Is The Black Dog Really A Dalmatian?

An Investigation Into Whether Stress Impact and Attributional Style Lead to Different Outcomes for Individuals Receiving 20 Sessions of Cognitive Behavioural Therapy for Depression

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Kimberly Suzanne Good

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Abstract

There is a need for greater clarity in the relationship between psychosocial stress and depression and its application to outcomes in cognitive behavioural therapy (CBT). A preponderance of research focuses primarily on the causal relationship between stress and depression and is limited by the traditional assumption of homogeneity amongst first-episode sufferers of mild to moderate depression. In actual fact, the perceived intensity and type of stress as well as an individual's attributional style may create significant differences in how they respond to therapy and overcome depression.

This research had four aims: to develop an understanding about why individuals differ in their CBT recovery trajectories; to examine how the stress-diathesis framework relates to treatment outcomes; to develop a way of effectively assessing and measuring the quantitative impact of stress; and to develop an effective approach towards assessing contextual aspects of stress. The research inquiry was guided by stress-diathesis theory and a reformulated stress-diathesis framework was proposed that specified a quantitative − qualitative stress distinction. This accorded with the study's development of two stress measures. A measure for objectively quantifying stress was introduced, along with a therapist questionnaire that identifies precipitating stressors in depression and the qualitative aspects of the stress experience.

A final sample of 26 clients experiencing their first episode of Major Depressive Disorder (MDD) was achieved. Clients were recruited for 20 sessions of CBT with 2- and 6-month follow-ups. Depression severity was measured each session with the *Beck Depression Inventory* (*BDI-II*) and attributional style was measured at six time points with the *Attributional Style Questionnaire* (*ASQ*). Stress impact was measured using the *Impact of Event Scale − Video Format* (*IES-VF*) and the *Identification of Precipitating Stressors Questionnaire* (*IPSQ*) was developed to assess precipitating stressors of depression. Multilevel analysis suggested that attributional style moderates the relationship between change in stress and change in depression. Clients with predominantly depressogenic attributional styles showed a delay in depression improvement compared to clients with non-depressogenic styles, even when significant stress reductions were achieved. Gender, therapy completion and marital status were also significant predictors of recovery. Preliminary support was achieved for the classification of clients into three recovery subgroups, according to whether they

achieved rapid, expected or minimal stress improvements. Post-hoc analyses also indicated that chronicity and impact on autonomy appear to be the most influential stressor characteristics. Implications for future research and clinical considerations are discussed.

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Chapter 1: Introduction

Overview

Clinical depression is widespread, debilitating and costly. If left untreated, depression can result in serious functional disability or even death and it is recognised that the relapsing tendency of depression accounts for one of the highest levels of disease burden of any disorder (Ellis, 2004). Indeed, the World Health Organization (WHO) predicts that depression will be the second leading cause of death and disability by 2020, after heart disease (WHO, 2008). In addition to the mortality ratios, the direct and indirect health care costs of depression have also been well established in the literature to-date (Scott & Dickey, 2003; Berndt, Koran, Finkelstein, Gelenberg, Kornstein & Miller, 2000).

In terms of the treatment for mild to moderate depression, cognitive behavioural therapy (CBT) has been well recognised as a preferred treatment of choice (Hollon & Beck, 2004). The efficacy of CBT has been supported by many randomised controlled studies investigating treatment outcomes over the past few decades (see DeRubeis & Crits-Christoph, 1998; Kazdin & Weisz, 1998; Butler, Chapman, Forman & Beck, 2006; see *Chapter 2*). However, in spite of its effectiveness and its proposed prophylactic effect, CBT remains susceptible to problems such as attrition and relapse. While some clients struggle to remain engaged in the therapeutic process in the first place and terminate early as a result, other clients complete therapy and then experience a relapse. Indeed, given that the risk of relapse even one year after recovery is as high as 60-70%, it is clear that the improvement of treatment approaches is of paramount concern (Scott, 2006).

Developments in better understanding this relapsing tendency and the gap in treatment efficacy have previously been restricted by a range of factors. In particular, there has been somewhat of a longstanding tradition to view individuals suffering from depression as a largely homogeneous client group (Person, Burns & Perloff, 1988; Beck, Hollon, Young, Debrosian & Budenz, 1985). This perspective is reflected in the preponderance of studies imposing strict inclusion and exclusion criteria in order to increase similarity across clients in the study sample. In addition, there has traditionally been a strong inclination towards using pre-to-post difference scores as a methodological approach when investigating treatment outcomes in depression. This

results in a stark neglect of valuable process-rich information that might offer an important perspective on individual differences during the treatment process and how these may affect outcomes (Edwards, 1994). Moreover, the frequent tendency for researchers to use population averages in their assessment of improvement curves or recovery trajectories similarly neglects the richness of data that could potentially be contracted from longitudinal investigations of CBT for depression (Raudenbush & Bryk, 2002).

It is highly possible that client heterogeneity is in fact an influential but too frequently overlooked factor, with implications for treatment outcomes and individual differences in recovery. An exploration of this heterogeneity therefore forms the basis for the present study. Within the context of CBT for depression, it is well accepted that depression results when significant stressors interact with a vulnerability or predisposition towards depression. Using the stress-diathesis theory as a basis for investigation it can therefore be assumed that clients might differ significantly according to the types or levels of stress they experience and the particular types of vulnerability they exhibit. Stress and attributional style therefore form the backbone of the present study. A more extensive understanding of how stress and attributional style change throughout therapy and interact with recovery processes will hopefully equate to opportunities for improving treatment. A greater level of insight into client differences would better equip clinicians for the tailoring of treatments and a more informed assessment of treatment efficacy for different subsets of clients. Most importantly, any investigation into client differences in this field needs to make use of a sophisticated methodology. In particular, the use of multilevel analysis provides an excellent mechanism for accessing change across a number of levels, and monitoring longitudinal change throughout a therapy process. This would provide a much-needed supplement to previous attempts at measuring treatment outcome across a limited number of variables using averaged pre-to-post measures.

A central thesis proposed herein is that it is only when a better understanding of client heterogeneity is achieved that treatment interventions can be improved. While previous studies have investigated the respective relationships between stress, attributional style, and depression, the current study presents a unique research approach in this area. In addition to the use of a multilevel analytical approach, novel measurements of attributional style and stress are also employed. Importantly, stress is

measured across a number of levels and using a range of constructs in order to allow for a comprehensive and sophisticated assessment of interaction.

Organisation

Chapter 2 provides an introduction to depression and cognitive behavioural therapy (CBT). In particular, the epidemiology of depression and Beck's cognitive model of depression will be reviewed. The origins, guiding principles and efficacy of CBT will also be discussed. *Chapter 3* provides an introduction to the field of psychosocial stress. In the context of the relationship between stress and depression, different models of interaction will be reviewed and findings from recent studies in this area will be discussed. This chapter also addresses the prominent methodological considerations that are applicable to the field of stress research. In particular, these include the issues of how best to define stress and how best to measure it within research studies specifically investigating depression. In *Chapter 4* the focus is on attributional style and the relationship between cognitive styles and depression is evaluated. A brief history of the development of attribution theory is presented and key findings and research gaps within the field are discussed. *Chapter 5* comprises a re-consideration of the stress-diathesis framework and a revised version is proposed. The stress-diathesis theory is extended to include a more specific definition of stress and a number of important drivers that are assessed within the present study. Primary research aims and hypotheses are also explicated.

The methodology employed within the present study involves a number of stages. In terms of measuring stress, several different measures are developed so that stress can more accurately be assessed in a format appropriate for longitudinal research. In addition, the use of multilevel analysis provides a mechanism for the assessment of change at different levels and the exploration of between-client differences across time. A description of the study's methodology and its rationale is presented in *Chapter 6* and a comprehensive introduction to the analysis follows in *Chapter 7*. *Chapter 8* presents the results of the investigation. This begins with a review of exploratory studies and preliminary investigations, followed by a comprehensive comparison of each of the multilevel models. In addition, a number of post-hoc analyses are performed in order to provide a perspective on the importance of various stress, client and demographic variables. The penultimate chapter, *Chapter 9*, offers a

discussion of the study's main findings. Support for the study hypotheses is reviewed and the study's contribution to the literature across a number of areas is evaluated. Finally, considerations for future research and implications for clinicians are discussed. *Chapter 10* concludes the research and closes with a reconsideration of the study's primary aims and the extent to which the initial objectives were achieved.

Chapter 2: Depression and Cognitive Behavioural Therapy

Aims and Scope

This chapter provides an introduction to depression and the research and theory that underpins the ensuing thesis. The first half of this chapter provides a succinct overview of the epidemiology of depression and a justification for continuing research efforts in this domain. The second half of this section focuses on cognitive behavioural therapy (CBT). Its origins as a foundational psychotherapy, its relationship with the cognitive model of depression and its established efficacy as a treatment intervention will be reviewed. As the current study involves a longitudinal, clinical study of depression, a solid understanding of the fundamental principles and premises of treatment in this area is required. Moreover, the chapter closes with a review of the gaps that remain in this area of research. Identification of areas requiring further investigation is essential and it is on this basis that the inherent thesis of the current study is developed.

Why Study Depression?

The study of depression is integral as for several decades countries all over the world have prioritised the development of mental health initiatives that target clinical depression (Cassano & Fava, 2002; Wang, Simon & Kessler, 2003; Pirkis et al., 2005). The World Bank recently classified unipolar depression as the top contributor to the global burden of disease among $19 - 45$ year olds in the developed world (Murray & Lopez, 1997). In many respects, clinical depression can be considered a global crisis (Murray & Lopez, 1996; Chisholm, Sanderson, Ayuso-Mateos & Saxena, 2004). The costs of depression are profoundly recognised at all levels of society. It is irrefutable that individuals, families, workplaces, communities and economies alike all suffer the consequences of the impairment and suffering that depression elicits (Ustün, 1999; Wang et al., 2003). Moreover, the inextricability of mental and physical health exacerbates the devastation that depression can cause (Patel, Saraceno & Kleinman, 2006; Cassano & Fava, 2002). However, in spite of its severity and the breadth of its implications, depression is still a treatable disorder and an extensive armamentarium of proven treatments has evolved over recent decades (Patel et al., 2006; Pincus, Hough, Houtsinger, Rollman & Frank, 2003).

A recent editorial by Jan Scott (2006) highlighted the incorrect tradition of referring to depression as "the common cold of psychiatry" (p 985). Although clinical depression is indeed a common illness that transcends cultural, gender, age and social barriers; depression is in no way an insignificant or mild disturbance. Current estimates purport that approximately 20% of adults experiencing depression never fully recover and given that the risk of relapse even one year after recovery is as high as 60-70%, improving treatment approaches is paramount (Scott, 2006). It has been suggested that the two primary barriers to effective intervention are under-recognition and under-treatment (Hays, Wells & Sherbourne, 1995). In light of a recent Cochrane review highlighting the inefficacy of several screening initiatives (Gilbody, House & Sheldon, 2005), it has been suggested that a paradigm shift towards viewing depression as a chronic condition might improve screening and subsequent interventions (Scott, 2006; Cassano & Fava, 2002). While the issue of under-treatment obviously includes difficulties with help-seeking behaviour (Barney, Griffiths, Jorm & Christensen, 2006), medication adherence and appropriate prescription (Scott, 2006), clear potential exists to develop more tailored and efficacious treatment approaches. Although increased availability of cognitive behavioural interventions has been advocated as one particular solution (see Layard, 2004), the attrition rates from such forms of psychotherapy cannot be overlooked. A primary driver of the current study is therefore the search for a better explanation of differences in treatment outcomes among clients experiencing clinical depression.

Epidemiology of Depression

It is well-recognised that depression exists along a continuum and all individuals feel slightly depressed at various points during their lifetime (Schwartz & Weinberger, 1980). However, when the severity of depression begins to outweigh an individual's capacity to function, clinical depression can result (Williams, 1992). The definitive symptoms of a Major Depressive Episode are clearly explicated in the Diagnostic and Statistical Manual of Mental Disorders (*DSM-IV-TR*; American Psychiatric Association, 2000) and a Major Depressive Disorder (MDD) significantly impacts on thoughts, emotions, behaviours and physical well-being. The three prominent features that distinguish clinical depression from commonplace sadness include the duration of symptoms (present for at least two weeks), the lack of symptom fluctuation (occurring

most days for most of the time), and the symptom intensity (significantly impacting on an individual's ability to function).

Major Depressive Disorder (MDD) causes clinically significant distress or impairment in important areas of functioning and this is frequently a key reason for individuals seeking treatment (APA, 2000; Dew, Bromet, Schulberg, Parkinson & Curtis, 1991). The 2006 New Zealand Mental Health Survey showed that in New Zealand MDD has a moderate overall level of interference with life and a level of interference much higher than that observed in anxiety disorders (using Sheehan Disability Scales; Oakley Browne, Wells & Scott, 2006). MDD has its highest level of impact on an individual's social life, followed closely by work, home and intimacy (Oakley Browne et al., 2006). The supplementary distress that depression causes in interpersonal relationships and its effect on social identity are often the most frequent reasons for seeking help (Joiner, 2000).

Depression across age groups

In New Zealand, the reported 12-month prevalence of MDD is approximately 5.7% (Oakley Browne et al., 2006) and an overview of prevalence statistics is presented in Figure 2.1. While there is no significant gender difference in bipolar disorder, a clear gender discrepancy exists in MDD (Piccinelli & Wilkinson, 2000). Indeed, the 7.1% prevalence rate for New Zealand females is significantly higher than the corresponding 4.2% rate for males (Oakley Browne et al., 2006; Rutter, 1991). In addition to gender, variation also exists in terms of the prevalence rates across different age groups. The highest risk for depression occurs in the 16 – 24 year old age bracket with a prevalence of 8.7%, and average prevalence rates decline in accordance with the aging process thereafter (Oakley Browne et al., 2006). However, while the elderly population is reported to have a much lower prevalence rate for depression (Ministry of Health, 2008; Oakley Browne et al., 2006), studies also point towards the potential for under-reporting or misdiagnosis within populations from this age group (Unutzer, Katon, Sullivan & Miranda, 1999).
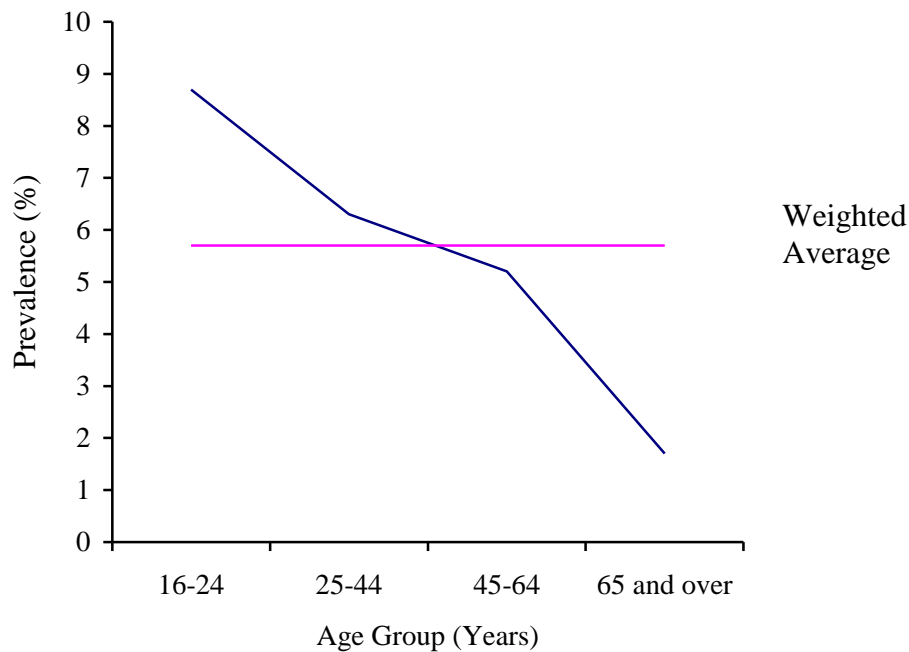
Figure 2.1. Twelve month prevalence rates for MDD in New Zealand.[1]

Depression across gender and ethnic groups

Within the New Zealand adult population, females show a higher prevalence of mood disorders between the ages of 25 and 34 years, while males peak much later in life and show their highest prevalence rates between the ages of 55 and 64 years (Ministry of Health, 2008). After adjusting for age, both New Zealand European males and females are over-represented in terms of the total number of lifetime mood disorder diagnoses (Ministry of Health, 2008). In comparison, lifetime prevalence for Maori is comparable to the New Zealand national average, while the proportion of diagnoses in people of Pacific or Asian ethnicity is well below that expected given their share of the population (see Figure 2.2). Interestingly after adjusting for age, the ratio between female and male diagnoses for mood disorders is relatively equal in the European population but the gender gap within other ethnic groups is considerable (Ministry of Health, 2008). For Maori and Pacific populations, females show much higher lifetime prevalence rates, while Asian males are far more likely to be diagnosed with a mood disorder than their female counterparts. This may possibly reflect cultural differences in help-seeking behaviours (Cheung & Snowden, 1990). The finding that females are

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[1] Source: Key Results of the 2006/07 New Zealand Health Survey (Ministry of Health, 2008)

only 1.7% more likely to experience a mood disorder during their lifetime (after adjusting for age) supports a hypothesis that female mood disorders may be of a more chronic or recurrent nature, or that differential recall biases may exist (Kessler, 2003; Ernst & Angst, 1992).
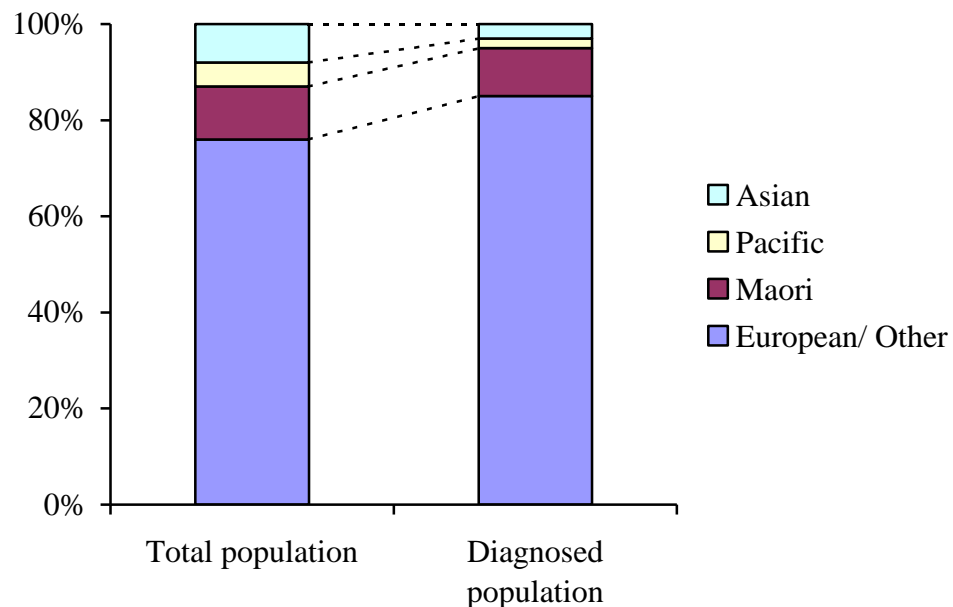
Figure 2.2. Overview of diagnosed mood disorders by ethnicity for New Zealand adults.[2,3]

How does New Zealand compare to the rest of the world?

Results from other World Mental Health Survey Initiative countries are most directly comparable to New Zealand's findings, as a result of similar interview and diagnostic criteria (Oakley Browne et al., 2006). New Zealand's 12-month prevalence rates for anxiety, mood and substance-use disorders are relatively high compared to the 15 sites reported in the 2004 World Mental Health Survey (Demyttenaere et al., 2004). Specifically for mood disorders, only three countries (United States, Ukraine and France) reported higher rates than New Zealand.

At a more specific level, prevalence statistics for individual mood disorders are available for the United States (Kessler, Chiu, Demler & Walters, 2005) and for the six European sites in the European Study of the Epidemiology of Mental Disorders

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[2] Source: Key Results of the 2006/07 New Zealand Health Survey (Ministry of Health, 2008)

[3] *Note*. Age-standardised rate ratio

(ESEMeD) combined (Alonso et al., 2004). Although on average New Zealand shows a higher prevalence for MDD, the comparison is difficult to interpret, given the variation that exists across each of the European sites and the large variability in response rates (Alonso et al., 2004).

The WHO recently published lifetime prevalence rates for MDD which also highlight the variation across different countries, with a range from 3% in Japan to 17% in the United States (Murphy, Laird, Monson, Sobol & Leighton, 2000; Vasiliadis, Lesage, Adair, Wang & Kessler, 2007). Similarly, although North American research supports a clear gender discrepancy in prevalence that accords with New Zealand research (Inaba et al., 2005), cross-cultural research and findings from less-developed nations tend to suggest a more equal gender ratio (see Culbertson, 1997).

In summary, it is clear that depression shows a widespread occurrence and transgresses many cultural, gender and age-related barriers. Nonetheless, epidemiological studies consistently highlight the tendency for some populations to be more susceptible towards developing MDD than others. This underlines a need for greater clarity in this area and a better understanding of why variations in prevalence and outcome exist. Although genetics and hormones have been implicated as moderating or causal factors (Rutter, 1991) other variables may also play determining roles in the aetiology of depression and the inception of a depressive episode (Garber, 1992). In particular, the way in which an individual sees their world and the types of beliefs and personality characteristics they possess appear influential, particularly when combined with different types of stressful life events that precipitate an effect on mood and functioning (Spangler, Simons, Monroe & Thase, 1997). Not only does research suggest that these factors might be influential in causing depression; but recent research has also attested to their influence in determining whether or not individuals seek help from mental health professionals (Mojtabai, Olfson & Mechanic, 2002; Garland & Zigler, 1994).

Why Study Cognitive Behavioural Therapy (CBT)?

In light of the integral role that attitudes, beliefs and personality styles play in determining a particular depressive presentation or recovery process, an intervention with the potential to affect change at that level is clearly needed. CBT is a widely recognised treatment of choice for many psychological disorders (Hollon & Beck,

2004). In the treatment of mild to moderate depression, CBT has fared exceptionally well and an established body of empirical support exists (see DeRubeis & Crits-Christoph, 1998; Kazdin & Weisz, 1998). National Institute for Health and Clinical Excellence (NICE) guidelines and other sources of authority also identify CBT as the recognised treatment of choice for mild to moderate depression (National Institute for Health and Clinical Excellence, 2004, 2009; Karasu, Gelenberg, Merriam & Wang, 2000). With respect to the present study's objective of determining individual differences in treatment outcomes, it is essential that an appropriate and valid treatment intervention is used. CBT was chosen as a result of its strong treatment efficacy and also because there are clear areas within the CBT literature that still warrant attention and further development. The present study therefore represents an excellent opportunity for such investigation.

Origins of CBT

The importance of cognition dates back many years, with origins in the philosophy of stoicism (Beck, Rush, Shaw & Emery, 1979) and evidence even within processes such as systematic desensitisation that are used in behaviour therapy (Wolpe, 1958; as cited in Schwartz, 1982). However, the formalisation of CBT as a particular therapeutic approach dates back to the 1960s and early 1970s (see Dobson & Dozois, 2001). CBT was developed as an alternative treatment in an era characterised by a predominance of psychoanalytic and behavioural approaches (Sexton, 1978). In fact, CBT emerged mostly out of attempts to empirically validate psychodynamic theories around dream content (see Alford & Beck, 1997). Originally trained in psychoanalysis, Aaron Beck began questioning the prevailing psychoanalytic formulations of the neuroses, and in particular the formulation related to depression (Dobson & Dozois, 2001). His research demonstrated that psychiatric patients with depression actually exhibit cognitive distortions and negatively biased thinking, rather than retroflected anger as had been purported under the psychoanalytic framework (Beck, 1967; Dobson & Dozois, 2001; Gotlib & Hammen, 1992). Consequently, Beck's empirical research led to his development of a cognitive theory of emotional disorders (Beck, 1976) and subsequently, a cognitive model specifically addressing depression (Beck et al., 1979).

Arguably the most predominant CBT model today is that developed by Beck in 1976 (Ekers, Richards & Gilbody, 2008). However, it is important to note the influence that

other theorists have had on the development of a cognitive protocol for treatment. George Kelly has been recognised as an influential therapist, particularly with his work on personal constructs and beliefs related to behaviour change (see Kelly, 1955; Merrick & Dattilio, 2006). Similarly, theorists such as Arnold (1960) and Lazarus (1966) also proposed that cognitive change was the primary mechanism involved in emotional and behavioural modification (as cited in Datillio & Padesky, 1990). Beck's development of CBT was also concurrent with the emergence of Ellis' (1962) Rational-Emotive Therapy (RET), which continues to provide support for many of the CBT principles as we understand them today (Datillio & Padesky, 1990). Ellis (1980) purported that it was the therapist's role to convince patients that their thoughts were irrational and that they were in need of more adaptive cognitive functioning. This can be differentiated from the Beckian approach, which postulates that individuals are personally capable of learning to evaluate and test their own cognitions, provided they collaborate with their therapists (Beck, Kovacs & Weissman, 1979). Ellis' (1962) RET also slightly predated Beck's CBT Model and often assumed a more directive, confrontational style of interaction. Finally, it is important to note that the CBT model that eventuated out of this era still recognised the importance of behaviour, emotion and physiology in the development, maintenance and presentation of psychological illness. In fact, the cognitive domain was possibly singled out in response to the lack of attention that preceding therapy models had assigned to cognition (Datillio & Padesky, 1990).

Societal influences on the development of CBT

A number of contemporaneous factors facilitated the development of CBT at the end of the 1960s and the early 1970s. Firstly, it was becoming increasingly clear that a rigid behavioural approach was not flexible enough to account for all aspects of human behaviour, particularly the more covert behaviours like thought (Breger & McGaugh, 1965). Furthermore, the alternative psychodynamic perspective was also facing intense criticism, as theorists began to question the role of unconscious processes, historical influences and the need for long-term therapy (Beck, 1967; Dobson & Dozois, 2001). An additional factor was the realisation that several psychological problems were not being adequately addressed. Consequently, a clear need emerged for a wider range of treatment options (see Dobson & Dozois, 2001). As supplementary treatment protocols were developing, a growing number of theorists

and therapists began identifying with a cognitive-behavioural orientation (e.g. Beck, 1967; Mahoney, 1974; Meichenbaum, 1977). Accordingly, this created somewhat of a Zeitgeist that increasingly drew other researchers to the field (Meichenbaum, 1992). The inauguration of the journal *Cognitive Therapy and Research* in 1977 further strengthened the development of this orientation (Dobson & Dozois, 2001). Finally, the increasing publication of RCT studies explicating empirical support for CBT also contributed to its development as a recognised treatment of choice. Beginning with the seminal publication by Rush, Beck, Kovacs and Hollon in 1977, CBT was increasingly shown to be at least as effective as strictly behavioural approaches and other treatment options (Hollon & Beck, 2004).

CBT initially gained recognition as a treatment specifically for depression (Beck, 2005). However, over time and in the wake of increasing empirical support, CBT acquired a reputation for having clinical application that extended beyond the treatment of depression and specific mood disorders (McGinn & Sanderson, 2001; Salkovskis, 1996). The development of CBT was clearly congruent with the context of the time, as the 1960s and 1970s produced a range of psychotherapies that advocated for a shift in responsibility from the therapist to the client (Kazantzis, MacEwan & Dattilio, 2005).

CBT and the Cognitive Model of Depression

In order to understand the applicability of CBT for depression one must first be familiar with Beck's (1967) cognitive model of depression. Beck's model is considered one of the very first postulations to implicate the role of cognition in the cause, presentation and maintenance of depression. It has remained one of the most dominant cognitive paradigms for understanding depression ever since (Beck et al., 1979; Salkovskis, 1996; Dobson & Dozois, 2001).

Emphasising the role of depressogenic information processing, Beck's model relies on three cognitive concepts (Segal, 1988; Beck, 1967, 1976). These three concepts are the focus of intervention when an individual receives CBT treatment for depression. Firstly, the *cognitive triad of depression* refers to the characteristic negative thinking patterns that depressed individuals show in terms of the way they view themselves, their future and the world around them. It is suggested that the cognitive triad of thinking leads depressed individuals to view themselves as unworthy, unlovable and

expecting failure, rejection and hopelessness in the future (Segal, 1988). Secondly, the model proposes that *cognitive distortions* manifest in the presentation of depression (Segal, 1988). These maladaptive cognitions are the result of depressed individuals misinterpreting or misperceiving reality in a way that confirms their negative expectations. Examples of distortions include selective abstraction, arbitrary inference and dichotomous thinking (Beck, 1976). Finally, both the cognitive triad and cognitive distortions are considered to be products of underlying *schemata* (Beck, 1967, 1976). Schemata are enduring internal templates of the self, the world and the future, derived from an individual's past experiences (Beck, Rush et al., 1979). Once a particular schema is activated, information processed by the individual is increasingly channelled to conform to their template and confirm their activated beliefs (Segal, 1988). Schema-consistent information therefore has a much greater salience and can aid in a selectively negative construal of reality. It is this style of thinking that contributes to both the inception and maintenance of a major depressive episode (Brewer & Nakamura, 1984).

Key principles of CBT

The three fundamental premises underlying the CBT model are that an individual's thinking affects their behaviour, an individual's thinking can be monitored and altered, and behavioural change can be achieved through cognitive change (Dobson & Dozois, 2001). CBT therapies include a hybrid of behavioural strategies and cognitive processes that are intended to achieve both behavioural and cognitive change (see Gaudiano, 2008; Dobson & Dozois, 2001). Given that CBT grew out of a traditionally behavioural approach, it is also important to understand the distinction between CBT and behavioural therapy. Essentially, it is CBT's emphasis on the mediating role of cognition (as outlined in the three premises above) that differentiates the two approaches. While cognitive change is the goal in CBT, the primary objective of behavioural therapy is to achieve behaviour modification.

Many authors have offered attempts to define the guiding principles of CBT. For the purposes of the present study, direction can be taken from Blackburn and Twaddle (1996) who postulate eight core CBT principles. Some of the principles are clearly shared with other treatment orientations, while some are unique to the CBT approach. An overview of these treatment principles is provided in Table 2.1. Firstly, treatment

must be directed by a clear, ever-evolving cognitive conceptualisation of the client and their problems (Beck, 1995; McGinn & Sanderson, 2001). Secondly, a phenomenological approach must be adopted so that a client's idiosyncratic experience remains central within therapy. Thirdly, therapeutic collaboration is at the core of CBT and captured in the principle of collaborative empiricism (Beck et al., 1979). Descending from Kelly's (1955) notion of therapists and clients working together as 'personal scientists', this principle emphasises the importance of clients being actively involved in testing their beliefs and developing more adaptive ways of functioning in their daily life (Blackburn & Twaddle, 1996). A fourth treatment principle is the use of guided discovery and Socratic questioning in order to allow clients to discover ideas for themselves (Beck et al., 1979; Beck, 1995). While this tends away from the provision of interpretations, it does not restrict the therapist from being explicit within the relationship. Indeed, explicitness is the fifth guiding principle that requires therapists to share their working hypotheses with clients. It is especially important that clinicians share their hypotheses about the cognitive conceptualisation (Blackburn & Twaddle, 1996). An additional principle is the importance of empiricism, as the creation and testing of hypotheses is a primary focus of CBT (Persons, 2005). Finally, the last two principles relate to the client's life outside of therapy. CBT places a strong emphasis on the generalisation of in-session gains, and the use of psycho-education allows clients to become their own therapists. It is thought this will increase their chance of preventing future relapse (Blackburn & Twaddle, 1996; McGinn & Sanderson, 2001).

Table 2.1

Guiding Principles of CBT

1. Importance of a cognitive conceptualisation
2. Phenomenological approach
3. Therapeutic collaboration
4. Guided discovery and Socratic questioning
5. Explicitness of the therapist
6. Empiricism and hypothesis-testing
7. Generalisation of in-session gains
8. Relapse prevention

Overall, CBT for depression is a time-limited, problem-focused therapy that emphasises the importance of understanding and treating an individual's *present*

difficulties. Clients are encouraged to treat their beliefs as hypotheses to be tested and together with their therapist they are trained to develop and implement behavioural experiments that test the accuracy of their cognitions. In the treatment of depression CBT typically transpires over approximately twenty sessions and there has been a recent shift towards delivering the first eight sessions bi-weekly, with weekly therapy thereafter (Tang & DeRubeis, 1999). Treatment also focuses primarily on the cognitive, behavioural and physiological domains (McGinn & Sanderson, 2001). Within the cognitive domain, the acquisition of cognitive restructuring techniques helps clients to modify their thinking and negative affective states. This is supplemented by more behavioural techniques that attempt to ameliorate the behavioural deficits that contribute to depression. These techniques include but are not limited to behavioural activation, exposure, activity scheduling and problem solving. Finally, more physiologically-oriented interventions such as imagery and relaxation are also used when treating depression. Most importantly, the reciprocity between these three domains predicated in CBT for depression means that interventions at any point have the capacity to affect change across a patient's broad experience or situation (McGinn & Sanderson, 2001).

Efficacy of CBT for Depression

The chronic, recurrent nature of depression necessitates an effective treatment approach that not only targets the acute episode, but also protects against future relapse (Hollon, Thase & Markowitz, 2002; Mueller et al., 1999). Support for CBT in the treatment of depression has grown extensively over the past two decades (Hollon & Beck, 2004). In particular, the advent of managed care and an emphasis on empirical comparative outcome studies has contributed to an accumulating body of research looking specifically at CBT and its relative therapeutic merits (Hollon & Shelton, 2001). Consequently, an increasing number of meta-analyses have been possible (Hollon & Beck, 2004).

Overall, CBT has fared better than both no-treatment and non-specific treatment conditions, and at least equal to specific psychotherapeutic or pharmacological alternatives (Butler, Chapman, Forman & Beck, 2006; Hollon & Beck, 2004; Gloaguen, Cottraux, Cucherat & Blackburn, 1998). While several earlier studies comparing CBT and antidepressant medication were criticised for methodological

biases (e.g. Rush et al., 1977; Blackburn, Bishop, Glen, Whalley & Christie, 1981), more recent controlled trials have found CBT to be at least equally effective for the initial treatment of moderate to severe depression (DeRubeis et al., 2005). The one exception to this is a recent mega-analysis (Thase et al., 1997) that concluded that psychotherapy alone is less effective than medication for severe depression. However, this particular mega-analysis has been broadly criticised as all included studies were conducted at one single site and used data from the NIMH Treatment of Depression Collaborative Research Program (TDCRP) study where the standard of CBT administration and treatment integrity has been questioned (Hollon & Shelton, 2001). Research in recent years has provided empirical support for the efficacy of CBT for adults (DeRubeis & Crits-Christoph, 1998; see Butler et al., 2006) as well for child and adolescent clinical populations (Reinecke, Ryan & DuBois, 1998; Kazdin & Weisz, 1998).

Issues of debate within the field of CBT

Although CBT has yielded strong empirical support, three particular areas of debate exist within the literature. Firstly, one of CBT's suggested merits is its potential for achieving long-term change after the termination of treatment. Theorists have argued that CBT's emphasis on belief change and the development of coping behaviours and problem solving skills has the ability to alter an individual's underlying risk for future relapse (Butler et al., 2006). This possibility is highly relevant given the chronic nature of depression and also the evidence suggesting that medication serves a more palliative role, with no indicated effect on underlying risk (Hollon & Shelton, 2001). In support, several studies have confirmed the long-term effectiveness of CBT for depression (Reinecke et al., 1998; Fava, Rafanelli, Grandi, Conti & Belluardo, 1998) and further support has been elicited in recent meta-reviews (Butler et al., 2006; Gloaguen et al., 1998). Research has found that those patients who fully recover in response to CBT are considerably less likely to relapse compared to those treated to remission via pharmacological interventions (Blackburn, Eunson & Bishop, 1986; Kovacs, Rush, Beck & Hollon, 1981; Evans et al., 1992). However as aforementioned, the TDCRP study represents the one exception to this finding (Elkin et al., 1989), although its treatment integrity has been criticised. Nevertheless, CBT advocates argue that the differences between CBT and medication purported in the NIMH study were neither consistent across therapy sites, nor consistent with other studies in the field

(see Klein, 1990; Jacobson & Hollon, 1996). Furthermore, a recent study by Hollon and colleagues provides additional support for CBT's long-term effectiveness. In their study those patients treated with CBT were found to be considerably less likely to relapse than those receiving anti-depressant medication (Hollon et al., 2005). Moreover, they were also less likely to relapse than those patients who actually remained on medication.

The second topic of debate has been the applicability of CBT to more severe depression. Research has suggested that psychotherapy alone may not be as effective as a combined CBT and pharmacological approach when treating more severe depressive presentations (Scott, 1995). Similarly, TDCRP outcomes showed a less favourable outcome for severely depressed outpatients receiving CBT (Elkin et al., 1995; Elkin et al., 1989). However, as aforementioned, the TDCRP finding was inconsistent across treatment sites and replication of its result has been problematic (DeRubeis, Gelfand, Tang & Simons, 1999). Although current American Psychiatric Association guidelines (based on TDCRP findings) assert that most patients will require medications, a recent study by DeRubeis and colleagues found equivalent support for the use of CBT and medication (DeRubeis et al., 2005). The authors established a site-by-treatment interaction and concluded that CBT can indeed be as effective as medication when treating more severely depressed patients, provided it is administered by experienced clinicians.

Contention concerning the treatment of severe depression has stimulated a third area of debate, as researchers have begun investigating the efficacy of combined psychotherapeutic and pharmacological interventions. While some researchers assert that combining CBT and medication produces only a modest improvement in efficacy (Hollon & Shelton, 2001), others advocate for the benefits of such an approach. The immediacy of antidepressant medication can be attractive in the treatment of severe depression (Markowitz, 2008); particularly in terms of helping individuals achieve the stability that is necessary before cognitive interventions can be implemented. In the wake of this debate, some researchers therefore propose a sequential model of treatment, whereby CBT is considered an effective adjunct to antidepressant medication (Fava et al., 1998; Fava et al., 2004). Recent research in this area has suggested CBT could also play an integral role in preventing relapse for up to six

years, if implemented subsequent to a patient's withdrawal from medication (Fava et al., 2004).

In summary, it is clear that the field of CBT research is still evolving and CBT shows a clear amenability to RCT treatment studies (Hollon & Beck, 2004). While researchers continue to investigate the relative effectiveness of CBT compared to other therapeutic options, its efficacy in treating depression and its long-term effectiveness have been well established to-date. Perhaps its most salient characteristic is its curative potential for mitigating the risk of future relapse. Moreover, CBT's relative cost-effectiveness compared to combined treatments or pharmacotherapy is a further advantage that distinguishes it as a treatment of choice (Haby, Tonge, Littlefield, Carter & Vos, 2004; Antonuccio, Thomas & Danton, 1997). The challenge now is for research to focus on determining the specific patient characteristics that correlate with a successful outcome in CBT for depression. This might additionally explain some of the inconsistency that has been observed in findings up until this point (see Shea et al., 1990). While the confounding role of therapist factors has been (Shaw et al., 1999), a focus on patient factors related to CBT outcome appears well overdue. In recent years, some researchers have indeed made concerted efforts to investigate patient factors (see Clarkin & Levy, 2004; Fennell & Teasdale, 1987). However, research on the relationship between patient factors and changes across therapy is lacking. This is largely because the majority of studies to-date have adopted a primarily static view at the expense of assuming a longitudinal and clinically-relevant perspective in terms of how factors change over time.

Explaining and exploring client variability in treatment outcomes

An extensive amount of research has sought to investigate the risks associated with developing depression or the causes that predispose individuals to developing a depressive episode. One of the most well-established theories in this area is the stress-diathesis model, which suggests that people have different degrees of vulnerability (diatheses) towards developing depression (Sacco & Beck, 1995). These diatheses comprise genetic, biological, psychological and social factors (Gotlib & Hammen, 2002). The core tenet of the stress-diathesis model is that stress activates a diathesis and transforms the "potential of predisposition into the presence of psychopathology" (Monroe & Simons, 1991, p407). The amount and type of stress required to cause

depression is variable, and dependent upon an individual's inherent level of vulnerability (Monroe & Simons, 1991). Until the critical stress level is reached, individuals will function normally and their vulnerabilities are considered to be latent. Furthermore, the same type or level of stressor may produce variable levels of stress in different individuals. The stress-diathesis interaction is therefore a complex phenomenon that arguably depends on the types of cognitive attributions, coping strategies, belief structures and personality characteristics that individuals possess.

The stress-diathesis framework will be re-visited in more detail in *Chapter 5*. However, at this point it is important to consider its implication within the context of client heterogeneity. This theory can be accessed to explain some of the variability that clients show throughout the therapy process and in their treatment outcomes. If it is well accepted that the level of stress or vulnerability factors are responsible for any differences in the inception or cause of depression, it is conceivable that these differences would also continue to affect client engagement in therapy and the potential for recovery. Within the current study, it is assumed that what drives the inception of depression is also responsible for driving its recovery. In other words, the stress and diatheses that clients exhibit will be influential in determining their individual treatment outcomes. The following two chapters therefore provide a comprehensive review of two of the most commonly cited drivers of depression from the stress-diathesis model. These two drivers are stress and attributional style.

