover, studies show that when in a dysphoric state, ruminators are more likely to feel that the situation was out of their control, blame themselves and be less likely to put plans into action (Lyubomirsky, Tucker, Caldwell, & Berg, 1999a). Peled and Moretti (2010) indicate that sad rumination can turn into angry rumination, and that angry rumination may be a preceding factor for aggressive behavior. Vansteelandt and Van Mechelen (2006) also suggest that
feelings of sadness and angry may co-occur in response to the same event, for instance, self-blame for an angry situational response. While expressing aggressive behaviors may be seen as a method of reducing feelings of frustration and angry in the short term (Bushman et al., 2005; Bushman, Baumeister, & Philips, 2001), it does not provide a long term solution to the problem.

As such, collectively, these studies suggest that engaging in ruminative thinking while feeling depressed is likely to result in greater difficulty in managing negative emotions (Nolen-Hoeksema & Jackson, 2001), with individuals rating high on trait aggression being more likely to express this. The direction of this aggression, outward or inward, may depend on individual preferences (Cautin et al., 2001), with the severity of depressed mood increasing the propensity for inwardly directed aggression (Bridewell & Chang, 1997). As indicated in section 8, further longitudinal studies are needed to investigate these assumptions in more detail.

7.4.2 Suicidal Ideation Group

Research by Enns, Cox, and Inayatulla (2003b) indicates that neuroticism continued to significant predict the relationship between depressed mood and suicidal ideation one year after an initial suicide ideation or attempt. Suls and Martin (2005) indicate that neuroticism is associated with reporting more daily hassles, with this mood spilling over onto other tasks. The authors show that while old problems were associated with negative mood, new problems were more likely to increase current negative mood. Moreover, individuals rating higher on neuroticism were likely to respond to these problems by using emotion focused coping techniques (e.g. disengagement, day dreaming etc.). While individuals rating low on neuroticism also employed these types of strategies, they were only used in response to
challenging stressors. The authors suggest that the use of emotional-focused strategies indicates that individuals rating higher on neuroticism may find it more difficult to cope with everyday problems. Therefore, it may be that the association between neuroticism and suicidal ideation could be maintained by a heightened reactivity to everyday stressors or the activation of negative self-schematic information when faced with stressors as suggested the cognitive model of suicide. Future longitudinal studies would be required, however, to investigate the cognitive mechanisms underlying the association between suicidal ideation and neuroticism in more detail.

Studies also show an overlap between neuroticism and impulsivity. Under normal circumstances, anxiety tends to inhibit impulsive behavior. Individuals rating high on neuroticism, however, show the opposite relationship with impulsivity. That is, heightened anxiety and worry levels typically associated with neuroticism enhance the probability of impulsive behaviors, resulting in more negative affect because of these impulsive behaviors (Carver & Miller, 2006; Fetterman et al., 2010). High levels of negative affect, in turn, may increase the propensity of using impulsive behaviors as a means of reducing distress in the short term (Tice et al., 2001). Therefore, theoretically, based on the findings for this group it may be that individuals who have thought about suicide share a similar cognitive profiles to the non-suicidal group. Due to the combination of neuroticism and impulsivity, however, an individual’s vulnerability for suicidal ideation may increase over time due to difficulties with emotional and behavioral regulation, which do not provide long term solution to the problems faced. Alternatively, it may be that the cognitive profile for individuals experiencing past suicidal ideation may differ from those actively experiencing suicidal ideation. Given the cross-sectional nature of the studies reported, longitudinal studies may wish to explore these propositions further.
7.5 *Impulsivity and Trait Aggression*

Some studies propose that trait aggression and impulsivity represent a unitary vulnerability. These studies tend to focus on a limited range of competing factors compared to a single control group (e.g. diagnosis history, impulsivity and trait aggression in suicide attempters and non-attempters, Mann et al., 1999b) or focus on serotonergic explanations for an impulsive aggression link (Mann & Currier, 2009; Seroczynski et al., 1999). Unlike these studies, the findings obtained suggest that impulsivity may affect the relationship between trait aggression and current depressed mood as well as exerting a greater influence on the suicidal ideation group, compared to the non-suicidal group.

In part, findings for the suicidality-impulsivity association could be a result of systematically comparing the effects of a number of different risk factors in three different groups. Doing so highlighted subtle differences between groups which may not have been detected otherwise. For instance, compared to the non-suicidal group, impulsivity ratings were higher in both, suicidal ideation and suicide attempt, groups. Comparing beta weights, however, indicated that the effect of impulsivity was strongest in the suicidal ideation group. If, for instance, only one control group had been used (e.g. either non-suicidal or suicidal ideation) different findings may have been observed, and it may not have been possible to observe the subtle differences between all three groups.

Alternatively, it may be that impulsivity has a greater influence on suicidality before a suicide attempt, and given that the recruited sample had already recently attempted suicide it seems logical that impulsivity may not have had as strong an effect in this group. Conversely, for the suicidal ideation group, impulsive behaviors or thoughts may provide a means for
managing distress in the short-term. Findings from section 5.2, suggest that certain facets of impulsivity (e.g. attentional impulsivity and non-planning) positively mediate the relationship between trait aggression and current depressed mood. It would be interesting to see whether these facets of impulsivity also effect individuals who have experienced suicidal ideation in a similar manner, and whether the use of impulsive behaviors were related to reducing emotional distress. It may also be that the findings observed in section 6 are a result of an incomplete suicide attempt and it may be that individuals who complete suicide may differ in their levels of trait impulsivity.

Figures 7.1 shows how the relationship between trait aggression and current depressed mood, as well as the link between suicide attempts and current depressed mood may influence each other because of the underlying cognitive constructs.
8.0 LIMITATIONS AND FUTURE DIRECTIONS

It is acknowledged that there may be limitations associated with methods of data collection and also the cross sectional nature of the data. These are discussed next.

8.1 Recruitment

One potential criticism of the methodology concerns the recruitment of the groups. For the non-suicidal and suicidal ideation groups, rather than using extensive formalized testing (such as the structural clinical interview, SCID), participants were given a semi-structured interview as part of the autobiographical memory test and administered the profile of mood states. The reliance on subjective self-reports, however, may be less of an issue when one considers that the SCID is also a subjective self-reporting tool, albeit a highly structured one. Furthermore, every individual was asked whether they had a current or prior history of mental ill health or consulted a medical professional because of low mood or other psychological problem.

For participants in the non-suicidal group, this pragmatic screening identified six individuals that did not meet the inclusion criteria and were, therefore, not invited to take part. Furthermore, the depressed mood scores fell below the cut-off for clinical symptoms, indicating that participants in the non-suicidal group were not currently suffering from clinical levels of psychological ill health.