Summary

Clinical depression represents a significant burden for individuals and communities alike. While its prominence and significance has been well established, the focus now needs to shift towards improving treatment outcomes and better understanding client variability. Epidemiological reviews of the New Zealand population highlight its relatively high rates of depression relative to other nations and its variation across gender, age and ethnic groups, consistent with what is observed in other countries around the world. In the treatment of depression, CBT is recognised as an intervention of choice. With several guiding principles, CBT accords well with the cognitive model of depression and has received strong empirical support. However, in spite of its superiority, a percentage of clients still relapse or terminate therapy early. Moreover, not all clients achieve an identical level of symptom reduction. As a result, there is a

need for continued research that addresses the underlying factors influencing therapy engagement and recovery trajectories. This chapter closes with reference to the well-established stress-diathesis theory. It is assumed that those factors that predispose or influence the inception of depression also influence the therapeutic process and treatment outcomes that clients show. The present study provides a specific focus on stress and attributional style as two factors that are theoretically-implicated in determining recovery and contributing to client variability.

Chapter 3: Stress

Aims and Scope

The stress-diathesis model clearly explicates the role of stress and extra-personal factors in the inception of depression. As a result, a central aim of the present study is to explore how psychosocial stress might in fact continue to play a role in the treatment process and the way clients recover from depressive episodes. This chapter provides an introduction to the field of psychosocial stress and is divided into two sections. Firstly, an overview of the most important research to-date is provided, with a particular emphasis on different models of interaction and the role of client characteristics in the stress-depression relationship. The second section reviews the methodological issues that are paramount in the field, with an emphasis on the definition and measurement of stress. Both sections conclude with an overview of the research gaps in this area and offer a prioritization of research needs for the future.

It must be noted that the literature on stress is incredibly expansive and extends well beyond clinical psychology into the domains of psychiatry, epidemiology, health psychology and sociology (Hammen, 2005). This chapter is limited to the context of clinical depression and the stressors associated with its onset, presentation and treatment needs. Furthermore, treatment focus is limited to the CBT approach most relevant to this thesis.

Stress and Depression

While stress continues to attract substantial research attention, it is alarming to consider the ambiguity surrounding its definition. Indeed, no widely-accepted operationalisation of stress exists, and different researchers investigating similar topics frequently employ different conceptualisations. Prominent writers in the field have commented how the term "stress" is indiscriminately used to describe every part of the stress process per se, ranging from the particular life circumstances in which stress grows, to the stress response itself, to reactions to the stress and even the various factors mediating or moderating the stress process (Kaplan, 1996). Clearly the definition of stress hinges upon the particular part of the process one is referring too, in addition to the specific content that substantiates the stress. The difficulties inherent in defining such a concept have too often led researchers to avoid doing so (Cohen,

Kessler & Underwood Gordon, 1995). While this flexibility has allowed for interesting research, it has sadly created a domain tainted by ambiguity and inconsistency (Wheaton, 1996). Given the significant role that stress plays in contributing to depression, it is integral that attempts are made to more explicitly and precisely conceptualise stress, so that appropriate treatment can be offered (Cohen et al., 1995). Within the present study, stress shall be defined as the strain encountered by an individual that leads to their experience of distress and difficulty.

More recently, research has expanded beyond the realms of life event stress to incorporate stress of a more chronic nature (Wheaton, 1996; McGonagle & Kessler, 1990). While this gives rise to obvious methodological questions (see Hammen, 2005 for a more comprehensive review), it is helpful to consider Wheaton's (1996) suggestion that stress exists along a continuum (Figure 3.1). Such an inclusive approach avoids the trade-off that comes with identifying stress as *either* discrete *or* chronic (Wheaton, 1999). Moreover, the notion of different types of stress has gathered both conceptual and empirical support (Wheaton, 1994; 1996).
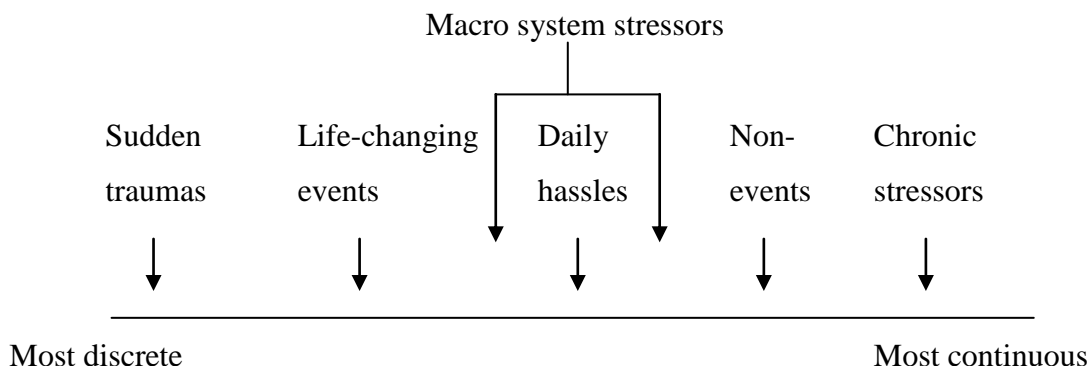
Figure 3.1. The stress continuum.[4]

Models of Interaction

In light of a robust relationship between stress and depression onset (Hammen, 2005), research attention has shifted to determining the specific model of interaction between stress and depression and the dynamics of their association. In particular, three models

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[4] Source: The Domains and Boundaries of Stress Concepts (Wheaton, 1996)

of interaction that have been extensively researched are the *kindling/sensitization model*, the s*tress generation model* and the *psychological immunization model*.

The kindling/sensitization model

The kindling/sensitization model proposes that an individual's susceptibility to the effect of stress increases as they experience repeated depressive episodes (Kessing, Agerbo & Mortensen, 2003; Post, 1992). Many researchers have purported that recurrent depressive episodes become progressively independent of life stressors as a result of the neurobiological changes that occur when an individual is exposed to repeated stress (Kessing et al., 2003). When a person becomes "sensitized" or "kindled" in this fashion, they are therefore more susceptible to experiencing spontaneous episodes. Using a critical within-person research design, Kendler, Thornton and Gardner (2000) used twin data to investigate the validity of the kindling hypothesis. They concluded that the kindling effect occurs intensively during the first few depressive episodes and then slows or stops completely. Similar support is found in research by Ehnvall and Agren (2002), although it is important to note that research in this area has typically neglected the concept of chronic stress (Hammen, 2005).

The stress generation model

The stress generation model was first proposed in the 1990s (Davila, Bradbury, Cohan & Tochluk, 1997). Up until that point the possibility that depression could increase susceptibility to stress had primarily been viewed as a methodological confound to be controlled for. However, research in the last two decades has blurred the boundary between diatheses and stressors to some extent, and a more transactional relationship between stress and depression has been suggested (Davila et al., 1997). Hammen (1991) has driven much of the research in this domain. Her influential 1991 study found that women followed up one year after treatment for unipolar depression were significantly more likely to experience dependent stressful life events than those women who had experienced bipolar disorders or no depression at all (Hammen, 1991). As reviewed in Hammen (2005), support for a stress generation model has also been replicated using community samples of late adolescent women (Daley et al., 1997); adult men (Cui & Vaillant, 1997); adult women (Hammen & Brennan, 2002; Harkness & Luther, 2001); adolescent males and females (Patton, Coffey, Posterino, Carlin & Bowes, 2003); children of depressed mothers (Adrian & Hammen, 1993) and

clinical samples of children and adolescents (Rudolph & Hammen, 1999; Rudolph et al., 2000) and adults (Harkness, Monroe, Simons & Thase, 1999). However, the stress generation hypothesis has not been as well supported for independent events outside of an individual's control (Hammen, 2005).

In response to these findings, researchers have sought to investigate the factors responsible for stress generation (Hammen, 2005). Although depressive symptomatology such as irritability, low energy and anhedonia can increase tension within relationships, several studies have concluded that high rates of negative interpersonal events occur even in periods of remission (Daley et al., 1997; Hammen & Brennan, 2002). Essentially, this suggests that depression itself does not directly account for higher rates of stress between episodes (Hammen, 2005). Although research is inconclusive, several possibilities have been suggested. Hammen (1992) has proposed a tendency for depressed females to become "locked" into highly stressful family environments characterized by relationship distress and mental illness. Alternatively, Kendler and colleagues' twin studies suggest that depressed individuals may self-select themselves into problem contexts (Kendler, Karkowski & Prescott, 1999). Although genetic mediation may explain this phenomenon, it is also possible that personality characteristics and attributional styles or beliefs significantly influence the type of environment or stressors that an individual is exposed to.

The psychological immunization model

Finally, the psychological immunization model first proposed by Henderson, Montgomery and Williams (1972) has similarly received research attention (Henderson et al., 1998; Jorm, 2000). Primarily based on learning theory, this hypothesis asserts that individuals exposed to repeated adversity over time develop an increased resistance to stress (Henderson et al., 1972). In particular, the model has been most prominent in research examining the relatively lower rates of depression among elderly populations (Henderson, 1994; Jorm, 2000). While other causal factors such as decreased emotional responsiveness (Gross et al., 1997; Levenson, Carstensen, Friesen & Ekman, 1991), increased emotional control (Lawton, Kleban, Rajagopal & Dean, 1992; Gross et al., 1997) and even under-reporting (Unutzer et al., 1999) have also been suggested, researchers of the psychological immunization hypothesis have investigated whether risk factors such as stressful life events actually decline with age

(Jorm, 2000). Overall however, research findings have suggested that the decline in such risk factors only partly explains the decline in symptom prevalence with increasing age (Henderson et al., 1998).

Overview of Research Findings

Over the past three decades, improved measurements of stress and advances in research design have helped confirm the association between stress and depression. As a result, recent attention has shifted from a unidirectional perspective of the stress-depression relationship to a more multivariate, dynamic perspective that also considers contextual factors (Hammen, 2005; Monroe & Kelley, 1995). The knowledge that stress is significantly implicated in the onset of depression has allowed researchers to assume a wider realm of exploratory study and determine other variables of influence, and the application and limitations of the stress-depression association.

Congruency hypothesis

One of the most extensively researched topics within the stress literature is the personality-stress match (Friedman, 1990). Although the present study is not specifically investigating the validity of a congruency hypothesis, it is important to understand the previous research that has been conducted in this area and some of the main findings. The congruency hypothesis predicts that an individual is most likely to develop depression when the type of stress they experience is congruent with their particular personality characteristics (Bartelstone & Trull, 1995). Research in this area can be traced to Beck's (1983) suggestion that two different personality dimensions (sociotropy and autonomy) contribute to different depressive presentations (Robins, 1990). Within Beck's ensuing paradigm, *sociotropy* links to an individual's need for social interaction and a concern about disapproval or loss of secure attachment (Robins, 1990). In comparison, *autonomy* reflects a need for independence and goal attainment, and a concern about personal failure. Within the cognitive theory of depression, Beck suggests that sociotropy and autonomy are 'vulnerability markers' that make individuals particularly sensitive to events corresponding to each of these two dimensions (Mazure, Bruce, Maciejewski & Jacobs, 2000; Beck, 1987). In particular, it has been proposed that highly sociotropic individuals are most susceptible to negative interpersonal events (e.g. divorce) and highly autonomous individuals are vulnerable to negative achievement events (e.g. job loss).

Overall, research findings in this area have been fairly inconsistent. Mazure and colleagues (2000) reported that adverse interpersonal events (as opposed to achievement events) and a congruency between stress and personality style was associated with a better treatment outcome. However, their results failed to support the congruency hypothesis in terms of depression onset. In comparison, several studies have supported congruency between sociotropy and negative interpersonal events for the onset of depression (Hammen, Ellicott, Gitlin & Jamieson, 1989; Segal, Shaw, Vella & Katz, 1992; Robins & Block, 1988; Clark, Beck & Brown, 1992) while support for congruency between autonomy and negative achievement events has been less common (Segal et al., 1992). However, a large amount of this inconsistency has been linked to variations in the use of stress measures, outcome measures and the use of clinical versus community-based samples (Little & Garber, 2000; Mazure et al., 2000). Recent research has also emphasised the important role of subjectivity when determining the congruency of events (Voyer & Cappeliez, 2002).

Given the extent of research that has sought to investigate the congruency hypothesis, it is important to also briefly consider alternative personality conceptualisations that have been explored to-date. This is because various terms and concepts are frequently referenced throughout the stress literature. One of the most prominent alternatives stems from a psychodynamic orientation and classifies individuals as either self-critical or dependent. *Self-critical* individuals are negativistic and avoidant and will typically precipitate failure by displaying obstructive behaviour (Goldberg, Segal, Vella & Shaw, 1989). In comparison, *dependent* individuals are self-effacing and non-competitive and will typically seek guidance and support from others. Research in this area has also produced inconsistent findings. Segal and colleagues (1992) and Hammen and colleagues (1989) have reported congruency effects in favour of self-critical individuals experiencing achievement stress, while congruency effects in favour of dependent individuals experiencing interpersonal stress have been reported elsewhere (Hammen, Marks, Mayol & deMayo, 1985; Robins & Block, 1988; Lakey & Ross, 1994). Once again, methodological and sampling differences may explain a lot of this variability (Segal et al., 1992). Although the congruency hypothesis is not a focus of the present study, an understanding of the research on congruency is essential in order to fully engage with the psychosocial stress literature as a whole.

Moderating variables

In addition to research testing the congruency hypothesis, a large body of work has investigated the role of client characteristics within the stress domain. In particular, a number of demographic factors have been implicated as moderators and mediators of the relationship between stress and depression (Taylor & Aspinwall, 1996).

In light of the robust gender variation in prevalence, several researchers have studied the effect of gender on the association between stress and the onset of depression (Hammen, 2005; Nazroo, Edwards & Brown, 1997). One study in particular concluded that gender differences and life conditions relate to depression severity (Barnow, Linden, Lucht & Freyberger, 2002). More specifically, the study demonstrated that it was sociodemographic factors but not life events that related to a greater severity of depression. Moreover, this relationship was gender specific in that it was only observed for women. However, the independence of sociodemographic factors and stress is questionable given that demographic factors such as marital and parental status have been correlated with stress in other recent studies (Luecken et al., 1997; Waldron, Weiss & Hughes, 1997; Blumenthal, Thyrum & Siegel, 1995). Nonetheless, the relationship between sociodemographic factors and severity of depression in women appears consistent across the literature (Maier et al., 1999; Paykel, 1991).

In addition to gender, researchers have also examined the role that genetic liability plays in an individual's exposure to stress and their subsequent susceptibility towards developing depression. Several studies have suggested that genetic factors may influence the risk of depression by altering an individual's sensitivity to the depression-inducing effect of stressful events (Kendler et al., 1995; Pollitt, 1972). In addition, recent research also suggests that a genetic risk for depression increases the likelihood that women in particular experience stress in interpersonal and occupational domains (Kendler & Karkowski-Shuman, 1997).

Finally, research has also suggested that social support may mediate the stress-depression relationship. In particular, social resources have been posited as a protective factor for individuals suffering from depression (Cohen, 2004). In a study by Billings and Moos (1985), social resources increased from pre- to post-treatment, while life stressors remained relatively constant. This might suggest that levels of

stressors and resources are both causes and effects of an individual's functioning, and that social resource factors might be as important as stressors in navigating the course of remission and relapse (Billings & Moos, 1985).

In the field of research exploring the relationship between social support and mental health, two primary models have been proposed – the *main effect model* and the *stress-buffering model* (Cohen & Wills, 1985; Kawachi & Berkman, 2001). The main effect model purports that social ties are beneficial regardless of whether an individual is under stress, while the stress-buffering model asserts that social support is related to mental health outcomes only when an individual experiences stress. Validity of both models has been attested, with the main effect model being more indicative of the structural aspects of support (e.g. marital status, social integration) and the stress-buffering model being more representative of the functional aspects of support (e.g. perceived support). Once again this reiterates the discrepancies that can arise when different perspectives or levels of subjectivity are not accounted for within this area of research (Kawachi & Berkman, 2001).

Research Gaps

A clear preponderance of research to-date has focused on deciphering the way in which stressors *cause* depression. While this obviously represents a valid research avenue, it has perhaps at times been at the expense of developing a clearer perspective about how stress changes over the course of therapy. Research investigating the congruency hypothesis has not yielded substantial results and findings have largely been equivocal (Clark, Beck & Alford, 1999; Voyer & Cappeliez, 2002). More research adopting a wider realm of exploratory study is warranted in order to investigate how the relationship between stress and depression actually changes over treatment. A clearer understanding of whether certain types of stressors play particularly influential roles is also needed. While research highlighting moderating variables has been valuable, this too could be advanced by an exploration of the way in which stressor characteristics also moderate the stress-depression relationship. This type of development accords with recent requests for a greater acknowledgement of the specific context in which the stress occurs (Monroe & Kelley, 1995).

Methodological Considerations

Methodological considerations remain paramount within the domain of stress research (Hammen, 2005; Herbert & Cohen, 1996). While this reflects the depth of the field and its wide-ranging application, it also reflects the ongoing difficulties in defining stress and its appropriate assessment measures. Given the present study's focus on stress, it is important to understand these methodological issues and ensure that any limitations are mitigated to the best extent within the current research approach.

Defining Stress

Debate concerning the most appropriate way to define stress is no new phenomenon. From a methodological viewpoint, ambiguity concerning the way to define stress not only amounts to less sound empirical studies, but also inconsistent conclusions across research (Thoits, 1999).

In the first instance, there has been a consistent lack of consensus in terms of the different types of stress categories that exist. Some researchers have chosen to categorise the content of stressors using domains such as interpersonal versus achievement (Mazure et al., 2000; Segal et al., 1992), while other researchers have used category definitions such as dependent versus independent (Rudolph & Hammen, 1999; Cui & Vaillant, 1997). Although these differences might appear slight, the ramifications of this variation can be significant. Even subtle differences in categories can amount to differences in the way stress is then measured and assessed, or the generalisability of the research conclusions that follow (Cohen et al., 1995).

In addition to varying the way stress categories are defined, researchers also differ in the way they incorporate chronic stress (Hammen, 2005). It is now well recognised that stress is not necessarily a time-limited or static incident (McGonagle & Kessler, 1990). Although specifically in the context of depression stress is commonly a more dynamic process, research has often varied in terms of the extent to which a chronic perspective is incorporated. Some researchers advocate for the strict inclusion of chronic stressors (Monroe & Simons, 1991; Wheaton, 1996; Pearlin, 1989; Cohen, Kessler & Underwood Gordon, 1997; McGonagle & Kessler, 1990), while others focus on differentiating stressors other than life events, such as daily hassles or non-events (Wheaton, 1996; Gersten, Langner, Eisenberg & Orzeck, 1974). However, even

when studies have similarly sought to include chronic stress, the specific definition of chronicity often varies considerably (see Hammen, 2005). Furthermore, some researchers question whether a categorical approach towards defining stress is even appropriate in the first place, and instead assume dimensional perspectives in their investigations (Wheaton, 1996).

Several researchers also highlight the potential for stress to be conceptualized as both a cause *and* effect of depression (Kessler, 1997; Cui & Vaillant, 1997). In essence, this highlights the risk of stress being confounded with outcome if a specific and clear definition is not implemented (Dohrenwend & Shrout, 1985; Monroe, 2008). Finally, no definition of stress is complete without appropriate consideration for the particular perspective it assumes. It is clear that circumstances deemed stressful for one individual may not necessarily create distress for another (Dohrenwend, 2006). This highlights the importance of appraisal within the stress context and in particular, the idea that it is an individual's interpretation of their circumstances that determines their reaction (McEwen & Stellar, 1993). The level of subjectivity adopted when defining stress can therefore have a considerable influence and affect the severity or particular type of stress that is under consideration (Park & Folkman, 1997).

Measuring Stress

Given the methodological issues concerning the definition of stress, it is critical to ensure a robust measurement of the stress effect is achieved. The two main approaches to stress measurement are checklist schedules and interview-based assessments (McQuaid, Monroe, Roberts, Kupfer & Frank, 2000).

Checklist approaches towards stress measurement

Checklist measures of stressful life events require individuals to acknowledge which of a range of events occurred within a specific time period. Typically, a time-frame of one year is used and the number of events included in the checklist can vary considerably (Turner & Wheaton, 1995). The types of events included in such lists are supposed to be representative of major life events for a broad population and a fundamental premise of the checklist approach is that stress accumulates in accordance with an increasing number of stressful events (Turner & Wheaton, 1995). Various checklist measures also include a weighting allocation. This involves the assignment

of a specific value to each stressor in accordance with the level of readjustment or undesirability the event is thought to correspond to. Measures differ in the way that the weightings are measured, as some are calculated objectively by expert judges (e.g. Dohrenwend, 1973; Gersten et al., 1974; Myers, Lindenthal & Pepper, 1974), and others are calculated subjectively by the clients themselves (e.g. DeFaire & Theorell, 1976; Vinokur & Selzer, 1975).

The use of checklist measures has been a predominant feature in the field of stress research to-date (Turner & Avison, 2003; McQuaid et al., 2000). The inception of the checklist method arguably dates back to Holmes and Rahe's (1967) publication of the *Social Readjustment Rating Scale* (*SRRS*). The introduction of this measure is seen to be responsible for the significant increase in stressful life event research that has ensued over the past three decades (Turner & Avison, 2003; Turner & Wheaton, 1995). The *SRRS* represented a refinement of the previous *Schedule of Recent Experiences* (*SRS*; Turner & Wheaton, 1995) as it incorporated expert opinions in its determination of how much adjustment each stressor would require. It has often been suggested that the most integral effect of this particular refinement was an improvement in the face validity of a checklist approach to stress measurement (Turner & Wheaton, 1995). However, a number of limitations in the use of checklist measures have been highlighted.

A primary criticism of the checklist approach is the limitation it places on the number of life events that can be assessed. A checklist is inherently finite and it has been argued that the comprehensiveness of the approach is often compromised at the expense of practicality issues (Shrout, 1981). One response to the threat to sensitivity that generic checklists pose has been the tailoring of some checklists for use only within specific populations (see Turner & Wheaton, 1995 for a comprehensive review). However, a consequence of increasing the number of checklist measures in the field has been a limitation in the generalisability of results across different studies (McQuaid et al., 2000). A second criticism of checklist measures has been their limited ability to measure the personal meaning or context of stressors (Turner & Avison, 2003). As it is well recognised that one event may not necessarily be similarly stressful for different individuals, a failure to account for the personal meanings of stressors poses a risk that stressors are viewed as isolated incidents unrelated to situational, interpersonal or personal factors (Turner & Avison, 2003). A third

limitation of checklist approaches concerns the time-limited nature they assume. Several researchers have argued that the inclusion of stressors from a specific timeframe neglects the importance of lifetime stressors such as parental loss (Turner & Wheaton, 1995; Lepore, 1995). This may be significant in light of research confirming the relationship between lifetime trauma and subsequent mental and physical health distress (McLeod, 1991; Horowitz, Widom, McLaughlin & White, 2001). A final issue that concerns the use of checklist measures is the validity of the output they produce. Those checklists that yield only a total number of stressors have been criticized for their inability to measure the true level of stress that clients experience (Dohrenwend, 2006). In contrast those checklists using weightings have similarly been termed invalid in the cases where weightings are arbitrary and unrelated to clients' true situations. Alternatively, checklists using clients' subjective ratings are also susceptible to a negative response bias caused by symptom severity (Monroe, 2008).

Although checklist measures continue to be used in research, their significant limitations mean they are generally not considered the recommended measurement approach (Kessler, 1997; Brown, 1993; Monroe, 2008). As previous reviews have often refrained from recommending one particular checklist as the preferred measure, difficulties in generalizing across studies persist, as an increasing number of checklists are developed (Turner & Wheaton, 1995). Overall, most checklists include only negative life events and a substantial amount of literature has also confirmed the relationship between accumulating stress and risk for depression (Turner & Wheaton, 1995). Although some researchers advocate that those checklists developed more recently represent considerable improvements (Zimmerman, 1983), several measures still include items that are thought to actually be symptoms or consequences of illness, rather than precipitants of distress (Thoits, 1981; Turner & Wheaton, 1995). In essence, although checklist measures like the *PERI Life Events Scale* (Dohrenwend, Askenasy, Krasnoff & Dohrenwend, 1978) continue to be used and improvement attempts have been made, clear limitations remain. As requests arise for more longitudinal research that provides a greater level of insight into client distress across time, the validity of a checklist approach becomes more questionable.

Interview-based approaches towards stress measurement

Intensive personal interviews represent an alternative and widely-used approach towards stress measurement (Monroe, 2008). Such interviews use qualitative probes in order to ascertain a more in-depth understanding of the characteristics surrounding those life events that produce stress. While checklist approaches typically involve a cumulative approach towards measuring the number of stressors, interview approaches seek to gather reports about *specific* events and their context (McQuaid et al., 2000; Wethington, Brown & Kessler, 1995). Although a number of interview measurements have been developed (Monroe, 2008) the two most prominent measures are the *Life Events and Difficulties Schedule* (*LEDS*) and the *Structured Event Probe and Narrative Rating Method* (*SEPRATE*).

The *LEDS* (Brown & Harris, 1978) is a semi-structured interview measure that assesses a wide range of stressors and is applicable for use within both community and clinical populations (Wethington et al., 1995). Clients are asked to acknowledge whether certain life events have occurred over the past 12 months or longer, and interviewers are provided with guidelines to assist them in probing further. However, the *LEDS* is intended to resemble a conversation and interviewers are only provided with very general guidelines for probing (Wethington et al., 1995). The *LEDS* is designed to elicit a narrative around each event (Gorman & Brown, 1992) and the purpose of the interviewer's probing is to gather information that allows for the long-term contextual threat or severity of events to be rated (Wethington et al., 1995). Over a series of decades, specific dictionaries have been developed that provide ratings of severity for different events. These dictionaries offer a rating that is blind to the individual's subjective response and the dictionaries are only made available to those who are formally trained in the interview administration. Administration times range from 30 minutes to 2 hours, depending on the client setting (Wethington et al., 1995).

Within the *LEDS* framework, acute stressful events are termed "events" and chronic stressful conditions are referred to as "difficulties". The differentiating factor is duration, with events occurring for a period of less than one month. The *LEDS* has received psychometric support and is considered to be very reliable (Malkoff-Schwartz et al., 1998; Parry, Shapiro & Davies, 1981; McPherson, Herbison & Romans, 1993). However, it is only in recent years that the interview has been applied

to different subsets of the population, such as children and ethnic minorities (Wethington et al., 1995). Although the *LEDS* is frequently preferred over more checklist-type measures of stress, it has also been prone to its share of criticism. In particular, it has been suggested that its inclusion of contextual factors is too extensive, to the point that operational confounding is a real risk (Dohrenwend, Raphael, Schwartz, Stueve & Skodol, 1993; Tennant, Bebbington & Hurry, 1981). One response to this criticism has been the development of alternative measures or versions of the *LEDS* (Kessler & Wethington, 1991). The development of alternative measures has also been initiated in response to the high cost and complexity involved in administering the *LEDS* (Wethington et al., 1995).

One of the prominent alternatives to the *LEDS* is the *SEPRATE* (Dohrenwend et al., 1993). Derived from the *PERI* life-events checklist, the *SEPRATE* elicits a series of yes/no responses when individuals are asked questions about 84 stressful events or difficulties that may have occurred. Interviewers are trained to probe further on any affirmative responses (Wethington et al., 1995). Similar to their use in the *LEDS*, these probes are designed to elicit a narrative description of the event and also produce a standardized assessment of the magnitude of change, desirability, disruptiveness, independence, and threat of each event experienced (Wethington et al., 1995). In a similar approach to that adopted in the *LEDS*, the narrative is then independently rated by two raters. However, many of the contextual factors that are removed at this point in the *LEDS* are actually still included in the *SEPRATE*. Psychometric assessment has confirmed the strength of the *SEPRATE* and in particular, its superior reliability to its *PERI* predecessor (Shrout et al., 1989). However, it has been suggested that the *SEPRATE* is less comprehensive than the *LEDS* as its list of events and interview methods are not as complex or extensive (Wethington et al., 1995).

In summary, the *LEDS* and *SEPRATE* are the two most prominent interview-based approaches towards stress measurement used in the field today. However, although they represent an improvement on checklist measures in terms of their ability to provide a rich description of events, they too have several limitations in their usage. In particular, they are time-consuming for both interviewers and respondents, expensive to administer, and require high levels of training for both interviewers and raters (Wethington et al., 1995). To some extent their complexity also limits their applicability to longitudinal research in clinical settings, as it becomes complicated

and time-consuming to re-administer the measures frequently across a course of treatment.

Introducing the concept of stress impact

In light of the stress literature to-date, some important decisions are required if stress is to be measured effectively within the present study. In the first instance, an appropriate definition is needed and such a conceptualisation needs to take account of the developments that have been reviewed in this chapter so far. Secondly, the accurate measurement of stress is paramount as the integrity of the study's results will be inextricably linked to its validity and reliability.

It is clear that the concept of stress encapsulates a wide range of factors. As has been discussed, this breadth has so often created ambiguity and inconsistency within the research conducted in this field. A comprehensive review of the literature suggests that at a high level there are effectively two components to psychosocial stress. The first aspect relates to the qualitative components of stress and incorporates important details such as the type of stress, its duration and its contextual factors. The second aspect relates to the quantitative component of stress and incorporates the amount of impact a stressor has on an individual. This is likely to change over time and represents the net effect of the amount of stress an individual confronts and their own coping ability. The disproportionately small amount of research that has investigated changes in stress over time has likely been a direct effect of an inability to measure such change. In light of the psychometric limitations of checklists and the time-consuming constraints of interviews, the concept of stress change has been relatively neglected to-date. This thesis therefore introduces a new term *Stress Impact* which will hopefully foster a wider-change in how stress is viewed and measured. If the difficulties in determining appraisal of stress and specific stressor characteristics can be distinguished from the raw impact a stressor yields, it becomes more likely that stress can be measured in a longitudinal format.

The ability to distinguish between these two aspects of stress has the benefit of ensuring that both angles of stress are still incorporated. Research gaps in this field clearly point to a need for better understanding of *both* the change in stress over time and also the influence of particular stress typologies or characteristics. Given the conceptualisation of stress in this manner, separate measurements for the qualitative

and quantitative aspects of stress will need to be developed in the present study. Furthermore, it seems that the measurement of these components may be more valid if the influence of self-report is limited. The confounding influence of symptom severity and distress – particularly in the context of depression – has been extensively reported (Cohen, Towbes & Flocco, 1988; McQuaid et al., 2000). It appears that one of the most valid approaches is therefore to gather a range of different perspectives in the measurement of stress.

Summary

The domain of research investigating psychosocial stress and its relationship with depression is expansive. While a robust relationship between stress and the onset of depression has been well supported, investigations into how stress changes over time or interacts with treatment outcomes have been less prevalent. To a large extent, research has been confounded by two limitations. Firstly, inconsistent approaches towards the conceptualisation of stress have amounted to ambiguity within the literature and a breadth of study that is sometimes at the expense of cohesion. Secondly, the measurement of stress has been dominated by checklist approaches and interviews; both of which yield clear limitations in their application to in-depth, longitudinal research. Instead of continuing to explore the model of interaction implicated in depressive onsets or the extent of support for a congruency hypothesis, the present study adopts a new perspective. In its focus on longitudinal change and the interaction of stress with the therapy process, a new approach towards conceptualising stress is advocated. While the qualitative and contextual aspects of stress are still integral, a new concept of *Stress Impact* is coined in order to permit the assessment of stress over time. It is anticipated that this dual conceptualisation of stress in both a quantitative and qualitative manner will allow for a comprehensive evaluation of both stressor characteristics and stress change in a longitudinal treatment context.

Chapter 4: Attributional Style

Aims and Scope

While the preceding chapter highlighted the role of stress within the stress-diathesis model, attention now is now turned to the diathesis or vulnerability component. Within the field of clinical psychology, the particular vulnerability that an individual is said to possess has been framed from biological, psychological and social perspectives. However, given the focus on depression and CBT in the current study, a specific concentration on the psychological diathesis is required. One of the most widely recognised cognitive vulnerability factors in the literature is attributional style and this is the particular diathesis that is studied in-depth in the present study. This chapter therefore provides a comprehensive review of the theory and findings relevant to attributional style.

The current chapter is separated into two sections. The first segment reviews attribution theory and the origins of attributional style as it is known today. The core facets of learned helplessness, the reformulated hypothesis and the hopelessness and recovery theories of depression are each reviewed and current perspectives in this area are outlined. In addition, the measurement of attributional style is discussed and its primary measurement scales are introduced. The second section provides a review of the research findings in this domain. The relationship between attributional style and depression is reviewed in addition to the most prominent issues that have arisen within research in this area. This section closes with a brief commentary on the outstanding research gaps that remain within the literature and a prioritization of future research needs.

Attributional Style and Depression

Attributional style can be defined as the way in which an individual explains the causes of events and in doing so makes attributions that are consistent across situations (Buchanan & Seligman, 1995; Abramson, Seligman & Teasdale 1978; Kent & Martinko, 1995). The concept of attributional style as it is known today was essentially born out of a series of decades characterised by systematic developments in the theory of attribution. In order to adequately understand attributional style and its

implications for depression and CBT, an understanding of these theoretical developments is essential.

Overview of the Theory Underpinning Attributional Style

Learned helplessness

The origins of attributional style can be traced to the context of learning theory and the learned helplessness hypothesis that evolved out of canine behavioural experiments in the 1960s (Maier & Seligman, 1976). Overmier and Seligman (1967) discovered that being exposed to inescapable electric shocks in one situation meant that dogs failed to initiate escape in subsequent situations, where escape was in fact possible (Maier & Seligman, 1976). The fundamental premise underlying the learned helplessness hypothesis is that realising that behaviour and outcomes are independent of one another induces a belief of uncontrollability and consequent motivational, cognitive and emotional deficits (Maier & Seligman, 1976). Seligman (1975) proposed that the learned helplessness observed in the laboratory was analogous to the depressive presentation observed in humans. The model assumes that compared to individuals who do not suffer from depression, depressed individuals view outcomes in a skill situation as more response independent (Garber & Hollon, 1980). The theory proposed that an individual's experience with uncontrollable events would produce three deficits: individuals would be less motivated on future tasks; less able to recognize contingencies between responses and outcomes; and more likely to exhibit a depressed affect (Seligman, 1975).

In the decade following Overmier and Seligman's (1967) seminal work, researchers replicated similar findings among other animals including cats (Seward & Humphrey, 1967) rodents (Seligman, Rosellini & Kozak, 1975; Seligman & Beagley, 1975; Maier & Testa, 1975; Maier, Albin & Testa, 1973) and fish (Frumkin & Brookshire, 1969). Alongside this growing body of infrahuman literature was a concurrent application of the learned helplessness model to humans (Klein & Seligman, 1976; Roth & Bootzin, 1974; Klein, Fencil-Morse & Seligman, 1976; see Maier & Seligman, 1976 for a comprehensive review). However, as the need for theoretical advancement intensified, it became clear that the application of learned helplessness to humans was in fact limited (Miller & Norman, 1979; Abramson et al., 1978). In particular, researchers pointed to two predominant issues within this context. Firstly, the model of learned

helplessness failed to adequately distinguish between *universal* and *personal* helplessness. Universal helplessness occurs when individuals believe outcomes are uncontrollable for everyone; whereas in personal helplessness individuals believe outcomes are uncontrollable only for themselves (Garber & Hollon, 1980). The second criticism was that learned helplessness failed to adequately differentiate between *general* helplessness (when uncontrollability applies to all situations) and *specific* helplessness (when uncontrollability applies only to a specific situation; Peterson & Seligman, 1984).

Reformulated hypothesis of learned helplessness

In light of the emerging inadequacies, Abramson and colleagues (1978) reformulated the learned helplessness model from a different theoretical perspective. Using attribution theory, Abramson and colleagues (1978) argued that when individuals find themselves helpless, they respond by questioning *why* such an outcome is uncontrollable. Essentially, this causal attribution is the critical factor that determines how chronic or detrimental the effects of their uncontrollability will be (Abramson et al., 1978). In accordance, the authors proposed three attributional dimensions to explain human helplessness and its relationship to depression (Seligman, Abramson, Semmel & von Baeyer, 1979). The first dimension can be defined as *internal-external* and refers to the extent to which the cause of an event is located within or outside of the individual experiencing the event. The second dimension can be defined as *stable-unstable* and refers to whether an outcome is changing or unchanging across time. Finally, the third dimension can be defined as *global-specific* and describes the extent to which an outcome is universal throughout one's life or specific to one particular part. The reformulated model argued that attribution of uncontrollability to internal factors results in lowered self-esteem, whereas attribution to external factors does not. Within the model, the concept of self-esteem is therefore implicated within the internal-external dimension (Abramson et al., 1978). It has been asserted that attributing a lack of control to stable and global factors would likely lead to a helplessness that extends across time and generalizes across situations (Abramson et al., 1978).

Abramson and colleagues (1978) suggested that individuals should differ in the types of attributions they make. Furthermore, in relating their theory to depression the

authors proposed the existence of a depressogenic attributional style. Specifically, those individuals susceptible to developing depression were presumed to attribute negative outcomes to global, stable and internal causes. Moreover, although it was not explicitly stated, the reformulated model also implied that these individuals would be likely to attribute positive outcomes to external, unstable and specific factors (Seligman et al., 1979). Within the literature a depressogenic attributional style is somewhat synonymous with a proposed pessimistic explanatory style and as a result the two concepts are frequently used interchangeably (Peterson & Seligman, 1984; Carver & Gaines, 1987).

Hopelessness theory of depression

Although a large number of empirical studies supported the reformulated model (see Sweeney, Anderson & Bailey, 1986 for a comprehensive review; Seligman et al., 1984), the 1978 model did not explicitly expel a theory that was *specifically* related to depression (Abramson, Metalsky & Alloy, 1989). Consequently, research support concerning its applicability to depression and clinical implications was largely inconclusive in early years (Barnett & Gotlib, 1988; Coyne & Gotlib, 1983). Some researchers even argued that the theory of depression had never been adequately tested (Brewin, 1985; Abramson et al., 1989). In light of this disparagement, Abramson and colleagues (1989) subsequently revised the reformulated theory of helplessness and depression. This particular revision became known as the hopelessness theory of depression.

The revised hopelessness theory also incorporated concurrent developments in the field of depression, and inherent within it was the proposition of a particular subtype of depression – *hopelessness depression* (Abramson et al., 1989). This proposition accorded with contemporaneous suggestions that depression was a heterogeneous concept comprising a range of disorders that could be differentiated by different symptom clusters, problem causes, courses and therapeutic requirements (Craighead, 1980; Depue & Monroe, 1978). The authors asserted that hopelessness was a proximal, sufficient cause of hopelessness depression (Abramson et al., 1989). Hopelessness involves an expectation that highly adverse outcomes will occur (or highly desired outcomes will not occur) and that the individual is helpless in changing the likelihood of such outcomes. Hopelessness theory states that it is not the mere

uncontrollability of an outcome, but rather this *negative outcome expectancy* that is the critical determinant of depression (Abramson et al., 1989). However, researchers have struggled to empirically validate the hopelessness theory of depression. In particular, a recent review concluded that only mixed support has been elicited thus far (Henkel, Bussfeld, Möller & Hegerl, 2002).

Recovery model of depression

In response to the emphasis on attributional style for negative events that is assumed in the preceding models, a supplementary model was developed. Needles and Abramson (1990) proposed that individuals who make global and stable attributions for positive events will recover more quickly from depression if positive events occur. Empirical testing of their model confirmed that an improved recovery did occur for such clients, but only on the condition that both an enhancing attributional style *and* positive events were present (Needles & Abramson, 1990). In subsequent years, the concept of a recovery-based paradigm gained prominence within research, clinical, institutional and policy fields (Davidson, Shahar, Lawless, Sells & Tondora, 2006). In many respects, the recovery model of depression sought to emphasise the simultaneous importance of client strengths and the influential role that such attributes can play within a treatment or recovery context (Jacobson & Greenley, 2001). Although research on positive life events is relatively scarce in comparison to the extensive amount of research on negative events, evidence has accumulated to support the important role of positive events. Their mechanism of influence has been hypothesised as either a direct amelioration of distress, or a more protective effect that buffers the adverse consequence of negative events (Davidson et al., 2006; Cohen, McGowan, Fooskas & Rose, 1984; Cohen & Hoberman, 1983).