Participants in the suicidal ideation group, in contrast, were asked to only take part if they had experienced suicidal ideation in the past. While it may have been interesting to differentiate between suicidal ideators who had attempted suicide in the past and those who had not, this was not possible due to the sample size. Heterogeneity of the suicidal ideation group is rarely explored by researchers and may be an interesting direction for future studies. Furthermore, it
may be that individuals who are currently experiencing suicidal ideation may have a different cognitive profile that those who have experienced suicidal ideation in the past. This, however, would raise ethical issues which would need to be addressed first.

Similarly, although suicidal groups are known to be heterogeneous, it was not possible to differentiate based on prior psychiatric diagnoses. Given comorbidity between psychiatric diagnosis, this would be difficult to investigate unless the specific focus was on a particular type of diagnosis. This, however, was not the aim of this thesis. All participants in this group were screened by the Liaison Psychiatric Team to ensure that participants recruited were not actively in distress, neuro-psychologically compromised or psychotic at the point of testing, which would have greatly influenced the findings obtained. Depending on the medical needs of individual at the point of admission, this may involve blood or oral samples to ensure toxicity levels were within acceptable levels or had returned to acceptable levels, CT scans and or cognitive assessments as dictated by the admissions procedure and consultant psychiatrists on duty.

8.2 Sampling autobiographical memories

For the recall of memories, a specific time-window was set, asking participants to recall memories between 1 and 5 years ago. Whilst it is obvious that setting a constraint on the time-period for recall is likely to affect executive processing and possibly will lead to different memories being recalled than would have been spontaneously generated, this method was adopted here for several significant reasons. First, theory suggests that memories that are over a year old are more deeply embedded into the autobiographical memory hierarchy (Singer & Bonalume, 2010), and therefore into self-schemas. Secondly, having predefined parameters prevented the age of the memory acting as a confounding factor for the
diverse age ranges of participants (Piolino et al., 2010). Despite these parameters, though a minority of participants found it difficult to only report memories that were 1-5 years old, the majority were able to use salient anchor events or their own age to guide memory retrieval.

8.3 Biases associated with Cross Sectional Research

Another limiting factor is the fact that the data are cross-sectional and some potential issues have been highlighted with using cross-sectional data with mediational analysis. In their paper, Maxwell and Cole (2007) suggest that using cross sectional data for mediational analysis increases the likelihood of both type 1 and type 2 errors, depending on the sample size, such that increases in sample size does not increase power, it merely changes the error one is likely make. Their findings were based on a statistical model of simulated data, maternal depression (x), parenting behaviors (m) and resultant child behavior (y).

Maxwell and Cole (2007b), suggest that when the mediator is more stable (i.e. has less variability) than the predictor, then the c’ path is biased towards supporting the null hypothesis. In terms of the indirect effect, they show that when both the predictor and mediators have beta values that are close to .1 then the indirect effect may be much smaller than what could be observed using longitudinal data. Conversely, when the predictor and mediator have beta values that are closer to .9, then this shows increased stability of the predictor, but the observed indirect effect nevertheless may be over exaggerated compared to when longitudinal data are used. Moreover, they suggest while bootstrapping confidence intervals may help with reducing bias estimates, the fundamental problem is that the data being resampled comes from an originally biased sample.

In a response article to this paper, Shrout (2011) acknowledges that while it may not be possible to eliminate biases associated with cross sectional mediational studies, it is possible
to reduce it. Moreover, Shrout (2011) argue that any such analysis should be driven by a strong theoretical component, which details a sound theoretical justification for the causal direction that for temporal processes. Assuming that mediational analysis cannot be conducted using cross sectional data is an over simplification and negates the opportunity to discover other elements of change that may not be detected by longitudinal data. In his paper, Shrout (2011) gives the example of a study which examined the relationship between poverty and childhood psychopathology. While the study collected longitudinal data, it was the cross sectional data collected via a survey that provided information about an indirect factor which indirectly influenced the relationship between poverty and childhood psychopathology.

As such, Shrout (2011) argues that the one of the issues with the Maxwell and Cole (2007) paper is that they simulate biases in cross sectional data without considering the possibility of multiple indirect factors that may mediate the relationship between maternal depression and childhood psychopathology. Including, and contrasting, multiple mediating factors allows one to test competing theories and therefore reduces the risk of an incorrectly assuming that only one mediating factor exerts an influence on a given relationship. Neither do Maxwell and Cole consider the impact of personality characteristics on group membership. By not considering individual level x group interactions, there is an assumption that the same effects will apply to all individuals in the group in the same way, rather than taking into account that on some days the effects of maternal depression, say, may be lower than others or that some individuals would be more motivated to seek or adhere to treatment for depression than others. Failing to take these factors into account introduces parameter biases. Interactions between individual and group effects could be assessed more accurately by multilevel models, which take into account individual x group effects. There is also an implicit assumption that a temporal lag must occur for maternal depression to affect childhood
psychopathology but there is no information as to what length of time must pass for this effect to be observed.

Shrout (2011) acknowledge that that while parameter estimates for cross sectional data may be biased, but the biased analysis may still be able to advance scientific thinking as long as the sign is not effected and is driven by a strong theoretical temporal justification for why the process should occur in the order specified. It may also be possible to reduce bias by including a randomized predictor and adjusting the correlated residuals for the mediating and outcome variables. According to the author, claiming that a certain mediator will completely explain the relationship between a predictor and outcome variable will remain suspicious given the possibility of other indirect and potentially unmeasured factors that may affect this relationship. As such, Shrout (2011) advocates refraining from making strong statements about the nature of the direct effects.

While accepting these biases, it is assumed that, based on neuropsychological, genetic and empirical studies, that predispositional traits such as trait aggression and neuroticism would pre-date the occurrence of rumination, overgenerality, which are more likely to be learnt in response to environmental stimuli and events. While impulsivity also has strong genetic components, it was not used as a predictor variable given that studies show overlaps between neuroticism-impulsivity and aggression-impulsivity constructs. Moreover, researchers show that impulsivity is a multidimensional construct which may have positive and dysfunctional aspects to it depending on the interaction with other traits, temperaments and environmental stimuli (Whiteside & Lynam, 2001). As such, trait aggression and neuroticism were thought to be more stable and consistent predictors of current depressed mood. Crucially, it is assumed that both predictor and mediators will have occurred prior to the measure of current
depressed mood, thereby providing a temporal justification for the causal processes modeled. Nevertheless, in sections 4 and 5, a number of theoretically feasible alternative models are tested using the mediating factors as predictors. The results indicate that these models do not fit the data as well as the original model. While mediational multilevel modeling in sections 6.2-6.4 could have addressed some of the biases associated with cross sectional data, there were not enough data points to be able to accurately estimate the interactions between individual traits and group type. This, however, might be an area for future investigation.

Furthermore, longitudinal analysis was not possible for ethical reasons when the present data were analyzed, however, local medical research ethics (LREC) approval has now been granted to conduct a longitudinal study to explore some of the issues raised by this thesis further.

Reporting effect sizes for multiple mediation models could be considered to be limitation of the statistical techniques used. Typical effect size measures tend to determine the strength of a direct relationship between two variables (e.g. Cohen’s D, interclass correlations) and as such do not tend to accurately estimate the strength of indirect effects. Some researchers (e.g. MacKinnon, Fairchild, & Fritz, 2007) propose that the standardized regression coefficients of paths a and b can be used to provide an estimate of the effect size. Others (e.g. Preacher & Kelley, 2011), however, argue that the regression coefficients do not accurately represent the indirect effect, which is of primary interest in a mediational model, and that a variety of different effect size measures should be reported instead. These papers, however, employ single mediator models to provide simulated models of effect size. The models presented in the thesis tend to employ multiple mediators, some of which are categorical (e.g. section 6). As such, it is difficult to report, or rely on a single effect size measure. For each model presented a variety of different potential indicators of effect size are reported in order to
provide a more accurate estimation of the indirect effects reported. These include adjusted $R^2$ statistics (as suggested by Fairchild, MacKinnon, Taborga, & Taylor, 2009), percentile (or BCA) confidence intervals for indirect effects, standardized regression coefficients for individual paths as well as the amount of variance accounted for by mediators and or alternative models.

Similarly, it is difficult to accurately conduct a power analysis given the complexity of the models used and requirement for specialist statistical programs/training (e.g. MPlus Thoemmes, MacKinnon, & Reiser, 2010). Nevertheless, it is hoped that reporting a range of effect size statistics may allow for a cautious interpretation of the findings presented. Future, larger studies, however, may wish to investigate the findings obtained here in more detail.

### 8.4 Future directions

Future research may wish to investigate several different areas, which could be of theoretical and clinical interest. First, it would be interesting to investigate how frequently intrusive and distressing memories occur in a psychologically healthy population that rate high on neuroticism, and whether these types of memories relate to detailed, intrusive memories. Examining the underlying retrieval strategies of these types of memories may also help to determine whether these types of memories are elicited due to direct retrieval or some other underlying mechanism. It would also be interesting to investigate whether frequent recall of involuntary, distressing memories increases the likelihood of developing emotional disorders in a psychologically healthy population, and how this relates to individual levels of neuroticism.

While neuroticism and trait aggression are considered to be a relatively stable personality constructs, brooding and overgenerality are shown to be amenable to change using specific
therapeutic interventions such as mindfulness based cognitive therapy (Dalgleish et al., 2007). Studies by Fetterman et al., (2010) and Heeren, Broeck, & Philippot, (2009) indicate that mindfulness based strategies contribute to higher levels of emotional control in individuals rating high on neuroticism, with other studies indicating that mindfulness reduces overgenerality and brooding (Watkins, 2008). Therefore, future research may wish to investigate these relationships further by using experimental manipulations of ruminative thinking or mindfulness interventions and comparing the effects of each intervention in different types of suicidal group.

In terms of suicidal ideation, future research may wish to investigate whether the relationship between neuroticism and impulsivity relates to a tendency to approach emotionally challenging situations in a cognitively inflexible manner, and whether this relationship differs between individuals who have a past history of suicide and those that do not. It would also be interesting to investigate whether the relationship between suicidal ideation, neuroticism and impulsivity may affect current depressed mood in individuals who were actively experiencing suicidal ideation, and how this would translate into suicide risk. Comparing and contrasting individuals who have thought about suicide but never attempted, and those who have attempted suicide may also be an interesting future direction which may highlight subtle differences between the two groups.

In terms of the suicide attempt group, future studies may wish to include a risk of repetition scale, or cortisol measure as a biological marker of physiological stress as another potential outcome factors. It would also be interesting to investigate whether the relationships observed in this thesis would apply to individuals prior to a suicide attempt, or whether different cognitive processes underlie the relationship between suicide attempts and current depressed
mood. It would also be interesting to consider how specific personality characteristics (e.g. trait aggression) influence the attributional style and rationale for the suicide attempt, and whether this remains the same immediately after the suicide attempt or changes with time.

While these potential future directions may be of theoretical and clinical interest, they also raise a number of ethical issues which would need to be addressed. Conducting a longitudinal study in a psychologically healthy population who are more likely to experience emotional difficulties could provide a naturalistic means of sampling the transition from never suicidal-suicidal ideation- suicide attempts. Using mediational multi-level modeling would help to identify trait and group level differences in more detail, depending on the number of times data was sampled.

8.6 Summary of thesis

To summarise, while suicide models propose a number of theoretical vulnerability factors, few studies have explored the inter-relationship between them and how they may impact current depressed mood, which is proximal indicator for suicide attempts. This thesis explored the the impact of two personality characteristics (neuroticism and trait aggression) that have been associated with suicidality and current depressed mood. One aim was to determine whether the relationship between personality factors (neuroticism and trait aggression) and current depressed mood was indirectly mediated by other known risk factors (rumination, overgenerality, impulsivity) of information based on the cognitive model of suicide. The analyses examined this relationship between personality and current depressed mood in non-suicidal, suicidal ideation and suicidal attempt groups to investigate if there differences between the inter-relationships in each group. The final series of analyses aimed to explore the relationship between suicidality and current depressed mood using a systematic
exploration of known risk factors which may mediate this relationship (neuroticism, trait aggression, brooding, impulsivity, and overgenerality)

Key findings from section 6 indicate that, compared to the NS group, the SA group is more likely to be influenced by the effects of trait aggression and brooding, and that the combination of these factors are positively associated with current depressed mood. From earlier studies, we also know that trait aggression is positively associated with current depressed mood, with impulsivity, brooding and overgenerality mediating this relationship. In contrast, neuroticism and impulsivity appear to influence individuals who have experienced suicidal ideators more than individuals those who report never having suicidal thoughts or attempting suicide. The influence of neuroticism and impulsivity on current depressed mood, however, did not differ between NS and SI groups. Findings from this thesis could be implemented within specific cognitive interventions for individuals who have either recently attempted suicide or have thought about suicide in the past. As such, it may be that clinicians may wish to focus on symptoms underlying the trait aggression-brooding relationship (e.g. attribution of blame, repetitive focus on emotional aspects of an event) for recent suicide attemptors, whereas focusing on cognitive flexibility and over emotional responding could be of greater benefit to individuals who have experienced suicidal ideation.
REFERENCES


connectivity in response to negative emotional facial expressions. *Neuroimage, 49* (1), 963-70. doi: 10.1016/j.neuroimage.2009.08.023


Huesmann, L. R., & Guerra, N. G. (1997). Children’s normative beliefs about aggression and aggressive behavior.