Current perspective

In the last two decades it is fair to say that the revised version of the reformulated model has remained the most prominent perspective on attributional style as it relates to depression. Essentially, the three dimensions of internal-external, stable-unstable and global-specific are still used to differentiate individuals and the causal attributions they make. Substantial empirical support for the revised model has come from the Cognitive Vulnerability to Depression (CVD) Project (Alloy et al., 1999; Alloy et al., 2000; Abramson et al., 1999). Within the context of depression, empirical evidence

supports the existence of a depressogenic attributional style (Moore & Fresco, 2007). This particular attributional style also accords with the notion of a diathesis or vulnerability in placing individuals at a higher risk of developing depression when confronted with stressful events (Jacobs, Reinecke, Gollan & Kane, 2008; Haeffel et al., 2008). As aforementioned, the notion of a depressive attributional style has also become somewhat synonymous with the concept of pessimism, just as a positive attributional style is also frequently described as dispositional optimism (Goldstein, 2006; Higgins & Hay, 2003).

While attributional style and explanatory style are used somewhat interchangeably within the research literature (Moore & Fresco, 2007; Hewitt, Foxcroft & MacDonald, 2004), it is important to note the differences that do exist between attributional style and other related concepts. In particular, locus of control has been differentiated on the basis that it is concerned with expectations about the past, whereas attributional style focuses primarily on expectations concerning the future (Furnham & Steele, 1993). Attributional style also differs from locus of control in its inclusion of a number of different dimensions and its inherent focus on conditions tied to success or failure (Martinko, Gundlach & Douglas, 2002).

Measuring Attributional Style

In light of increasing support for the association between attributional style and depression, researchers have focused on developing methods to measure attributional style. In particular, researchers have been interested in devising measures that enable the assessment of individual differences across the three attributional dimensions. One of the most prominent measures that has been developed is the *Attributional Style Questionnaire (ASQ)* and a review of this measure and its psychometric properties is important.

The *ASQ* was developed by Peterson and colleagues (1982) in order to measure individuals' tendencies to attribute the causes of negative and positive events to internal (versus external), stable (versus unstable) and global (versus specific) factors. The original *ASQ* contains six hypothetical negative events and six hypothetical positive events. The events are either achievement-related or interpersonally-related and each requires respondents to offer a cause in their own words. Respondents then use a seven-point likert scale to rate the causes along each of the three attributional

dimensions (Spangler & Burns, 1999). They also offer a rating for how important the situation would be to them and total scores are derived by averaging their ratings across events, separately for positive and negative situations. Although the *ASQ* does not create or restrict the causal explanations offered by respondents, its format does however allow for a simple and objective quantification of responses (Schulman, Seligman & Amsterdam, 1987).

Initial research on the *ASQ* was supportive, and its psychometric properties included satisfactory internal consistency and acceptable stability of its composite factors (Peterson et al., 1982). It also yielded good predictive validity (Metalsky, Halberstadt, & Abramson, 1987). However, initial data also suggested that the *ASQ* had weak internal reliability and limited discrimination across the three dimensions for positive events (Peterson & Villanova, 1988). In response, Peterson and colleagues (1982) suggested that individuals might make fewer distinctions for such events because their positive nature necessitates a lower level of rumination compared to more negative events. In response to early questions about the *ASQ*'s reliability, some researchers chose to combine scores from all three dimensions and calculate a composite score, in order to enhance the reliability of their measurement (Peterson & Seligman, 1984; Peterson & Villanova, 1988). This approach has tended to predominate within more recent research.

In interim years an alternative, extended version of the *ASQ* has also been developed. Heeding concerns about the *ASQ*'s reliability, Peterson and Villanova (1988) extended the questionnaire to include 24 items. In response to both low discriminant validity and the fact that the helplessness reformulation does not explicitly refer to positive events, the *Expanded Attributional Style Questionnaire* (*EASQ*) incorporates only negative events (Peterson & Villanova, 1988). Although early reports from Peterson and Villanova (1988) reported that the *EASQ* had improved reliability, difficulties in measuring the internality dimension were also acknowledged. These difficulties were similar to what had been observed in the original development of the *ASQ* and it has been suggested that this mirrors the difficulty in measuring the conceptually-related locus of control dimension (Peterson et al., 1982). Concurrent research purports that internal versus external locus of control is in fact multidimensional (see Lachman, 1986; Levenson, 1973) and it is feasible that such multidimensionality may therefore also apply to internal versus external attributional style (Peterson & Villanova, 1988).

In spite of any earlier queries concerning the *ASQ*'s reliability, recent research has provided support for *ASQ* as both a clinical and research tool (Blount & Epkins, 2009). In particular, research has supported its validity even in the face of motivation to "beat it" by answering in socially-desirable ways (Schulman et al., 1987). In addition, it has yielded superior validity and a higher correlation with depression when compared to alternative measures such as the *Content Analysis of Verbatim Explanations (CAVE)* (Schulman, Castellon & Seligman, 1989; Hewitt et al., 2004). Its validity in distinguishing symptoms of hopelessness depression from symptoms of endogenous depression has also been highlighted (Joiner, 2001). Finally, its applicability to children and adolescents (Voelz, Walker, Pettit, Joiner & Wagner, 2003), non-clinical community samples (Sanjuan, Perez, Rueda & Ruiz, 2008) and different cultural populations (Lo, Ho & Hollon, 2008) has also been confirmed in recent years.

Research Findings Concerning Attributional Style and Depression

An extensive amount of research has tested the cognitive vulnerability hypothesis proposed in the reformulated model of learned helplessness and the hopelessness theory of depression (Fresco, Alloy & Reilly-Harrington, 2006). Although early research was more generic and demonstrated a relationship between depressogenic attributional styles and physical illness (Peterson, Seligman & Valliant, 1988), researchers have increasingly applied attributional style specifically to the context of depression.

The reformulated learned helplessness model has been validated in many contexts. Specifically, the framework's applicability to both adult (Eaves and Rush, 1984) and child and adolescent samples (Gladstone & Kaslow, 1995; Joiner & Wagner, 1995) has been highlighted. Seligman and colleagues (1984) were the first researchers to explore the applicability of the model to child populations and the outcomes of their investigation suggested that a depressive attributional style predicted depressive symptoms up to six months later. Similarly, Nolen-Hoeksema, Girgus and Seligman (1986) measured the explanatory styles of school children five times over the course of a year and found that explanatory style correlated with levels of depression and school achievement. Explanatory style also predicted changes in depressive symptoms over the course of the year.

A meta-analytic review conducted by Sweeney and colleagues (1986) reviewed the research that had been conducted in this field and with a sample of 104 studies, the authors proposed several recommendations for future research. Sweeney and colleagues (1986) concluded that the research supporting a relationship between a depressogenic attributional style and depression was largely conclusive and robust. Consequently, they suggested that future research efforts should focus on *explaining* the relationship, or better understanding the nature of causality inherent within it.

However, reviews in the intervening years have highlighted one particular bias that has occurred within this domain of research (Fresco et al., 2006). Even though the reformulated hypothesis considered attributional style for both positive and negative events to be important, a preponderance of research has in fact focused primarily on attributional style for negative events. This may have been a consequence of the early meta-analytic reviews (e.g. Peterson, 1991, Robins, 1988; Sweeny et al., 1986) that implied that attributional style for negative events yielded a stronger correlation to depression than attributional style for positive events (Fresco et al., 2006). However in light of the recovery model of depression, accumulating research has demonstrated the important role that attributional style for positive events can play in terms of recovery and the risk of relapse (Edelman, Ahrens, & Haaga, 1994; Ilardi, Craighead, & Evans, 1997; Johnson, Crofton, & Feinstein, 1996; Needles & Abramson, 1990). Moreover, recent research has also re-confirmed the earlier findings of Ingram, Kendall, Smith and Donnell (1987) that attributional style for both negative and positive events demonstrates specificity to depression (Fresco et al., 2006). This appears in contrast to earlier theorists who asserted limited value in even assessing attributional style for positive events and recommended removing positive events from measures of attributional style altogether (Peterson & Villanova, 1988).

Research Issues

Given the extent of research investigating attributional style and its role in the context of depression, it is understandable that a number of issues have arisen. Essentially, the two primary debates have concerned the stability of attributional style and the methodological issues relevant to its assessment.

The Stability of Attributional Style

Within the literature a clear debate has ensued concerning whether attributional style represents a stable trait, or a changeable state-like quality (Tems, Stewart, Skinner, Hughes & Emslie, 1993; Karney & Bradbury, 2000). More specifically, while some researchers have defined attributional style as a life-long quality representing a largely unchanging, trait-like predisposition (Cutrona, Russell, & Jones, 1984), others have asserted that attributional style can in fact change over time (Tems et al., 1993; Dohr, Rush & Bernstein, 1989). The latter of these two groups utilize evidence from psychotherapy treatment outcomes to support their view. A number of studies have consistently elicited evidence showing that individuals can develop less depressogenic attributional styles when they undertake a course of CBT for depression (Petersen et al., 2004; Jacobson & Hollon, 1996). Moreover, recent research has suggested that developmental stages may be influential, as cognitive style appears to be unstable in infancy and early childhood and only strongly consolidated at the stage of adolescence (Turner & Cole, 1994; Calvete, Villardo & Estevez, 2008).

A current perspective on attributional style needs to incorporate these varied research opinions and findings. In essence, it has been suggested that in spite of its enduring and relatively stable nature, attributional style does in fact exhibit the capacity to change (Jacobson & Hollon, 1996). However, the context of such change appears to be important. It has been suggested that the nature of attributional style as a psychological construct means its susceptibility to change is likely to be heightened within a psychotherapeutic treatment context. This opinion appears to be supported by recent research suggesting that changes in attributional style may in fact partly mediate CBT's prophylactic treatment effect (Teasdale et al., 2001).

Methodological Issues in Attributional Style Research

A number of reviews have highlighted the inconsistencies in research investigating the relationship between attributional style and depression (Calvete et al., 2008; Peterson, Raps & Villanova, 1985). One of the primary reasons for such inconsistencies appears to be the extensive variation that exists in terms of measurement approaches.

Specifically in the use of the *ASQ*, researchers have differed considerably in the way in which attributional style scores are calculated. Some researchers (e.g. Needles &

Abramson, 1990) recommend the calculation of individual negative and positive scores (CoNeg and CoPos), while other researchers attest for the calculation of an overall composite score (CPCN). This particular score has also been referred to as a "self-serving score" (Alloy, Just & Panzarella, 1997). Theoretical rationales aside, it is clear that the inconsistency of results is potentially a manifestation of such discrepant approaches. Furthermore, other researchers have purported the use of individual scores for each of the three attributional style dimensions (*internal-external; stable-unstable; global-specific*). As the field of research has grown and attributional style has increasingly been applied to different domains and subpopulations, the *ASQ* has also been adjusted. While its original reformulation as the *EASQ* was an attempt to improve psychometric properties (Peterson & Villanova, 1988), the *ASQ* has more recently been revised to allow for a specific application to children (*Children's Attributional Style Questionnaire*, *CASQ*; Seligman et al., 1984), organisations (*Occupational Attributional Style Questionnaire*, *OASQ*; Furnham, Sadka & Brewin, 1992) and other cultures (Lee & Seligman, 1997). Although a broader study of attributional style is clearly beneficial, the introduction of an increasing number of measures creates methodological challenges for researchers working in this field.

Finally, in addition to discrepancies in the calculation of scale scores, the use of different scale versions and varied definitions of depression, researchers have also utilised different study designs. The two most prominent study types have been remitted depression designs and longitudinal investigations. In the remitted depression paradigm, individuals in remission from depression are compared to those individuals with no depressive history in order to ascertain whether they possess a stronger depressogenic attributional style (Calvete et al., 2008). In longitudinal designs, those individuals possessing more depressogenic attributional styles are compared to individuals without such a predisposition to determine whether their cognitive style corresponds to a greater risk for depression (Calvete et al., 2008). It is understandable that such different research designs and retrospective or prospective angles have the potential to lead to different levels of confirmation for an attributional style diathesis for depression.

Research Gaps

In the quarter-century since the reformulated model of depression was first proposed, a breadth of research efforts have been undertaken. However, a number of areas within the domain of attributional style require further clarification and these research gaps can be conceptualised on two levels. The first level concerns improvements in the type of samples that are used. A large amount of research in this field has used sub-clinical populations such as student samples or organisational subgroups (Sweeney et al., 1986). Given the research premise is often to confirm the validity of attributional style as a risk factor for depression, an increased use of clinically depressed treatment samples is recommended (Sweeney et al., 1986; Curry & Craighead, 1990). Concomitant with an increased use of clinical samples is the important consideration of potential symptom confounding and negative recall biases in retrospective analyses. In this respect, a longitudinal prospective research design may be preferable.

The second area in need of improvement in future research is the actual measurement of attributional style. The earlier tendency to neglect attributional style for positive events should be updated in light of recent research suggesting its specificity to depression (Needles & Abramson, 1990; Alloy, Just & Panzarella, 1997). Within the present study it is advocated that an appropriate solution is an increase in research using the overall *ASQ* composite score (CPCN). This type of measurement assumes that attributions for both positive and negative events are valid in the context of depression and that their effects need to be measured simultaneously rather than independently. Particularly in the case of more longitudinal research investigating treatment outcomes and recovery, the use of both dimensions appears integral (Alloy et al., 1997).

Summary

Over the past four decades, attribution theory has undergone a significant transformation and research has confirmed the relationship between a depressogenic attributional style and an increased risk for depression. In light of a robust relationship and heeding advice from several meta-reviews, researchers have increasingly sought to explore additional factors implicated in the association between attributional style and depression. Issues such as the permanence of a depressive attributional style, the most appropriate form of measurement and the generalisability of findings to clinical

settings have surfaced. The present study addresses many of these previous limitations and issues of debate. In particular, a more longitudinal analysis of attributional style is needed, especially within a clinical treatment setting. In addition, assessments of attributional style and client beliefs should take account of both attributional styles for positive events *and* attributional styles for negative events. Such an approach appears most valid in light of the recent developments in the recovery model of depression.

Chapter 5: The Stress-Diathesis Model

Aims and Scope

As indicated in the literature reviewed in the previous chapters, research has confirmed the relationship between a stress-diathesis model and the onset of depression. However, research exploring the relationship between stress, attributional style and the treatment of depression or subsequent recovery is less comprehensive. This chapter provides an introduction to the main research questions that are explored in the current study. The first half of the chapter provides an overview of the most recent stress-diathesis literature and introduces a reformulated framework. The second half of the chapter outlines the research questions underpinning the present study and the primary study objectives.

The Stress-Diathesis Model – A Current Perspective

The preceding chapters clearly emphasise the importance of both stress and attributional style within the context of depression. Their roles have not only been theoretically supported but also empirically validated through the numerous empirical studies that have accumulated over the previous decades. However, the true strength of these two concepts lies in their interaction (Ingram & Luxton, 2005). The notion of a stress-diathesis model of depression forms the backbone of the present study and as a result, a review of its origins, empirical support and recent development is integral at this point.

The concept of a diathesis has its origin within ancient Greek medical terminology (see Monroe & Simons, 1991; Ingram & Luxton, 2005) and the relationship between stress and psychopathology was to a large extent first implicated in the early theories of schizophrenia (e.g. Meehl, 1962). The notion of a stress-diathesis interaction is typically attributed to the early thinking of Bleuler (1963) and Rosenthal (1963) and from that point on, the importance of equilibrium in maintaining health became well recognised. Disorder was thought to arise when an individual's sense of equilibrium became disturbed (Ingram & Luxton, 2005).

Within this early context the notion of vulnerability was developed and it was asserted that vulnerability factors affected the ease at which external stressors could upset an individual's homeostasis and create a state of distress (Ingram & Luxton, 2005;

Monroe & Simons, 1991). Since its early inception, the stress-diathesis model has undergone a range of iterations. In particular, although earlier models focused on genetic or biological predispositions, it is now widely-accepted that vulnerability also incorporates psychological and psychosocial factors (Schotte, Van Den Bossche, De Doncker, Claes & Cosyns, 2006).

Within the field of mental health, the notion of a stress-diathesis interaction has been applied to different types of disorders (e.g. Walker & Diforio, 1997; Zvolensky, Kotov, Antipova & Schmidt, 2005; Ingram & Price, 2001). Specifically in the context of depression, the roles of stress and attributional style are most frequently referenced. A large amount of research has sought to clarify the particular interaction that exists between stress and attributional style. In essence, it is often suggested that the two factors interact in an additive and ipsative manner and empirical studies have discounted the likelihood that a mega stress-diathesis model of interaction exists (Ingram & Luxton, 2005). However, more recent reviews have recognised that a focus on explaining the particular type of interaction between stress and attributional style has inherently neglected the possibility that the interaction may actually change over time. A dynamic interaction has rarely been explicated in work to-date (Ingram & Luxton, 2005). However, given the speculation of a kindling model of stress, more longitudinal investigations of change over time seem imperative. A somewhat related possibility also concerns the idea that diatheses might be better conceptualised as continuous variables, rather than as dichotomous or categorical concepts. Particularly in the context of attributional style, a continuous perspective is likely to yield a greater level of ecological validity.

A Reformulated Stress-Diathesis Model of Depression and Recovery

It has been suggested that previous research in the stress-diathesis domain has been too focused on attempting to decipher the type of interaction or the predictability of the model in terms of depression *onset* (Ingram & Luxton, 2005). In light of the emphasis on recovery models of depression and the reality of incomplete treatment effects, there is a clear need for research to now be extended to include changes in the stress-diathesis interaction *during* the treatment process. More specifically, it can be assumed that the initial stress and diathesis drivers of depression onset are likely to be

influential in determining individual variations in CBT treatment effects. It is intended that the present study will test this particular proposition.

The stress-diathesis framework provides the theoretical basis for the present study and the model needs to be evaluated in light of the literature reviewed in the preceding chapters. In response to some of the recent developments in the literature and in order to incorporate other closely-related theories, a reformulated stress-diathesis model is now presented. This represents one of the first attempts to more comprehensively define the variables involved in the stress-diathesis process. Importantly, it attempts to unwrap the complexity in the way in which the variables correlate and affect one another in the context of depression. The reformulated model represents an extension of the original framework and it is anticipated that the more specific definition of variables will allow for a more accurate and valid testing of the related theory. The revised model is presented in Figure 5.1.
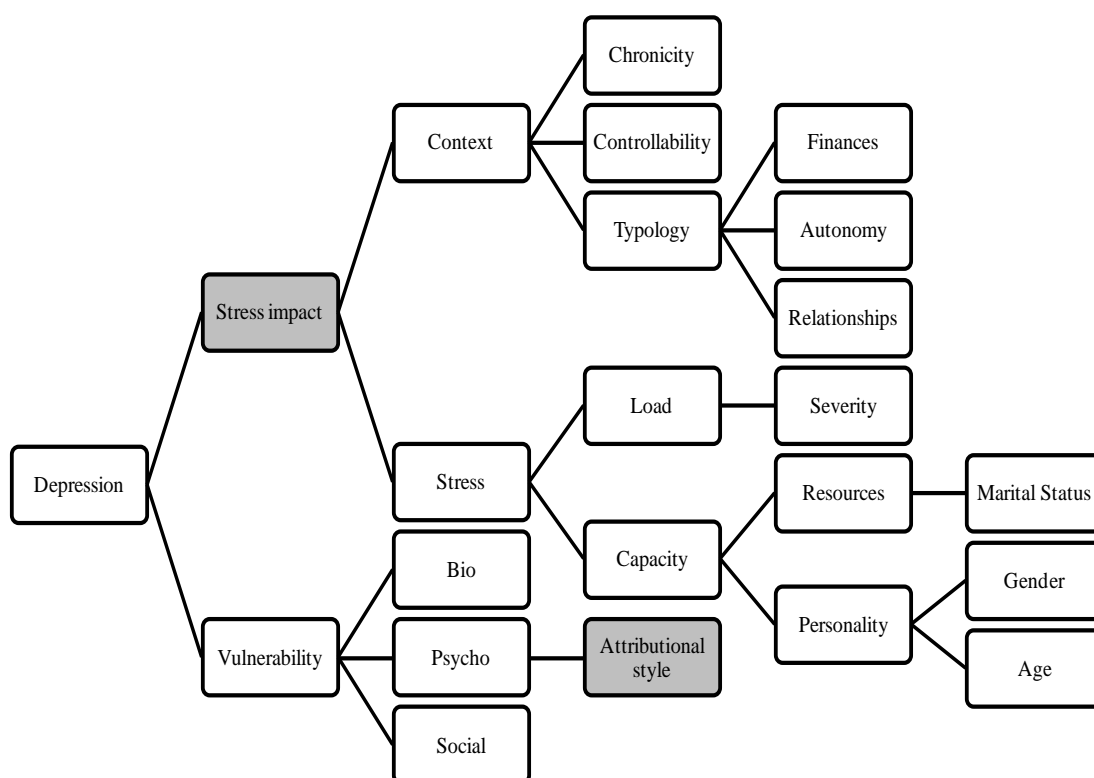
Figure 5.1. A reformulated stress-diathesis model of depression and recovery.[5]

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[5] *Note*. The two concepts explored in the previous chapters – stress impact and attributional style – are shaded to highlight their role in the reformulated stress-diathesis process

The reformulated model is not intended to provide a completely comprehensive review of the mechanisms at work in the context of depression. For example, although a number of biological, social and psychological diatheses of depression have been reported, the reformulated model highlights only the psychological diathesis of attributional style, as it is the vulnerability factor most relevant to the present study. Most importantly, the above reformulated model offers a more comprehensive review of the stress perspective. The distinction between qualitative and quantitative aspects of stress is evident and the notion of a new concept entitled stress impact is explicated. The composition of the stress concept as entailing both a quantitative measurement (the effect of load and capacity) and a qualitative measurement (the consideration of contextual factors) is outlined. This is also the first time that the term "stress impact" has been coined and extensively examined within a clinical study. Figure 5.1 also highlights a number of stressor characteristics such as chronicity and relevance to finances, autonomy and relationships. These particular qualities have been said to influence the relationship between stress and depression and their inclusion in the model at this point is preliminary. It is hoped that the ensuing study will test their validity and confirm or dispel their relevance to the overall dynamic.

Study Objectives

The primary objective of the current study is to clarify the relationship between stress, attributional style and depression. The reformulated stress-diathesis model in Figure 5.1 forms the basis for this investigation and it is hoped that the study will confirm which drivers are in fact most important. Given the longitudinal nature of the present study, a prime opportunity exists for investigating how stress and attributional style influence changes in depression over time and the specific recovery curves that clients exhibit. This focus on longitudinal change provides a complementary perspective to previous studies that have focused primarily on depression onset or the relative permanence of diathesis factors.

Hypotheses

Six main hypotheses are investigated in the present study:

1. As clients progress through therapy, their overall level of depression will lessen

2. As clients progress through therapy, their stress impact will decrease

3. A relationship between change in stress impact and change in depression will be observed

4. As clients progress through therapy, their attributional style will become less depressogenic

5. A relationship between change in attributional style and change in depression will be observed

6. Attributional style will moderate the relationship between stress impact and depression

Chapter 6: Methodology

Aims and Scope

This chapter introduces the methodology used in the current research. The two-phase structure of the current study is presented first, followed by a discussion of the treatment sample and the associated recruitment and treatment processes. The various measures that are used in the study are introduced next, with attention given to their relative psychometric properties. As the measurement of stress is a focal point within the current study, particular emphasis is placed on the assessment of stress and the study's novel adaptation of a pre-eminent stress measure is detailed. The section concludes with a review of the stress measure's psychometric properties, and a description of how the measure's reliability will be evaluated.

Current Study

This research was part of a longitudinal clinical study assessing the efficacy of 20 sessions of CBT for depression. The study was administered at the Centre for Psychology outpatient clinic at Massey University in Albany, Auckland and therapy was provided by advanced trainee Clinical Psychologists who were concurrently completing their Doctoral Degrees in Clinical Psychology. Ethical approval for the study was gained on 3 September 2006 by the Northern X Regional Ethics Committee, which is accredited by the HRC (Ethics committee reference number NTX/06/07/085). The study was also investigating the effectiveness of a new homework protocol and consequently a rigid training programme was adopted for all therapists involved. Specifically, there were two distinct phases to the study – the *Therapist Training Phase* and the *Clinical Phase*.

Therapist Training Phase

The aim of the *Therapist Training Phase* was to train therapists to be fully-qualified and competent in administering CBT. This enabled therapists to participate in the study and treat clients suffering from their first episode of depression. Seven therapists were trained to a competent level and their training consisted of the following components:

- Three full-day workshops involving intensive training in the administration of CBT for depression. This also included training in using the particular homework protocol that was administered in the study (see Kazantzis, MacEwan & Dattilio, 2005 for specific detail on the protocol)

- Video assessments that involved being videoed while delivering mock therapy sessions. These were subsequently rated for adherence to the CBT protocol. One hundred percent adherence was achieved and across all therapists this required a maximum of three video assessments

- Completion of the week-long block course *"Psychotherapy I: Theory, Research & Practice"*, which is a prerequisite for clinical training at Massey University

- Completion of the week-long block course *"Theory and Practice of CBT"*, which is a core paper in the Massey University Postgraduate Diploma in CBT

- Completion of the week-long block course *"CBT for Depression"*, which is a core paper in the Massey University Postgraduate Diploma in CBT

Clinical Phase

The aim of this phase was to administer CBT to clients suffering from their first episode of clinical depression. Once they had progressed to the *Therapist Training Phase*, therapists were assessed by a registered Clinical Psychologist to ensure they met the clinical research criteria for CBT therapist competence. This was an essential step in allowing therapists to take on additional clients. Clinical competence was assessed using the *Cognitive Therapy Scale* (*CTS*; Young & Beck, 1980).

The *CTS* is a measure of therapist competence in administering cognitive therapy for depression. It is an observer-rated scale that contains 11 items divided into two subscales. One subscale measures the therapist's 'General Skills' (establishing an agenda, obtaining feedback, therapist understanding, interpersonal effectiveness, collaboration, pacing) and the other subscale measures 'Specific Cognitive Therapy Skills' (empiricism, focus on key cognitions and behaviours, strategy for change, application of cognitive-behavioural techniques, and quality of homework assigned). Items are measured on a 7-point likert scale for which a detailed rating manual is

available (Vallis, Shaw & Dobson, 1986). The *CTS* has demonstrated high internal consistency (Dobson, Shaw & Vallis, 1985) and acceptable concurrent and discriminant validity (Vallis et al., 1986). Therapists were required to meet clinical research standards on the *CTS* upon their assessment during the *Clinical Phase*. Each item in the *CTS* is scored on a 0–6 likert scale and the highest possible total score is 66. A score of 40 or higher is considered the cut-off score for defining minimum competency amongst therapists participating in outcome research studies (Sudak, Beck & Wright, 2003; Dimidjian et al., 2006). Subsequent assessments using the *CTS* were also conducted at four time points throughout the remainder of the study, to measure continuing therapist competency.

Treatment Sample

A total of 251 individuals made initial telephone contact with the study. Of those individuals, 186 people were excluded and did not meet criteria during the phone interview stage while 65 individuals met preliminary criteria for MDD during the initial screening. These 65 individuals proceeded through to the next phase of the study. Of these clients, 37 individuals did not meet criteria to continue with therapy, either as a result of exclusion criteria, or in response to an initial screening with a therapist. At the end of this process, the current sample therefore comprised 28 clients who actively participated in therapy. An overview of the treatment sample is provided in Figure 6.1.
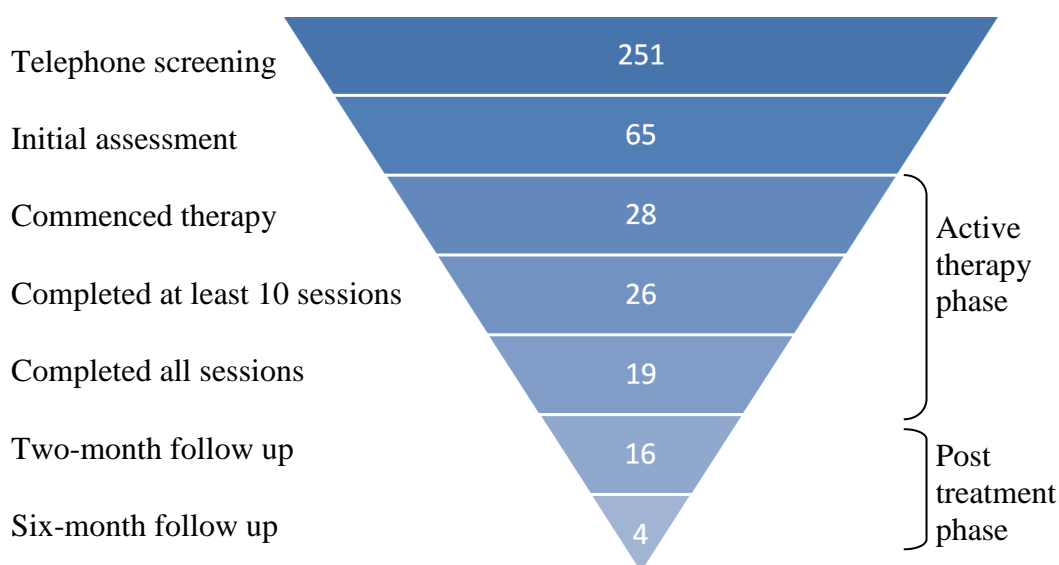
Figure 6.1. Client participation at each stage of the present study.

Study Criteria

Clients were required to meet a number of eligibility criteria in order to participate in the study. They needed to be between 18 and 65 years of age, be experiencing their first episode of clinical depression, meet DSM-IV criteria for a Major Depressive Episode and be considered appropriate for safe management in an outpatient centre with no imminent risk. Clients were excluded if they were concurrently taking any psychotropic medication, receiving any other form of therapy, or met DSM-IV criteria for Borderline Personality Disorder. Clients who approached the clinic and were ineligible to participate in the study were appropriately referred to other agencies or places of support.

Recruitment

Patients were recruited through advertisements in local media across Auckland, contact with clinical agencies in the Auckland area and University Student Health Centres at both Massey University and the University of Auckland (see Appendix A and Appendix B). Pamphlets and information cards were produced to support recruitment efforts and these were distributed to local community agencies and centres.

Treatment Process

Client participation in the study involved the following four steps:

1. Referral to the study
   - Clients were either self-referred or referred by a third party (e.g. clinical agency, family, GP)

2. Phone screening
   - Each client underwent a 30-minute telephone interview to assess for symptomatology, severity, co-morbidity, and overall intensity, duration and frequency of current symptoms of distress.

3. Intake Assessment
   - Each client completed the *Composite International Diagnostic Interview (CIDI)*, which is a 50-minute structured diagnostic interview that screens

for the DSM-IV criteria for clinical depression. The *CIDI* also screens for co-morbid psychopathology and has excellent psychometric properties (for a review, see Andrews & Peters, 1998; Wittchen, 1994). In addition, clients completed the *Attributional Style Questionnaire (ASQ)* and the *Beck Depression Inventory – Revised (BDI-II)* and underwent a 90-minute assessment interview with a therapist from the study. Details and psychometric properties for these measures will be reviewed at a later stage. All clients were provided with an Information Sheet and Study Participation Sheet (Appendix C1 and C2).

4. Treatment

o Each client received 20 sessions of CBT. Therapy sessions were 50-minutes in length and therapy was administered bi-weekly for the first 4 weeks and then weekly for the 12 weeks thereafter. Clients also received 2 follow-up booster sessions at both 2-months and 6-months post-treatment. At the beginning of each session, clients completed the *BDI-II* and the *Homework Rating Scale (HRS-II).* At intake and at Sessions 5, 8, 20 and both follow-ups, clients completed the *ASQ*. At Session 8 they also completed the *Personality Beliefs Questionnaire – Short Form (PBQ-SF).*

o All therapists attended weekly supervision with a qualified practicing CBT Clinical Psychologist. Ongoing assessment using the *Cognitive Therapy Scale (CTS)* was also required, and therapists were expected to maintain a high level of competence with all clients, meeting the threshold requirements for CBT competence within a research setting.

Study Measures

All analyses within the current study were performed using *SPSS Version 17.0 for Windows* (SPSS Inc., 2008).

Beck Depression Inventory – Revised (BDI-II)

A primary concern of the study was the accurate measurement of depression, which is the dependent variable in the regression analysis undertaken in the study. The *Beck Depression Inventory – Revised (BDI-II)* was selected to be used in the study and was administered at the beginning of every session as well as at intake and at follow-up

sessions. The *BDI-II* is a 21-item pencil-paper client questionnaire that measures cognitive, somatic and behavioural symptoms of depression. Each item is scored on a 0–3 scale, with higher scores indicating more severe levels of depression. Total *BDI-II* scores range from 0–63, with scores less than 13 indicating minimal levels of depression, 14–19 indicating mild depression, 20–28 indicating moderate depression, and 29–63 representing severe depression (Beck, Steer & Brown, 1996).

As a measure of major depression, the *BDI-II* has demonstrated acceptable psychometric properties including adequate reliability and validity in both psychiatric and non-psychiatric samples (Dozois, Dobson & Ahnberg, 1998; Beck et al., 1996; Steer, Ball, Ranieri & Beck, 1997; Steer & Clark, 1997). High internal consistency estimates have consistently been confirmed (Steer et al., 1997; Steer, Kumar, Ranieri & Beck, 1998) and psychometric reviews have also confirmed its improved external convergent and divergent validity relative to the original *BDI* measure (Beck et al., 1996; Osman et al., 1997). Although the *BDI-II* has only recently been introduced to the field of psychological assessment, its empirical testing to-date has implicated a level of psychometric integrity comparable to its strong predecessor (Beck, Steer & Garbin, 1988; Endler, Cox, Parker & Bagby, 1992; Dozois et al., 1998).

Attributional Style Questionnaire (ASQ)

In order to measure attributional style within the study, the *Attributional Style Questionnaire (ASQ)* was administered at certain sessions. In light of the questionnaire length and session time constraints, the *ASQ* was administered at intake, in Sessions 5, 8 and 20 and at both follow-up booster sessions These particular sessions were selected as a result of current literature suggesting that most therapeutic change in CBT occurs in the first 60–70% of therapy time (Ilardi & Craighead, 1994; Hollon, 1999). While there has been some debate around the rapid early response hypothesis, contention has largely concerned the cognitive mediation hypothesis. Indeed, the notion of a rapid treatment response is a largely separate and well-supported phenomenon (Longmore & Worrell, 2007). Recent evidence has also suggested that the rapid early response phenomenon may actually be more of a general phenomenon, and not something specific only to depression (Wilson, 1999). Consequently, it was thought that results from the *ASQ* would be more informative and valid if collected with an emphasis on the first ten sessions.

The *ASQ* (Peterson et al., 1982) is a widely used measure of attributional style. As outlined in *Chapter 4*, the *ASQ* is a pencil-paper client questionnaire that presents individuals with six positive and six negative hypothetical outcomes. Participants are required to suggest possible causes of the outcomes and then rate each cause on three 7-point likert scales. The scales reflect the extent to which the cause is external versus internal, stable versus unstable, and specific versus global. Overall, the measure gives separate composite subscale scores for the positive and negative scenarios. The subtraction of total negative scores from total positive scores gives an overall composite score for each individual (referred to as CPCN). This is said to provide a measure of the extent to which the participant has a depressogenic attributional style (Teasdale et al., 2001).

The *ASQ* has strong psychometric properties, with acceptable internal consistency and test-retest reliability (Peterson et al., 1982; Ilardi et al., 1997). It has also demonstrated reasonable predictive validity (Golin, Sweeney & Shaeffer, 1981) and stability over a 52-year interval (Burns & Seligman, 1989).

Measuring Stress

While depression severity and attributional style both have psychometrically-valid and reliable questionnaires that can be implemented for their measurement, the measurement of stress within the current study presents a much more complicated issue. Indeed, a thorough review of the literature highlighted the complexity inherent in measuring or categorising stress and its role in depression. As a result, a significant component of the current research was the development of appropriate measurement tools for this purpose. The measurement of stress within the context of this study involved two stages. In the first instance, the *type* of precipitating stressor was identified and in the second stage, the *amount* of impact that the stressor was causing was assessed and calculated at various time points throughout therapy.

Part 1: Identifying Types of Precipitating Stressors

A large body of research purports the importance of exploring the relationship between the *type* of stressor a client is exposed to and the subsequent course of depression or reaction that ensues (Wallbott & Scherer, 1991; Vitaliano, Russo & Maiuro, 1987; Monroe, Kupfer & Frank, 1992; Monroe et al., 2006). In the current

study an important stage was therefore the collection of information concerning the types of stressors that precipitated clients' depressive episodes. In order to do so, a specific questionnaire entitled the *Identification of Precipitating Stressors Questionnaire (IPSQ)* was developed. The *IPSQ* was completed by all therapists in the study and a separate questionnaire was completed for each client in the study. The *IPSQ* was developed in accordance with current literature as it incorporates a range of factors that have been framed as important within the assessment of stressors. In particular, the *IPSQ* asks therapists to list up to three main stressors that they believe precipitated their client's depression. Each stressor is rated for severity on a 0–6 likert scale. Therapists then rate each stressor on five dimensions that reflect some of the most frequently measured components of stress within the current literature:

- Extent to which the stressor is affiliative-related

- Extent to which the stressor is autonomy-related

- Extent to which the stressor is financially-related

- Extent to which the client is in control of the stressor

- Extent to which the stressor is chronic

For the last dimension of chronicity, classification subtypes were taken from Elliott & Eisdorfer (1982). These four categories classified the particular stressor as belonging to one of the following subtypes:

- *Acute time-limited event* (duration less than three months) – The stressor is confined to a definite short-term period

- *Stressful event sequence* – One major event sparks a series of related events that continue after the initial event has passed

- *Chronic intermittent stressful events* (duration more than three months) – Events that occur periodically (e.g. once per week; once per month)

- *Chronic stress condition* (duration more than three months) – Situations that may or may not be initiated by a discrete event

In order to ensure sufficient reliability and validity, supplementary guidelines were also developed to assist therapists in their completion of the *IPSQ*. These included clear definitions of each dimension and hypothetical examples to demonstrate how the

scale should be used. These guidelines were developed to ensure that each therapist would complete the questionnaire in a similar way. The questionnaire was then assessed by four practicing Clinical Psychologists who applied the draft *IPSQ* to clients they were currently working with. A revised version was then completed on the basis of their feedback and the final *IPSQ* was used by all therapists in the study (see Appendix D).

Part 2: Measuring Stress Impact

Selecting an appropriate measure to assess stress impact over time

The second stage of stress measurement involved measuring the quantitative impact of the stressor on each individual and assessing how this changed over the course of therapy. An important feature of the current study was the intention to measure stress impact in an objective format. As mentioned in *Chapter 3*, the choice of subjective versus objective measurement remains a subject of debate within the current literature (Lepore, 1995). In particular, the potential for negative bias, social desirability, or inaccurate recall or attribution within the current study influenced the decision to measure stress objectively. The objective stress measurement was conducted using the video-taped therapy sessions (Watson, Pennebaker & Folger, 1987).

A thorough literature review was completed in order to search for any pre-existing measures that could be appropriate for this particular type of assessment. However, as this is a relatively new domain within the research, measures specifically intended for rating stress impact via video observation have not yet been developed. As a result, the approach taken in the present study involved drawing upon a subjective scale and applying it to the video domain. Among the literature currently available, the *Impact of Event Scale (IES*; Horowitz, Wilner & Alvarez, 1979) appeared on a priori grounds to be the most applicable to the current study. The *IES* is a pencil-paper questionnaire completed by clients about specific stressors in their lives and the questionnaire takes approximately 10 minutes to administer. The *IES* is based on Horowitz's (1976) model of traumatic stress and it has been demonstrated to have excellent psychometric properties. Indeed, a large amount of literature has accrued in support of its use as a measure of stress reaction after traumatic events (see Sundin & Horowitz, 2002; 2003). It has also been shown to have high specificity (.88) and high sensitivity (.89) when compared to a diagnosis using the *Clinician-Administered PTSD Scale* (*CAPS*;

Neal et al., 1994). Psychometric reviews have also shown the *IES* to have a reported Cronbach's alpha rating of .82–.90 for the avoidance subscale and .79–.91 for the intrusion subscale (Zilberg, Weiss & Horowitz, 1982; Weiss & Marmar, 1997; Classen, Koopman, Hales & Spiegel, 1998; Briere & Elliott, 1998). More recently, its cross-cultural reliability has also been supported (van der Ploeg, Mooren, Kleber, van der Velden & Brom, 2004) and the *IES* has been translated into multiple languages for both clinical and research use.

At this point it is important to note that this study intentionally used the original *IES* rather than the revised version of the *IES*. In 1997 a revised 22-item scale was established (*IES-R*; Weiss & Marmar, 1997). This was premised on the publication of the DSM-IV and the revised scale includes additional items assessing hyperarousal symptoms and flashback experiences. The inclusion of these symptoms therefore allows for a more valid and accurate diagnosis of Post-Traumatic Stress Disorder (PTSD) to be made. The revised version of the scale was not used in the current study for a number of important reasons. Firstly, the purpose of assessment in the current investigation was to measure stress impact and not PTSD, which is the main focus of the *IES-R*. Secondly, data on the psychometric properties of the *IES-R* are still only in preliminary stages (Pratt, Brief & Keane, 2006). For example, only a very small number of studies have examined its internal consistency and although early data appears positive, the original *IES* has undergone a more rigorous review and process of validation (Baumert, Simon, Guendel, Schmitt & Ladwig, 2004; Creamer, Bell & Failla, 2003). Similarly, sound data investigating the convergent and discriminant validity of the *IES-R* is not yet available (Pratt et al., 2006) and more studies are needed to check the *IES-R* psychometric properties before it is used extensively in clinical or research formats (Pratt et al., 2006; Beck et al., 2008). In light of these observations, the original *IES* was most appropriate for the current investigation.