*Behavior Research and Therapy, 46*, 392-401.


SECTION 9: APPENDICES
• Participant Information Sheet, consent form and debriefing sheet for never suicidal, suicidal Ideation and suicide attempt groups

• Inclusion/ Exclusion Criteria for all groups

• Instructions for recalling a memory for all groups

• Recall Instructions

• Instructions to Participants

• Demographic Information Sheet

• Eysenck Personality Questionnaire (Neuroticism scale only)

• Adapted Profile of Mood States

• Revised Coping Scale

• The Rumination Response Scale

• Bartlett’s Impulsivity Scale

• Trait Aggression Questionnaire
You have been asked to take part in postgraduate research supported by the University of St Andrews, School of Psychology (see attached address and contact points). My name is Shri Cameron, my main supervisor in the University is Dr Barbara Dritschel and my external supervisor within the clinical psychology department is Professor Kevin Powers.

This study will examine personal memories and their relationship to personality and mood. It is known that personal memories, personality and mood may influence each other. This study aims to consider how these impact on each other in individuals who have recently exhibited suicidal behaviour. The study involves completing a small number of questionnaires and then carrying out a personal memory test, prompted by key words. The questionnaires are simply tick box type questionnaires which require you to make a series of judgements in your own time. The questionnaires measure mood and personality and should not take any longer than 15 minutes to complete.

For the memory test, you will be given a total of 12 happy, sad, angry and non-emotional words. For each word, you will be asked to think of a personal memory that you think relates to words provided. The words will be read out by the researcher and your response will be audio recorded. Overall, this should be a short procedure but you should feel free to take breaks and ask about anything that you want to with regard to the research.

You should understand the purpose of the study in detail before you take part and what it would involve you in doing, before you reach your decision to take part. Please read over the following information, in your own time, and make sure that you understand what you are being asked to do. The researcher will read a short explanation of each task before you start the task to ensure that you know and understand what you are being asked to do. If you feel the procedure is too demanding you can stop at any time.

Feel free to ask or discuss any questions you have about the study before you take part, while you take part or afterwards. This information sheet is for your information and you can take the sheet away with you to review, so that if you have any questions at a later time you may contact us.

There are two parts to this information sheet. Part 1 tells you about the purpose of this study Part 2 explains what to do if there is a problem.

Please feel free to ask if there is anything that you are unsure about or if you would like more information before proceeding to take part. Take time to decide whether or not you wish to take part.
PART 1

PARTICIPATION

It is up to you to decide if you would like to take part. The study will be described before you take part. You will then be asked to sign a consent form to show you have agreed to take part. Your signature indicates that you know and understand what the purpose of the study is, what you will be required to do and how you may gain support if the outcomes are of concern to you.

PURPOSE OF RESEARCH

The purpose of this research is to determine how personality, mood and personal memories may influence the risk of suicidal behaviour. Thus, you will be asked to complete personality questionnaires, your mood will be assessed and a memory task will prompt you to recall memories of things you have experienced in the past.

WHY HAVE I BEEN CHOSEN?

Individuals who have presented at the short stay ward at Ninewells Hospital following an episode of suicidal behaviour, during Winter 09, have been invited to take part in this study. It is thought that understanding your memory and the kinds of events that you recall will help to understand why you feel the way that you do. This in turn may be used to develop new therapeutic approaches to helping people with suicidal thoughts.

WHAT HAPPENS TO ME IF I DECIDE TO TAKE PART?

- This study is independent of the hospital and the treatment regime you will receive and there are no consequences if you decide not to participate in the research.
- You do not have to take part if you do not want to, and if you do decide to go ahead you are free to withdraw from the study at any stage, without any negative consequences or having to provide a reason. This will not affect the standard of care you receive. All your information will be confidential and anonymous, though there is an exception to this under the Duty of Care Act if you raise issues of concern for your well-being.
- If you decide to take part, you would be seen in a private room within the short stay ward and asked to complete 5 questionnaires which will ask you about your personality and mood. You will also be asked to take part in a short personal memory test.
- The study itself will take 30-40 minutes in total. This is because some people can complete the study faster, whereas others take a little longer.
- You are free to take comfort breaks, as required.

WHAT WILL I HAVE TO DO?

- You will be asked to complete 4 questionnaires asking you about how you tend to respond to situations (which measure personality) and 1 questionnaire asking you about your mood. Please remember that there are no right or wrong answers so simply respond as quickly and accurately as you can with the first answer you think of.
- The personality questionnaires will ask you about how you tend to think over things, what kinds of coping skills you use in different situations, how emotionality sensitive you are, if you act on ‘spur of the moment’ and finally about what how you typically react when you get angry. All the questionnaires will be in a ‘tick box’ format. The questionnaires should take about 15 minutes to complete and you will be given generalized feedback about each of these questionnaires, if you would like.
• You will also be asked to complete a short personal memory test. This should not last any longer than 15 minutes. In the memory test you will be asked to talk about a personal memory, which is at least 1 year old, in response to a word read aloud by the researcher. There will be a total of 12 happy, sad, angry and emotionally neutral cue words. For example, you might be asked to think of a personal experience relating to the word ‘house, unhappy or joy’. The personal memory test will be audio taped so that the interview can be transcribed afterwards. However, you can ask for the recording to be stopped at any point if this concerns you.

• In addition to the questionnaires and personal memory test, I will ask you for some demographic information, which will solely be used to make sure that people are equally matched for things like age, education etc.

WHAT ARE THE POSSIBLE DISADVANTAGES OR RISKS OF TAKING PART?

• Please be aware that some elements of this experiment may inadvertently cause you to feel distressed or upset, particularly if you recall memories that cause you distress.

• During the personal memory test, please make sure that you only report memories that you feel comfortable sharing with others.

• You will be given an opportunity at the end of the personal memory testing session to informally chat about how you felt about the testing experience.

• You can also withdraw at any stage of the study, or ask for a comfort break, without having to provide an explanation.

• Please make sure that you do not walk away feeling upset.

• You can use the contact and guidance sheet for further information if you are distressed by the testing and arrange an informal discussion with any member of the research team. If you have concerns which you would like to talk about in more depth with a professional, you can contact any member of the Liaison Psychiatric Team in the first instance. If you feel that your concerns have not been answered then you can speak to Scott Kane or Dr Mitchell Stewart.

• A guidance sheet is attached to the back of this questionnaire to guide you through the possible courses of action you can take as an in patient. I have also listed some contacts that you may wish to use as an out-patient. The most important thing is that you should not hesitate to ask for any help you require.

WHAT ARE THE BENEFITS OF TAKING PART?

We cannot promise the study will help you personally but sometimes discussing problems with a third party can help to see the issues in a new light, which helps in the short term. This cannot be guaranteed. The information we get from this study may help improve the treatment of people who engage in suicidal behavior and give an understanding of what creates such distress.

You can also choose to receive generalized feedback about the questionnaires that you have completed and to meet with the researcher who tested you.

WHAT HAPPENS WHEN THE STUDY STOPS?

You be given a debrief at the end of the testing session. This will give you a more detailed explanation of the study and a further opportunity to ask questions about the results. You will be given access to a copy of the summarised findings.
If the information in Part 1 has interested you and you are considering participation, please read the additional information in Part 2 before making any decision.
PART 2:

WHAT WILL HAPPEN IF I DON’T WANT TO CARRY ON WITH THE STUDY?

We will follow ethical and legal practice to keep all information about you in strict confidence. If you decide to withdraw from the study, we will destroy all your data if requested.

WHAT IF THERE IS A PROBLEM?

Being asked to think about unpleasant experiences may have made you feel sad or unhappy. Please talk through your experience of taking part with the researcher. You can also speak to any member of Psychiatric Liaison Team or your clinician if you have experienced any concerns that you wish to talk about in more depth with a professional. If your concerns have not been addressed you can speak to Scott Kane or Dr Mitchell Stewart. You can also use any of the social support contacts listed below, as an out-patient.

If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the hospital.

In the event that something does go wrong and you are harmed during the research and this is due to someone’s negligence then you may have grounds for a legal action for compensation against NHS Tayside Trust but you may have to pay your legal costs. The normal National Health Service complaints mechanisms will still be available to you.

(University of St Andrews indemnity policy will be included here)

CONFIDENTIALITY

All data will be handled, processed, stored and destroyed in line with the Caldicott principles, British Psychological Society guidelines for ethical research and the Data Protection Act, 1998.

- Data will be compiled from the questionnaires and personal memory test that you have completed and held in a secure place.
- All information which is collected about you during the course of the research will be kept in strict confidence, and any information about you which leaves the hospital will be identified by a numerical code so that you cannot be recognized from the source.
- Access to the data will be limited to the immediate supervisory team, consisting of Dr Dritschel, Prof. Power and S. Cameron, and will be stored in a secure locked filing cabinet.
- The anonymous data will be held for a period of 5 years and will only be used for the purpose of this study.
- You have a right to check the accuracy of data held about you and to correct any errors prior to the data being stripped of identifiers.

WHAT HAPPENS TO THE RESULTS?

- A summarized copy of the results will be available to you and the liaison psychiatric service. You can contact the research team within 12 months to access this.
- No identifiable information will be disclosed in any reports relating to this research.
Any specific references to individuals or places during the personal memory test will be removed. This is to ensure that all data remains anonymous.

The results of this study will be published in a thesis and made available to members of the general public through the University of St Andrews library and information service.

WHO IS ORGANISING OR FUNDING THE RESEARCH?

This study is organized by the University of St Andrews.

WHO HAS REVIEWED THE STUDY?

All research in the NHS is looked at by independent group of people, called a Research Ethics Committee to protect your safety, rights, wellbeing and dignity. This study has been reviewed and given favourable opinion by the Ninewells Research Ethics Committee Date and signatory (Once approval was obtained.).

CONTACT DETAILS

If you are unsure about any aspects of this study and you would like further information, you can either contact a member of the Liaison Psychiatric Service, the principle researcher or one of the study supervisors (see attached list):

<table>
<thead>
<tr>
<th>Principal Researcher</th>
<th>Principal Supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shri Cameron</td>
<td>Dr Barbra Dritschel</td>
</tr>
<tr>
<td>School of Psychology</td>
<td>School of Psychology</td>
</tr>
<tr>
<td>University of St Andrews</td>
<td>University of St Andrews</td>
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<tr>
<td>St Mary’s College</td>
<td>St Mary’s College</td>
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<tr>
<td>South Street</td>
<td>South Street</td>
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<tr>
<td>St Andrews</td>
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<td>Fife</td>
<td>Fife</td>
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<tr>
<td>KY16 9JP</td>
<td>KY16 9JP</td>
</tr>
<tr>
<td>Email: <a href="mailto:sc443@st-andrews.ac.uk">sc443@st-andrews.ac.uk</a></td>
<td>E-mail: <a href="mailto:bd9@st-andrews.ac.uk">bd9@st-andrews.ac.uk</a></td>
</tr>
<tr>
<td></td>
<td>Tel: 01334 463047</td>
</tr>
</tbody>
</table>

Clinical Supervisor

Prof. Kevin Power
Clinical Supervisor
NHS Tayside Psychological Therapies
7 Dudhope Terrace
Dundee

THANK YOU FOR TAKING THE TIME TO READ THIS INFORMATION
PARTICIPANT INFORMATION SHEET

Project Title
The Affect of Personality and Mood on Personal Memories: Implications for suicidal ideation

What is the study about?
You have been invited to take part in a research study that explores the affect of personality and mood on personal memories in individuals who have previously experienced suicidal thoughts. Please note that we will not be asking about these suicidal thoughts and we ask that you do not report anything which may be distressing to you.

Previous studies suggest that some populations may store or recall personal memories differently from others. The purpose of this study is to find out if personality and mood influences the way we remember our personal memories. By doing this study we hope to highlight key differences in personal memories in individuals who have previously thought about suicide. As this area has been under explored, by taking part you will help other researchers understand about different factors that may influence personal memories and suicidality. This information, in turn, could be used to help in therapeutic environments. This study is also being conducted as part of my, Shri Cameron, PhD Thesis in the School of Psychology.

Before you reach your decision about participating, it is important for you to understand what the study entails. As you read this information sheet, please think carefully about whether you might feel distressed or uncomfortable about taking part and make sure that you understand what is being asked of you. Please feel free to ask or discuss any points mentioned. This information sheet and consent form is to be taken away with you so that you can take your time about your decision. Please sign the consent form only if you have decided to participate in this research study. You do not have to give a reason if you decide not to take part. If you do decide to take part you will be free to withdraw at any time without providing a reason.

What would I be required to do?
You will be asked to take part in one session, which may take up to 50 minutes. In this session, you will be asked to complete some questionnaires and take part in a personal memory test.