Adaptation of the Impact of Event Scale for use in the present study

The *IES* contains 15 items that measure the impact of stress over a period of seven days. The 15 items consist of 8 avoidance items and 7 intrusion items and each item is scored according to the frequency with which the client believes it has occurred. Although in the original version of the *IES* clients were also required to measure the intensity of each item, it was determined that intensity and frequency were highly

correlated (Horowitz et al., 1979). In addition, clients often struggled to score the intensity item and as a result, the final version of the *IES* only measured frequency (Horowitz et al., 1979). However, the objective format within the current study counteracts this difficulty with subjective scoring. Moreover, as ratings of intensity would appear to be more applicable to the aims of the current study, the correlation between frequency and intensity supports the substitution of frequency for intensity as the primary dimension of rating within the current investigation.

Within the current study, each client was assessed for stress impact at eight different time points across therapy. The *IES* was used to rate Sessions 1, 3, 5, 8, 10, 13, 16 and 20. While the 15 items remained exactly the same, some minor adjustments to the scoring of the *IES* were implemented in order to make it amenable to a video format. For the purposes of the current investigation, the revised *IES* which is applicable for use in an objective format can be called the *Impact of Event Scale – Video Format (IES-VF)*.

First of all, items in the *IES-VF* were scored for intensity on a 0–5 likert scale. The rationale behind using such a polytomous rating scale is that it is most applicable to clinical use and it also allows for adequate sensitivity in client scores (Reise, Waller & Comrey, 2000; Comrey, 1988). A pilot trial of a 0–10 likert scale was performed and it showed that a scale of this length was more likely to result in compromised reliability. Consequently, the 0–5 likert scale was preferred and a shorter scale also appears more consistent with current literature (Clark & Watson, 1995). In addition, an extra response option of "Not Rated" was included in the scoring of the *IES-VF*. This provided an option for those situations where not enough information was available on the video in order to accurately score that particular item. Finally, each of the scores from 0–5 were anchored for the purposes of the study, to ensure that the rating scale would be used reliably across different client sessions.

In applying the *IES-VF* specifically to sessions of CBT, it became clear that the questionnaire items could be classified into the categories of *cognition, behaviour, emotion* and *physiology* which comprise the 5-Part Model so frequently referenced in CBT (Padesky & Greenberger, 1995). As a result, the scoring sheet used in the current study was designed in such a way that it coincided with this breakdown. This also allowed for the possibility of scoring the level of stress impact more specifically on

one particular dimension, if required. The *IES-VF* and the relevant anchors are included in Appendix E.

Phases of rating using the IES-VF in the present study

There were three key phases in the use of the *IES-VF* within the current study. The first phase was essentially a training phase and involved the practice administration of the *IES-VF* alongside an experienced Clinical Psychologist. Session videos were selected at random for the purposes of training and the training phase concluded with a check for interrater reliability across a number of sessions.

Once adequate levels of consistency were obtained (average alpha = .80 across all sessions), the next stage of ratings was commenced. This second phase was essentially the rating phase and it involved the administration of the *IES-VF* across all of the sessions that were used in the current study. The total number of therapy sessions that were rated for the purposes of this investigation was 188 and each session was approximately one hour in length.

The third and final phase was essentially a verification phase and it included a final check for interrater reliability (by a Clinical Psychologist), using randomly-selected sessions that had been rated during the second phase. Reliability checks were also administered earlier in the second phase, so that any identified difficulties could be remedied early on and their overall effects mitigated.

Assessing the psychometric properties of the IES-VF in the present study

The measurement of stress and ensuring that its assessment is consistent and reliable is at the heart of this study. To ensure this was achieved, two reliability checks were administered. The first, as mentioned in the previous section, was a test of interrater reliability in order to ensure that the use of the *IES-VF* conformed to the standards employed by an experienced CBT clinician. The second reliability analysis involved a more specific item analysis and a consideration of which particular items were most reliable across time and across different clients.

For the purposes of performing the interrater reliability analysis, three sessions were selected at random and scored simultaneously by the independent rater and the experienced clinician. At the end of each video session, scores were calibrated and

justifications for the scoring approaches were discussed. A range of clients and session numbers were examined and the method of percentage agreement was used to assess for reliability, as its relatively gross approach imposes a high threshold for reliability. Percentage agreement is a standard calculation of the percentage of total observations that two raters agree on. Heeding advice from current literature, chance agreement rates were also calculated, so as to assist in the accurate interpretation of reliability using this particular approach (Hayes & Hatch, 1999). Table 6.1 provides an overall summary of the reliability analyses performed in the training phase and Table 6.2 presents the chance agreement rates specific to the study. A more comprehensive review of the results from individual sessions is presented in Appendix F.

Table 6.1

Summary of the IES-VF Interrater Reliability Analysis Across all Training Sessions Calculated Using Percentage Agreement

	Intrusion Items	*Avoidance Items*	*Total Items*
Cognition	*78%*	*50%*	*67%*
Emotion	*83%*	*92%*	*89%*
Behaviour	*No items*	*100%*	*100%*
Physiology	*100%*	*No items*	*100%*
Total	*86%*	*83%*	*84%*

Note. The overall summary represents an average of all results from the training phase.

Table 6.2

Calculation of Chance Agreement Rates Using the IES-VF

	Intrusion Items			Avoidance Items		
	Number of Questions	Number of Options	Chance Agreement	Number of Questions	Number of Options	Change Agreement
Cognition	3	21	4.76%	2	14	7.14%
Emotion	2	14	7.14%	4	28	3.57%
Behaviour	-	-	-	2	14	7.14%
Physiology	2	14	7.14%	-	-	-

Note. Chance = Number of questions/ (Number of options x Number of questions) x 100.

Overall it can be seen from Table 6.1 and 6.2 that clinicians achieved agreement levels of 67–100% versus the chance agreement levels of 3–7%. These results clearly demonstrate the accuracy that can be achieved when using the *IES-VF*. Reliability

scores also consistently improved across the sessions. Results from Table 6.1 indicate that items measuring the impact of stress on a client's cognitions were perhaps the most difficult to score initially, in addition to those items that assess the effect of stress on emotions. Nevertheless, 100% reliability was achieved by the end of the training phase (i.e. complete agreement) and reliability estimates were consistently higher than what would be achieved solely by chance. An overall interrater reliability of 84% agreement ($\alpha = .84$) is also clearly within an acceptable range for clinical and research work, and above the .60 acceptability for reliability coefficients proposed by DeVellis (2003).

The second stage of reliability assessment involved an in-depth analysis of the items included in the *IES-VF*. Although the original *IES* has been subject to significant reliability assessment, the novel application of the *IES* in an objective format in the current study warrants additional assessment. Consequently, a reliability analysis was performed to investigate the reliability of the *IES-VF* in each session. This analysis was conducted in *SPSS* and the results are presented in *Chapter 8*. Analysis for each session provided an overall Cronbach's alpha in addition to relative Cronbach's alpha values if each item was deleted. As the intention was to achieve the highest alpha, the consequent improvements or reductions achieved by removing various items from the measure were compared across sessions. In the instances where data was missing for a particular session, the *SPSS* missing data computation function was used. Missing data was calculated on the basis of only those scores for that particular session, so as to increase the accuracy and validity of imputation.

The end result of the reliability analysis was a measure of *IES-VF* that included only those items deemed acceptably reliable across various clients and sessions. It is essential to conduct this type of reliability analysis for two reasons. Firstly, it ensures the integrity of the study results by eliminating additional error and unexplained variance in the model that occurs if items are measuring traits inconsistently or inaccurately. Secondly, a reliability analysis helps to clarify and tighten the *IES-VF* so that it can be used again in future research. Given this is the first known objective application of the *IES*, it is hoped that this may be a fruitful area of research in years to come. Having preliminary work on reliability and validity helps to ensure that the measure will be used most appropriately and any replicated work will be accurate.

The Stress-Diathesis Model – measurement within the present study

At this point it is also important to review the Reformulated Stress-Diathesis Model and in particular, the approach towards measuring each of the key variables within the present study. As the study is looking to investigate a number of different predictors, a variety of sources are required in order to ascertain and measure each variable. Figure 6.2 outlines the approach towards measurement, with the measurement sources for each variable highlighted towards the right hand side of the model. While the *IPSQ* provides the majority of contextual information about client stressors, the two primary predictor variables – stress impact and attributional style – are measured by the *IES-VF* and *ASQ* respectively. In addition, the demographic data form also provides important information about each client and specifically within the context of the present study, a client's marital status, age and gender are key variables being examined.
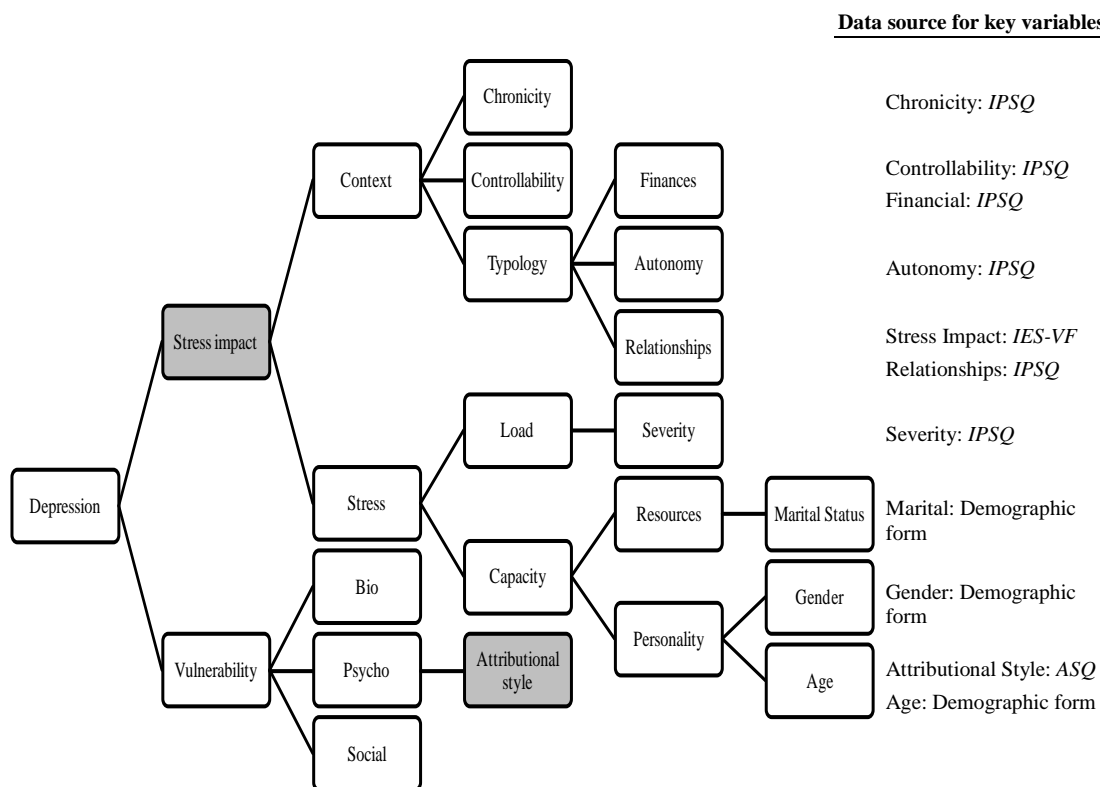
Figure 6.2. Overview of measurement sources for the stress-diathesis model.

Summary

A clear and structured methodology was implemented within the current study. The therapy phase involved two explicit stages in accordance with therapist training and competence. The treatment sample was recruited from local communities and specific inclusion and exclusion criteria were implemented. In terms of the measures used in the current study, both the *BDI-II* and the *ASQ* were selected on the basis of their psychometric properties and their amenability to use within clinical research. The measurement of stress was more complex and the measurement of qualitative and quantitative stress data was deliberately separated. The *IPSQ* was developed to enable therapists to ascertain the type of stressors precipitating depression and any associated impacts. The development of the *IES-VF* allowed for the objective measurement of stress impact across time. Both measures were assessed to ensure they yielded reliable and valid results. Reliability analysis of the *IES-VF* was particularly essential in order to ensure the integrity underlying any results within the current study.

Chapter 7: Analytical Approach

Aims and Scope

This chapter provides an overview of the multilevel analytical approach employed in the current study. To begin with, initial considerations are discussed. This includes consideration of the treatment of time and missing data within the current research. The assumptions of linearity, normality and homoscedasticity are also tested. After reviewing these initial considerations, the specifics surrounding the key parameters and data set are determined. In particular, each variable is operationalised at its appropriate level of analysis and the specific size and nature of the data set is ascertained. The chapter concludes by stepping through the various multilevel models that are developed in the current study. Their nested structure is described, in addition to the key estimates that are analysed as outcome variables in the subsequent results section.

Introduction to Multilevel Analysis

Multilevel analysis or hierarchical linear modelling (HLM; Bryk & Raudenbush, 1992; Raudenbush & Bryk, 2002) is the statistical approach used in the current study. HLM is synonymous with Mixed Effects Modelling (MEM) and Applied Longitudinal Data Analysis (ALDA).

Multilevel analysis is a more advanced type of analysis than standard approaches such as simple linear regression or multiple linear regression. Multilevel analysis is a particular methodology that allows for parameters or variables of interest to be modelled at different levels. In this way it allows for the modelling of data that has quite complex patterns of variability with parameters or variables being nested at different levels. For example, multilevel analysis can provide for a comprehensive analysis of pupils nested in classrooms, but also classrooms nested within schools (Snijders & Bosker, 1999). For more detail or a comprehensive overview of the development of multilevel analysis, Snijders and Bosker (1999) or Singer and Willett (2003) can be consulted.

A key benefit of HLM is that it represents change within a person's data over multiple time points while also modelling the different trajectories across time that different individuals can exhibit (Hankin, Fraley & Abela, 2005). Modelling the degree of

between-subject variation that exists within a population sample is a key advantage and the multilevel analysis within an HLM approach is achieved by modelling different levels of regression equations (Hedeker & Gibbons, 2006). The regression equations constructed at the lowest level (Level-1) model variations in the repeated measure over time. With respect to the current study, *BDI-II* was modelled as a Level-1 variable. At the next level in the hierarchy of analysis (Level-2), equations are modelled to represent between-client differences in the Level-1 parameters (Hankin et al., 2005). In summary, an individual client's data are captured at Level-1, while between-subject differences among outcome trajectories are modelled at Level-2 (Singer & Willett, 2003).

Multilevel analysis such as HLM has several notable advantages. In particular, it is recognised for its flexibility in handling missing data. This makes it particularly relevant for longitudinal studies where attrition becomes more of a concern (Hedeker & Gibbons, 2006). Furthermore, several researchers highlight its superiority as an analysis for extracting causal inference and examining nested relationships (Cohen & Cohen, 1983). This makes it highly appropriate for the current study, where therapy sessions are nested in clients.

Initial Considerations

Time

The literature cites a multitude of examples where researchers have inaccurately considered the role of time in research investigations. Particularly within a longitudinal research design, time is a critical variable and its accurate measurement is inextricably linked to the integrity of any research analysis (Singer & Willett, 2003).

For the current study it was important to determine a sensible metric for time before completing any analyses. While many researchers undertaking research on therapy measure time using the number of sessions, this simplistic approach is not entirely accurate in the context of the current study as therapy sessions were actually administered bi-weekly for the first eight sessions and at weekly intervals from Sessions 8 to 20. Similarly, the follow-up sessions were held 2-months and 6-months after the last therapy session. In this context time therefore needed to be measured in a way that captures this variation. As a result, time was re-formulated as a variable

entitled "Session Time" that accurately represented the number of weeks since therapy was initiated. The intake and first 8 sessions were coded as "0, 0.5, 1, 1.5, ..., 4" and Sessions 8 through 20 were listed as "4, 5, 6, ..., 16". Follow-up sessions were calculated as occurring 8.7 weeks and 26 weeks after the final session and these values were therefore added on to the time at which the client discontinued therapy. For example, if a client completed 20 sessions of therapy, their final session would be coded as "t = 16" and their follow-ups would be "t = 24.7" and "t = 42" respectively. Alternatively, if a client ended therapy prematurely in Session 14, their final session would be coded as "t = 10" and their follow-ups would be "t = 18.7" and "t = 36". Coding time in this way ensured that the elapsed time from the initiation of therapy was accurately modelled and that the different times in the therapy cycle were accurately reflected. This ensured that slow-burn effects (e.g., between the final session and the first follow-up session) were not forced to be one unit apart in the final HLM analysis.

Missing data

Another important consideration was the treatment of missing data in the current sample. This is a common consideration in multilevel analysis and choosing an appropriate approach to remedy cases of missing data is integral in order to ensure unbiased estimates with robust statistical power and valid conclusions (Acock, 2005). In the process of choosing the most appropriate approach, it is important to consider both the *amount* of data that is missing and also the *type* of missing values (Schafer, 1997).

The first step involved evaluating the scale of the problem at hand, in terms of how much data is actually missing from the present study. The current study uses *ASQ*, *BDI-II*, *IES-VR* and *IPSQ* as primary measures and overall, less than 1% of data was missing, and the amount of missing data for each measure was well within the acceptability limits proposed in recent literature (Arbuckle, 1996). An overview of the missing data is provided in Table 7.1 and upon closer examination it is only in the measurement of the *ASQ* and *BDI-II* that data was actually missing. The *ASQ* dataset was largely complete with only two out of six sessions missing any data for any of the clients – Session 20 and the 2-month follow-up session. Importantly, the proportion of missing data was less than 3% in both of these sessions. With respect to *BDI-II*, data

was missing in three sessions. In Session 2, 0.17% of data was missing; in Session 8, 0.18% of data was missing; and in Session 17, 0.21% of data was missing. This analysis explicates the limited amount of data that was missing overall.

Table 7.1

Overview of the Amount of Missing Data in the Final Data Set

	ASQ		
	Number of Missing Items	*Total Items*	*Missing Data*
Session 20	6	228	2.63%
2-Month Follow-up	5	180	2.78%
	BDI		
	Number of Missing Items	*Total Items*	*Missing Data*
Session 2	1	588	0.17%
Session 8	1	567	0.18%
Session 17	1	483	0.21%

Following on from this, the nature of the missing data needed to be considered, as this influences the decision about how to treat missing data in the study. Essentially, three types of missing values exist and Rubin (1976) is considered to be one of the first authors responsible for coining such a classification system. The first type of missing data is that which is 'missing completely at random' (MCAR). This situation occurs when the reason the data is missing is unrelated to any observed or unobserved data. The second type of missing data is that which is considered to be 'missing at random' (MAR). This situation occurs when the missingness mechanism depends on the observed data but is unrelated to the unobserved data (for example if extra sessions were not provided to clients with high *ASQ* scores). Finally, data is considered to be 'not missing at random' (NMAR) if the reason it is missing depends on the unobserved data, even after accounting for the observed data. This final scenario is considered the most difficult condition to model for (Scheffer, 2002). Within the present study, missing data was considered to be MCAR, as the reason the data was missing was unrelated to the observed or unobserved data.

Several different approaches are possible when it comes to correcting for missing data. Until recently, methods to account for missing data tended to favour those approaches that removed data by deleting values, or that substituted in plausible values such as means or regression predictions (Schafer & Olsen, 1998). However, case deletion (either list-wise or pair-wise) is typically avoided in multivariate analyses due to its potential to create biased estimates and limit the representativeness of the concluding sample. Its use in multilevel analysis can also mean that when only small amounts of data are missing, a disproportionately large reduction in the overall sample size occurs (Schafer & Graham, 2002). Similarly, mean substitutions can dampen the relationships and level of variance within a model, while the substitution of regression predictions artificially inflates correlations (Schafer & Olsen, 1998).

In contrast to case deletion, imputation is more typically recommended as an acceptable approach when dealing with missing data in multivariate analyses (Allison, 2002). Imputation offers a more principled approach and involves filling in missing values. As it does not require any units to be deleted, it is potentially more efficient than a case deletion approach and helps to mitigate any loss of power created by a diminished sample size (Schafer & Graham, 2002). In the past few decades, expectation-maximisation (EM) imputation has significantly increased its prominence as an approach of choice when performing imputation to remedy missing data concerns (Allison, 2002). EM imputation uses the expectation-maximisation algorithm in order to predict the missing value (see Scheffer, 2002 for more detail). Given that the missing data in the present study was MCAR and that the standard approach for MCAR is to use EM imputation, this approach was employed to deal with missing data in the study.

The process of EM imputation used in the current study was consistent with best practice. In order to use EM imputation, a separate data set for each session with missing data was created, in a person-period format. Specifically for the *ASQ*, two separate data sets were created with one data set including only those responses to positive scenarios and the other data set including only those responses to negative events. This specification ensured that the subsequent missing value calculations were optimally accurate and there was no influence of unrelated items. When the missing value analysis produced items that were outside of the appropriate scale for the ASQ or the *BDI-II*, the upper or lower limit of the scale was used as a substitute value

accordingly. For the purposes of all further analyses in this thesis, imputed values have been substituted for missing items and analyses are performed using the complete version of the data set.

Finally, a hypothesis test of the nature of the missing data was also conducted. For each missing value analysis performed (for both the *ASQ* and the *BDI-II*; so seven tests in total), Little's MCAR test found an insignificant relationship between the missing data and the observed values ($p > .001$). This result confirmed that missing data was missing completely at random (Little, 1988).

Residual plots

In the fitting of multilevel models for change, it is essential to test assumptions regarding both the structural and stochastic features of each level. The three primary assumptions to check within the context of the current study are the assumptions of linearity, normality and homoscedasticity (Singer & Willet, 2003). Testing the tenability of these assumptions is possible following the methods outlined in Pallant (2007). Many authors such as Gujarati (2006) recommend testing the assumptions via visual inspection of the residual distributions and the results from such analyses are presented in Figure 7.1.
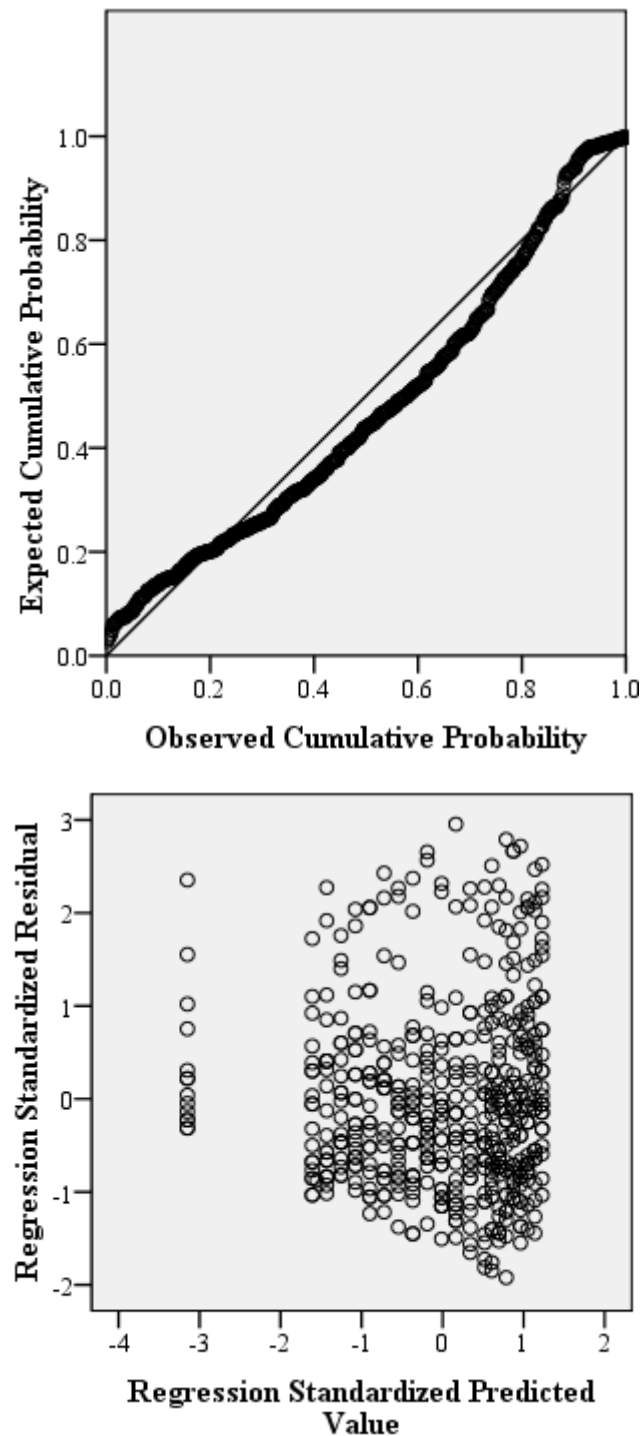
Figure 7.1. Normal probability and standardised residual plot for *BDI-II.*

Applying the standard recommendations outlined by Tabachnick and Fidell (2007), support was elicited for the assumptions of linearity, normality and homoscedasticity. The assumption of normality was confirmed by the random scattering and normal distribution of standardised residuals around the predicted dependent variable scores, rather than any notable skewing to the bottom or top. *Shapiro-Wilk's Normality Test*

also confirmed that the assumption of normality was met for the current data set (Shapiro & Wilk, 1965). The assumption of homoscedasticity was confirmed by the fact that the variance appears the same for all predicted scores, with no significant skewing or bias. This was confirmed by the fact that the residuals are distributed at roughly equal distributions across the chart. *Park's Test* also confirmed an insignificant relationship between the squared *BDI-II* residuals and the residuals for each of the independent variables (Park, 1966). This provides further support to confirm the homoscedasticity of the current sample. Finally, the assumption of linearity was tentatively confirmed by the fact that the standardised residual scores appear to be concentrated in the centre and distributed in a rectangular pattern across the scatter plot. A straight-line relationship also appears to exist between the residuals and the predicted variable scores. In other words, the spread of the residuals is randomly scattered about a horizontal line and there is no apparently systematic pattern or clustering of scores. At a later point in this chapter, the linearity of the dependent variable will again be discussed and comprehensively tested using a curve-fit analysis and significance testing, as part of the preliminary preparation for multilevel analysis. On *page 102* further confirmation is therefore ascertained that supports the assumption of linearity within the current data set and the consequent modelling of depression severity as a linear variable.

The validation of the critical properties of normality, linearity and homoscedasticity within the data set permitted the use of regression analysis, and any data cleansing or data transformation was deemed unnecessary. Indeed, the confirmed tenability of these assumptions can strengthen the confidence in the accuracy of the final results, as the risk of making a Type I or Type II error is considerably reduced. In addition to testing the dependent variable to see whether these primary assumptions were upheld, residual plots for the other main parameters were also assessed. Appendix G presents the residual plots for attributional style and stress impact and validates the assumptions of linearity, normality and homoscedasticity for those variables as well.

Defining Variables as Time-Variant or Time-Invariant

A key step in HLM involves defining which level certain variables should be modelled at. In the current study the dependent variable depression severity and the predictor

variables stress impact and attributional style had to each be defined at particular levels in the overall model.

Depression severity

In the present study, depression severity was modelled using raw *BDI-II* scores at Level-1. Within HLM, dependent variables have to be modelled at the lowest level as this represents the lowest, most-detailed level of observation (Snijders & Bosker, 1999; Luke, 2004). The current study provides a rich data set of *BDI-II* data to model at Level-1, given that the *BDI-II* was administered at the beginning of every session for all clients. An important initial step in the analysis involved the assessment of variability that exists at this lowest level. HLM is only appropriate in situations where significant variation exists between groups in terms of the dependent variable. It is therefore imperative that a first step involves confirming that such variability exists. Once this is established, variables (at either the same or higher levels) can then be modelled in an attempt to explain this variability (Bryk & Raudenbush, 1992).

Attributional style

In addition to deciphering how depression severity should be modelled, the properties and modelling of each of the two predictor variables also had to be considered. Attributional style was measured at four time points across therapy and then again at both follow-up sessions and an important consideration was whether there was sufficient variability in *ASQ* scores. Using the *ASQ* composite score (calculated by subtracting the total negative score from the total positive score) it can be seen that 89.5% of clients presented with positive total scores by Session 20, at which point the average composite *ASQ* score was 2.4. In fact, of the two clients who showed negative full composite scores at Session 20, one of them exhibited a score of -0.2 and the one client who scored -3.5 showed a similarly strong negative pattern throughout other therapy sessions. As a result, it seems that greater variation *between* individuals in terms of the positivity and negativity of their attributional style was observable in the earlier sessions. Figure 7.2 demonstrates the variability that existed between clients in terms of their overall attributional style.
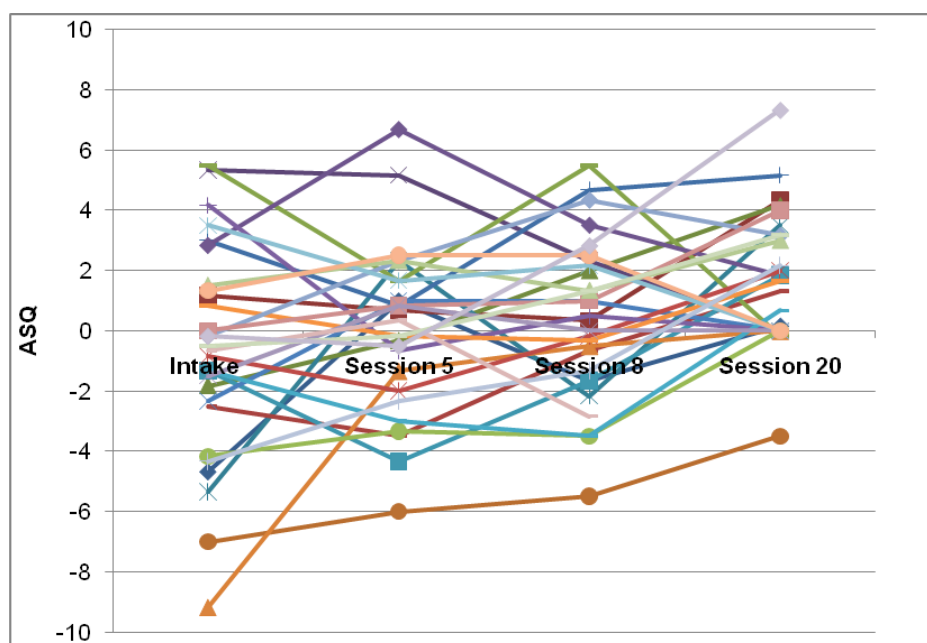
Figure 7.2. Client attributional style *ASQ* scores across the course of therapy.

It appears that at Session 20, the *ASQ* scores were not very differentiated between clients. However, client *ASQ* profiles varied considerably across the earlier sessions. Rather than clouding this earlier variability by including the scores from Session 20, for the purposes of the current study attributional style was therefore defined as a Level-2 predictor variable. Clients were able to be differentiated as primarily more depressogenic or non-depressogenic in their attributional styles by calculating the average of each client's first three *ASQ* scores. To describe these cases the term "mostly depressogenic" was used for those clients with average composite scores greater than zero, and "mostly non-depressogenic" was used for those with average composite scores less than zero. The modelling of attributional style as a Level-2 variable accords with current theory as what appears to influence recovery most is the type of attributional style clients present with for the majority of sessions *during* therapy, rather than the level of optimism or pessimism they present with at the *conclusion* of treatment (DeRubeis et al., 1990). Attributional style is a key defining variable for depression because of its variation between individuals and not within individuals and so the calculation of an average score for each individual client is also consistent with the predominant viewpoint in current literature. Although debate ensues, attributional style is commonly referenced as having an intrinsic quality. Although these initial results from the current study highlight changes across time, they also suggest a level of consistency within an individual, at least in the first half of

therapy, in terms of whether their style is predominantly depressogenic or non-depressogenic.

Stress impact

With respect to the stress impact variable measured in the current study, clear variability existed both between-individuals and within-individuals over time. Upon closer examination clients showed distinctive patterns in terms of their stress impact trajectories over the course of therapy. Indeed, they appeared to fall into one of three different groups with respect to their recovery patterns. When considering the percentage improvement each client achieved from Session 1 to Session 10 (the half-way therapy point), clients showed either a rapid, expected or minimal level of improvement. In the current study, a rapid improvement occurred when clients improved their stress level by at least two-thirds; an expected improvement occurred when clients improved their stress level by at least one-third but less than two-thirds; and a minimal improvement occurred when clients improved their stress level by less than one-third.

A sensitivity analysis provided confirmation for this grouping and alternative groupings and thresholds did not provide the same level of data fit. Figure 7.3 demonstrates the sensitivity analysis around the stress groupings. Six clients experienced minimal stress improvements; 13 clients exhibited expected stress improvements; and 7 clients showed rapid improvements in stress by Session 10.
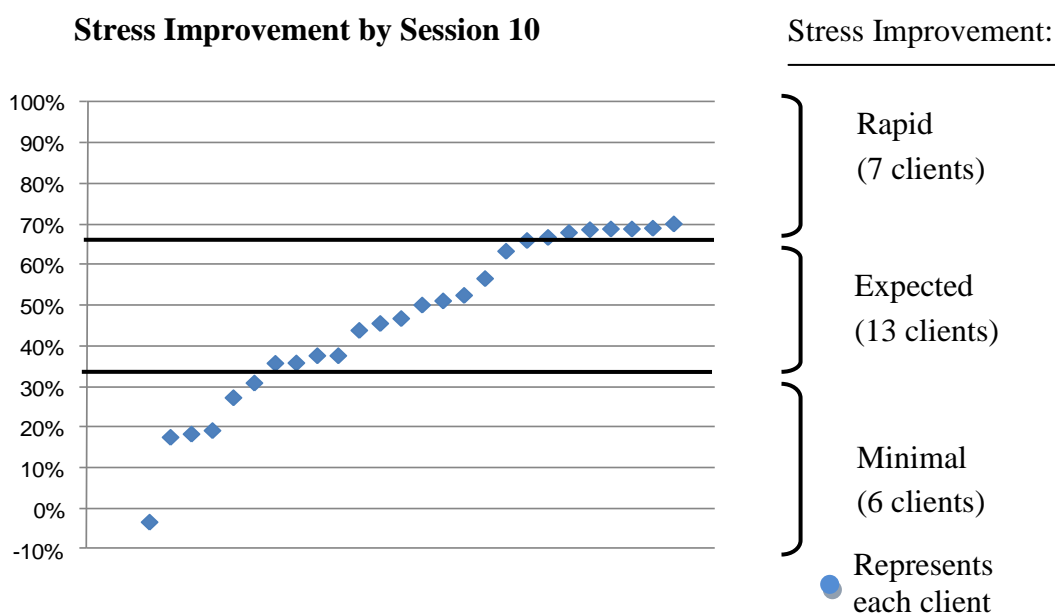
Figure 7.3. Sensitivity analysis of stress curve groupings.

As a result of this client group categorisation, the current study treated stress impact as a Level-2 variable for the purpose of analysis. A new variable entitled "Stress Curve" was created to represent the three different stress trajectories. Each client was assigned an ordinal dummy code of 0, 1 or 2 to represent their corresponding grouping (minimal, expected or rapid improvement).

Defining the Data Set

After defining the variables in the current study and assigning them to their appropriate levels of hierarchy within the model, the next step involved constructing the final data set for analysis. In particular, three main decisions had to be made in terms of which data to include or exclude in order to yield the richest possible data set. Firstly, a decision needed to be made about how to treat those clients who did not complete the full 20 sessions of therapy. Secondly, a decision was needed concerning the appropriate number of therapy sessions to include in the data set and in particular, whether to include follow-up sessions. Finally, once the appropriate size of the data set had been determined, consideration then had to be given to the linearity of the dependent and predictor variables and any ensuing analytical implications. While the previous sections in this chapter have addressed similar issues, it is important to note that they were focused more on individual measures and decisions related specifically to each measure, as opposed to overarching decisions concerning the final data set. For example, previous sections have addressed whether or not to include ASQ follow-up measurements. This is an important but separate issue to which of the follow-up sessions should be included in the final data set overall, or whether clients who terminated therapy early should still be included in the analysis. In other words, the work discussed to-date has been incremental and at this point the focus now shifts to the *overall* data set and defining *its* parameters.

Determining the appropriate sample size

As discussed in the missing data section earlier, issues concerning attrition need to be considered as a result of the longitudinal nature of the study. Several clients were unable to commit to all 20 sessions plus the 2 follow-up boosters and as a consequence an important initial decision concerned how best to treat those clients who discontinued therapy prematurely.

Upon closer investigation it was clear that not all clients who discontinued therapy completed a similar number of sessions. Some clients completed as few as six sessions, while others only attrited at the follow-up sessions. In order to determine which of these clients to include in the current investigation, a number of alternative data sets were created by implementing increasingly strict inclusion criteria. The first data set ("*Absolute" data set*) consisted of all clients who attended at least one therapy session (n = 28). The second data set (*"Weekly" data set*) consisted of all clients who progressed to at least Session 8. This represented the point in therapy where sessions became weekly (n = 27). The third data set (*"Half-way" data set*) consisted of all clients who progressed to at least Session 10 and therefore completed at least half of the therapy sessions (n = 26). The fourth data set (*"Relapse" data set*) consisted of all clients who progressed to at least Session 10 but also terminated therapy with a relapse prevention session (n = 22). Finally, the fifth data set (*"Complete" data set*) consisted of all clients who completed all twenty therapy sessions (n = 19). Multilevel analysis was then performed on each of these five data sets and each model was compared to the alternative models. Particular attention was given to the amount of variance and the significance of any fixed effects as these factors are cited as important determinants of multilevel model fit (Snijders & Bosker, 1999; Singer & Willett, 2003).

As the multilevel model and its analysis will be discussed systematically in *Chapter 8*, only a brief overview of the results from the data set comparison analysis is presented in this section. For more detail on the comparison between the different data sets, a comprehensive account of the analysis can be consulted in Appendix H.

Theory and research best practice would suggest that a larger sample size (provided validity is ensured) would be more preferable. This position is consistent with recommendations explicated in current research (Van der Heijden, Donders, Stijnen & Moons, 2006). Researchers such as Longford (2005) argue that case deletion should typically be avoided as it frequently yields a biased data set that is more likely to produce invalid results due to an increased susceptibility to response or attrition bias. To test the validity of this assumption, the results from the comparative analysis across the five data sets were consulted. Overall, the results indicated that the model's predictive power was based on the clients who actually *completed* therapy and was *not* significantly enhanced by adding in clients who completed less sessions of therapy.

This conclusion was based on the fact that a greater level of variance (particularly at Level-2) was explained in those models where a larger sample size was utilised (see Appendix H). The analysis for the current study therefore proceeded by utilising a data set that maximised sample size. This approach ensured that the available data were being utilised and the data set's generalisability was maximised (Kessler, Little & Groves, 1995).

However, one other condition was important to consider. The measurement of both stress curve and attributional style as Level-2 variables required clients to have completed at least half of the therapy sessions. As a result of this condition, those clients who failed to complete at least 10 sessions of therapy were unable to be assigned a stress curve or attributional style score. The *"Half-way"* data set is therefore the preferred data set for the current analysis, as its requirement that clients have completed at least 10 sessions ensures that all clients in the sample have valid scores for both stress curve and attributional style at the second level of analysis. This provided a sample size of n = 26, which is also not too much smaller than the absolute pool of n = 28, and yet considerably larger than the sample size associated with using the *"Completed"* data set (n = 19). The analysis therefore proceeded using a data set comprising those clients who completed at least 10 sessions of therapy.

Determining the number of sessions to include

Having determined the *"Half-way"* data set to be the richest available, the focus then shifted to determining the number of sessions that needed to be included. Clients presenting for therapy were eligible to receive 20 sessions of CBT supplemented by 2 additional follow-up sessions. These booster sessions were offered 2-months and 6-months after their final session. As with all longitudinal studies, it was important to consider whether these follow-up sessions should be included in the final multilevel analysis. Table 7.3 outlines the attendance rates for follow-up sessions for the 26 clients in our revised sample.

Table 7.3

Follow-up Attendance Rates

	Number of Clients	Percentage
2-Month Follow-up	14	53.8%
6-Month Follow-up	3	11.5%

From Table 7.3 it is evident that although 2-month follow-up sessions were frequently attended, attendance declined significantly between the first and second follow-up session. Given that 2-month follow-up data were collected for the majority of clients, the first booster session could comfortably be included in the final analysis. However, the infrequency of 6-month follow-up data was a real concern. When the data at a time period (particularly the last one) falls below a critical threshold there is a real risk that statistical power is compromised if pairwise or listwise deletion is implemented (Roth, 1994). Researchers typically recommend a cut-off threshold of 20% missing data, provided appropriate imputation methods are employed (Arbuckle, 1996). This suggests that including the second booster session could potentially produce invalid results.