1. The questionnaires include; 1 mood questionnaire, which asks you about how you feel at the moment and 4 personality questionnaires, which ask you about how you feel most of the time. The personality questionnaires will ask you about how you tend to think over things, what kinds of coping skills you use in different situations, how emotionally sensitive you are, if you act on ‘the spur of the moment’ and about how
you typically react when you get angry. All the questionnaires will be in a ‘tick box’ format. Please remember that there is no right or wrong answer and equally, there is no right or wrong personality type. The questionnaires should take about 15 minutes to complete and you will be given generalized feedback about each of these questionnaires, if you would like.

2. For the personal memory test, I will ask you to describe a personal memory that you associate with different happy, sad, angry and neutral cue words. A total of 12 cue words will be read out. Although the personal memory test will be audio recorded, you can ask for the recording to be stopped at any point. This personal memory test usually takes around 15 minutes to complete.

3. In addition to the questionnaires and personal memory test, I will ask you for some demographic information, which will solely be used to make sure that people are equally matched for things like age, education etc.

By using these different measures, the study attempts to explore differences between personal memories and how these might relate to personality and mood. At the end, I will ask you about how you felt about taking part in this study and give you a debriefing sheet. This gives you a chance to hear a more detailed explanation about the study’s aims. The debriefing sheet also provides contact details of where you can get extra support, should you feel distressed. I will also give you a chance to ask questions and if everything is to your satisfaction, the data generated by you will be used for analysis. You can access the final research report by emailing me 6 months after you have taken part in this study.

**Will my participation be Anonymous and Confidential?**

Your data will be kept confidential at all times. The only exception to this rule would be if the researcher felt it necessarily to act under the Duty of Care Act, although you would be informed of this first. To ensure confidentiality, your data will be identified only by the numerical code written on a blank envelope, which is given to you at the start of the study. You are asked to place all the completed questionnaires in this envelope and seal it before you leave.

**Storage and Destruction of Data Collected**

- In accordance with the Data Protection Act and BPS Ethical guidelines, any identifiable information, like names and places, will be removed as soon as possible with the audio record destroyed. This is so that you cannot be recognized from the source.
- Data, compiled from the questionnaires and personal memory test that you have completed, will be held in securely in a locked office in a locked filing cabinet.
- Access to the data will be limited to the immediate supervisory team, consisting of Drs Dritschel and Campbell.
- The anonymous data will be held for a period of 5 years and will only be used for the purpose of this study.
- You have a right to check the accuracy of data held about you and to correct any errors prior to the data being stripped of identifiers.

**What will happen to the results of the research study?**

The results will be finalized by 2011 and written up as part of my PhD Thesis. Findings may also may be presented at suitable conferences and published within in peer review journals.
Possible disadvantages & risks

Please be aware that some elements of this experiment may inadvertently cause you to feel distressed or upset. Given the nature of recalling personal memories, you are asked to make sure that you feel comfortable with disclosing the memories that you choose to discuss. You will be given an opportunity at the end of the personal memory test to have an informal chat about how you felt. Please make sure that you do not walk away feeling upset and use the contact details provided in the debriefing sheet for further information or discussion. Alternatively, you can also contact the student support services, in confidence, for further support. You can also contact one of the study supervisors, in confidence, if you have any questions about any aspect of this study.

Reward

There are no immediate rewards for taking part. However, your participation will help us to understand how personality and mood variables affect personal memories in a specific population.

Consent and Approval

This research proposal has been scrutinized and been granted Ethical Approval through the University ethical approval process. If you have any concerns about this study, there is a full outline of the procedures that you can follow, governed by the University Teaching and Research Ethical Committee at ://www.st-andrews.ac.uk/utrec/complaints/

Contact Details

If you are unsure about any aspects of this study or would like further information please contact the study supervisors or myself.

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Principle Supervisor</th>
<th>Secondary Supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shri Cameron, School of Psychology, St Mary’s College</td>
<td>Dr Barbra Dritschel, School of Psychology, St Mary’s College</td>
<td>Dr Martin Campbell, School of Psychology, St Mary’s College</td>
</tr>
<tr>
<td>Email: <a href="mailto:sc443@st-andrews.ac.uk">sc443@st-andrews.ac.uk</a></td>
<td>Email: <a href="mailto:bd9@st-andrews.ac.uk">bd9@st-andrews.ac.uk</a></td>
<td>Email: <a href="mailto:mc1@st-andrews.ac.uk">mc1@st-andrews.ac.uk</a></td>
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THANK YOU SO VERY MUCH FOR YOUR HELP AND YOUR TIME
Recall instructions

Cued recall instructions ‘Can you recall a specific memory involving the cue word……..(provide cue word)? ’

Cue Word List in order of presentation

Happy
Grief
Destroy
Doctor
Furious
Love
Sadness
World
Unhappy
Rage
Bouquet
Happiness

Cue words were matched for concreteness, imaginability, goodness, high emotionality & average probability of recall (c.f. Rubin & Friendly, 1986: Paivio, 1968) and pre-rated by a population separate from the main study (n=21) for typical words most associated with happy, sad, angry and neutral affective states
Copy of Measures:

Standardized instruction for reading out with psychometric questionnaires:

Each of the following questionnaires assesses different aspects of your personality. There are no right or wrong answers and please try and answer as honestly as possible. Please answer each question by ticking the appropriate box. For some questions, you may find that the answers provided are not the ones that you would like. However, please answer them based on how you would generally react/ behave, or choose the statement that applies to you best. At the end, I will go through each of these questionnaires and explain what questionnaire measures and how this relates to the study’s aims. I will also give you another chance to ask any questions you may have.

Do you have any questions now? Are you clear about what you have to do?

Work quickly and do not spend too long thinking about the exact meaning of the questions. Remember, there are no trick questions.

Demographic information:

Please circle an age group:

18-25  26-33  34-41  42-49  50-57  57+

Gender:  M/ F

Please state your usual country of residence:

Please state your ethnicity:

Occupation:
**Eysenck Personality Inventory Instructions**

(Neuroticism scale only)

Please answer each question by selecting either the ‘Yes’ or the ‘No’ answers following the question **based on your typical reactions**. There are no right or wrong answers, and no trick questions. Please answer openly and honestly as possible based on your initial impressions. Work quickly and do not think too long about the exact meaning of the questions.

<table>
<thead>
<tr>
<th>Questions/ Ratings</th>
<th>Y</th>
<th>N</th>
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<tbody>
<tr>
<td>1. Does your mood often go up and down?</td>
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<td>2. Are you a talkative person?</td>
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<td>3. Do you ever feel ‘just miserable’ for no reason?</td>
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<td>4. Can you usually let yourself go and enjoy yourself at a lively party?</td>
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<td>5. Are you an irritable person?</td>
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<td>6. Are your feelings easily hurt?</td>
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<td>7. Do you often feel ‘fed-up’?</td>
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<td>8. Are you often troubled about feelings of guilt?</td>
<td></td>
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<tr>
<td>9. Do you worry about awful things that might happen?</td>
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<tr>
<td>10. Would you call yourself happy-go-lucky?</td>
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<tr>
<td>11. Would you call yourself tense or ‘highly-strung’?</td>
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<tr>
<td>12. Do you worry about your health?</td>
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<td>13. Do you worry too long after an embarrassing experience?</td>
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<td>14. Do you often feel lonely?</td>
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<tr>
<td>15. Are you easily hurt when people find fault with you or the work that you do?</td>
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<tr>
<td>16. Are you sometimes bubbling over with energy and sometimes very sluggish?</td>
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PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED ALL THE QUESTIONS.
Adapted Profile of Mood States

Please describe **HOW YOU FEEL RIGHT NOW** by checking one space after each of the words listed below:

<table>
<thead>
<tr>
<th>Feelings</th>
<th>Not at all</th>
<th>A little</th>
<th>Moderate</th>
<th>Quite a Bit</th>
<th>A Lot</th>
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<tbody>
<tr>
<td>Tense</td>
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<td>Angry</td>
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<tr>
<td>Worn Out</td>
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<td>Unhappy</td>
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<td>Confused</td>
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<tr>
<td>Sorry for things done</td>
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<tr>
<td>Shaky</td>
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<td>Listless</td>
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<td>Peeved</td>
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<tr>
<td>Sad</td>
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<td>On edge</td>
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<td>Grouchy</td>
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<td>Blue</td>
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<td>Panicky</td>
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<td>Hopeless</td>
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<td>Unworthy</td>
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<td>Spiteful</td>
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<td>Uneasy</td>
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<td>Restless</td>
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<td>Unable to concentrate</td>
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<td>Fatigued</td>
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<tr>
<td>Annoyed</td>
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<td>Discouraged</td>
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<td>Resentful</td>
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<td>Miserable</td>
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<td>Muddled</td>
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<td>Bitter</td>
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<td>Exhausted</td>
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<td>Anxious</td>
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<td>Ready to fight</td>
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<td>Gloomy</td>
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<td>Desperate</td>
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<td>Sluggish</td>
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<td>Rebellious</td>
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<tr>
<td>Feelings</td>
<td>Not at all 0</td>
<td>A little 1</td>
<td>Moderate 2</td>
<td>Quite a Bit 3</td>
<td>A Lot 4</td>
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<td>Helpless</td>
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<td>Weary</td>
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<td>Bewildered</td>
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<td>Deceived</td>
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<td>Furious</td>
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<td>Bad-tempered</td>
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<td>Worthless</td>
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<td>Forgetful</td>
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<td>Terrified</td>
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<tr>
<td>Guilty</td>
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<tr>
<td>Uncertain about things</td>
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</table>
Revised Coping Skills (Folkman, 1986)

Please read each item below and select a response that describes how often you would typically use each of the following skills. Please remember there are no right or wrong answers, and no trick questions. Answer openly and honestly as possible based on your initial impressions.

<table>
<thead>
<tr>
<th>Ratings</th>
<th>Not used</th>
<th>Used</th>
<th>Used somewhat</th>
<th>Quite a Bit</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Just concentrated on what I had to do next – the next step.</td>
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<td>2. I tried to analyze the problem in order to understand it better.</td>
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<td>3. Turned to work or substitute activity to take my mind off things.</td>
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<td>4. I felt that time would make a difference – the only thing to do was to wait.</td>
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<td>5. Bargained or compromised to get something positive from the situation.</td>
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<td>6. I did something which I didn’t think would work, but at least I was doing something.</td>
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<td>7. Tried to get the person responsible to change his or her mind.</td>
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<td>8. Talked to someone to find out more about the situation.</td>
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<td>9. Criticized or lectured myself.</td>
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<td>10. Tried not to burn my bridges, but leave things open somewhat.</td>
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<td>11. Hoped a miracle would happen.</td>
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<td>12. Went along with fate; sometimes I just have bad luck.</td>
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<td>13. Went on as if nothing had happened.</td>
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<tr>
<td>14. I tried to keep my feelings to myself.</td>
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<tr>
<td>15. Looked for the silver lining, so to speak; tried to look on the bright side of things.</td>
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<td>16. Slept more than usual.</td>
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<td>17. I expressed anger to the person(s) who caused the problem.</td>
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<td>18. Accepted sympathy and understanding from someone.</td>
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<tr>
<td>19. I told myself things that helped me to feel better.</td>
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<td>20. I was inspired to do something creative.</td>
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<td>21. Tried to forget the whole thing.</td>
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<td>22. I got professional help.</td>
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<tr>
<td>23. Changed or grew as a person in a good way.</td>
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<td>24. Waited to see what would happen before doing anything.</td>
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<td>25. I apologized or did something to make up.</td>
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<td>26. I made a plan of action and followed it.</td>
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<td>27. I accepted the next best thing to what I wanted.</td>
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<td>28. I let my feelings out somehow.</td>
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<td>29. Realized I brought the problem on myself.</td>
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<td>30. I came out of the experience better than when I went in.</td>
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<tr>
<td>31. Talked to someone who could do something concrete about</td>
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</table>
the problem.
32. Got away from it for a while; tried to rest or take a vacation.
33. Tried to make myself feel better by eating, drinking, smoking, using drugs or medication, etc.

<table>
<thead>
<tr>
<th>Ratings</th>
<th>Not used</th>
<th>Used some what</th>
<th>Quite a Bit</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
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</tbody>
</table>

34. Took a big chance or did something very risky.
35. I tried not to act too hastily or follow my first hunch.
36. Found new faith.
37. Maintained my pride and kept a stiff upper lip.
38. Rediscovered what is important in life.
39. Changed something so things would turn out all right.
40. Avoided being with people in general.
41. Didn’t let it get to me; refused to think too much about it.
42. I asked a relative or friend I respected for advice.
43. Kept others from knowing how bad things were.
44. Made light of the situation; refused to get too serious about it.
45. Talked to someone about how I was feeling.
46. Stood my ground and fought for what I wanted.
47. Took it out on other people.
48. Drew on my past experiences; I was in a similar situation before.
49. I knew what had to be done, so I doubled my efforts to make things work.
50. Refused to believe that it had happened.
51. I made a promise to myself that things would be different next time.
52. Came up with a couple of different solutions to the problem.
53. Accepted it, since nothing could be done.
54. I tried to keep my feelings from interfering with other things too much.
55. Wished that I could change what had happened or how I felt.
56. I changed something about myself.
57. I daydreamed or imagined a better time or place than the one I was in.
58. Wished that the situation would go away or somehow be over with.
59. Had fantasies or wishes about how things might turn out.
60. I prayed.
61. I prepared myself for the worst.
62. I went over in my mind what I would say or do.
63. I thought about how a person I admire would handle this situation and used that as a model.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>64. I tried to see things from the other person’s point of view.</td>
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<tr>
<td>65. I reminded myself how much worse things could be.</td>
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<tr>
<td>66. I jogged or exercised.</td>
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</table>
The Rumination Response Style Questionnaire

Instructions:

People think and do many things when they feel sad, blue or depressed. You are going to read a list of possibilities. This questionnaire asks you to indicate what you generally do, not what you think you should do.