It is also worth noting that the time between the initiation of treatment and the 6-month follow-up session also differed across patients, as is common in therapy of this type. This is a regular problem in longitudinal clinical studies and further supported the decision to exclude such data rather than fitting for the missing values (Pettigrew, 1990).

In order to empirically test this decision, a comparative multilevel analysis was performed using three different data sets: one data set excluding all follow-up data; one data set including only 2-month follow-up data; and one data set including both 2-month and 6-month follow-up data. Model fit was evaluated by comparing the amount of variance explained by the models derived from each of the three data sets. Results from this analysis are displayed in Appendix I and confirm that the data set which includes 2-month follow-up data but excludes 6-month follow-up data explains a greater proportion of variance than the two alternative data sets (given the focus on the *"Half-way"* data set). This composition minimises the total amount of overall variance in the model, therefore maximising model fit (Singer & Willet, 2003). When no

follow-up data are included, there is a greater amount of variance at Level-2 and when the 6-month follow-up data are included as well, there is an increase in the amount of variance at Level-1.

Current literature commenting on the treatment of follow-up data supports this approach. The fact that attrition rates were far more significant at the later follow-up session suggests that the probability of response bias at that point is high (Greenland, 1977; Goodman & Blum, 1996). It is possible that significant variation may exist between responders and non-responders at the second follow-up session, and the data set could therefore be negatively influenced by a selective attrition bias (Kane, 2006). It is well recognised that serious attrition can compromise external validity at follow-up assessment. The low response rate of 11.5% at the 6-month follow-up might therefore cause treatment effects to be overestimated. This is consistent with recent research that has highlighted an increased tendency for remaining responders to have experienced greater improvement in treatment than those who do not continue with follow-up assessments (Bjork, Clinton & Norring, 2006). Overall, it was therefore concluded on the basis of both detailed analysis of model fit and academic literature that only 2-month follow-up data should be included in the final data set.

Testing the linearity of the data

A final and equally-important consideration in multilevel analysis is the linearity of the dependent variable. Prior to performing the multilevel analysis, it was important to determine what type of change trajectory was actually being modelled. This involved testing the dependent variable for linearity, as if the dependent variable is found to be non-linear, transformations can sometimes be required. Within the current study this test was conducted in *SPSS*, using the curve estimation function. This testing was supplementary to the visual inspection of standardised residual plots discussed earlier.

A separate file was created for each client that included *BDI-II* data from intake right through to the 2-month follow-up. Curve estimation was performed to test for data fit with a linear, quadratic or cubic function (see Appendix J). Results showed that no clients yielded a linear estimation as the best fit, 24 clients (92.3%) yielded a cubic function as the best fit and 2 clients (7.7%) jointly yielded a cubic or quadratic function as the best fit. These findings indicated that the *BDI-II* data in the current study might be best conceptualised as cubic in form. For the purposes of multilevel

analysis it was therefore important to consider whether any data alterations were necessary, such as a transformation of the cubic dependent variable so that it could be modelled in a linear fashion alongside the other predictor variables. This type of transformation would require taking the cube root of *BDI-II* and using the transformed scores to create another variable, entitled *BDI-II Cube Root*.

In order to test whether such a transformation was necessary two data sets were created; with one data set including raw *BDI-II* scores and the other data set including *BDI-II Cube Root* data. A multilevel analysis was then performed on each data set and the relative results were compared. The analysis indicated that a cube-root transformation did not significantly change the intercepts or significance within such a model and using *BDI-II* in its raw form actually provided an equally acceptable model fit. Furthermore, keeping *BDI-II* in its original form also avoids the added complexities and interpretational requirements that transformations require. Consistent with current literature, such complexity would appear disproportionate to the minimal improvement a cubic transformation might provide in this instance (Singer & Willet, 2003). While the cubic function clearly predominated as the best model fit in the curve estimation analysis, it is important to note that the difference between the R-squared values for linear and cubic functions were in fact, minimal.

In summary, the data set used for the primary analyses within the current study included 26 clients who each completed at least ten sessions of therapy (plus an intake session). Of the follow-up sessions, only data from the 2-month follow-up sessions were included and this resulted in a maximum total of 22 sessions for each client.

Model Assessment and Model Fit

Multilevel analysis was the statistical approach employed in the current study. While specific results are presented in the subsequent results section (*Chapter 8*), a summary of the overall structure of the approach is introduced at this point. In particular, the different models and outcome variables associated with the analysis are reviewed.

Model specification

Multilevel analysis involves the staged addition of predictor variables in an attempt to model nested data. Inherently, it requires the development of multiple models that

build upon one another (Snijders & Bosker, 1999). This preliminary stage provides a timely opportunity to review those models that will be developed in *Chapter 8*.

The first model in multilevel analysis is commonly referred to as the *Unconditional Means Model*. This particular model is the simplest model in that it considers only the dependent variable and does not incorporate predictor variables at any level (Heck & Thomas, 2000). In the current analysis the first step involved fitting the *Unconditional Means Model* to the *BDI-II* data, in order to confirm that appropriate levels of variability exist in the data and that clients' *BDI-II* scores differed over time and also from one another (Singer & Willett, 2003). This first model also provides a baseline magnitude for both within-person and between-person variance. These values can be used as a relative baseline for comparing subsequent models and assessing model fit (Hox, 2002; Singer & Willett, 2003).

The second model is the *Unconditional Growth Model*. This model is a natural extension of the *Unconditional Means Model* in that it incorporates both the dependent variable and time. In the current study this second model included *BDI-II* raw data and time with a linear change trajectory (Singer & Willett, 2003). This model was assessed to confirm that sufficient variability existed in individual initial status or rate of change. When the variance component is significant, justification exists for building subsequent models as it suggests more variability can be explained by introducing additional Level-2 predictors (Singer & Willett, 2003).

After building the first two models, subsequent models were developed that incorporated an increasing number of predictors. The addition of Level-2 predictors was intended to reduce the amount of variance in the overall model. In the current study, the specific predictors that were introduced included stress curve and attributional style. As discussed at the beginning of this chapter, both variables were defined as Level-2 predictors and were therefore considered to be time-invariant. Within the multilevel model it is important to tease apart the relative influence that each predictor has on estimated fixed effects and variance components. In HLM each variable needs to be entered separately and new models therefore build upon preceding models. As a result, the appropriate order of entering predictors needs to be determined and it is considered best practice to base such a decision on theory (Wallace & Green, 2002). With respect to the current study, the appropriate ordering

of attributional style and stress curve was informed by research. Research drawing on both the hopelessness theory of depression (Abramson, Metalsky, & Alloy, 1989) and Beck's cognitive theory (Beck, 1967; Beck, Rush, Shaw & Emery, 1979; Robins & Block, 1989) provided support for the role of attributional style as a moderating or mediating factor in the relationship between stress and depression (Dixon, Heppner, Burnett & Lips, 1993). This suggested that the current analysis should be structured with stress curve entered as the first Level-2 parameter and attributional style entered as a subsequent control variable.

To confirm this ordering of variables, the multilevel analysis was re-run with attributional style entered first and stress curve entered second. The results from this alternative analysis were then able to be compared with the results from the proposed model for the purposes of confirming which approach explains the most variance and provides the best model fit. This iterative process is common best practice and is typically repeated until a stable and interpretable model is achieved (Wallace & Green, 2002; Kwok et al., 2008).

The definition of outcome variables and estimates within the present study

In the domain of multilevel analysis, subsequent models and model fit are compared on the basis of a number of important outcome variables. Prior to analysing the multilevel framework for the current study, these variables and the way in which they need to be assessed can be reviewed. Overall, the process of multilevel analysis follows the four steps proposed by Wallace and Green (2002). The first step involves a comprehensive review of past and present literature, in order to formulate an appropriate initial model. The second stage involves an adequate examination of the initial model and an evaluation of the fixed components within the model. The third step involves a subsequent evaluation of the random components within the model and the final step involves an iterative process of fine-tuning the model and parameter choice until an adequate model fit is achieved.

Within the multilevel model for change, the fixed effect components include several key estimates. The first estimate, $\breve{y}_{00}$, represents the intercept of the true change trajectory for the average individual within the population. The subsequent fixed effect $\breve{y}_{01}$ represents the relevant difference in this intercept for individuals in different subgroups of the population. Finally, $\breve{y}_{02}$ represents the difference in the intercept for

individuals in different subgroups, while controlling for additional factors (Singer & Willett, 2003). In addition to providing estimates for initial status, the fixed effects component of each model also provides an estimate for the rate of change in individual scores. The fixed effect $\breve{y}_{10}$ provides an estimate for the rate of change experienced by an average individual in the population, while the fixed effect $\breve{y}_{11}$ estimates the differential in rate of change between individuals in different population subgroups. Similarly, the fixed effect $\breve{y}_{12}$ provides an estimate of the difference in rate of change for individuals in different subgroups, while controlling for additional factors.

In terms of the variance components within the multilevel model for change, a range of outcome variables also exist. In particular, the Level-1 variance component σ^2_E estimates the amount of variance within-individuals in the sample. In contrast, the Level-2 variance component σ^2_0 estimates the amount of variance between-individuals in the sample. Similarly, σ^2_1 represents the residual rate of change in the sample and the covariance is represented by the σ^2_{01} estimate.

Within each model a series of *Pseudo R^2* statistics and *Goodness-of-fit* estimates are also calculated. These values offer a perspective on the appropriateness of fit and enable a comparison of suitability across subsequent models. If the variance components significantly decrease at either level when progressing from one model to the next, an improvement will be noted within the *Pseudo R^2* statistics. Similarly, the *Deviance* statistics are also calculated to offer a judgement on model fit. Difference scores in terms of *Deviance*, *AIC* or *BIC* statistics can be calculated and compared to published threshold values (Singer & Willett, 2003). When these scores are deemed to be significant for the associated degrees of freedom, the new model is considered to be a significant improvement on the preceding model to which it is being compared.

Summary

This section considered the approach to modelling the relationship between stress impact, attributional style and depression. Based on an investigation of the present data set and a review of the advantages of multivariate analysis, it can be ascertained that the use of multilevel analysis is most appropriate for the current study.

This chapter also outlines the importance of measuring time accurately and appropriately treating any missing data. For the current study, time was conceptualised

as "Session Time", in order to accurately capture the points at which therapy was administered at different frequencies. In addition, only a minimal amount of missing data existed and in light of it being MCAR, EM imputation was used for those sessions where data was missing. Preliminary analysis also confirmed that the assumptions of linearity, normality and homoscedasticity were met for all of the primary variables in the study.

Finally, the level of the explanatory variables and the size and parameters of the final data set were determined. In terms of the multilevel analysis, *BDI-II* was measured at Level-1, while stress and attributional style were categorised as Level-2, time-invariant predictors. Clients were differentiated into three different groups according to the type of stress improvement they showed from Session 1 to Session 10 and clients were similarly divided into one of either two groups according to the predominant type of attributional style they presented with. The appropriate data set was also determined. Only those clients who completed at least 10 sessions of therapy were included (the *"Half-way"* data set), and data was sourced from all 20 sessions of therapy in addition to the first follow-up session at 2-months post-termination.

Chapter 8: Results

Aims and Scope

This chapter presents the main results from the multilevel analysis. However, before specifying each of the different multilevel models, a number of preliminary analyses are important. The chapter begins by presenting an overview of the final sample in terms of sample size, demographic variables and client characteristics. Results from the reliability analyses performed on the *BDI-II* and the *IES-VF* are presented next. This is followed by an assessment of the amount of variance that exists within the data set. More specifically, each of the primary variables were reviewed to see whether they show significant variation both between-clients and within-clients over time. Once an appropriate level of variability was confirmed, preliminary correlation analyses could then be performed as an introduction to the need for multilevel analysis. At this point, bivariate correlation analyses were used to highlight which variables appeared to be related. This served to identify which parameters should be included in the subsequent models.

Finally, results from the multilevel analysis are presented, and each model is reviewed in turn and compared to its predecessors, in order to determine the most appropriate model. This iterative process allows for a comprehensive review of the predictors of depression severity. The relative contributions of stress and attributional style are examined and the complexity of the relationship between all three variables is extricated. The chapter concludes with a number of important post-hoc analyses that were performed in order to determine whether specific stressor characteristics or demographic variables also represent important parameters that should be included in the final model of depression. These post-hoc analyses incorporated demographic factors and also those variables measured in the *IPSQ* that reference the context of clients' stressors.

Participants

The final sample included 26 clients who had completed at least 10 sessions of therapy. Baseline characteristics of participants are reported in Table 8.1. The final sample included 17 females and 9 males and the average age at intake was 43.88 years ($SD = 11.4$). Approximately half of the clients were married at intake, most had two or

more children and only a minority of clients (23%) were in full-time employment. Using Beck and colleagues' (1996) classification of severity, 46% of clients presented with severe depression, 38% had scores in the moderate range, 12% had scores in the mild range and only 4% (one client) presented with intake scores in the minimal range. Less than half the clients in the final sample had previously received therapy or previously used psychotropic medications.

Table 8.1

Baseline Characteristics of Participants

Baseline Characteristics	Full Sample: n(%)
Sex (female)	17 (65.4)
Age (years)*	43.9 (11.5)
BDI-II*	31.0 (11.1)
Severity	
Minimal (BDI-II 0–13)	1 (3.9)
Mild (BDI-II 14–19)	3 (11.5)
Moderate (BDI-II 20–29)	10 (38.5)
Severe (BDI-II 30–63)	12 (46.2)
Employment	
Full-time	6 (23.1)
Part-time	10 (38.5)
Other	10 (38.5)
Marital Status	
Single	4 (15.4)
Dating	1 (3.9)
De Facto	5 (19.2)
Married	11 (42.3)
Divorced	4 (15.4)
Widowed	1 (3.9)
Children	
No children	8 (30.8)
1 child	1 (3.9)
2 children	14 (53.9)
> 3 children	3 (11.5)
Previous Medication	10 (38.5)
Previous Psychotherapy	4 (15.4)

Note. * Indicates a measurement of M(SD).

Reliability Analyses

An important first step involved performing a reliability analysis on the measures for the two primary variables – the *BDI-II* and the *IES-VF*. This was critical to ensuring that subsequent results were well-supported and accurate, and confirming the reliability of these two measures is inextricably connected to ensuring the integrity of the overall analysis and study results.

Reliability of the BDI-II

The reliability of the *BDI-II* as a measure of depression severity has been confirmed on multiple occasions (Dozois et al., 1998; Steer et al., 1997; Steer et al., 1998). As discussed in *Chapter 6*, the *BDI-II* has demonstrated adequate psychometric properties in both psychiatric and non-psychiatric populations (Steer & Clark, 1997; Osman et al., 1997). However, it was necessary to re-confirm its reliability within the specific context of the current study. In order to perform such an analysis, each session of *BDI-II* data was separated into an individual data set and the *SPSS* reliability analysis function was used. Table 8.2 summarises the results of this analysis. From Table 8.2 it can be seen that the *BDI-II* has an average alpha of .94 and a range of .90 to .96 across all sessions. This demonstrates excellent reliability based on current thresholds for acceptability cited within the literature (Nunnally, 1978).

Table 8.2

Reliability Analysis of the BDI-II Across All Sessions

Session	N	α	M	SD
0	26	.93	31.0	11.5
1	26	.94	27.1	11.9
2	26	.93	25.5	11.3
3	26	.95	22.4	12.5
4	25	.95	24.8	12.4
5	26	.96	22.0	13.5
6	26	.94	19.6	11.3
7	26	.95	19.7	11.9
8	26	.95	18.9	12.1
9	26	.94	19.0	11.8
10	26	.95	17.6	11.9
11	26	.94	16.6	10.9
12	25	.93	19.0	10.9
13	25	.93	15.8	10.5
14	23	.94	15.8	10.7
15	22	.94	16.0	11.1
16	22	.93	15.4	10.7
17	22	.91	14.9	9.5
18	21	.90	14.1	8.7
19	20	.94	12.7	10.7
20	19	.92	10.7	8.8
2-month FU	14	.92	9.7	9.0
6-month FU	4	.96	6.8	10.4

Reliability of the IES-VF

The current study represents the first use of the *IES* as an objectively scored measure. It was therefore imperative that the revised version (*IES-VF*) was tested for reliability. In performing such an analysis it was important to consider each item in the measure independently, in order to be able to determine which items were more or less reliable across different clients and different sessions.

This reliability analysis was again performed using *SPSS*. To compensate for any missing data, multiple imputation was implemented using the EM missing value analysis function and values were imputed using only data from the relevant session (as previously discussed in *Chapter 7*). Furthermore, data for intrusion items was imputed using only other intrusion items as predictors and data for avoidance items was imputed using only other avoidance items in order to increase the accuracy of such imputation. Table 8.3 provides an overview of the amount of data that was missing for each item across each session. It is important to note that this is an overview of how the *IES-VF* data looked in preliminary stages, before the most valid and effective version of the scale was selected.

Table 8.3

Percentage of Missing Data in IES-VF

Session	Avoidance Items								Intrusion Items						
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
1	86	54	79	21	89	21	25	43	50	82	14	0	18	0	93
3	100	39	100	25	96	18	46	71	68	96	0	0	11	0	93
5	89	32	96	18	96	21	100	100	68	82	11	0	14	0	96
8	85	85	93	37	96	37	33	100	70	81	7	0	15	0	93
10	88	4	88	4	96	12	31	31	69	81	4	0	4	0	96
13	96	22	96	13	96	33	21	38	75	88	4	0	8	0	100
16	86	24	90	24	100	38	33	33	90	95	0	0	10	0	100
20	79	5	100	5	100	53	21	32	89	84	11	0	32	0	100
Avg	89	33	93	18	96	29	39	56	73	86	6	0	14	0	96

For the purposes of clarity, only the final results from the reliability analysis are presented here. The specific results from each iteration of the reliability analysis can be consulted in Appendix K. In the first instance, all items on the *IES-VF* were included in the reliability analysis, and the results yielded an overall Cronbach's alpha for each session, in addition to individual alpha values for each item. These alpha values reflected the reliability that would be achieved if that particular item was *removed* from the scale. A separate reliability analysis was performed for intrusion and avoidance items, in accordance with the original *IES* scale which confirmed the significance of these two factors (Horowitz et al., 1979).

The first criteria for trimming the number of items used in the *IES-VF* was the percentage of missing data an item had. In Table 8.3 it is clear that out of all avoidance items, items 1, 3 and 5 had a significant amount of missing data. This indicated that these items were measured far less frequently and of all the items, these were the most difficult to score in an objective format. In light of their high percentage of missing data, there is a higher risk of multiple imputation generating inaccurate values which has the potential to lead to confabulation of data. Consequently, the criterion of having at most 50% missing data in every session was used. This resulted in the exclusion of avoidance items 1, 3 and 5 from the data set. With respect to the intrusion items, application of the same criterion led to the removal of items 1, 2 and 7 from the data set. This decision was consistent with the results from the initial item reliability analysis presented in Appendix K. The analysis indicated that these three items were relatively unreliable and that the scale's reliability would be considerably improved if they were removed.

After reducing the data set in this way, a reliability analysis was performed. In order to improve the accuracy of such an analysis, the original missing values were re-imputed using only those remaining five avoidance items and four intrusion items respectively. The identical reliability analysis was then repeated using the revised measure. Results from this analysis (shown in Appendix K) justified the additional exclusion of intrusion item 6 and avoidance item 8 from the *IES-VF*, as their exclusion substantially improved the alpha value (the exclusion of intrusion item 6 improved the overall alpha value for every session, and avoidance item 8 was problematic with zero variance computed in several sessions). Avoidance item 8 also had relatively high levels of missing data. The specific results from this reliability analysis can also be consulted in Appendix K.

After this stage of refinement, item analysis was repeated (as the approach is iterative). As the *IES-VF* scale now included only intrusion items 3, 4 and 5 and avoidance items 2, 4, 6 and 7, missing values were re-imputed using only these more reliable items. Results from this reliability analysis are presented in Table 8.4 below and they clearly highlight the improved reliability statistics that were achieved as a result of item-reduction. The results indicated that no further exclusions were needed and the data set established with the removal of the four intrusion items (1, 2, 6 and 7) and the four avoidance items (1, 3, 5 and 8) resulted in the soundest measure. Using only these

seven most reliable items, the *IES-VF* yielded an average alpha of .64 overall, across all sessions. Table 8.5 highlights this improved reliability and also provides a comparison to the original *IES-VF*.

In conclusion, the reliability analysis of the *IES-VF* confirmed its psychometric strength as an objective measure. Its reliability was optimized by removing a number of items that were perhaps less amenable to its use in an objective format. This yielded a measure with compelling statistical properties (average alpha = .64 across all sessions). For the main analyses within the current study, these items were therefore removed and stress impact was recalculated using only results from the remaining seven items. A list of the final items retained in the *IES-VF* is provided in Appendix K.

Table 8.4

Reliability Analysis of IES-VF Measured with Cronbach's Alpha – Final Item Analysis Using Seven Items

| Session | All items included | \multicolumn{7}{c}{Intrusion Items (α if item was deleted)} | All items included | \multicolumn{8}{c}{Avoidance Items (α if item was deleted)} |
		1	2	3	4	5	6	7		1	2	3	4	5	6	7	8
1	.85			.79	.87	.64			.51		.64		.47		.12	.39	
3	.71			.87	.36	.58			.52		.65		-.01		.23	.68	
5	.74			.76	.56	.66			.52		.60		-.21		-.52	n/a	
8	.67			.78	.55	.42			.62		.60		.77		.18	.46	
10	.85			.87	.71	.79			.21		.28		.05		-.21	.42	
13	.63			.63	.73	.23			.77		.79		.57		.67	.77	
16	.82			.85	.68	.71			.72		.63		.65		.77	.60	
20	.93			.94	.89	.86			.77		.63		.67		.55	.86	

Note. Cells marked n/a had zero variance and were removed from the analysis. Negative *α* values indicate that the average covariance among the items is negative.

Table 8.5

A Comparison of Reliability Analysis Results from the Final and Original Versions of the IES-VF Measured by Cronbach's Alpha

Final Version of the IES-VF

Session	All items included	Intrusion Items (α if item was deleted)							Avoidance Items (α if item was deleted)							
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	8
1	.79			.74	.78	.70				.75		.76		.79	.79	
3	.64			.61	.51	.54				.74		.45		.59	.70	
5	.65			.58	.53	.57				.70		.59		.67	n/a	
8	.42			.49	.37	.38				.30		.39		.13	.53	
10	.54			.42	.41	.50				.54		.52		.58	.52	
13	.67			.69	.64	.66				.63		.53		.67	.61	
16	.65			.54	.61	.56				.63		.56		.64	.70	
20	.72			.56	.63	.65				.69		.61		.74	.81	

Original Version of the IES-VF

Session	All items included	Intrusion Items (α if item was deleted)							Avoidance Items (α if item was deleted)							
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	8
1	.78	.81	.77	.73	.74	.74	.85	n/a	n/a	.73	n/a	.71	n/a	.73	.80	.71
3	.51	.58	n/a	.45	.42	.42	.67	.53	n/a	.48	n/a	.32	n/a	.45	.50	.43
5	.45	.34	.58	.35	.33	.46	.34	n/a	.37	.43	n/a	.40	n/a	.56	n/a	n/a
8	.28	.34	.34	.30	.26	.22	.22	n/a	.21	.39	.40	.23	n/a	.47	.06	n/a
10	.67	.62	.62	.62	.58	.62	.63	n/a	.66	.65	n/a	.69	n/a	.69	.70	.67
13	.78	.75	.78	.79	.78	.78	.74	n/a	n/a	.76	n/a	.75	n/a	.77	.75	.77
16	.55	.63	n/a	.41	.48	.50	.61	n/a	n/a	.50	.54	.54	n/a	.46	.55	.49
20	.78	.81	.77	.73	.74	.74	.85	n/a	n/a	.73	n/a	.71	n/a	.73	.80	.71

Note. Cells marked n/a had zero variance and were removed from the analysis.

Determining the Variance in the Data Set

In order for multilevel analysis to be effective, a significant amount of variance needs to exist within the data sample. An important next step therefore involved reviewing each of the primary variables (depression severity, stress curve and attributional style) in order to determine the amount of variability within each parameter and therefore ensure that multilevel analysis was appropriate.

Assessing the Variance in Depression (BDI-II)

Within the current study, depression severity was measured using the *BDI-II*, which was administered at intake and at the beginning of every therapy session. It was hypothesised that depression severity would decrease as clients proceeded through therapy. An overview of the change in *BDI-II* is reported in Appendix L and a graph showing the average change in depression severity is presented in Figure 8.1. Variation was assessed first at the level of the population average and then at the individual level of change.
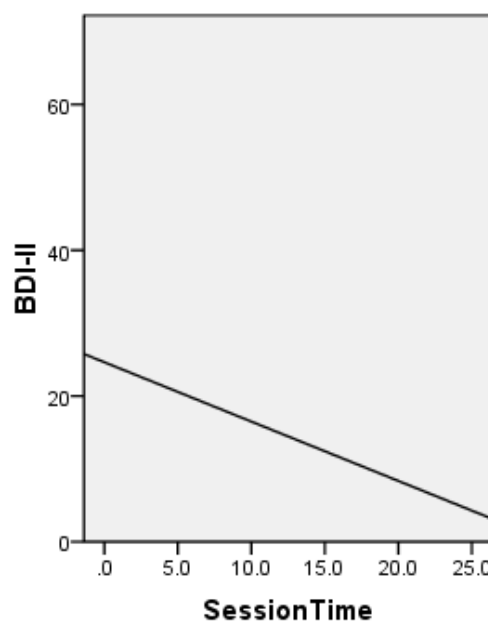
Figure 8.1. Average change trajectory for BDI-II data.[6]

A clear pattern of improvement was ascertained in the current study. All of the 26 clients showed improvement in their *BDI-II* scores from intake to the end of therapy.

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[6] *Note.* Average is calculated across all clients presenting for therapy at that particular session.

The average improvement was 68% and improvement scores ranged from 22% to 100% across the 20 core sessions of therapy for those completing therapy. In the current study, support for the prophylactic effect of CBT was also implicated, as the improvements were maintained at both follow-up sessions. At the 2-month booster, the average client showed a 72% improvement in their depression level relative to intake, as indicated by their *BDI-II* score. At this time the range of improvement varied between 33% and 98%. At the 6-month booster, an average improvement of 72% was achieved and *BDI-II* improvement ranged from 8% to 100%. A similar pattern of improvement was also observed when Beck and colleagues' (1996) classification of depression severity was applied. At intake, the modal depressive profile was severe, with 46% of clients presenting with *BDI-II* scores in the 29–63 range. In contrast, the most common level of depression at the point of therapy termination was minimal; with 65% of clients finishing therapy with a *BDI-II* score less than 13.

While these results highlighted the significant change that was achieved on average in the current sample, it was important to also consider change on a more individual level. Figure 8.2 therefore presents the client trajectories of depression severity levels over time (illustrated by the fitted ordinary least squares line).
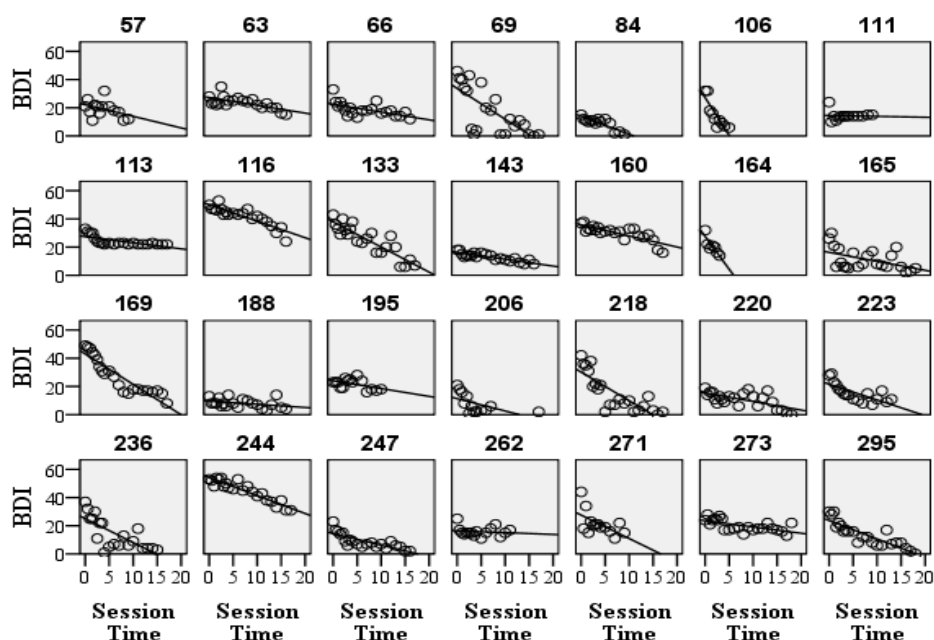
Figure 8.2. Fitted OLS trajectories for client *BDI-II* scores in the current study.[7]

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[7] *Note.* Individual client numbers are labelled at the top of each OLS trajectory chart.

These ordinary least squares (OLS) trajectories provided further support for the variation in *BDI-II* scores across time as it was evident that all clients experienced a reduction in depression severity over the course of therapy. Not only did *BDI-II* scores vary within the same client at different points in therapy; but differences also existed between different clients in terms of both their intake severity scores and recovery trajectories. Taken together, the analyses at both an average and individual level confirmed that the null hypothesis for Hypothesis 1 could be rejected. Moreover, the variability that existed both between-clients and within-clients provided support for subsequent multilevel analysis. There appeared to be a clear benefit in exploring whether additional predictors might be able to explain some of the variation that was evident at the level of the dependent variable.

Assessing the Variance in Stress Impact (IES-VF)

Stress impact scores were measured at eight sessions in therapy, using the *IES-VF*. It was hypothesised that clients would become less affected by stress as they proceeded through therapy and that this would be reflected in a significant reduction in their stress impact scores over time. An overview of the change in stress impact is reported in Appendix M and Figure 8.3 presents the change in stress impact for the average client over the course of therapy.
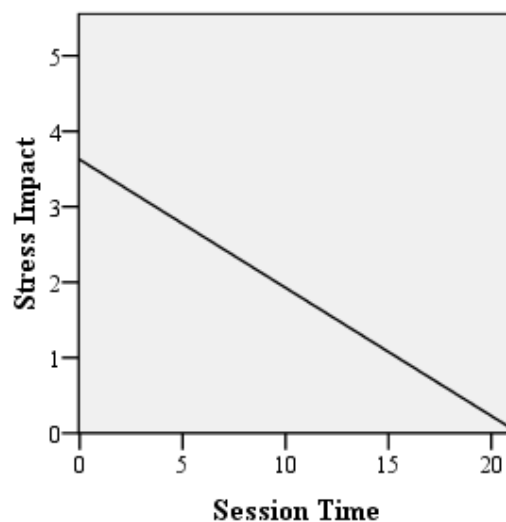
Figure 8.3. Average change trajectory for stress impact data.[8]

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[8] *Note*. Average is calculated across all clients presenting for therapy at that particular session.

Results from the current study confirmed that a clear improvement in stress impact was observed for all clients in the current study. On average, clients' stress impact scores improved by 68% over the course of the core 20 sessions. Percentage improvement scores ranged from 6% to 93%. At an individual level clients also showed significant changes in their stress impact scores. Figure 8.4 presents the individual trajectories of each client in terms of their stress impact scores over time.
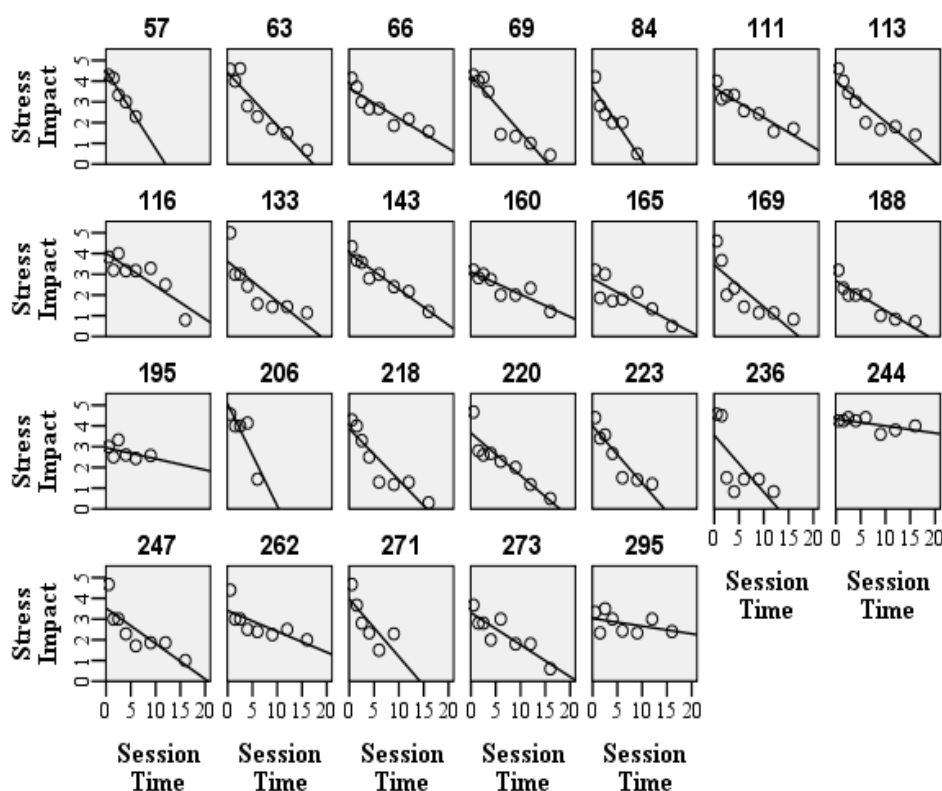
Figure 8.4. Fitted OLS trajectories for client stress impact scores in the current study.[9]

These OLS trajectories supported the hypothesis that stress impact scores vary across time as it all clients experienced a reduction in stress impact over the course of therapy. Furthermore, these individual graphs highlighted the fact that variation exists not only within-clients over time, but also between-clients. As discussed earlier, clients in the current study were able to be categorised into three different groups according to the type of stress improvement trajectory they exhibited. In the final sample, 23% of clients showed a minimal improvement in stress impact scores by Session 10, 50% of clients showed an expected improvement, and 27% of clients

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[9] *Note*. Individual client numbers are labelled at the top of each OLS trajectory chart.

experienced a rapid improvement. Irrespective of the particular category of improvement clients exhibited, the overall findings suggested that the null hypothesis could be rejected, as stress impact scores did significantly improve as clients advanced through treatment. These findings also showed that sufficient variation existed to permit the use of subsequent multilevel analysis.

Assessing the Variance in Attributional Style (ASQ)

Attributional style was measured using the *ASQ*, which was administered at intake, Sessions 5, 8 and 20 and at both follow-up boosters. It was hypothesised that clients would develop a more optimistic disposition as a result of engaging in CBT and that this would be reflected by an increase in their *ASQ* composite scores. An overview of the change in attributional style is reported in Appendix N. Similarly, Figure 8.5 presents the average change in *ASQ* over the course of therapy and Figure 8.6 presents the individual trajectories for *ASQ* composite scores over time.
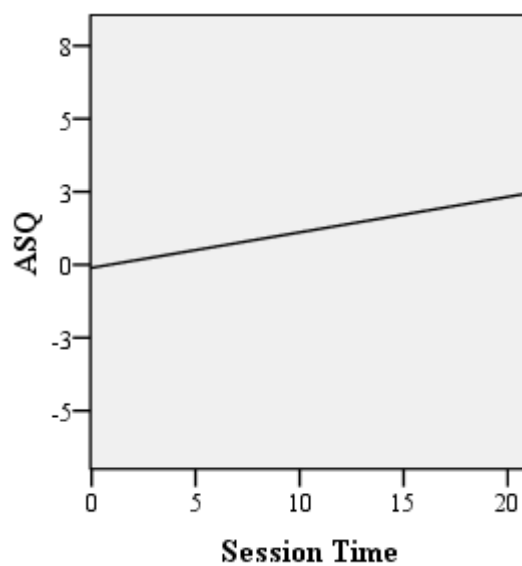
Figure 8.5. Average change trajectory for *ASQ* data.[10]

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[10] *Note.* Average is calculated across all clients presenting for therapy at that particular session.
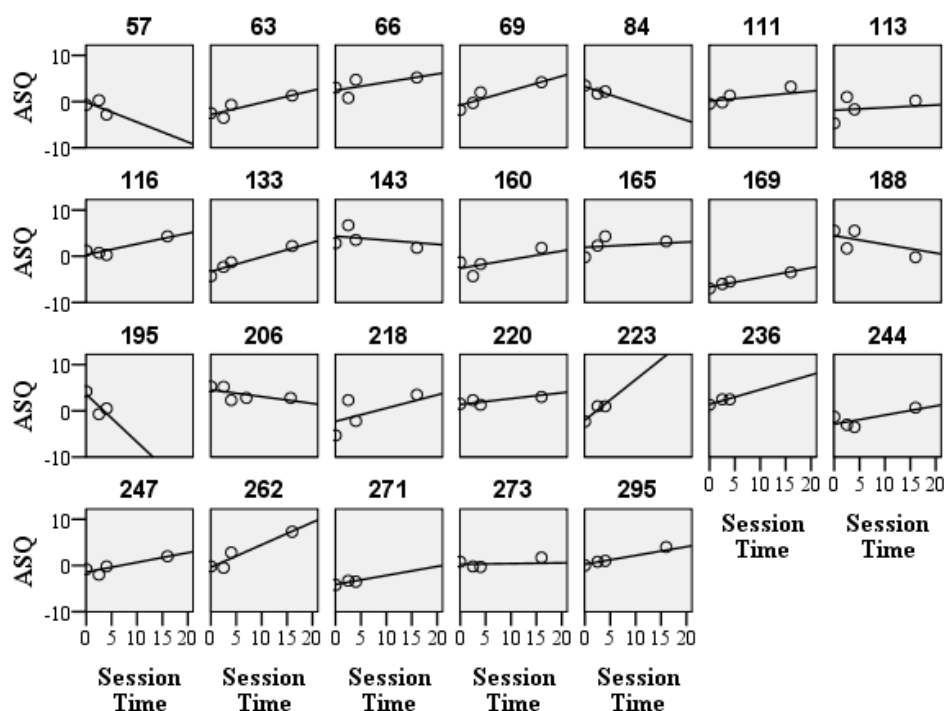
Figure 8.6. Fitted OLS trajectories for client *ASQ* scores in the current study.[11]

Figure 8.6 highlights the clear pattern of change that was ascertained within the current study. The results showed that 89.5% of clients exhibited non-depressogenic attributional styles by their point of termination from therapy. Moreover, results from the current sample confirmed that 77% of clients showed an optimistic improvement in their attributional style from intake to Session 20.

It was also useful to examine clients' *ASQ* scores at the various booster sessions in order to establish the maintenance of the non-depressogenic attributional style. Results from the present study indicated that of those clients who attended the first follow-up session only 43% actually exhibited less depressogenic attributional styles at that point, relative to their intake scores on the *ASQ*. Interestingly, only half of the clients who became more depressogenic in their attributional style by the 2-month follow-up were the same clients who also became more depressogenic by the end of core therapy. In other words, the heightened level of optimism achieved by Session 20 had actually dissipated for a number of clients by the point of 2-month follow-up.

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[11] *Note*. Individual client numbers are labelled at the top of each OLS trajectory chart.

For the purposes of multilevel analysis in the current study, raw scores on the *ASQ* were not used. As discussed earlier, clients were differentiated according to whether they had a predominantly depressogenic or predominantly non-depressogenic attributional style. This was determined by taking the average of their first three *ASQ* scores. In this way, attributional style was classified as a Level-2, time-invariant predictor. However, for the purposes of preliminary analyses it was clear that variability did exist in attributional style within the current sample. The two most notable findings were that the majority of clients terminated therapy with a non-depressogenic attributional style that represented a greater level of optimism as compared to their intake disposition, and that clients were typically predominantly depressogenic or predominantly non-depressogenic throughout the first half of therapy. In light of these two findings, there appeared to be sufficient variation to proceed with a multilevel investigation.

Preliminary Correlation Analysis

The preceding analysis confirmed that a significant amount of variability existed within the *BDI-II* data. As a result, the introduction of predictors, particularly at Level-2, was justified. If appropriate predictors were included, the amount of variability in the data should be reduced. In order to determine which parameters to include, a preliminary correlation analysis was performed.

In particular, a regression analysis using the OLS-estimates of intercepts and rates of change as outcome variables allowed for the testing of whether there was any significant interaction between the predictor variables and *BDI-II*. As this was still in the realms of exploratory analysis prior to building the more comprehensive multilevel model, a simple approach was used at this point. This consisted of fitting an exploratory OLS regression model to each client's data and then constructing bivariate plots and sample correlations. The results from fitting separate within-client exploratory OLS regression models for *BDI-II*, stress impact and attributional style as a function of linear time are presented in Table 8.6. (Note that the raw data for attributional style measured at Sessions 0, 5, 8, 20 and 2-month follow-up was used for the purposes of including non-categorical data in this analysis. Similarly, the raw stress impact data collected at Sessions 1, 3, 5, 8, 10, 13, 16 and 20 was also used).