Read each of the following statements as if it referred to you. Then, please select your response to each statement which accurately describes how often you engage in this style of thinking.

<table>
<thead>
<tr>
<th>Ratings</th>
<th>Don’t do this</th>
<th>Do this a little</th>
<th>Do this a medium amount</th>
<th>Do this a lot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>1. I think about how alone I am.</td>
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<tr>
<td>2. I tell myself “I won’t be able to do my job if I don’t snap out of this.”</td>
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<tr>
<td>3. I think about how fatigued and achy I feel.</td>
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<td>4. I think about how hard it is to concentrate.</td>
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<tr>
<td>5. I ask myself “What am I doing to deserve this?”</td>
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<tr>
<td>6. I think about how passive and unmotivated I am.</td>
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<tr>
<td>7. I analyze recent events to try to understand why I am depressed.</td>
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<tr>
<td>8. I think about how I don’t seem to feel anything anymore.</td>
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<td>9. I ask myself “Why can’t I get going?”</td>
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<td>10. I ask myself “Why do I always react this way?”</td>
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<td>11. I go away by myself and think about why I feel this way.</td>
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<tr>
<td>12. I write down what I am thinking and analyze it.</td>
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<tr>
<td>13. I think about a recent situation, wishing it had gone better.</td>
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<tr>
<td>14. I tell myself “I won’t be able to concentrate if I keep feeling this way.”</td>
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<tr>
<td>15. I ask myself “Why do I have problems other people don’t have?”</td>
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<td>16. I ask myself “Why can’t I handle things better?”</td>
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<td>17. I think about how sad I am.</td>
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<tr>
<td>18. I think about all my shortcomings, failings, faults, and mistakes.</td>
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<td>19. I think about how I don’t feel up to doing anything.</td>
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<tr>
<td>20. I analyze my personality to try to understand why I am depressed.</td>
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<tr>
<td>21. I go someplace alone to think about my feelings.</td>
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<tr>
<td>22. I think about how angry I am with myself.</td>
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</table>
Bartlett’s impulsivity Scale

Instructions: Please answer each question by selecting one of the answers below **based on how you would typically act**. There are no right or wrong answers, and no trick questions. Please answer openly and honestly as possible based on your initial impressions.

<table>
<thead>
<tr>
<th>Ratings</th>
<th>Rarely/Never 1</th>
<th>Occasionally 2</th>
<th>Often 3</th>
<th>Almost always/always 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>I squirm at plays or lectures</td>
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<tr>
<td>I am restless at the theatre or lectures</td>
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<tr>
<td>I don’t pay attention</td>
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<tr>
<td>I concentrate easily</td>
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<tr>
<td>I am a steady thinker</td>
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<tr>
<td>I act on impulse</td>
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<tr>
<td>I act on the spur of the moment</td>
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<tr>
<td>I buy things on impulse</td>
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<tr>
<td>I make up my mind quickly</td>
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<tr>
<td>I do things without thinking</td>
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<tr>
<td>I spend or charge more than I earn</td>
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<tr>
<td>I am happy go lucky</td>
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<tr>
<td>I am a careful thinker</td>
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<td>I plan tasks carefully</td>
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<tr>
<td>I am self controlled</td>
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<tr>
<td>I plan trips ahead of time</td>
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<tr>
<td>I plan for job security</td>
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<tr>
<td>I say things without thinking</td>
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<tr>
<td>I like to think about complex problems</td>
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<tr>
<td>I like puzzles</td>
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<td>I save regularly</td>
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<td>I am more interested in the present than the future</td>
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<td>I get easily bored when solving thought problems</td>
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<td>I change residences</td>
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<tr>
<td>I change jobs</td>
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<tr>
<td>I am future oriented</td>
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<td>I can only think about one problem at a time</td>
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<td>I often have extraneous thoughts when thinking</td>
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<td>I have racing thoughts</td>
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<tr>
<td>I change hobbies</td>
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</table>
**Aggression Questionnaire (Buss & Perry, 1992)**

**Instructions:** Using the 5 point scale shown below, indicate how uncharacteristic or characteristic each of the following statements is in describing you. Place your rating in the box to the right of the statement.

<table>
<thead>
<tr>
<th>Ratings / questions</th>
<th>extremely uncharacteristic of me</th>
<th>somewhat uncharacteristic of me</th>
<th>neither uncharacteristic nor characteristic of me</th>
<th>somewhat characteristic of me</th>
<th>extremely characteristic of me</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Some of my friends think I am a hothead</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. If I have to resort to violence to protect my rights, I will.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. When people are especially nice to me, I wonder what they want.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. I tell my friends openly when I disagree with them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. I have become so mad that I have broken things.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I can’t help getting into arguments when people disagree with me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. I wonder why sometimes I feel so bitter about things.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
8. Once in a while, I can’t control the urge to strike another person.
9. I am an even-tempered person.
10. I am suspicious of overly friendly strangers.
11. I have threatened people I know.
12. I flare up quickly but get over it quickly.
13. Given enough provocation, I may hit another person.
14. When people annoy me, I may tell them what I think of them.
15. I am sometimes eaten up with jealousy.
16. I can think of no good reason for ever hitting a person.
17. At times I feel I have gotten a raw deal out of life.
18. I have trouble controlling my temper.
19. When
frustrated, I let my irritation show.

<table>
<thead>
<tr>
<th>20. I sometimes feel that people are laughing at me behind my back.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratings / questions</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>21. I often find myself disagreeing with people.</td>
</tr>
<tr>
<td>22. If somebody hits me, I hit back.</td>
</tr>
<tr>
<td>23. I sometimes feel like a powder keg ready to explode.</td>
</tr>
<tr>
<td>24. Other people always seem to get the breaks.</td>
</tr>
<tr>
<td>25. There are people who pushed me so far that we came to blows.</td>
</tr>
<tr>
<td>26. I know that “friends” talk about me behind my back.</td>
</tr>
<tr>
<td>27. My friends say that I’m somewhat argumentative.</td>
</tr>
</tbody>
</table>
28. Sometimes I fly off the handle for no good reason.

29. I get into fights a little more than the average person.