Table 8.6

Results From Fitting Within-Client Exploratory OLS Regression Models for BDI-II, Stress Impact and Attributional Style as a Function of Linear Time

	BDI-II						Stress Impact						Attributional Style					
	Initial Status		Rate of Change				Initial Status		Rate of Change				Initial Status		Rate of Change			
						Residual						Residual						Residual
Client	Estimate	Error	Estimate	Error	R^2	Variance	Estimate	Error	Estimate	Error	R^2	Variance	Estimate	Error	Estimate	Error	R^2	Variance
57	23.98	2.03	-1.50	0.28	0.64	27.44	4.50	0.15	-0.38	0.04	0.97	0.03	-1.34	1.78	-0.43	0.65	0.30	3.49
63	27.28	1.22	-0.55	0.14	0.44	10.97	4.41	0.31	-0.26	0.04	0.89	0.29	-2.82	0.84	0.26	0.10	0.77	1.52
66	22.45	1.51	-0.55	0.18	0.34	16.72	3.66	0.23	-0.15	0.03	0.82	0.17	2.43	1.27	0.18	0.15	0.40	3.53
69	31.52	4.23	-1.80	0.43	0.47	154.15	4.26	0.35	-0.27	0.04	0.87	0.40	-0.79	0.68	0.32	0.05	0.93	1.16
84	13.92	1.00	-1.26	0.21	0.75	4.80	3.71	0.35	-0.36	0.07	0.86	0.26	3.26	0.76	-0.37	0.28	0.63	0.64
111	16.01	1.03	-0.50	0.11	0.53	9.19	3.68	0.18	-0.14	0.02	0.87	0.11	-0.33	0.42	0.23	0.05	0.91	0.38
113	26.88	0.93	-0.35	0.09	0.40	7.43	4.00	0.32	-0.20	0.04	0.81	0.32	-1.88	1.55	0.06	0.12	0.07	5.96
116	50.02	1.20	-1.17	0.14	0.78	10.60	4.02	0.30	-0.16	0.04	0.76	0.28	0.32	0.64	0.23	0.08	0.82	0.89
133	36.36	1.94	-1.51	0.20	0.74	32.59	3.61	0.46	-0.19	0.06	0.67	0.65	-3.31	0.52	0.31	0.04	0.96	0.68
143	15.99	0.52	-0.43	0.05	0.77	2.36	4.01	0.16	-0.17	0.02	0.93	0.08	4.33	1.20	-0.09	0.09	0.24	3.61
160	35.53	0.98	-0.72	0.10	0.72	8.35	3.11	0.18	-0.11	0.02	0.81	0.10	-2.61	1.09	0.19	0.08	0.64	2.97
165	15.89	2.42	-0.56	0.25	0.21	50.50	2.78	0.31	-0.13	0.04	0.67	0.29	1.93	1.14	0.06	0.09	0.13	3.24
169	41.04	2.09	-1.80	0.21	0.78	37.52	3.44	0.47	-0.20	0.06	0.68	0.69	-6.66	0.19	0.21	0.01	0.99	0.09
188	9.49	1.03	-0.21	0.11	0.16	9.22	2.68	0.21	-0.14	0.03	0.85	0.13	4.42	1.33	-0.19	0.10	0.54	4.41
195	24.07	1.43	-0.56	0.28	0.24	10.70	2.95	0.22	-0.05	0.05	0.23	0.12	3.57	1.99	-1.03	0.73	0.67	4.37
206	11.65	2.32	-0.98	0.41	0.34	34.59	5.05	0.62	-0.49	0.18	0.72	0.58	4.54	0.86	-0.15	0.11	0.38	1.73
218	28.02	2.98	-1.65	0.30	0.60	76.78	3.85	0.36	-0.25	0.04	0.84	0.40	-2.29	1.92	0.29	0.14	0.57	9.20
220	14.91	1.38	-0.49	0.14	0.38	16.52	3.65	0.32	-0.20	0.04	0.82	0.32	1.39	0.36	0.13	0.03	0.88	0.32
223	21.58	1.82	-1.12	0.27	0.52	20.94	3.99	0.33	-0.28	0.05	0.85	0.29	-2.00	0.95	0.88	0.35	0.86	1.00
236	25.17	2.97	-1.71	0.37	0.54	61.83	3.55	0.80	-0.27	0.13	0.49	1.67	1.41	0.35	0.32	0.13	0.86	0.13
244	53.23	1.04	-1.09	0.11	0.84	9.38	4.34	0.14	-0.03	0.02	0.42	0.06	-2.88	0.82	0.20	0.06	0.77	1.68
247	14.47	1.25	-0.82	0.15	0.62	11.47	3.53	0.38	-0.17	0.05	0.69	0.46	-1.43	0.63	0.21	0.08	0.79	0.88
262	17.08	1.17	-0.31	0.14	0.21	10.09	3.40	0.31	-0.10	0.04	0.54	0.30	-0.39	0.88	0.49	0.11	0.92	1.68
271	27.58	3.29	-1.66	0.70	0.32	52.14	3.97	0.55	-0.28	0.11	0.60	0.64	-4.09	0.36	0.19	0.13	0.69	0.14
273	23.74	1.02	-0.48	0.10	0.52	8.90	3.30	0.27	-0.15	0.03	0.79	0.22	0.26	0.61	0.02	0.05	0.04	0.92
295	22.54	1.61	-1.09	0.16	0.69	22.30	3.03	0.26	-0.04	0.03	0.18	0.22	0.27	0.32	0.19	0.02	0.95	0.26

Table 8.7

Correlations Between BDI-II, Stress Impact and Attributional Style (Initial Estimates and Rates of Change)

	BDI	BDI ROC	Stress Impact	Stress Impact ROC	Attributional Style	Attributional Style ROC
BDI	-	**-.46***	.20	.26	**.-62*****	.22
		.02	.33	.19	**.00**	.27
BDI ROC		-	-.33	**.43***	**.48***	-.20
			.11	**.03**	**.01**	.34
Stress Impact			-	**-.66*****	-.15	.14
				.00	.47	.50
Stress ROC				-	-.07	.03
					.74	.89
Attributional Style					-	**-.51***
						.01
Attributional Style ROC						-

Note. *** p<.001; ** p<.01; * p<.05 significance level (2-tailed; Pearson correlation). Significant correlations are in bold; ROC represents 'Rate of Change'.

Using the estimated slopes and intercepts for each variable, a bivariate correlation analysis was then performed. This tested for any significant relationships between the various predictors. Results from this analysis are presented in Table 8.7.

These results highlighted the relationships that existed between some of the predictor variables at a 95% level of significance. A significant positive relationship existed between the rate of change in *BDI-II* and the rate of change in stress impact (p<.05), suggesting that a fast reduction in depression severity coincided with a similar reduction in stress impact. A significant positive relationship was also observed between the rate of change in *BDI-II* and the initial attributional style status a client presents with (p<.05), suggesting that clients presenting with more or less depressogenic attributional styles experience significantly different rates of recovery in terms of their depressive symptoms. Finally, a significant negative relationship was observed between initial *BDI-II* and initial attributional style status (p<.001), with those clients presenting as more depressed at intake typically having a more depressogenic attributional style.

Essentially, this preliminary analysis demonstrated the importance of further analysing the relationship between these factors. The significant interactions that were observed between each of the main predictors (stress impact and attributional style) and depression suggested that subsequent exploration would be useful in order to adequately unveil what was happening during the course of therapy. The fact that both predictors significantly correlated with *BDI-II* confirmed the need for such multivariate analysis. Multilevel analysis allows for a simultaneous exploration of Level-1 questions about within-client change and Level-2 questions about between-client differences in change (Cohen, Cohen, West & Aiken, 2003). Furthermore, the structure of the analysis permits concomitant investigation of multiple predictor variables. This appeared most appropriate for the current study.

Visual Inspection of Differences in Trajectories for Level-2 Subgroups

A final step in the exploratory analysis prior to fitting the multilevel models involved comparing the growth trajectories for the various Level-2 subgroups. The preliminary correlations indicated that stress and attributional style interacted with depression and recovery trajectories. Therefore, a key step at this point involved investigating exactly *how* different types of stress improvements and attributional styles affected a client's

improvement over time. Figure 8.7 shows the relative *BDI-II* change trajectories for clients with rapid, expected and minimal stress improvements. Similarly, Figure 8.8 shows the relative *BDI-II* trajectories for clients with a predominantly depressogenic or non-depressogenic attributional style. The bold line on each chart corresponds to the average *BDI-II* trajectory for that subgroup.

0: Minimal Stress Improvement
1: Expected Stress Improvement
2: Rapid Stress Improvement
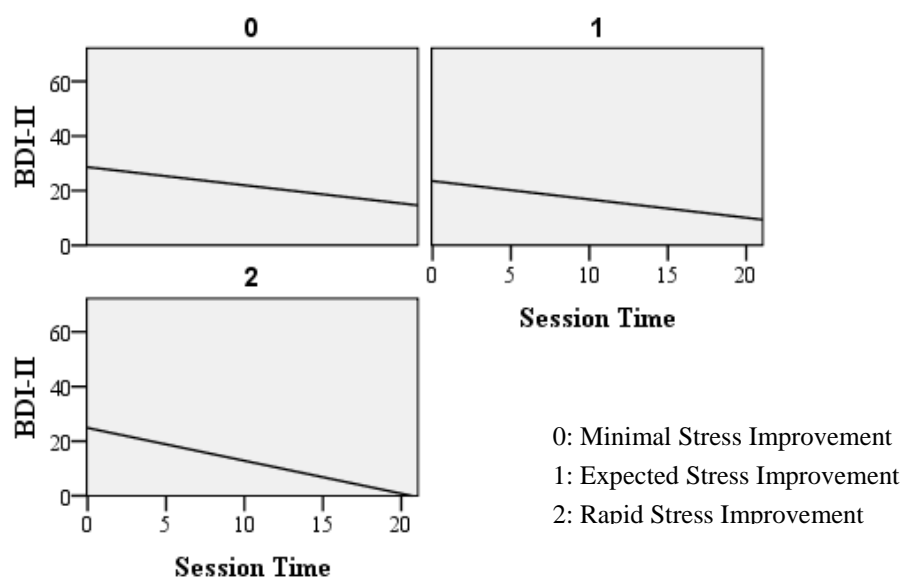
Figure 8.7. Differences in average *BDI-II* trajectories for clients with rapid, expected and minimal stress improvements.[12]

Attributional Style:
0: Non-depressogenic
1: Depressogenic
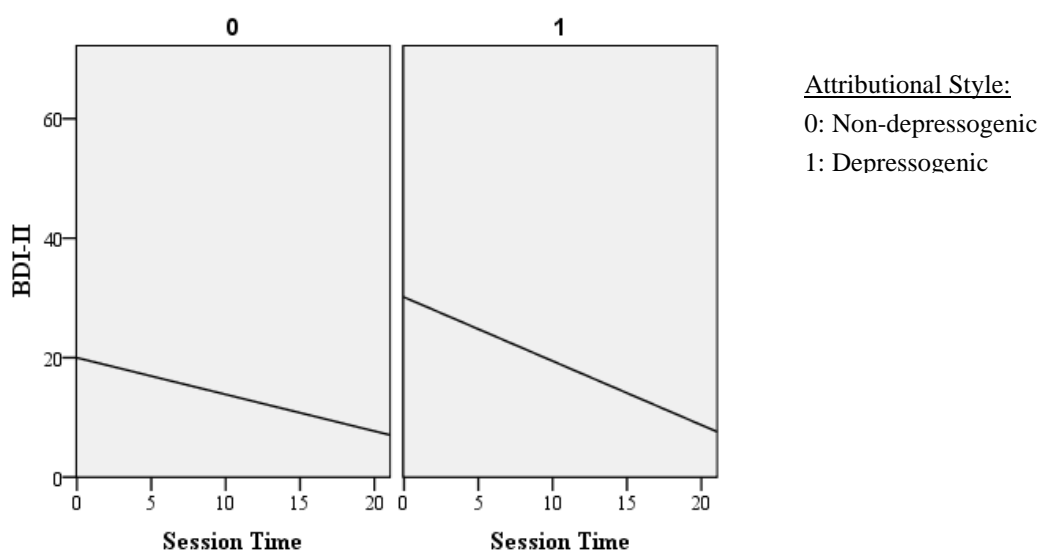
Figure 8.8. Differences in average *BDI-II* trajectories for clients with depressogenic and non-depressogenic attributional styles.[13]

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[12] *Note*. Average is calculated across all clients presenting for therapy at the particular session.

[13] *Note*. Average is calculated across all clients presenting for therapy at that particular session

Visual inspection of these charts indicated that systematic patterns existed between the different subgroups. While the *BDI-II* intercepts seemed relatively similar for each of the stress curve subgroups, a difference was discerned in their fitted rates of change in *BDI-II*. In terms of the attributional style subgroups, these observations indicated that those clients presenting with mostly depressogenic attributional styles had a higher *BDI-II* on intake and therefore demonstrated a higher rate of change throughout therapy. However by the end of therapy, it appeared that both attributional style subgroups terminated with similar levels of depression severity.

Visual inspection of the empirical growth plots confirmed the variability in the data set. *BDI-II* trajectories appeared to differ as a result of the type of stress impact and the attributional style a client presented with or experienced during therapy.

Multilevel Model Comparison

Multilevel analysis is an analytical tool that allows for the simultaneous exploration of predictor variables. After the preliminary analysis had highlighted the significant relationships between a number of important variables, a multilevel approach was desired in order explore the relationships at a closer and more meaningful level. The structure of analysis allows for the different variability that exists within clients and between clients to be partitioned out accordingly and comprehensively evaluated.

However, best practice multilevel modelling requires that prior to commencing the analysis and building the individual models, the issue of *centering* is considered. Centering can be defined as the process of transforming or scaling the variables that are to be used in the multilevel model. In certain situations, the use of raw scores may create invalid or inaccurate models and as a result, researchers may opt to transform their data (Paccagnella, 2006). Two simple examples could be choosing to centre results around the mean sample value; or alternatively for a data set comprising values recorded for children from the age of three years onwards, three could be subtracted from each measurement so that the sample more accurately predicted back to birth. Centering has important implications for the interpretation of final results and in several cases the practice of centering can help to facilitate parameter and outcome interpretation in multivariate analysis (Hofmann, 1997; Singer & Willett, 2003).

However, within the current study the way in which *BDI-II* was measured meant that centering was not necessary. As *BDI-II* was measured right from the intake session, a specially modified representation for *BDI-II* was not needed and the *BDI-II* intercept truly did represent a client's depression score at intake.

Fitting Two Unconditional Multilevel Models for Change

Multilevel models are developed for the purpose of analysing hierarchically-structured data. The preliminary analysis to this point had identified the clear relationship that existed between depression, stress impact and attributional style and the theory underpinning the stress-diathesis framework also speculates a hierarchical relationship between these three variables. A comprehensive analysis was therefore needed next in order to more carefully tease apart the complexity inherent in the relationship and the nature of interaction between each of the variables. As prefaced in *Chapter 7*, the process of multilevel analysis involves the development of subsequent models that are nested within one another. Each new model incorporates a different pattern of predictor variables. Each model is then assessed in terms of its fixed and random effects and the amount of variance it can explain is compared to previous models in order to ascertain a model of best fit. After conducting the preliminary analysis the iterative process was therefore able to begin, and each respective model was developed and analysed in turn.

Model A – The Unconditional Means Model

The first model in multilevel analysis is commonly referred to as the unconditional means model. This model includes only the dependent variable and does not incorporate any predictor variables. Consequently, instead of evaluating the change in *BDI-II* over time, this model simply described and meaningfully partitioned the variation that existed in *BDI-II* (Raudenbush & Bryk, 2002; Singer & Willett, 2003). An important reason for fitting the unconditional means model in the first instance is that it helps to test whether sufficient variation exists at each level to warrant further investigation. Although the amount of variation in the sample had already been investigated using both OLS and visual inspection, this form of analysis provided a subsequent check and further empirical validation.

Model A in Table 8.8 shows the results of fitting the unconditional means model to the *BDI-II* data in the current study. The fixed effect associated with this model ($\check{Y}_{00}$) estimated that the *BDI-II* grand mean across all sessions and clients is 18.73. The rejection of its associated null hypothesis (p<.001) confirmed that the average *BDI-II* of the average client between intake and the first follow-up was non-zero.

Moving on from the fixed effects, the random effects in *Model A* were then analysed. The estimated within-client variance ($\sigma^2\varepsilon$) was 61.82 and the estimated between-client variance (σ^2_0) was 83.11. Both of the associated null hypotheses were rejected at the p<.001 level which confirmed that the average client's *BDI-II* varied significantly across sessions and clients varied significantly from one another in terms of their respective *BDI-II* scores.

Finally, it the relative magnitude of each of the variance components was evaluated. The intra-class correlation coefficient (*p*) is a parameter used to describe the proportion of total outcome variation that lies *between* individuals (Singer & Willett, 2003). Consequently, the population intra-class coefficient was calculated as .57 for *Model A*, which indicated that 57% of the variance in the unconditional means model could be attributed to between-client variability at Level-2.

Model B – The Unconditional Growth Model

After fitting *Model A*, the unconditional growth model was developed next, by introducing the predictor variable time into the Level-1 sub-model. As discussed earlier, a linear model was posited within the current study and the variable *Session Time* was used.

Model B in Table 8.8 shows the results of fitting the unconditional growth model within the current study. The null hypotheses associated with the fixed effects ($\check{Y}_{00}$ and $\check{Y}_{10}$) in *Model B* were rejected (p <.001) and the model estimated that the average true change trajectory for *BDI-II* had a non-zero intercept of 24.92 and a non-zero slope of -0.93.

In examining the Pseudo R^2 statistics associated with this analysis the Level-1 residual variance in *Model B* ($\sigma^2\varepsilon$) was calculated as being 55% smaller than its equivalent counterpart in *Model A*. This indicated that 55% of within-client variation in *BDI-II*

could be explained by temporal change. In other words, the client's participation in the therapy process contributed to their improvement in depression level over time.

The Level-2 variance components in *Model B* provided estimates for the amount of unpredicted variation in the individual growth parameter. The results in Table 8.8 below illustrated that the null hypothesis associated with the variance components could be rejected (p<.001). This indicated there was significant, non-zero variability in both the true initial *BDI-II* status ($\sigma^2_0 = 116.41$) and the true rate of change ($\sigma^2_1 = 0.29$). Effectively, this confirmed the importance of introducing Level-2 predictors to explain some of this significant heterogeneity in the analysis.

Finally, the *Deviance* statistics associated with *Model B* were evaluated. In particular, the difference in *Deviance* between *Model A* and *Model B* was computed as (3748.63 – 3391.92) = 356.71. Compared to a χ^2 distribution on three degrees of freedom (*df*), this difference score far exceeded the p<.001 critical value, indicating a significant difference in *Deviance*. As aforementioned, this type of improvement in *Deviance* indicates that *Model B* provides a better level of model fit, as compared to *Model A*.

Table 8.8

Results of Fitting the Unconditional Means Model and the Unconditional Growth Model to BDI-II Data

	Parameter		Model A	Model B	Model C	Model D	Model E
Fixed Effects							
Initial Status (π_{01})	*Intercept*	$\breve{Y}_{00}$	18.73***	24.92***	-	-	-
			(1.82)	(2.15)	-	-	-
	Stress Curve	$\breve{Y}_{01}$	-	-	-	-	-
			-	-	-	-	-
	Attributional Style	$\breve{Y}_{01}$	-	-	-	-	-
			-	-	-	-	-
Rate of Change (π_{11})	*Intercept*	$\breve{Y}_{10}$	-	-0.93***	-	-	-
			-	(0.10)	-	-	-
	Stress Curve	$\breve{Y}_{11}$	-	-	-	-	-
			-	-	-	-	-
	Attributional Style	$\breve{Y}_{12}$	-	-	-	-	-
			-	-	-	-	-
Variance Components							
Level 1	*Within person*	σ^2_ε	61.82***	27.72***	-	-	-
			(3.91)	(1.80)	-	-	-
Level 2	*In initial status*	σ^2_0	83.11***	116.41***	-	-	-
			(23.89)	(33.25)	-	-	-
	In rate of change	σ^2_1	-	0.29*	-	-	-
			-	(0.12)	-	-	-
	Covariance	σ_ε	-	-4.65*	-	-	-
			-	(1.86)	-	-	-
Pseudo R^2 Statistics and Goodness-of-fit							
	R^2_ε		-	0.55	-	-	-
	R^2_0		-	-	-	-	-
	R^2_1		-	-	-	-	-
	Deviance		3,748.63	3,391.92	-	-	-
	AIC		3,754.63	3,403.92	-	-	-
	BIC		3,767.42	3,429.51	-	-	-

Note. *** $p<.001$; ** $p<.01$; * $p<.05$ significance level. Models C – E will be completed next.

Introducing Predictors Into the Multilevel Model

After fitting the unconditional means model and the unconditional growth model as baseline models for analysis, the next step involved introducing predictors. In the current study, the two primary predictor variables stress impact and attributional style

were hypothesised as predictors that help explain the variation in depression levels both within and between clients. Consequently, the subsequent models (*Model C* and *Model D*) tested their respective influences on the remaining variance in the model.

Model C – Introducing Stress Impact

Model C included stress curve as a predictor. As outlined earlier, stress curve was the variable that categorised all clients into one of three groups according to their stress impact trajectories. These three subgroups differentiated those clients who experienced a rapid, expected or minimal improvement in their stress over the course of therapy.

The results from *Model C* are shown in Table 8.9 below. The four fixed effects associated with *Model C* are presented and their interpretation is as follows. The estimated intake *BDI-II* score for the average client with minimal stress improvement was 26.29 (p<.001); the estimated differential in intake *BDI-II* between those clients displaying a minimal and rapid stress improvement was indistinguishable from zero (-1.21, *ns*); the estimated rate of change in *BDI-II* for an average client with minimal stress improvement was -0.51 (p<.01); and the estimated differential in the rate of change in *BDI-II* between clients displaying minimal and rapid stress improvements was -0.36 (p<.05).

In terms of the variance components in *Model C*, the results indicated no real change in Level-1 residual variance ($\sigma^2\varepsilon$) relative to *Model B*. This was to be expected as no time-variant predictors were added to the model. In terms of the Level-2 residual variance (σ^2_0) relative to *Model B*, only a minimal reduction was achieved by introducing stress curve into the model. The remaining Level-2 residual variance was also still statistically significant, indicating that further predictors were needed in the model in order to explain the between-client variability in *BDI-II*. Nevertheless, the Level-2 residual variation in rate of change (σ^2_1) did represent a reduction of 45% from *Model B*. From the results in *Model C* it could be concluded that the effects of the second Level-2 predictor attributional style should be explored as a significant amount of Level-2 residual variance continued to exist in the model.

Model D – Introducing Attributional Style

Model D extended the analysis by incorporating attributional style as another Level-2, time-invariant predictor. In particular, *Model D* evaluated the effects of stress curve on

BDI-II initial status and rate of change, while controlling for the effects of attributional style on initial status and rate of change.

Results from *Model D* are also presented in Table 8.9. The fixed effect estimates $\breve{y}_{01}$ and $\breve{y}_{11}$ respectively describe the difference in *BDI-II* initial status and rate of change between clients with minimal and rapid stress improvements, while controlling for the effects of attributional style. The additional fixed effects estimates $\breve{y}_{02}$ and $\breve{y}_{12}$ describe the differential in *BDI-II* initial status and rate of change for clients with different attributional styles, controlling for the effect of their stress change trajectory.

Essentially, *Model D* provided *controlled* answers to the research questions concerning the relationship between stress and depression. The finding that the difference in the *BDI-II* rate of change between clients in different stress curve groups was significantly lower after attributional style was controlled for, was noteworthy. The absolute value of the fixed effect estimate $\breve{y}_{11}$ decreased from 0.36 in *Model C* to 0.26 in *Model D* and this indicated that at least some of the significant differential that was initially found between different stress improvement groups (in *Model C*) may have been attributable to the type of attributional style clients presented with (as this was controlled for in *Model D*). In other words, *Model D* provided evidence to suggest attributional style moderates the relationship between the rate of change in stress and depression.

Evaluation of the variance components in *Model D* also confirmed the controlled relationship of *BDI-II* and stress curve. Comparing *Model D* to *Model B*, it was clear that both Level-2 residual variance components declined considerably. The between-client variance (σ^2_0) decreased by 31% and the residual variance in rate of change (σ^2_1) similarly decreased considerably, by 55%. Taken together, stress curve and attributional style explained 31% of the variation in *BDI-II* intake scores and 55% of the variation in rate of change.

The superior fit of *Model D* was confirmed by its associated *Deviance* statistics. In particular, the difference in *Deviance* between *Model C* and *Model D* was calculated as $(3381.98 - 3372.75) = 9.23$. Compared to a χ^2 distribution with 2 degrees of freedom (equal to the difference in the number of parameters between the two models), this difference score exceeded the p<.001 critical value. This therefore indicated a significant difference in *Deviance*, with *Model D* being more preferable.

Table 8.9

Results of Fitting a Multilevel Model to BDI-II Data That Controls for Stress Curve and Attributional Style

	Parameter		Model A	Model B	Model C	Model D	Model E
Fixed Effects							
Initial Status (π_{01})	*Intercept*	$\breve{Y}_{00}$	18.73*** (1.82)	24.92*** (2.15)	26.29*** (4.30)	24.47*** 3.65	20.08*** (2.57)
	Stress Curve	$\breve{Y}_{01}$	- -	- -	-1.21 (3.24)	-4.75 (3.87)	- -
	Attributional Style	$\breve{Y}_{02}$	- -	- -	- -	12.79** (3.87)	10.48** (3.78)
Rate of Change (π_{11})	*Intercept*	$\breve{Y}_{10}$	- -	-0.93*** (0.10)	-0.51** (0.18)	-0.45* (0.17)	-0.70*** (0.12)
	Stress Curve	$\breve{Y}_{11}$	- -	- -	-0.36* (0.14)	-0.26 (0.14)	- -
	Attributional Style	$\breve{Y}_{12}$	- -	- -	- -	-0.37 (0.18)	-0.49* (0.18)
Variance Components							
Level 1	*Within person*	σ^2_{ε}	61.82*** (3.91)	27.72*** (1.80)	27.70*** (1.80)	27.70*** (1.80)	27.72*** (1.80)
Level 2	*In initial status*	σ^2_{0}	83.11*** (23.89)	116.41*** (33.25)	115.48*** (32.99)	80.23*** (23.25)	88.93*** (25.67)
	In rate of change	σ^2_{1}	- -	0.29* (0.12)	0.16* (0.06)	0.13** (0.05)	0.15** (0.06)
	Covariance	σ_{ε}	- -	-4.65* (1.86)	-2.63* (1.13)	-1.61 (0.85)	-1.18 (0.90)
Pseudo R^2 Statistics and Goodness-of-fit							
	R^2_{ε}		-	0.55	0.55	0.55	0.55
	R^2_{0}		-	-	0.01	0.31	0.24
	R^2_{1}		-	-	0.45	0.55	0.48
	Deviance		3,748.63	3,391.92	3,381.98	3,372.75	3,382.63
	AIC		3,754.63	3,403.92	3,397.98	3,392.75	3,398.63
	BIC		3,767.42	3,429.51	3,432.10	3,435.41	3,432.75

Note. *** p<.001; ** p<.01; * p<.05 significance level. Models A and B are re-presented for comparison.

Finally, within the context of multilevel analysis it is important to consider alternative formulations and alternative model compositions. Given the significant influence attributional style had on the variance composition once it was introduced as a Level-2 predictor in *Model D*, it was important to consider whether attributional style alone

might provide an equally fitting model. Table 8.9 also presents the results from fitting an alternative multilevel model, where only session time and attributional style were included as predictors (i.e. not stress). This allowed for a test of whether stress curve does in fact contribute a significant influence over and above attributional style. The results clearly affirmed the role that stress curve does play. Although *Model E* resulted in a considerable reduction in Level-2 residual variance (both σ^2_0 and σ^2_1), the total unexplained variance in *BDI-II* was 116.65 in *Model E* compared to only 107.93 in *Model D*. *Model D* therefore explained 7.5% more variance than *Model E*, making it a more preferable fit and confirming the significant role that stress curve plays in the relationship between *BDI-II*, attributional style and time.

The preference for *Model D* over *Model E* was also confirmed by a comparison of the *AIC* and *BIC* statistics associated with each model. Analysis of these ad hoc criteria is especially recommended in situations where the two models of comparison are not nested within one another, as is the case with *Model D* and *Model E* (Singer & Willett, 2003). The *AIC* statistic in *Model D* was 5.88 smaller than the *AIC* statistic associated with *Model E* and *Model D* appeared to provide a more accurate model fit for the data in the current study. This was consistent with the deviance classification standards purported by Raferty (1995).

Summary of the Multilevel Model

Results from the multilevel analysis at this point suggested that attributional style moderates the relationship between stress and *BDI-II*. In other words, attributional style appears to moderate the relationship between the trajectory of a client's stress improvement and their recovery from depression over the course of therapy. When a client's attributional style was controlled for, a greater proportion of Level-2 variance was explained and an improved model fit was achieved. Tests of alternative formulations of the model confirmed that this moderating relationship appeared to provide the most accurate formulation for the current sample. Indeed, the final model explained a greater proportion of variation than what would be achieved if only attributional style, or stress curve were incorporated as sole predictors.

Post-Hoc Analyses

The foregoing multilevel analysis indicated that attributional style may moderate the relationship between stress impact and *BDI-II*. However, given the richness of the current data set, it was possible to perform further analyses in order to investigate whether other factors might have further influence within the treatment context. In particular, the information collected from the *Identification of Precipitating Stressors Questionnaire* was considered, along with a range of demographic client variables.

Results from the Identification of Precipitating Stressors Questionnaire (IPSQ)

An extensive amount of literature posits the influence of contextual factors of stress. Indeed, several researchers have been interested in how variables such as chronicity and different stressor typologies interact with the course of depression, or the type of depressive vulnerability an individual experiences (Wheaton, 1996). In light of this, it seemed pertinent to explore the effect of stressor characteristics within the current study. The *IPSQ* provides a useful mechanism for such investigation, and prior to investigating the interaction between stressor characteristics and depression trajectories (in a multilevel format), the overall findings from the *IPSQ* were reviewed.

The *IPSQ* asks therapists to identify up to three primary stressors that precipitated each client's depression (see Appendix D). For each individual stressor, a range of information is then gathered to provide clarity around the specific type of impact the stress had on each client's life. Figure 8.9 provides a graphical representation of the results from the *IPSQ*. The results presented here represent the characteristics pertaining only to the primary stressor for each individual.

Impact of Primary Stressor on Relationships

Impact on Relationships
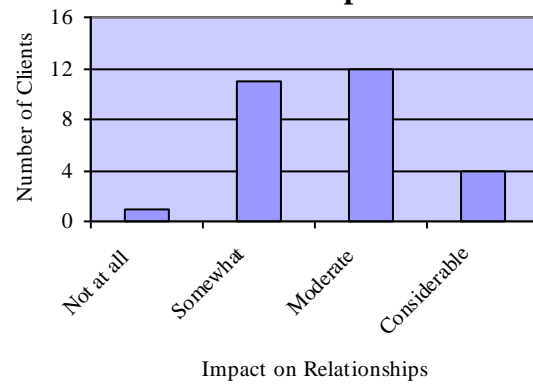
Impact of Primary Stressor on Autonomy

Impact on Autonomy
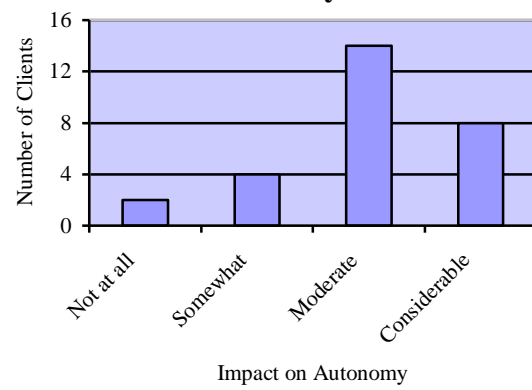
Impact of Primary Stressor on Finances

Impact on Finances

Controllability of Primary Stressor

Chronicity of Primary Stressor
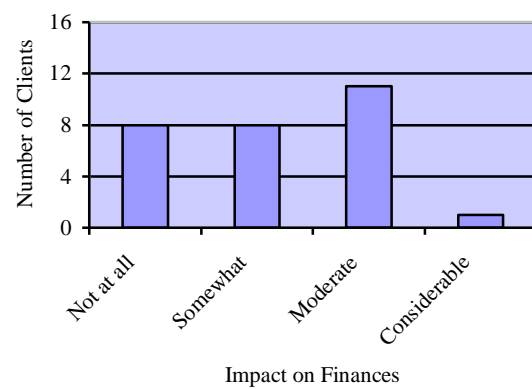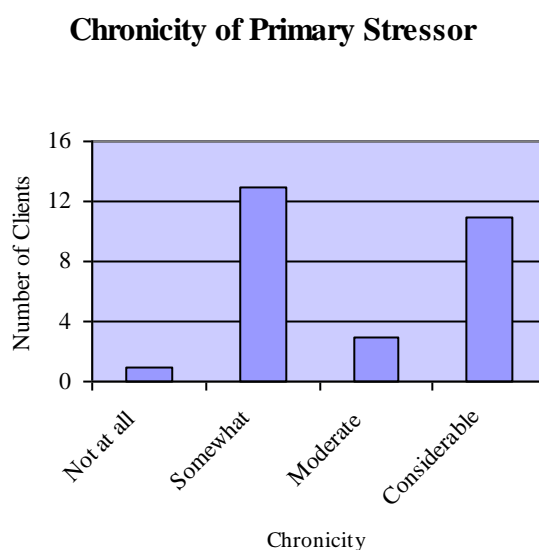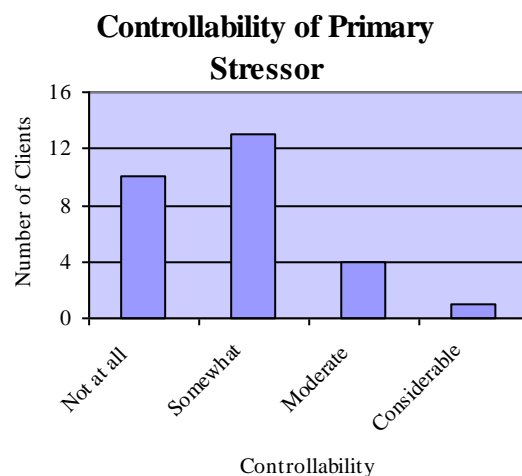
Figure 8.9. Overview of results from the *IPSQ*.

Overall these graphs illustrate that for the majority of clients the primary stressor was indicated to be of the highest severity. The modal stressor was one that was somewhat controllable, had a moderate impact on relationships and autonomy and a moderate impact on finances. The most common stressor also involved a stressful event sequence, which characteristically involves one major event provoking a series of related events that continue even after the initial event has passed.

Demographic Variables

In addition to the contextual factors concerning precipitating stressors, it was thought that several demographic variables may also potentially influence the interaction between stress, attributional style and depression. At intake, clients completed a standard, although New Zealand-specific, demographic form (see Appendix O1). During the study, an additional demographic form was also compiled in order to gather further information about the clients' lifestyles or situation (see Appendix O2). Demographic information about the sample population was summarised in an earlier section and for the purposes of post-hoc analyses several variables were included. In particular, it was important to determine whether gender, age, employment status, number of children and previous therapy or medication usage influenced the recovery trajectories that clients exhibited (see Lambert, 2004 for a comprehensive overview of research in this area).

The first stage in the post-hoc analyses involved identifying which variables appeared to be important in the relationship between depression, stress and attributional style. A bivariate correlation analysis was performed in *SPSS* in order to explore the relationships between the various factors. A summary of the results is included in Appendix P.

Autonomy

In the current study, the level of impact a stressor had on an individual's autonomy was significantly correlated with a range of factors. In particular, stressors that negatively affected a client's level of autonomy were more likely to negatively affect their finances ($p<.1$) and result in a more severe initial level of stress ($p<.05$). In addition, males ($p<.1$) were significantly more likely to experience stressors that negatively impacted on autonomy and a high impact on autonomy also significantly correlated with a smaller rate of change in *BDI-II* ($p<.05$). An interesting finding also revealed that those clients who experienced a greater level of impact on their autonomy as a result of stressors were also less likely to complete therapy ($p<.1$) and more likely to present with a depressogenic attributional style ($p<.1$). This suggests that these clients might experience lower levels of self-efficacy and the extensive impact on their ability to exercise their freedom or autonomy might permit them less flexibility in terms of engaging in and completing a therapeutic process.

Relationships

Next we consider the role of relationships. Within the current sample, those clients experiencing stressors associated with a greater impact on relationships were significantly more likely to have previously engaged in psychotherapy (p<.05) and exhibit a smaller rate of change in stress impact throughout the therapy process (p<.1). Interestingly, they were also more likely to present with a lower level of stress severity at the conclusion of therapy (p<.05). Taken together, this might suggest that the therapeutic alliance itself is more influential for these particular clients. It is possible that the very relationship they establish in therapy inherently leads to a significant improvement in their stress levels by providing an alternative social support and curative example of a working relationship.

Finances

The level of impact a stressor had on a client's finances was significantly correlated with the amount of therapy they completed, as those clients experiencing a higher level of financial distress were significantly less likely to complete the full 20 sessions of treatment (p<.1). In addition, they were also significantly more likely to have previously engaged in psychotherapy (p<.5) and as aforementioned, a significant positive relationship was found between stressors that impacted on finances and stressors that impacted on autonomy (p<.1).

Controllability

The extent of control a client had over their primary stressor did not significantly correlate with many other factors. Indeed, the only significant interaction was with previous therapy engagement, in that those clients who experienced a greater level of control over their stress were more likely to have previously participated in therapy (p<.01).

Chronicity

The chronicity of the stressor was also reviewed. Interestingly, those stressors that had a more chronic duration were more likely to result in a less severe *BDI-II* score at intake (p<.1). In addition, clients experiencing more chronic stressors also tended to be less likely to have depressogenic attributional styles during therapy (p<.1). One

possible explanation for this could be that clients with chronic stressors typically present for therapy only after a period of time has passed, and the more acute phase of depression has subsided.

Stress severity

Finally, the severity of the primary stressor clients experienced was also assessed. Within the current sample, a significant relationship was found between stress severity and gender, with males more typically experiencing stressors of a more severe nature ($p<.001$). Those clients with fewer children were also more likely to experience a greater severity of stress ($p<.01$).

Re-modelling the Multilevel Model with Control Variables

In addition to determining the significance of any interactions between these additional contextual and demographic variables, it was important to decipher what kind of impact they might have on the final model of analysis (*Model D*). As a result, a series of post-hoc analyses were performed using the same format as the original analysis. Each variable was entered as a separate additional parameter to be controlled for. The main results from these analyses can be consulted in Appendix Q. However, the Level-1, Level-2 and total variance associated with each model is presented separately in Table 8.10 and the relative variance distributions are compared to the chosen model (*Model D*).

Table 8.10

Distribution of Variance in Models Incorporating Additional Control Variables

	Level-1 ($\sigma^2\varepsilon$)		Level-2 ($\sigma^2_{0)}$)		Total
BDI Severity at Intake	27.71	(1.80)	38.57	(11.65)	66.28
Therapy Complete	27.63	(1.79)	71.87	(20.91)	99.51
Gender	27.70	(1.80)	73.87	(21.41)	101.57
Marital Status	27.69	(1.79)	73.98	(21.52)	101.67
Past Medication	27.68	(1.79)	76.91	(22.33)	104.59
Autonomy	27.65	(1.79)	77.69	(22.55)	105.35
Past Therapy	27.69	(1.79)	78.35	(22.73)	106.04
Relationships	27.67	(1.79)	78.40	(22.75)	106.07
Chronicity	27.70	(1.80)	78.74	(22.83)	106.44
Finances	27.69	(1.79)	79.26	(22.98)	106.95
Children	27.69	(1.79)	79.35	(23.00)	107.04
Controllability	27.68	(1.79)	79.55	(23.06)	107.23
Age Intake	27.67	(1.79)	80.08	(23.20)	107.74
Employment	27.70	(1.80)	80.21	(23.24)	107.91
Stress Severity	27.70	(1.80)	80.26	(23.26)	107.96
Model D	27.70	(1.80)	80.23	(23.25)	107.93

Note. Models are ranked in order of model fit (as measured by total variance explained).

Overall, the results showed that the introduction of control variables did not significantly affect the amount of within-client variance within the model. This was to be expected, as the control variables are all considered to be time-invariant parameters. As a result, justification for the inclusion or exclusion of the control variables in the final model could only be based solely on the relative effects they had on the Level-2 variance within *Model D*. A more in-depth review of the effects on Level-2 variance is presented in Figure 8.10 and the chart highlights how only a few of the variables actually made a notable difference to the amount of between-client variance in the model. When stress severity was added into *Model D*, the total Level-2 variance in the model actually increased, which clearly highlighted a specification error.

Although including a number of the control variables in the final model appeared to explain slightly more of the Level-2 variance, the majority of these variables only improved the variance by a minimal amount. If a threshold of at least 10% improvement in within-client variability was applied, only *BDI-II* severity at intake

would meet criteria to be included in the final model. Alternatively, if a threshold of at least 5% improvement in within-client variability was applied, a client's marital status at intake, their gender and whether or not they completed therapy would also be included in the model. Overall, post-hoc analyses confirmed that controlling for marital status, gender, therapy completion and *BDI-II* severity at intake yields a smaller level of variance and provides a better model fit. For these reasons, the final model (*Model D*) was re-modelled to incorporate these factors. This revised model is presented in Table 8.11 as *Final Model*.
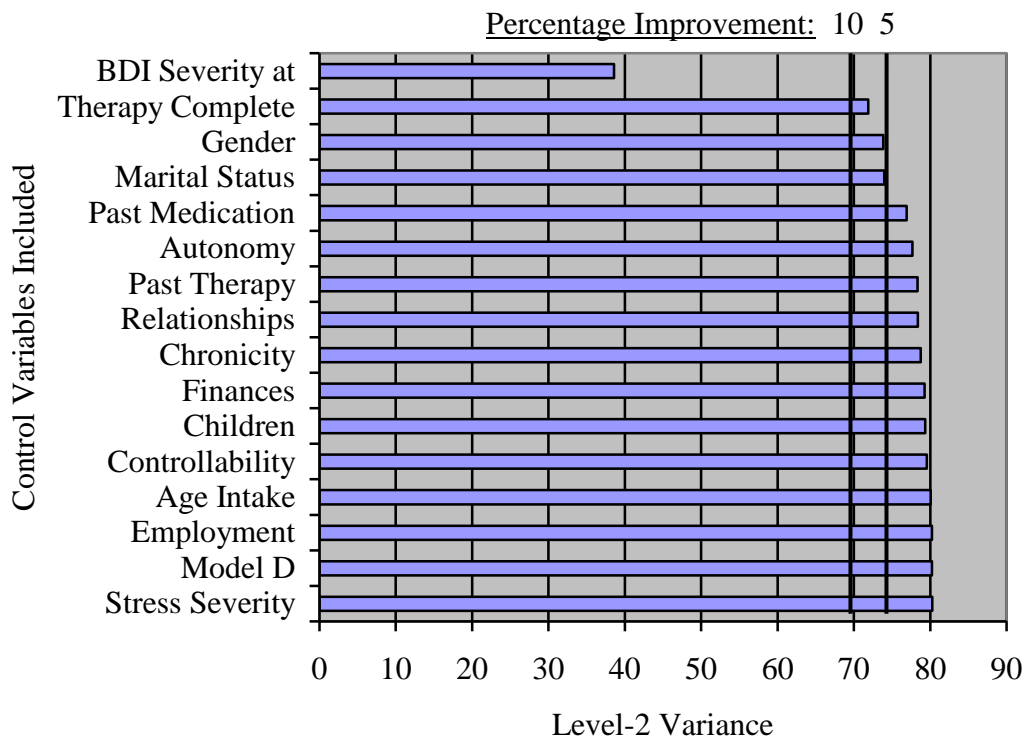
Figure 8.10. Comparison of the level-2 variance associated with models incorporating different control variables.

Table 8.11

Multilevel Results for the Final Model

		Parameter	Model D	Final Model
Fixed Effects				
Initial Status (π_{01})	Intercept	$\breve{y}_{00}$	24.47*** (3.65)	11.60*** (4.94)
	Stress Curve	$\breve{y}_{01}$	-4.75 (3.87)	-6.07** (1.81)
	Attributional Style	$\breve{y}_{02}$	12.79** (3.87)	6.69* (2.63)
	BDI Intake Severity	$\breve{y}_{03}$	-	8.88 (1.60)
	Gender	$\breve{y}_{04}$	-	-6.2* (2.28)
	Therapy Complete	$\breve{y}_{05}$	-	2.06 (2.70)
	Marital Status	$\breve{y}_{06}$	-	-0.58 (0.86)
Rate of Change (π_{11})	Intercept	$\breve{y}_{10}$	-0.45* (0.17)	-0.47 (0.32)
	Stress Curve	$\breve{y}_{11}$	-0.26 (0.14)	-0.25* (0.12)
	Attributional Style	$\breve{y}_{12}$	-0.37 (0.18)	-0.15 (0.17)
	BDI Intake Severity	$\breve{y}_{13}$	-	-0.31** (0.10)
	Gender	$\breve{y}_{14}$	-	0.21 (0.15)
	Therapy Complete	$\breve{y}_{15}$	-	0.41 (0.21)
	Marital Status	$\breve{y}_{16}$	-	0.05 (0.06)
Variance Components				
Level 1	Within person	σ^2_ε	27.70*** (1.80)	27.64*** (1.79)
	In initial status	σ^2_0	80.23*** (23.25)	26.58*** (8.35)
Level 2	In rate of change	σ^2_1	0.13** (0.05)	0.07* (0.03)
	Covariance	σ_ε	-1.61 (0.85)	-0.21 (0.39)
Pseudo R^2 statistics and Goodness of fit				
	R^2_ε		-	0.00
	R^2_0		-	0.67
	R^2_1		-	0.46
	Deviancce		3,372.75	3,339.98
	AIC		3,392.75	3,375.98
	BIC		3,435.41	3,452.75

Note. *** p<.001; ** p<.01; * p<.05 significance level. *Model D* is re-presented for comparison.

A Closer Consideration of the Relationship Between Stress and Depression

After having developed a model that could explain 67% of variation in *BDI-II* intake scores and 46% of the variation in rate of change, the focus then shifted back to a higher level and a consideration of what this specified in terms of the causes, correlations and treatment of depression. A primary hypothesis of the current study was that change in stress impact would correlate with change in depression severity. The multilevel analysis suggested that the relationship between stress and depression appears to be moderated by the predominant type of attributional style a client presents with during therapy. While the previous analysis provided empirical support for this relationship, post-hoc analyses were also performed, in order to provide an additional perspective on the intricacies of this relationship.

More specifically, the relationship between change in stress and depression was re-examined, in order to more closely examine the complexity of the interaction between these primary variables. In accordance with the measurement of stress trajectories using the improvement in stress severity achieved by mid-therapy (stress curve), *BDI-II* recovery trajectories were also able to be calculated in a similar manner, by calculating the percentage change in *BDI-II* for each client from intake to Session 10. These *BDI-II* Percentage improvements for each client are presented in Appendix R.

Figure 8.11 provides a visual representation of the improvements each client made throughout the first ten sessions of therapy and demonstrates the testing of Hypotheses 4 and 5. If change in stress impact and change in *BDI-II* were directly correlated, clients' change scores could be expected to fall along the diagonal line (labelled "expected"). As observed in Figure 8.11, this type of relationship exists for those clients who predominantly exhibit a non-depressogenic attributional style during therapy (these clients are represented by the black dots in Figure 8.11). However, for those clients who present with a predominantly depressogenic attributional style during therapy, the relationship between change in stress impact and change in depression severity appears to be stunted. The improvement these clients experience in terms of their stress severity scores shows a delayed translation into improved *BDI-II* (these clients are represented by the red dots in Figure 8.11). In other words, post-hoc analyses suggested that for example, a non-depressogenic client with a rapid stress improvement was likely to achieve a similarly rapid *BDI-II* improvement. However, a

depressogenic client with a rapid stress improvement was more likely to only achieve an expected rate of *BDI-II* improvement.
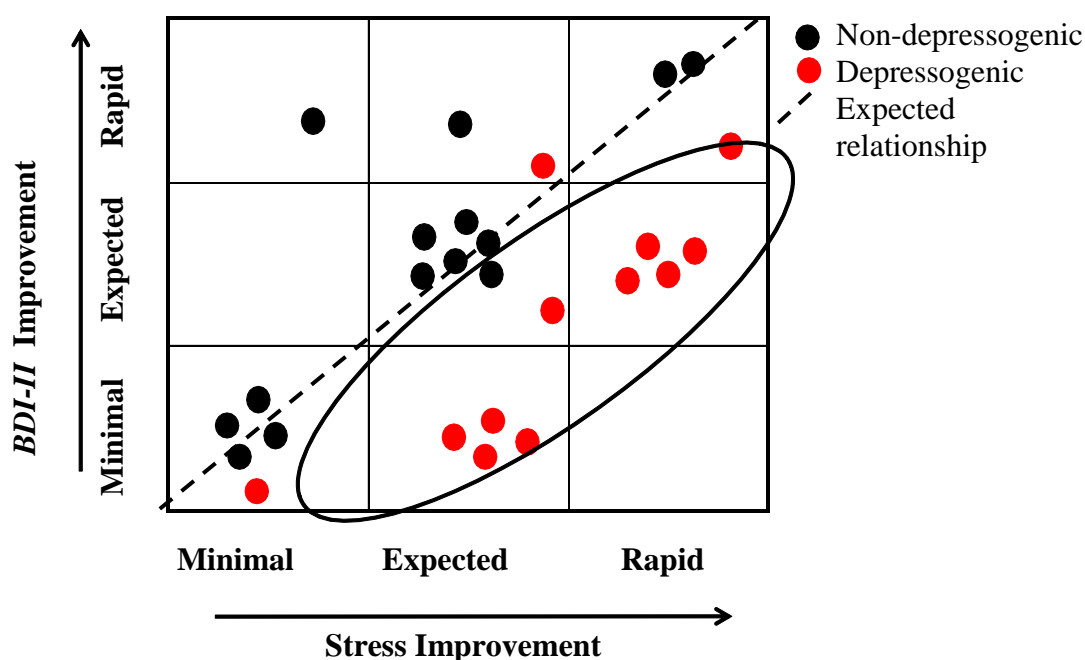
Figure 8.11. Attributional style moderates the relationship between change in stress impact and change in depression.

While the current study obviously represents only a preliminary investigation into the complexities of the relationship between stress impact, attributional style and depression, this graphical representation provides a useful perspective. The notion that a depressogenic attributional style would impede or hold back improvements in therapy accords with current literature. The present study therefore extends the current research as the results suggest that even in the situation where a client is able to significantly improve their stress level, a tendency to make depressogenic attributions can still powerfully restrict their therapy gains and recovery trajectory.

Summary

This chapter provides an overview of the results from the current study. In the first instance, the use of both the *IES-VF* and *BDI-II* was supported by robust reliability and psychometric statistics. In particular, an important first step in the current research involved a review of the *IES-VF* in order to decipher which items were most appropriate for use within an objective assessment format. Preliminary correlations

were then performed and exploratory analyses confirmed the relationships between the three primary variables within the study. Furthermore, the confirmation of sufficient variability within the dependent variable *BDI-II* provided adequate justification for the introduction of parameters into the multilevel model, in an attempt to explain between-client variance. These results provided support for the role of stress impact and attributional style in a client's recovery from depression. More specifically, a series of iterative multilevel analyses confirmed that attributional style appears to moderate the relationship between stress and depression in the context of CBT treatment. Finally, a number of post-hoc analyses were performed. After considering a range of demographic and stressor characteristics, findings from the current study suggested that only four control variables were significantly influential. This resulted in a final model where variability in depression recovery was explained by stress impact, attributional style, gender, severity of depression at intake, marital status and whether or not a client completed the therapy process.

Chapter 9: Discussion

Aims and Scope

This chapter reviews the main findings of the current research. It begins with a return to each of the study's primary hypotheses, discussing their validity and any important implications. The relevance of the findings to the current literature is then considered, with specific attention to the contribution this research makes to the theories underpinning work in this area. A discussion of recommendations for future research then ensues, followed by a presentation of clinical implications. An important focus of this chapter is the reiteration of the main findings and results. In particular, the study's use of multilevel analysis and its novel and reliable measurement of stress are reviewed.

Revisiting the Primary Hypotheses

- *As clients progress through therapy, their overall level of depression will lessen*

A primary hypothesis of the current research was that clients' depression would improve as they progressed through therapy. A pattern of improvement was indeed ascertained, as clients showed a significant improvement in terms of their *BDI-II* scores over time. Not only did the results confirm that depression severity improved for the average client, but the multilevel analysis meant that session-by-session improvements could also be evaluated for individual clients. Indeed, all of the clients demonstrated a reduction in depression severity from the point of intake to the end of therapy. Follow-up analyses also confirmed that for 100% of those clients attending 2-month follow-up sessions and 100% of those clients attending 6-month follow-up sessions, this relative improvement was maintained. A similar pattern of improvement was also observed when Beck and colleagues' (1996) *BDI-II* severity classification criteria was applied.

To supplement this traditional pre-to-post measurement of therapeutic success, the multilevel analysis in *Chapter 8* also confirmed that significant improvements were made at a session-by-session level. Fitting the unconditional growth model to the *BDI-II* data confirmed that depression levels significantly decreased over time, and the null hypothesis was consequently rejected.

Taken together, this is a positive finding that accords with current research purporting empirical support for the efficacy of CBT. In addition to the confirmed within-client variability in depression severity, post-hoc analyses also suggested that a *BDI-II* recovery classification similar to that used for stress improvement might also be valid. In other words, when the improvement in depression severity from intake to mid-therapy was analysed, clients were able to be differentiated into three different groups according to their rate of recovery; these groups were systematically referred to as *minimal*, *expected* and *rapid* improvement groups. The robustness of this classification schema suggests that future clinical and research work might benefit from categorising clients in this way. Sensitivity analysis confirmed the strength of the classification and the final results showed that the type of improvement group a client was assigned to had important consequences for their recovery and treatment trajectory.

- *As clients progress through therapy, their stress impact will decrease*

A second hypothesis predicted that clients' stress impact levels would decrease as they progressed through therapy. Stress impact scores were measured at eight sessions and results from the current study confirmed that clients did become significantly less affected by stress over time. In addition to an improvement trend for the population average, multilevel analysis highlighted the variability that also existed at the individual level. Not only did the majority of clients show significant improvements across time, but a difference was also noted *between* clients in terms of the types of stress trajectories they exhibited. Three different groups were distinguishable, and as mentioned, clients were classified as having a *minimal*, *expected* or *rapid* stress improvement. However, irrespective of the particular type of trajectory each client achieved, the null hypothesis was rejected overall, as sufficient variability in stress impact was detected between the point of intake and the termination of therapy. This suggests that CBT is an effective treatment for all patients, albeit a particular client who shows the highest performance on a distinct subset. A significant relationship was also confirmed between a client's initial level of stress impact and their subsequent rate of improvement through therapy.

Overall findings suggested that those clients experiencing a greater level of stress impact at the beginning of therapy experienced a significantly smaller rate of improvement. It is possible that their level of acuity at intake meant they were less

able to improve their situation initially, relative to other clients experiencing a less severe stress reaction.

- *A relationship between change in stress impact and change in depression will be observed*

It was hypothesised that a relationship would exist between the change in a client's stress impact and their change in depression severity. Results from the early correlation analysis supported this hypothesis. For the majority of clients, a positive improvement in depression severity significantly correlated with a concurrent reduction in stress factors. The ultimate specification in the *Final Model* clearly highlighted the relationship between depression and stress. Interestingly, no relationship was found between a client's initial level of stress impact and their corresponding intake depression severity or rate of recovery from depression.

- *As clients progress through therapy, their attributional style will become less depressogenic*

In addition to becoming less stressed and less depressed, it was purported that clients would become more optimistic as they progressed through therapy. Results from the current study confirmed that clients did in fact develop a more optimistic disposition by the end of their therapy engagement. Attributional style was measured as a time-invariant predictor and a sensitivity analysis clearly supported the division of clients into separate groups. Clients were classified as having either a *predominantly depressogenic*, or *predominantly non-depressogenic* attributional style during therapy and this classification was based on their scores from the *ASQ* which was administered at three time points during the first half of therapy. However, for the purposes of assessing total change across therapy (in this specific hypothesis), clients' final scores on the Session 20 *ASQ* were also considered. As hypothesised, almost all clients exhibited non-depressogenic attributional styles by their point of termination from therapy. In other words, the majority of clients became increasingly optimistic in their way of thinking as they progressed from the first ten sessions to the second ten sessions of treatment. Maintenance of this improvement was also assessed and follow-up analyses highlighted an inconsistency in maintenance across different clients. While the majority of clients maintained an optimistic attributional style at the point of 2-month follow-up, 30% of clients actually *decreased* their level of optimism over that

period. In effect, this meant that three clients actually presented with depressogenic attributional styles at the point of the 2-month booster session (two of which had exhibited non-depressogenic attributional styles at their point of termination from therapy).

Overall, results from the current study suggest that a focus exclusively on the gross change in attributional style from intake to Session 20 would indicate that attributional style improves as clients advance through therapy. However, the inclusion of follow-up data suggests that the change is not as simple as it might appear when viewed only as a pre-to-post treatment effect. A more valid conclusion would be that clients did become more optimistic as they progressed through therapy but such a change was skewed towards the latter stages of treatment and the effectiveness of the improvement was related to the acuity of treatment. Essentially, although a treatment effect was evident, maintenance of the effect was less apparent and for some clients the level of optimism they exhibited began to decrease after they terminated the core phase of therapy.

- *A relationship between change in attributional style and change in depression will be observed*

If clients' attributional styles became less depressogenic through therapy, it was predicted that this would correlate with an improvement in depression. However, findings from the current study did not support this hypothesis. Results from the two-tailed correlation analysis highlighted the lack of any significant relationship between the rate of change in a client's attributional style and their rate of change in depression. However, a significant correlation was observed between a client's intake attributional style and their intake depression and subsequent rate of change in depression. Those clients who initially presented with a more depressogenic disposition typically presented with a greater level of severity at intake and exhibited significantly smaller improvement rates across therapy. Further analysis also showed that this relationship with depression severity and rate of improvement not only applied to the attributional style a client exhibited at intake, but also to the predominant type of cognitive style they showed throughout therapy. In other words, the relationship was not exclusive to intake attributional style. For example, those clients who were not depressogenic at intake but were still predominantly depressogenic throughout therapy were also

observed to commence treatment with a more severe level of depression and show a slower rate of improvement. This is an important finding as current research tends to focus more on measuring attributional style cross-sectionally, or as a static factor. This finding therefore highlights the richness of data that can be obtained from a more longitudinal analysis. Importantly, it also highlights the increased accuracy and integrity of results that a longitudinal perspective yields.

- *Attributional style will moderate the relationship between stress impact and depression*

It was also hypothesised that attributional style would moderate the relationship between the change in a client's stress impact and their change in depression severity. This particular hypothesis is clearly supported by the results from *Model D* and the relationship is explicated in Figure 9.1. Multilevel analysis allows us to test the relative contributions of different variables while simultaneously controlling for certain parameters. Results from *Model D* did support an interaction, as attributional style appeared to moderate the relationship between stress impact and depression. This was evidenced by the fact that the fixed effect estimate $\breve{y}_{11}$ decreased significantly from *Model C* to *Model D*. This indicated that at least some of the significant differential that was initially found between different stress improvement groups (in *Model C*) was likely to be attributable to the type of attributional style clients presented with (as this is controlled for in *Model D*).

Moreover, post-hoc analyses allowed the relationship between these three variables to be more closely analysed (depression, stress and attributional style). The relationship between stress and depression was found to be stronger for clients who presented with predominantly non-depressogenic attributional styles. For those particular clients, the type of stress impact improvement they experienced corresponded closely to a similar improvement in depression. However, for those clients presenting with predominantly depressogenic attributional styles, the translation of stress improvement into depression improvement was not as straightforward. Post-hoc analyses highlighted the effective delay that such clients experience, as a rapid stress improvement more typically results in an expected rate of depression improvement; an expected rate of stress improvement more typically results in a minimal depression improvement; and even a minimal stress improvement also tends to result in a smaller level of depression

improvement. In summary, results from the current study suggest that attributional style moderates the relationship between stress and depression. In other words, the predominant type of attributional style that a client sustains throughout therapy significantly affects the way in which they benefit from any reduction in stress or the types of therapeutic gains they realise.
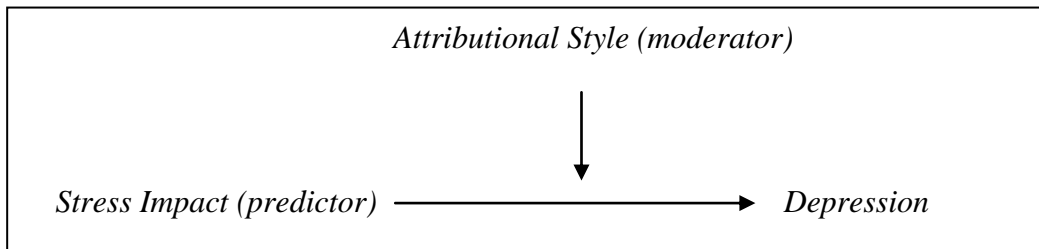
Figure 9.1. Attributional style moderates the relationship between stress impact and depression.

Contribution to Current Research

Consideration for how the present study's findings fit with contemporary research is needed. In particular, the use of multilevel analysis and the distinctive measurement of stress allow the present study to make a unique contribution to the literature. For the purposes of review, each of the theoretical frameworks and research areas underpinning the present model are re-considered in light of the study's main conclusions. However, as a priority at this point, the study's use of multilevel analysis and the development of new tools for measuring the stress reaction will be reviewed first. This is because it is hoped that the methodology and analytical procedures employed in the present study makes a significant contribution to the current literature – over and above the study's contribution to the theoretical domain.

Methodology

The comprehensive literature review that pre-empted the present study revealed the paucity of research in this field that uses advanced longitudinal analysis when investigating therapeutic processes and outcomes. Although multilevel analysis is a fairly new analytical tool, specifically in its application to clinical psychology, there is a clear need for a greater number of studies utilising its longitudinal and hierarchical approach towards data analysis. Particularly within the area of depression, stress and

attributional style, it appears that no study to-date has investigated the therapy process and client outcomes using an HLM approach. Within this context, it is therefore anticipated that the present study will represent a contribution to the field. While the results of the study remain paramount, the bare fact that a process of multilevel analysis has been demonstrated in application to this area is notable and will hopefully lead to the further development of studies of a similar analytical nature in the future. The present study explicates the depth of analysis that a hierarchical structure provides and the accuracy of results that can be achieved when both within-client and between-client variability are analysed.

In addition to the overarching methodological approach, the present study also makes a contribution in terms of its assessment and measurement of stress. Firstly, current research provided a theoretical argument for the coining of a more specific term – *stress impact*. More explicitly, this term reflects the two-fold nature of stress; with an important quantitative element (the amount of stress) and an equally important qualitative component (the contextual elements of the stress).

Secondly, the current study focused on developing a novel questionnaire that measures the contextual factors of the stressors that clients experience. The *Identification of Precipitating Stressors Questionnaire (IPSQ)* draws on current research and theory in providing a framework for quantitatively measuring the context of different stressors (see Appendix D). Importantly, the *IPSQ* met clinical standards of validity and reliability and increased the amount of data that was able to be included in the study's final analyses. The development of the *IPSQ* to measure stressors in first episode depression can be recognised as one of the first such approaches in the field. It highlights the need for greater clarity around specific stressor characteristics and their roles in the development, treatment and recovery of depression. The need for a more comprehensive understanding of stressor characteristics has been well voiced within literature to-date (Hammen, 2005; Monroe & Kelley, 1995; Monroe, 2008). The *IPSQ* represents an enhancement on the existing alternative of checklist measurements of stress, as it refrains from imposing restrictions on the number or type of stressors that clients can present with. Moreover, the open-ended format of the *IPSQ* and the use of multiple dimensions for measurement is advantageous considering criticisms about the tendency for checklist measures to misconstrue or fail to capture the personal meaning of stressors (Monroe, 2008; Hammen, 2005).

Finally, the current study makes a contribution to the field in terms of its measurement of *quantitative* stress. Through the adaptation of the psychometrically sound *IES*, a new measurement tool (*IES-VF*) was developed that reliably measures stress impact in an objective format (see Appendix E). This attempts to counteract the recognised disadvantages of subjective measurement tools that have been predominated in previous research (Mineka & Nugent, 1995). Moreover, the reliability analyses performed in the present study provided empirical support for the *IES-VF* and offered a preliminary perspective on which items are most reliable when assessing stress impact in an objective video-format. The iterative item analysis that was performed also helps to lay the groundwork for the *IES-VF* to be incorporated in future research. The inception of the *IES-VF* widens the range of possible aspects that can be measured in stress research, as the *IES-VF* addresses a range of factors implicated in a client's stress experience (impact on behaviour, emotions, cognitions, physiology). This aptly accords with recent requests for a consideration of the broader context of stress (Monroe & Kelley, 1995). In addition to a wider perspective of the individual's stress experience, the study's methodology also represents a concerted effort to incorporate both therapist and independent observer ratings of stress. This use of different perspectives delivers some long-requested triangulation to the measurement of stress in this field (Barnow et al., 2002).

Depression

Results from the present study confirm that clients presenting with first episode depression are not homogeneous. This finding supports the underlying premise of the study, which stated a clear need for more attention to nosological differences and individual variability in presentations. In the final sample, clients differed according to the severity of their depression and their specific baseline and demographic characteristics. Significant differences were observed in the characteristics of the clients' precipitating stressors and the type of attributional style clients upheld.

Importantly, the present study provides some confirmation of the depression profile purported by demographic detail in previous studies. The tendency for male clients to be older than their female counterparts in the current study accords with recent publications from the New Zealand Ministry of Health (Ministry of Health, 2008). The lack of a *significant* relationship between gender and age of onset also appears

consistent with similar research and epidemiological reviews in this field (Kessler, McGonagle, Swartz, Blazer & Nelson, 1993). Furthermore, no differences in the rate of recovery from depression were elicited between males and females in the current study. Interestingly, the overall average age at intake was slightly older than the age range purported in New Zealand mental health literature as having the highest prevalence for first episode depression (Ministry of Health, 2008). However, due to the present study representing help-seeking behaviour, an age delay relative to prevalence statistics seems valid in this instance.

The relatively higher proportion of female clients in the current sample is consistent with current literature. Several recent studies have confirmed the significantly higher prevalence of depression among females (Endler, Rutherford & Denisoff, 1999; Patten, 2000; Kessler, 2003) and although some researchers have cited examples where gender disparities are absent, these samples have been atypical with significantly more severe levels of depression amongst the male clients (see Goldstein, 2006; Rosenfield, 1980). The current sample showed no significant gender difference in depression severity at intake. This finding appears slightly discrepant with recent epidemiological studies that suggest females typically display a higher level of impairment (Kornstein et al., 2000; Angst et al., 2002). However, such a gender disparity usually coincides with the fact that even after screening for clinically significant impairment, males typically report a smaller number of symptoms (Angst et al., 2002; Wilhelm, Parker & Asghari, 1998). It is possible that the nature of the current study inhibited the potential for such bias as the desire to be accepted into the study may have meant that both males and females alike were less likely to under-report their symptoms at intake. Similarly, although it has been suggested that women are significantly more likely to have previously engaged in therapy (Kornstein et al., 2000), this finding was not confirmed in the current study. However, the present study did confirm a significant relationship between gender and stress severity, as males typically presented with a significantly higher initial level of stress impact than their female counterparts. In recent years researchers have suggested that the higher incidence of depression among female populations might be related to females having a greater propensity to stress or a hyper-responsivity to stressors overall (Nolen-Hoeksema, 2001). Results from the current study might extend this proposition by

suggesting that males require a significantly more severe level of stress to become depressed.

The current study also provides an interesting perspective on the types of recovery clients exhibit after their first depressive episode. Clear variability existed between client *BDI-II* improvement trajectories and preliminary support was obtained for three distinctive client groups (*rapid* improvers, *expected* improvers, and *minimal* improvers). This classification represents an exciting contribution to the literature, as previous classification criteria have typically only referenced intake severity scores, rather than providing a consideration of longitudinal change. An example is the recent work by Chen, Eaton, Gallo and Nestadt (2000), where heterogeneity in terms of depression course was investigated. Only one distinctive difference was noted and the notion of a recovery course was more liberally defined to refer to the level of recurrence or chronicity associated with the disorder. The current research allows for a more specific focus on change *during therapy*, and the elicitation of differences at this level appears to be more clinically relevant for practitioners who aim to affect change during the active treatment phase.

A significant relationship was also found between intake depression severity and the ensuing rate of change in stress. This finding is consistent with current literature as several researchers have theorised that severely depressed individuals are more likely to self-select themselves into stressful situations (Hammen, 1991), or engage in rumination (Nolen-Hoeksema, Parker & Larson, 1994). It is intuitive that a higher prevalence of such behaviour would accord with a slower recovery process. Higher levels of rumination and concurrent stress may also explain the significant correlation between rate of change in depression and rate of change in stress impact (Nolen-Hoeksema et al., 1994).

Cognitive Behavioural Therapy

The present findings demonstrate the efficacy of CBT as a treatment for first episode depression. This accords with other treatment outcome studies in the area of depression (see Lambert, 2004). In particular, the treatment effect in the current study was consistent across a range of clients and irrespective of the severity a client presented with at intake. The prophylactic effect of CBT was also evaluated and maintenance of improvement in depression levels was observed at both the 2-month

and 6-month points of follow-up. The specificity of CBT's effect was also clarified as clients were prevented from participating in the study if they were concurrently receiving any other psychotherapy or using psychotropic medications. While many studies purport a similar efficacy for CBT, not all research studies include such a controlled treatment intervention and most studies are not based on New Zealand client samples (see for example Seligman et al., 1989). Moreover, the use of multilevel analysis allowed for a more specific and focused measurement of improvement, at a session-by-session level. This is in contrast to a large proportion of current literature where pre-to-post outcome measures have tended to predominate (Lambert, Doucette & Bickman, 2001).

The present study also represents a critical improvement in terms of the standard employed in the training and clinical phases of therapy administration. Previous meta-analyses in the field of CBT for depression have cited limitations in the generalisability of results, owing to poor delivery in this respect (Persons, Bostrom, & Bertagnolli, 1999). In the current study, therapists underwent extensive amounts of training and screening prior to being engaged in therapy. They also undertook frequent supervision with a registered CBT Clinical Psychologist. This level of expertise compares favourably to several studies where therapist competence has been questioned (Weisz, Weiss, Han, Granger & Morton, 1995; Burns & Nolen-Hoeksema, 1992). The fact that therapy was also administered in a professional clinical setting as opposed to in a research setting is also advantageous and increases the generalisability of the results (Southam-Gerow, Weisz & Kendall, 2003). In addition, the variation in referral type, with some clients responding to advertisements and others being referred through family doctors, also strengthens the external validity of the sample.

Attributional Style

The predominant type of attributional style a client presented with *during* therapy appeared to be more influential than the specific attributional style they presented with at intake. This finding makes an interesting contribution to the literature, as studies typically tend to only measure a client's cognitive style at the beginning and end of treatment (Seligman et al., 1989). The present study therefore indicates that future research would benefit from assessing attributional style at multiple time points in the beginning of therapy in order to achieve a more valid representation.

Change in attributional style

The present study provided an opportunity to assess the stability of attributional style over time. Although attributional style was observed to change over the course of therapy, the majority of change occurred towards the end of treatment and attributional styles remained fairly constant during the first half of therapy. This observation provides a helpful commentary on the current debate concerning the durability of cognitive styles. Several authors have asserted that attributional style is a stable, trait-like disposition which is consistent across time (Burns & Seligman, 1989). In contrast, others have advocated for its ability to change, citing clinical examples where clients' attributional styles have changed from the beginning to end of treatment (Gotlib, Lewinsohn, Seeley, Rohde & Redner, 1993). Similarly, it has been suggested that attributional style is changeable during therapy, but not necessarily outside of the treatment context or in the follow-up period (Petersen et al., 2004; Seligman et al., 1989). The present study offers a useful perspective on this debate, as its comprehensive analysis of change *during* therapy enables an implication of a more specific trajectory. Attributional style does indeed appear to be changeable, but the process of change from the beginning to end of treatment is not necessarily linear. The fact that attributional style only appears to change significantly towards the end of therapy means that its conception as the mechanism for change in CBT might not be entirely valid. Results from the current study suggest attributional style change might actually be a result of improvement in symptomatology, rather than necessarily being the cause of such improvement. This appears consistent with recent literature reviews (see Scott, 2001).

In terms of the maintenance of attributional style change post-treatment, results were inconsistent. While the majority of clients maintained an overall level of optimism, 30% of clients attending the 2-month booster shown a reduction in their level of optimism as compared to their session 20 level. In some respects, this finding is discordant with current literature (Petersen et al., 2004). However, this discrepancy is also helpful as it further highlights the methodological limitations of many studies in this field. Previous researchers focusing solely on the negative subscale of the *ASQ* (Seligman et al., 1989) or using a combined treatment approach (Petersen et al., 2004) may not have been able to elicit the same level of specificity in terms of the amount of change and its temporal features. Furthermore, it is possible that the longer follow-up

periods used in several studies fail to capture the variability that might exist in the shorter-term post-treatment. The present study also maintained exclusion criteria that specified that follow-up information could only be included if clients were not receiving any concurrent treatment that might confound the results.

The relationship between attributional style and depression

A significant relationship was found between a client's predominant type of attributional style and their initial depression severity. This finding concurs with similar studies that have confirmed the tendency for individuals with more depressive cognitive styles to present with more severe depressive episodes (Alloy, Lipman & Abramson, 1992; Seligman et al., 1989; Rose, Abramson, Hodulik, Halberstadt & Leff, 1994). In addition, the recent Temple-Wisconsin Cognitive Vulnerability to Depression (CVD) Project has produced similar findings in both its retrospective (Alloy et al., 2000) and prospective phases (Alloy, Abramson, Whitehouse, Hogan, Panzarella & Rose, 2006).

The present study also confirmed that those clients possessing more depressogenic attributional styles experienced slower rates of improvement. This seems intuitive in light of the fact that such clients also had significantly more severe depression levels at intake. While these clients arguably had a greater potential for improvement, the hindrance of a depressogenic attributional style and a more severe level of depression has been explicated in theory and previous research. Within the literature it has also been suggested that the rate at which attributional style changes correlates with the rate of improvement in depression. However, no such relationship was found in the present study and it is likely that this discrepancy results from the study's use of more comprehensive statistical approaches towards measuring attributional style. Considering the combined effect of a client's attributions for positive and negative events is likely to offer a more valid representation than an exclusive consideration of their attributions for negative events, as has been the case in previous studies (Seligman et al., 1989). Similarly, the discrepancy in results might also be a reflection of the limited depth studies can achieve when relying completely on pre-to-post treatment measurements (Lambert et al., 2001).

No relationship was elicited between attributional style and the level of depression at follow-up, and those clients terminating therapy with the most depressogenic cognitive

styles were no more likely to present with higher levels of depression at either the 2-month or 6-month booster sessions. Although some studies have found a relationship between attributional style at termination and severity of depression at follow-up (Seligman et al., 1989), such studies have only used the CoNeg score of the *ASQ* or have assumed a significantly longer follow-up period. It is also possible that the level of improvement clients achieved in their attributional style during therapy inhibited the opportunity for a comprehensive testing of this hypothesis. If more clients had made only minimal improvements in their cognitive style, greater variability in depression severity may have possibly been noted at the two points of follow-up.

The relationship between attributional style and therapy and client variables

An interesting finding was that those clients experiencing a greater change in attributional style were significantly more likely to complete therapy. It is possible that these clients experienced a more pronounced therapeutic benefit and were therefore more inclined to commit to the entire process. Within the literature the relationship between attributional style and the duration of depression is often debated. While some authors claim no such relationship exists (Alloy, Lipman & Abramson, 1992), others attest that a depressogenic style causes more chronic depression and a greater number of depressive episodes (Iacoviello, Alloy, Abramson, Whitehouse & Hogan, 2006). Although the exact duration of depression was not a primary focus in the current study, it is possible that the completion of therapy might relate to illness duration. If those clients terminating therapy earlier were assumed to subsequently experience a longer depression, the relationship between attributional style and depression duration might indeed seem feasible.

Finally, it is important to consider the relationship, or lack thereof, between attributional style and a range of demographic variables. In the present study, no relationship was confirmed between attributional style and gender, age, marital status, employment status, number of children or past history of therapy or medication usage. This null finding was consistent whether attributional style was measured in terms of intake scores, the predominant presentation throughout therapy, or even the gross rate of change across time. Within the literature a range of assertions have been made concerning this particular topic. While some authors purport significant gender differences in attributions (Gladstone, Kaslow, Seeley & Lewinsohn, 1997), others

have found no correlation between gender and cognitive style (Rose et al., 1994; Piccinelli & Wilkinson, 2000). In the current study, the only demographic variable trending towards significance was age, as older clients were more likely to present with non-depressogenic attributional styles at the beginning of therapy. This is consistent with current research, as those clients with more depressogenic cognitive styles have shown a higher probability of presenting with depression at a younger age (Alloy et al., 1992).

Stress

The relationship between stress and depression

The majority of clients in the current study had at least two stressors precipitate their depressive episodes and just under half of the clients experienced at least three. Severity levels were also consistently high across all three stressors. Within the literature and specifically in work researching the kindling model of stress, it has been suggested that a higher number of stressors precipitates an individual's first episode of depression (Mazure, 1998; Monroe & Harkness, 2005). In recent years this notion has been supported approximately half of the time and methodological and measurement difficulties have impeded the opportunity for a clear investigation of the kindling hypothesis (Hammen, 2005; Mazure, 1998). In particular, most studies have failed to explicitly measure the number of stressors, or distinguish clearly between different episodes of depression. The present study therefore makes a notable contribution by focusing exclusively on first episode depression and explicitly defining different stressors. No relationship was found between the number of stressors and the initial severity of depression or the rate of depression improvement over time. However, the number of stressors did correlate with the rate of stress improvement and whether or not therapy was completed. Experiencing a larger number of stressors was related to experiencing a significantly slower rate of stress improvement and a higher probability of early termination. It is possible that those clients experiencing a multitude of stressors find it more difficult to commit to a therapeutic process and are consequently harder to retain in treatment.

An important finding was that the initial severity of a client's stress impact was more influential than the specific number of stressors precipitating their depression. In particular, those clients with an initially high level of stress experienced a smaller rate

of change in both depression and stress levels over time, and were more likely to have a depressogenic attributional style both at intake and during therapy. This accords well with current theory. While it could be argued that these clients have a greater potential for improvement compared to clients with less severe stress levels, a slower improvement fits with other research in this area. It has been suggested that a depressogenic attributional style can potentially hinder a client's ability to both engage fully in therapy and also appropriately attribute and appreciate therapeutic gains (Voelz, Haeffel, Joiner & Wagner, 2003).

Requests have increasingly been voiced for more extensive research into the interaction between stress and the ensuing treatment and recovery process (Billings & Moos, 1985; Lara, Leader & Klein, 1997; Belsher & Costello, 1988). In light of the fact that the majority of previous research has focused on the way in which stress *causes* depression, the present study made a concerted effort to focus on how stress impacts a client's *recovery*. In addition, there have been a number of calls to investigate the role of stress within more homogeneous samples (Hammen, 2005; Harkness, Monroe, Simons & Thase, 1999) as previous research has too often incorporated recurrent, chronic and single episode depression altogether. Co-morbid diagnoses are also common within some areas of psychosocial stress research. The current study therefore has the potential to further develop an understanding of the relationship between stress and depression in a well-controlled sample of clients experiencing only their first episode of the illness.

Stressor characteristics

The majority of clients' stressors were either chronic stress conditions or stressful event sequences. Interestingly, no clients presented with acute time-limited event stressors and if the three remaining types of stressors are all considered to be versions of chronic stress, the entire sample was effectively struggling with chronic stressors. To some extent this questions the validity of the kindling model (Hammen, 2005) and suggests that chronicity might be a more important factor than the total number of stressors (Avison & Turner, 1988). Future research might consider a re-conceptualisation of the kindling model to allow for this variation. In addition, the realisation that precipitating stressors are frequently more chronic accords with recent research and confirms the validity of Wheaton's (1996) stress continuum and the need

for chronic stressors to be included in future work (Aneshensel, 1992). However, the present research might advance the conceptualisation of chronic stress as it represents one of the first empirical attempts to investigate different types of chronic stress and their relationships with first episode depression. Two very interesting findings emerged. Those clients struggling with more chronic stressors typically presented with less severe depression scores; and they also exhibited less depressogenic attributional styles throughout therapy. Although this is somewhat surprising, recent research has shown that the effect of acute stress is actually reduced in the context of chronic stress. It has been suggested that adversity facilitates the initiation of coping responses which translate to a heightened level of resilience in the presence of subsequent stress (McGonagle & Kessler, 1990). Moreover, ongoing exposure to stress might elicit a more rapid mobilisation of coping resources that can be converted across different domains or applied to other types of stress (McGonagle & Kessler, 1990; Thoits, 1986). In the present study it is therefore feasible that ongoing chronic stress required clients to adapt their coping responses both in terms of their behaviour and also their cognitive style. Finally, no relationship was found between the chronicity of stress and its severity, rate of improvement or the depressive symptomatology at follow-up. Many researchers have hypothesised that stress chronicity might be an important factor in the relapse or recurrence of depression (Tennant, 2002). Within the current study however, the null finding suggests this may not be the case and the improvement in depression at follow-up was actually slightly above average for those clients who presented with more chronic forms of stress. Finally, although a significant gender-chronicity interaction has been proposed in previous research (Gannon & Pardie, 1989), the current study found no evidence to support this.

The extent to which a stressor impacted on a client's autonomy appeared to be the most influential stressor characteristic (in other words, the extent to which the stressor affected a client's sense of independence and freedom). Those clients suffering a greater impact on their autonomy experienced more severe initial levels of stress, as rated by both therapists and independent observers. They also presented with a more depressogenic attributional style, were more likely to be male and were less likely to complete therapy. There was a significant relationship between the impact on autonomy and the impact on finances, which accorded well with the significant economic and fiscal concerns prevalent at the time of the study.

Clients who experienced stressors that impacted considerably on their relationships were more likely to exhibit a smaller level of stress at the conclusion of therapy. This is a somewhat unusual finding but it is possible that these clients gained more from the therapeutic process than other clients less in need of relationship support. The therapeutic alliance could have been a more significant component in their treatment experience which served to indirectly alleviate some of their concurrent relationship stress. The relationship may have facilitated effective coping resources that could have been directly implemented into their interpersonal relationships (McGonagle & Kessler, 1990). The importance of the therapeutic alliance has been extensively advocated within the literature and its integral role within the present study is therefore understandable (see Zuroff & Blatt, 2006).

Finally, other stressor characteristics such as impact on finances and controllability appeared to be less important. The only variable that a stressor's impact on finances was significantly related to was employment status. Similarly, the greater the level of control a client had over their primary stressor, the more likely they were to have previously engaged in therapy. Within the literature, there has been a fair amount of speculation concerning the importance of stressor controllability (Gannon & Pardie, 1989) and the present study therefore provides a unique perspective as results suggest that a stressor's impact on autonomy is more important than the extent to which it is controllable. The current study could also be viewed as confirmation of previous researchers' contentions about the difficulty in accurately measuring controllability (Gannon & Pardie, 1989; Dohrenwend & Martin, 1979). It is possible that objective and subjective measurement may not reliably measure the concept to the same extent.

The relationship between stress and client variables

Several researchers have asserted a stress-gender relationship where women are significantly more affected by stressful life events (Barnow et al., 2002; Kessler & McLeod, 1984). However, other researchers have suggested that any heightened prevalence amongst women might be better accounted for by sociodemographic status (Maier et al., 1999; Paykel, 1991; Lorant et al., 2002). Irrespective of the reasoning, a recent review cited a tendency for higher stress prevalence rates among female populations (Hammen, 2005). Although no relationship was found between gender and the number of stressors or rate of change in the current study, males were found to

present with a greater severity of stress, as rated by their therapists. Females were also more likely to have a higher number of children and the results confirmed that the number of children a client had was negatively related to the severity of their stress. This raises an interesting possibility that males might require a high level of stress to develop depression, and that the female's nurturing role might actually provide a buffer in the face of stressful events. This is different to the more traditional perspective which has implicated a female's maternal or social role as a potential causal factor in the higher prevalence of depression and stress observed among females (Nazroo, Edwards & Brown, 1997; Kessler & McLeod, 1984).

The fact that previous therapy engagement was significantly related to a higher sense of control over one's primary stressor accords with other findings in the literature. It seems likely that such a heightened sense of control or self-efficacy was causally related to the client's previous therapeutic experience.

Finally, past medication usage, client age and marital status were all unrelated to characteristics of the primary stressor. However, a client's marital status was implicated as an important predictor in the final model as it appeared to explain a significant amount of variation between clients in terms of their recovery trajectories. This accords with current literature as social support has been posited as an important buffer of stress impact (Cohen, 2004). The measurement of marital status within the present study might therefore provide a representation of the level of support clients have on an intimate level. However, the lack of a significant relationship between marital status and stress severity is an interesting finding and one that might be better explained by recent suggestions that perceived availability of social support is perhaps a more influential factor (Kawachi & Berkman, 2001; Cohen, 2004). It is possible that the structural aspects of social support measured in the present study (e.g. assessment of marital status) may not provide the same insight into functional aspects of social relationships that subjective ratings of perceived support can offer.

The stress-diathesis model

An important contribution of the present research was the reformulation of the Stress-Diathesis Model postulated in the initial stages of the study. The original conceptualisation highlighted the primary factors thought to be implicated in the stress-diathesis interaction. The revised version of this framework presented in Figure

9.2 incorporates the main findings from the study. Its revision includes the addition of variables that were found to play a significant role in the development, treatment and recovery of depression. Those factors shaded the darkest represent the parameters that collectively explained the greatest proportion of variance in depression. These are the same factors that were included in the ultimate model (*Final Model*). The next set of factors to attend to are those shaded a lighter grey. These factors include the additional variables that were significantly related to key parameters in the therapeutic process, during the correlational analysis. Although these variables were not included in the final multilevel model, they clearly play an important role in affecting some of the most prominent drivers of stress impact and attributional style and represent a potentially important avenue for further research.

An important contribution of the present study is its confirmation of stress impact as a variable incorporating but distinguishing between the quantity of stress and its relevant context. Conceptualising stress in this manner enables a more in-depth analysis of the variables that influence a client's depression and their subsequent recovery. This novel formulation of a the wider stress-diathesis framework represents an improvement on former approaches that considered stressors as being fairly homogeneous. Indeed, to a large extent previous stress assessment has been limited to a focus on differences in stress duration or the potential for personality-congruency (Hammen, 2005; Masih, Spence & Oei, 2007). It is hoped that the present work therefore highlights the need for a more comprehensive and extensive evaluation of the drivers involved in the stress process at large, and offers a path forward.
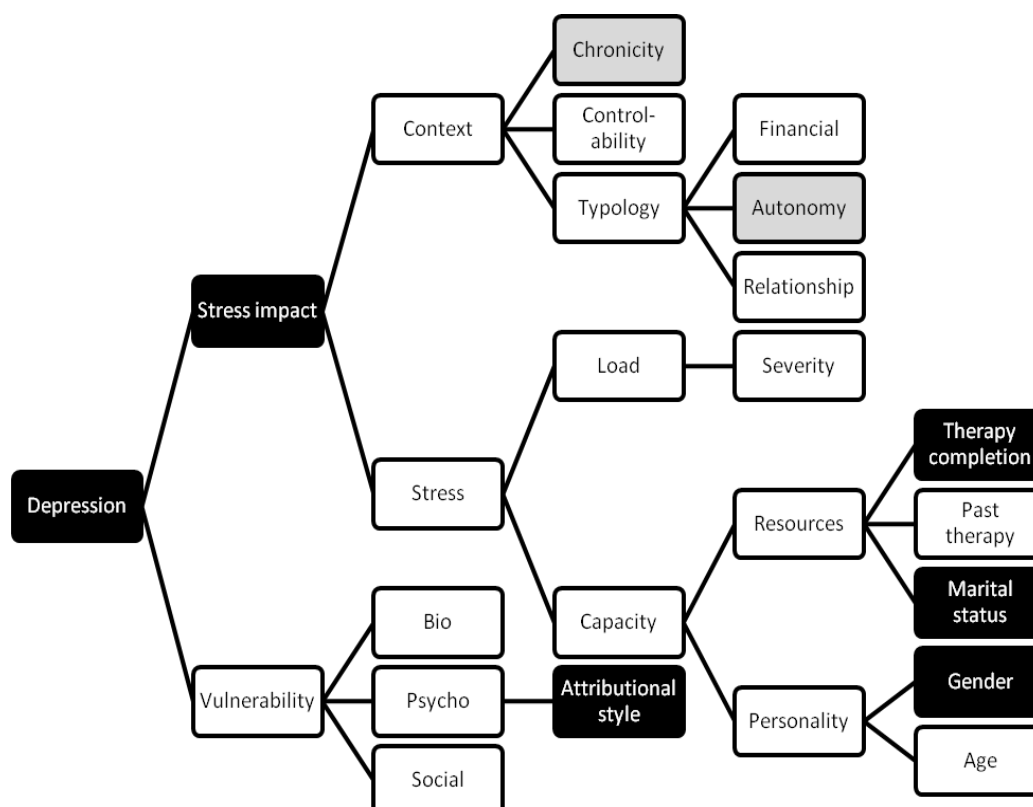
Figure 9.2. Revised conceptualisation of the stress-diathesis framework.

Areas for Further Investigation

Replication and Sample Considerations

An important consideration for future research will be the replication of this study using a larger sample. The use of multilevel analysis in the current study resulted in an extensive data set. This was because depression severity was scored at every session, attributional style was scored at six different time points, and stress impact was measured at eight sessions over the course of therapy. This yielded a rich data set that provided numerous opportunities for research and analysis. Nonetheless, replication of the study using a larger number of clients would of course be advantageous, especially as a larger sample size would inherently provide a greater variability of client and demographic variables to be analysed. A larger sample might also allow for the examination of other variables or parameters outside of the scope of the present study.

It would also be advantageous to replicate the study and implement longer follow-up periods. The current study produced interesting findings in terms of the maintenance of therapeutic effects and the prophylactic effect of CBT. However, as with most

clinical studies of a longitudinal nature, attrition rates were significant at the 6-month point of follow-up and as a result, replication would be beneficial. It is however important to note that exploratory analysis confirmed a lack of any response bias at the 6-month follow-up and the reasons for drop out and the rate of attrition appeared consistent with other longitudinal studies in this area (De Graaf, Bijl, Smit, Ravelli & Vollebergh, 2000).

Methodological Considerations

The methodology employed is considered a key strength of the current study, as previous studies in this area have not used a similarly robust formulation of the complex interactions of variables and timing. This step-change improvement in methodology could be further enhanced in future research in several different ways. In the first instance, it would be useful to consider measuring the parameters at different intervals or frequencies in future replications of the study. In particular, it would be interesting to extend the measurement of stress impact beyond the active treatment phase and into the follow-up period. Future research should also look to validate and refine the stress curve taxonomy developed in the present study. In addition, although the measurement of attributional style during the first half of therapy indicates a consistency of clients' cognitive styles, it would be interesting to determine the exact point in the latter half of therapy when attributional styles tend to become less depressogenic. The present study makes a significant contribution in its repeated measurement of attributional style and its longitudinal analysis and it may now be particularly useful for clinicians to determine whether the exact point of change in attributional style coincides with a particular therapeutic emphasis or a specific CBT technique.

The present study demonstrates the feasibility and most importantly the reliability and validity of measuring stress objectively within a clinical setting. It will be important for both the *IPSQ* and the *IES-VF* to be utilised in future research as a way of developing and encouraging more objective measurement attempts. This may go a considerable way towards ameliorating the difficulties that have arisen in terms of questionable validity and reliability in the subjective assessment of stress by clinically depressed clients. In fact, future research that compares the use of objective and subjective measures should be encouraged in the hope that a new standard for

assessment can be developed and widely employed. One important consideration will be the comparison of objective versus subjective measurements of social support. The possibility of a discrepancy in such measurement was highlighted within the present study and future research is needed to consider whether clients and therapists differ significantly in their assessment of support, in addition to their identification of precipitating stressors. This comparison was outside of the scope of the present study but its importance within the research field is now clear.

With respect to attributional style, future researchers should be encouraged to use the *ASQ* overall composite score (CPCN) as the primary form of measurement. Particularly in the context of understanding recovery, a greater emphasis has previously been placed on using only the *ASQ* positive score and measuring the level of optimism or hopefulness that clients present with. However, it is imperative that a client's attributions for negative events are also included, as in the context of depression it is likely to be the negative stressful life events that pose a higher risk for relapse. As a result, the particular attributions a client holds about such events are influential. Furthermore, if a client's level of optimism is considered to drive their recovery, the use of the *ASQ* composite score still appears to be superior, as high scores on the *ASQ* composite score indicate that clients will even be likely to display an optimistic tendency when confronted with negative events. In other words, it is possible that the *ASQ* composite score imposes an even higher threshold for optimism or hopefulness. In addition to measuring the *ASQ* as a full composite score, future research should also look to measure attributional style at a number of different time points during the beginning of therapy. Taking an average across several sessions might provide a more valid measurement that more reliably predicts treatment outcomes.

The reformulated stress-diathesis framework should also be used in future research, in order to test the strength of various predictors and further establish the relationships between those client and therapeutic variables examined in the current study. Research incorporating a more comprehensive analysis of the post-treatment phase would also make a significant contribution. In particular, an examination of the trajectory that stress impact assumes in the follow-up period and its relationship with treatment outcome would be insightful. An analysis of how the various interactions fare over longer follow-up periods could also be valuable. Future stress research should place

less of an emphasis on the extent to which stressors are controllable, and focus instead on the extent to which a stressor affects a client's sense of autonomy. There is also clear justification for the inclusion of more chronic stressors in future research and the use of a stress continuum.

Finally, it is possible that a longer period of follow-up in future research might allow for a more comprehensive assessment of maintenance effects. While the use of a 2-month booster session was effective in demonstrating the variability that exists between clients at this point, it has been suggested that a longer period post-treatment might allow for a clearer distinction between recurrence and relapse of depression (Frank et al., 1991). However, the high attrition rates at the 6-month point of follow-up within the present study cannot be ignored. Indeed, it is quite possible that other studies reporting different effects over a longer follow-up period may also be prone to the same effect and as a result, their discussion of follow-up results may be limited by hidden response bias or lowered power.

Implications for Clinical Practice

- *Prepare for a delay with depressogenic clients*

While improvements in stress impact correlate with improvements in depression for clients with non-depressogenic attributional styles, clients with depressive dispositions exhibit a more complex pattern of recovery. These clients appear to be more likely to experience a delay in the translation of their stress improvement as their improvement in stress impact is filtered down to a slower improvement in depression severity. Preparing for this effect means that clinicians are able to educate their clients and also tailor their treatment to focus more comprehensively on attributional change amongst such client subgroups.

- *Focus on improving clients' attributional styles but be patient in the process*

Clients appear to be more likely to stay in treatment if they experience a significant improvement in their attributional style. Those clients who become significantly less depressogenic in their cognitive style engage more consistently and show a higher tendency to complete the therapeutic process. However, patience is paramount, as it seems that attributional styles are more likely to change significantly in the second half of therapy.

- *Count the number of stressors but be more attentive to stress severity*

Clinicians should be encouraged to take note of the number of precipitating stressors clients present with, as it seems a larger number of precipitants is more likely to result in a slower rate of change in stress. As those clients experiencing a high number of stressors may also be more likely to terminate therapy early, therapists may need to be more prepared for resistance among this particular patient population. However, although the number of stressors can be informative, clinicians should be encouraged to pay greater attention to the severity of the primary stressor. A more severe level of stress tends to correlate with a more depressogenic attributional style and a slower improvement in depressive symptomatology. Clients presenting with more severe primary stressors may therefore require a higher level of patient care.

- *View stressors as ongoing difficulties rather than acute triggers*

Ongoing attention to stress is required right throughout the therapeutic process as the majority of stressors precipitating first episode depression appear to have a chronic duration. While clinicians may have previously viewed stressors mainly as acute triggers for depression, the results of the current study confirm that clients continue to be impacted by stressors throughout treatment. As a result, clinicians can be encouraged to adopt a durable perspective and remain attentive to the way in which stress improvement trajectories can interplay with recovery from depression.

- *Spot the disguise that chronic stressors wear*

Clinicians should be aware of the tendency for clients with more chronic stress to present with less depressogenic attributional styles and less severe depression at intake. If judged superficially, these clients might have previously been labelled as experiencing more minor difficulties. However, results from the present study suggest that a more optimistic disposition and a smaller level of symptoms might more accurately be a consequence of clients' facilitation of coping resources and their development of resilience. These clients will still need and benefit from therapeutic interventions.

- *Automatically check for autonomy*

The level of impact a stressor has on a client's sense of autonomy is influential within first episode depression. Clinicians should be encouraged to assess the extent to which a client's sense of independence is affected by their stress, as those affected to a greater extent will typically exhibit more severe levels of stress and more depressogenic attributional styles. It is likely to be beneficial for clinicians to address issues of limited autonomy early on in therapy, if the opportunity exists. Clinicians should also note that those clients who appear most susceptible to autonomy effects, are most likely to be male and also terminate therapy early. While the early termination might indicate a higher level of resistance, it could also suggest that these clients have a greater number of contextual factors to contend with. A larger number of situational variables might negatively impact on their ability to stay committed to a therapeutic process.

- *Use the therapeutic alliance to mitigate relationship stress*

Clients whose stressors affect their relationships to a greater extent appear to be more likely to conclude therapy with a more minimal level of stress. This has important implications for the therapy process as it suggests that the therapist-client relationship plays an inherently curative role. Therapists should continue to stay attentive to the state of the therapeutic alliance, as it appears the relationship might be an especially important mechanism of change for these particular clients.

- *Consider the role of gender and its relationship to depression*

Males appear to present with a greater severity of stress in their first episode of depression. While clinicians are encouraged to be aware of this gender disparity, an additional consideration is the fact that female stress severity tends to be negatively related to the number of children a female has. The clinical implications of these observations suggest therapists should consider whether males require a higher level of stress to develop depression or seek help, and whether children might actually provide a form of social support for females experiencing depression.

- *See support through the client's eyes*

Strong evidence exists for the role of social support and its ability to buffer the impact of stress in an individual's life. It appears that the level of social support might also explain a significant amount of variability between clients in terms of their depression levels throughout therapy. However, an important consideration for therapists is the increased validity that might come from measuring social support from the client's own perspective. Subjective measurements of perceived support might provide a different perspective from the more commonly used objective measurements of functional relationships or marital status. However, irrespective of the particular measurement approach, evidence from the current study suggests that social support does indeed have the potential to provide a second steering wheel for therapists when working with clients experiencing their first episode of depression.

Summary

The present study makes a significant contribution to research across a number of areas. While the analytical procedures and the development of stress measures represent a methodological contribution, the reformulation of the stress-diathesis framework and the investigation of the stress-depression relationship substantially builds on the theory underpinning similar work in this area to-date. The study highlights important avenues for future research both in terms of theory development and methodological improvements. Furthermore, important clinical implications are cited, with a particular emphasis on potential improvements to the therapeutic process. With a more comprehensive understanding of those variables implicated in recovery, it is hoped that a clear groundwork has been laid for significant improvements in the treatment of depression in the years to come.

Chapter 10: Conclusion

The present study had four overarching aims. In this closing chapter it is now appropriate to return to each of these primary aims and consider the extent to which they have been fulfilled.

Develop an understanding about why individuals differ in their recovery trajectories

A review of the literature in the field of depression and CBT highlighted the consistent variation that occurs in client recovery experiences. Even in controlled studies, clear variability is frequently observed in terms of improvement and rates of change that clients exhibit over time. In several instances researchers neglect the richness of this variability through their decisions to average client samples, or use pre-to-post change scores in their analysis. Against this backdrop, a key aim of the present research was therefore to represent the true trajectories clients show across a course of CBT for depression. Instead of reducing the variance within the clinical sample, the current study employed multilevel statistical techniques that allowed for an extensive longitudinal analysis. Using multilevel analysis, the variability both within-clients and between-clients was able to be evaluated. Indeed, the study's main findings include the acknowledgement and measurement of important differences between clients in terms of their respective rates of improvement. Not only were client trajectories explicitly assessed in the study; the interaction between trajectory types and client variables were also assessed. Preliminary support was also elicited for the classification of trajectory types. A sensitivity analysis suggested the existence of three client groups based on whether clients showed a minimal, expected or rapid rate of improvement in their stress level from therapy intake to the half way point. Although preliminary, this attempt at classifying different trajectories instead of homogenising client samples would appear to be a worthwhile contribution to the field and future research studies may benefit from employing a similar acceptance of client variability.

Examine how the stress-diathesis framework relates to treatment and recovery

A large amount of previous research in the stress-diathesis domain has focused on applying the stress-diathesis framework solely to the inception and causation of depression. In light of the clear variability in client recovery patterns, an integral aim of the present study was therefore to extend the stress-diathesis model into the realm

of therapeutic process and recovery. The theoretical underpinnings of the stress-diathesis framework support this application. Moreover, the extent of literature that has been developed in the psychosocial stress field calls for a reformulation of the stress-diathesis model that incorporates a more comprehensive definition of the stress lever. As a result, the present study conceptualised a revision of the model and its validity was subsequently tested in a multilevel analytical format. The most important aspect of this work was the specification of the term *Stress Impact*, which represented an attempt to concomitantly recognise both the quantitative and qualitative aspects of the stress experience. After multivariate and post-hoc analyses, some conclusions about the role of various stress-diathesis factors were developed. The present study provides one of the first attempts to test and refine an updated stress-diathesis framework and apply the model in a longitudinal format. It is hoped that the adoption of a longer-term perspective will now be replicated in future research.

Develop an effective way of assessing and measuring stress objectively

The field of psychosocial stress research is extensive and even within the specific clinical psychology domain previous research has been restricted by ambiguous definitions and no clear operationalisation of important stress concepts. As a result, an important aim of the study was to develop a reliable measurement tool for stress that assessed stress in an objective format. The objectivity of measurement was important as it represented an opportunity to ameliorate previous difficulties with response bias that have occurred when measuring stress subjectively among clinically depressed populations. Given the specification of the term *Stress Impact*, the study focused on devising a measure that specifically measured the quantitative impact of stressors. In this respect, the psychometrically-reputable *Impact of Event Scale* was selected and subsequently adapted to make it applicable to an objective assessment format. After initial interrater reliability checks and a refinement of the measure's scoring protocol, the revised *IES-VF* was then used to assess stress impact at eight points throughout therapy. At the end of the treatment phase, the *IES-VF* was then reassessed to decipher which items were most reliable and suitable for an objective style of assessment. This yielded a reliable and valid assessment of stress within the current study, and also a measure that can be included in future research. The *IES-VF* provides a mechanism for assessing different characteristics of the stress effect, beyond the most commonly assessed features such as number of stressors and stress type.

Develop a way of assessing and measuring the contextual aspects of stressors

In addition to measuring the impact of stressors, the present study aimed to capture the qualitative components of the stressors that individuals experienced. Current theory purports the importance of stressor typologies and chronicity and as a result, the *Identification of Precipitating Stressors Questionnaire* was developed. The *IPSQ* provided a mechanism for gathering important demographic information about the top three stressors each client experienced prior to their depressive episode. Important components of the *IPSQ* included specification of the duration of each stressor, its level of severity, its impact on relationships, autonomy, finances and also the extent to which is was controllable. These aspects were drawn from prevalent literature and each characteristic was measured objectively on a likert scale, so that quantitative differences between individuals could be elicited. This focused attention on stressor characteristics was important within the present study as it addressed a continuing research request for a greater inclusion of contextual elements within the psychosocial stress domain. As a result, the various stressor characteristics were able to be included in post-hoc analyses and the comparative importance of different features was established. Hopefully the current findings can guide future researchers in that tentative conclusions can be formed about which factors are most influential within the therapeutic context.

Results from the present study suggest that attributional style plays an important role in moderating the relationship between stress impact and depression. While improvements in stress correlate with improvements in depression for those clients with non-depressogenic attributional styles, the same relationship is not observed for those individuals with more depressogenic styles. In these latter instances, it seems that a tendency to more attribute negative events to internal, stable and global causes is a powerful hindrance that delays expected therapeutic gains even in the case of significant stress improvement. Nonetheless, attributional style was observed to have the potential to change over time, and the multivariate analysis allowed for a close evaluation of session-by-session changes for different individuals. Future exploration of these important predictors of the treatment and recovery of depression is warranted. The hierarchical structure of a multilevel approach is advantageous in this context given the complexity of the interaction and the number of variables that appear to play a role within the stress-diathesis framework.

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Appendices

Appendix A

Study Advertisement

Are you suffering from depression?

Massey University
CENTRE FOR PSYCHOLOGY, ALBANY
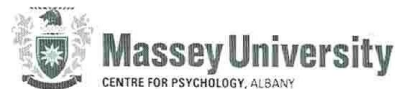
We are looking for people (aged 18-65) to help with a research project.

Are you suffering from depression? If so, you might be eligible to receive free assessment and treatment as part of volunteering for this research study. Clinical depression is characterized by persistent sad mood, loss of interest in activities, feelings of hopelessness and guilt, along with sleep difficulties, poor appetite, and reduced energy. A clinical diagnosis is made when most of these symptoms are present for at least two weeks, along with significant impairments in social and/or occupational functioning.

Researchers at the Centre for Psychology, at Massey University, Albany are investigating a theory as to how we can help individuals maximize their gains in psychological therapy and reduce the risk of depression in the future. The researchers are looking for men and women between the ages of 18 and 65 who are currently experiencing depression as described above for the first time. For inclusion in the study, you must also be (a) able to read, write, and speak in English; (b) not taking medications that affect the brain (an occasional sleeping tablet and/or the oral contraceptive is ok); (c) not involved in concurrent supportive counseling or psychotherapeutic treatment, (d) not meet diagnostic criteria for substance abuse, psychosis, borderline personality disorder; and (e) not currently a danger to yourself or someone else.

The time commitment is about two and half hours for an initial comprehensive assessment. The first half of the assessment includes a diagnostic interview and the second half involves completing questionnaires. Participants will receive feedback regarding the assessment and will then receive 20 sessions of CBT for depression (free of charge) over an 18 week period. To learn more about participating in this study, please phone Ms. Nicole Backhouse-Smith at 09-4140800 extn. 41252. If media are interested in obtaining more information please contact Dr. Nikolaos Kazantzis directly at 09-4140800, extn. 41224. (Dated. March 21, 2007)

Appendix B

Publicity for the Depression Study

Massey University

News release

Auckland • Palmerston North • Wellington • Extramural

Te Kunenga
ki Pūrehuroa

Jennifer Little
09 414 0800 ext 9331
027 453 4562
j.little@massey.ac.nz
http://news.massey.ac.nz

Tuesday, May 20, 2008

Free therapy for first time depression sufferers

Are you someone who struggles with low mood, poor appetite, lack of energy, disturbed sleep, feelings of helplessness and guilt? Has decision-making become increasingly fraught, do you beat yourself up over your mistakes and feel life has become overwhelming?

Massey's Centre for Psychology is offering a tried and tested traditional therapy free to first-time depression sufferers. Developing positive ways of dealing with life's ups and downs are at the crux of 20 individual sessions of Cognitive Behaviour Therapy (CBT) offered by a team of specially trained therapists from the University's Auckland-based Centre for Psychology. Each session lasts an hour and focuses on teaching strategies to change problem thoughts and behaviours.

Dr Nik Kazantzis, senior lecturer and practitioner who heads the team, says CBT teaches people how to become their own therapists by teaching them skills so they can deal better with difficult situations and the painful emotions they trigger. It is imperative volunteers are not taking medication for depression, he says.

He says CBT is a widely used, mainstream therapy developed by American-born psychiatrist Dr Aaron Beck in the 1960s. It has been endorsed by more than 400 studies internationally as an effective, low-cost treatment for a range of disorders, including depression. Dr Kazantzis, who trained under Dr Beck two years ago, believes the therapy is particularly suited to New Zealanders as it offers immediate, practical help in coping with the present and does not necessarily require clients to embark on in-depth analysis of their pasts to be effective.

The therapy sessions on offer at Massey are part of a collaborative international research project involving researchers from Harvard Medical School in the US, the Institute of Psychiatry in London as well as psychology experts from Canada and Australia. Researchers are evaluating how CBT helps people with depression and how it reduces the risk of depression recurring, says Dr Kazantzis.

Therapy sessions take place at Massey's Centre for Psychology, located in Albany village in modern, calm and comfortable rooms.

Appendix C1

Participant Information Sheet

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

Participant Information Sheet

Depression Study

You are invited to take part in a research study involving a brief psychological treatment for depression called Cognitive Behaviour Therapy (CBT). The purpose of the study is to examine certain processes of therapy which may increase its positive benefits. The study will involve 70 individuals between the age of 18 and 65 years, recruited within the greater Auckland area. Like yourself, these individuals will currently be experiencing a major depressive episode for the first time. Before you consent to be part of this study, please read the following. Ask as many questions as you need to be sure that you understand what taking part will involve. The decision to take part is entirely your choice.

If you provide written consent to be involved, you will receive a comprehensive psychological assessment, then a 20 session protocol of CBT for depression over a 16 week period. Treatment will be individualised based on your specific needs and goals, and provided by advanced clinical psychology trainees under close supervision. Consistent with prior research on CBT for depression, sessions will be scheduled twice a week for the first 4 weeks and then weekly for the next 12 weeks. Follow-up sessions will occur at 2 months and 6 months after treatment has ended. Participants will be asked to complete some assessment questionnaires to determine treatment gains, and also asked to provide informal feedback on the CBT they received. Your total time commitment (assessment, therapy sessions, questionnaires, and follow-up) is estimated to be about 30 hours, plus travel to and from the Centre for Psychology. Therapy will be provided by clinical psychology doctoral/masters students trained in delivering this protocol.

How will the study benefit you? It is expected that new information, which may benefit you or others, will be obtained by this study. Furthermore, it is very likely that the comprehensive psychological assessment and therapy offered as part of this study will improve your condition, although this cannot be guaranteed. These services will be provided free of charge. Due to funding limitations, you will be responsible for your own travel costs to and from the Centre for Psychology in Albany. Parking will be provided free of charge.

Who is unable to take part? Participants will need to be proficient in reading, writing, and conversing in English. They must be free from taking drugs which act on the central nervous system. They must not meet diagnostic criteria for substance abuse, psychosis, or borderline personality disorder. Lastly, they must be able to be managed safely with outpatient psychotherapy.

If you do agree to take part, you are free to withdraw from the study at any time without having to give a reason. This will in no way affect your continuing health care, as you will be referred to an appropriate provider to further assist your specific needs. Participation in this study will be stopped should any harmful effects appear or if an appropriate medical professional feels it is not in your best interest to continue. You may be taken out of the

study if you need treatment that is not allowed during this study, or if the study is cancelled. You will be asked to check with your study therapist before taking any other treatment; this includes anything from the supermarket, pharmacy or health shop.

Will my information remain confidential? Participating in this study will involve having your therapy sessions videotaped (and transferred to DVD discs) in order for the researchers to monitor the therapy protocol. All information collected about you during the study, including the recorded sessions, will be kept strictly confidential and only accessed by those researchers and clinical supervisors directly involved in the study. The only time in which confidentiality is breached is in the event that you express an intention to harm either yourself or somebody else, in which case a crisis team would become involved. No material which could personally identify you will be used in any reports on this study. All assessment information and clinical notes will be kept in individual files stored in a locked clinical records room, with files coded with anonymous identification numbers. Files will be stored in a separate location from both the identifying information and the DVD archive.

The information collected will be used for the research project and for publication in academic journals. All participants will be offered a summary of the findings at the conclusion of the study. This will include details of any publication arrangements that have been made. Please note that there is likely to be a delay between data collection and publication.

In the unlikely event of a physical injury as a result of your participation in this study, you may be covered by ACC under the Injury Prevention, Rehabilitation and Compensation Act. ACC cover is not automatic and your case will need to be assessed by ACC according to the provisions of the 2002 Injury Prevention Rehabilitation and Compensation Act. If your claim is accepted by ACC, you still might not get any compensation. This depends on a number of factors such as whether you are an earner or non-earner. ACC usually provides only partial reimbursement of costs and expenses and there may be no lump sum compensation payable. There is no cover for mental injury unless it is a result of physical injury. If you have ACC cover, generally this will affect your right to sue the investigators. If you have any questions about ACC, contact your nearest ACC office or the investigator.

If at any time you have questions or concerns about this study, you are welcome to contact: Dr. Nikolaos Kazantzis (who now has an academic office at La Trobe University), phone: Auckland (09) 8898292, or email: N.Kazantzis@latrobe.edu.au

If you have any questions about any issues pertaining to Maori in this study, regardless of your own ethnicity, you are welcome to contact Kaumatua koro Turoa, via the School of Psychology, phone Auckland (09) 414 0800 extension 2040.

If you have any queries or concerns regarding your rights as a participant in this research study, you can contact an independent Health and Disability Advocate. This is a free service provided under the Health & Disability Commissioner Act:

Telephone (NZ wide):	0800 555 050
Free Fax (NZ wide):	0800 2787 7678 (0800 2 SUPPORT)
Email:	advocacy@hdc.org.nz

This study has received ethical approval from the Northern X Regional Ethics Committee.

Appendix C2

Participant Consent Form

Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

Consent Form

Depression Study

This consent form will be held for a period of five (5) years

- I have read and I understand the Information Sheet dated 20 February, 2009, for volunteers taking part in the Depression Study

- I have had the details of the study explained to me.

- I have had the opportunity to use whanau support or a friend to help me ask questions and understand the study.

- My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

- I have been given contact details to use in case I have future questions about the study.

- I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time.

- I understand that my participation in this study is confidential and that no material that could identify me will be used in any reports on this study.

- I agree to my sessions in this study being videotaped.

- I understand that I will not receive any compensation for travel costs or for the time I spend as a participant in this study.

- I have had adequate time to consider whether or not to take part in this study. I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: _____   Date: _____

Full Name - printed   _____

Participant Consent Form – version 4 (dated 20/02/09)

Appendix D

Identification of Precipitating Stressors – Therapist Questionnaire

Client #:

Identifying Stressors

- Please list in order of prominence the three main stressors you believe precipitated your client's depression. You may list up to three.

	Low severity				High severity	
Stressor 1: _____	1	2	3	4	5	6
Stressor 2: _____	1	2	3	4	5	6
Stressor 3: _____	1	2	3	4	5	6

- How much *more prominent* is stressor 1 than 2?   Slightly / Somewhat / Moderately / Considerably
- How much *more prominent* is stressor 2 than 3?   Slightly / Somewhat / Moderately / Considerably

Please use the guidelines at the end of the questionnaire to help you complete the following:

Stressor 1

- Please indicate the extent to which stressor 1 impacted on your client's:
  1 = Not at all; 2 = Somewhat; 3 = Moderately; 4 = Considerably

  - Relationships   1   2   3   4
  - Capacity to exercise their autonomy or achievement 1   2   3   4
  - Finances   1   2   3   4

- Please indicate the extent to which stressor 1 was:
  - Controllable   1   2   3   4

- Which of the following phrases more accurately describes stressor 1:

  - It was an acute time-limited event   ☐
  - It was a stressful event sequence   ☐
  - It was a chronic intermittent stressful event ☐
  - It was a chronic stress condition   ☐

Stressor 2

- Please indicate the extent to which stressor 2 impacted on your client's:
  1 = Not at all; 2 = Somewhat; 3 = Moderately; 4 = Considerably

  - Relationships   1   2   3   4
  - Capacity to exercise their autonomy or achievement 1   2   3   4
  - Finances   1   2   3   4

- Please indicate the extent to which stressor 2 was:
  - Controllable   1   2   3   4

- Which of the following phrases more accurately describes stressor 2:

  - It was an acute time-limited event   ☐
  - It was a stressful event sequence   ☐
  - It was a chronic intermittent stressful event ☐
  - It was a chronic stress condition   ☐

Stressor 3

- Please indicate the extent to which stressor 3 impacted on your client's:
  1 = Not at all; 2 = Somewhat; 3 = Moderately; 4 = Considerably

  - Relationships   1   2   3   4
  - Capacity to exercise their autonomy or achievement 1   2   3   4
  - Finances   1   2   3   4

- Please indicate the extent to which stressor 3 was:
  - Controllable   1   2   3   4

- Which of the following phrases more accurately describes stressor 3:
  - It was an acute time-limited event ☐
  - It was a stressful event sequence ☐
  - It was a chronic intermittent stressful event ☐
  - It was a chronic stress condition ☐

Guidelines for Questionnaire Completion

Relationships

To evaluate how much the stressor impacted on the client's <u>relationships</u> with others

1 = Not at all:	*A problem that is unrelated to others – with no consequences on interpersonal relations*
2 = Somewhat:	*e.g. A problem that affects the client's relationships with people who are less important*
3 = Moderately:	*e.g. Serious relationship conflict (in primary relationship or immediate family); Loss of primary relationship support because of a move or transition*
4 = Considerably:	*e.g. Loss of partner (separation or death) with considerable impact on the client*

Autonomy

To evaluate how much the stressor impacted on the client's <u>autonomy</u> (independence, freedom, achievement, life goals, status)

1 = Not at all:	*A problem that is unrelated to autonomy – with no consequences on the client's capacity to exercise autonomy*
2 = Somewhat:	*e.g. Difficulty finding a job*
3 = Moderately:	*e.g. Loss of spouse that moderately impacts on the client's sense of identity/independence*
4 = Considerably:	*e.g. Loss of primary source of income/bankruptcy; Permanent disability with considerable impact on the client's autonomy*

Finances

To evaluate the extent to which the stressor caused financial ramifications

1 = Not at all:	*The stressor causes no change in financial position*
2 = Somewhat:	*The stressor somewhat affects their financial position – e.g. Missing out on promotion (losing anticipated gains)*
3 = Moderately:	*The stressor causes moderate financial ramifications – e.g. Losing your job but having the ability to find a new position*
4 = Considerably:	*The stressor causes considerable, longstanding financial impact – e.g. Loss of retirement savings; Death of primary breadwinner*

Controllable

This indicates the extent to which the client has control over the stressor

1 = Not at all:	*e.g. Death of partner; Disability*
2 = Somewhat:	*e.g. Dissatisfaction with work environment*
3 = Moderately:	*e.g. Conflict within immediate family*
4 = Considerably:	*e.g. Dissatisfaction with level of fitness*

- Acute time-limited event (< 3 months)
  The stressor is confined to a definite short-term time-period; e.g. Awaiting surgery

- Stressful event sequence
  When one major event sets off a series of related events that continue after the initial event has passed; e.g. Bereavement; Being fired from a job

- Chronic intermittent stressful events (> 3 months)
  Events that occur periodically (1/wk, 1/mth, 1/yr); e.g. Sexual difficulties; Conflicts with neighbours

- Chronic stress condition (> 3 months)
  Situations that may or may not be initiated by a discrete event; e.g. Disability; Chronic job stress

Appendix E   *IES-VF* Scoring Sheet

	NOT RATED	0 (NOT AT ALL)	1	2	3	4	5
Language/ Description (e.g. words used)		• Stated not a problem OR is actively trying to change it	• Doesn't say it • Implies it	• Doesn't say it • Implies it	• Similar words	• Similar words	• Exact words
Affect		• NONE	• LOW	• HIGH	• LOW	• HIGH	• HIGH

INTRUSION ITEMS

AVOIDANCE ITEMS

Thoughts
- Thought about the stress **when I didn't mean too**
  N/R   0   1   2   3   4   5
- **Pictures/Images** of the stress popped into mind
  N/R   0   1   2   3   4   5
- **Other things** made me think about the stress
  N/R   0   1   2   3   4   5

- **Tried to remove** the stress from memory
  N/R   0   1   2   3   4   5
- I **tried not to think** about the stress
  N/R   0   1   2   3   4   5

Emotion
- I had waves of **strong feelings** about the stress
  N/R   0   1   2   3   4   5
- Any **reminder** brought back feelings
  N/R   0   1   2   3   4   5

- My feelings about the stress were **numb**
  N/R   0   1   2   3   4   5
- I had lots of feelings - **didn't want to deal with them**
  N/R   0   1   2   3   4   5
- I felt as if it hadn't happened or **wasn't real**
  N/R   0   1   2   3   4   5
- **Avoided** letting myself get upset
  N/R   0   1   2   3   4   5

Behaviour

- **Stayed away** from reminders
  N/R   0   1   2   3   4   5
- Tried **not to talk** about it
  N/R   0   1   2   3   4   5

Physiology
- Trouble falling/staying **asleep**
  N/R   0   1   2   3   4   5
- **Dreams** about the stress
  N/R   0   1   2   3   4   5

COMMENTS ABOUT SESSION/STRESSOR:

Appendix F

IES-VF Interrater Reliability by Percent Agreement During the Training Phase

First Session Rated:

	Intrusion	Avoidance	Total
Cognition	67%	0%	40%
Emotion	50%	75%	67%
Behaviour	No items	100%	100%
Physiology	100%	No items	100%
Total	71%	63%	67%

Second Session Rated:

	Intrusion	Avoidance	Total
Cognition	67%	5%	60%
Emotion	100%	100%	100%
Behaviour	No items	100%	100%
Physiology	100%	No items	100%
Total	86%	88%	87%

Third Session Rated:

	Intrusion	Avoidance	Total
Cognition	100%	100%	100%
Emotion	100%	100%	100%
Behaviour	No items	100%	100%
Physiology	100%	No items	100%
Total	100%	100%	100%

Overall Summary:

	Intrusion	Avoidance	Total
Cognition	78%	50%	67%
Emotion	83%	92%	89%
Behaviour	No items	100%	100%
Physiology	100%	No items	100%
Total	86%	83%	84%

Note. The Overall Summary includes results from all sessions in the Training Phase.

Appendix G

Normal Probability and Residual Plots for Predictor Variables
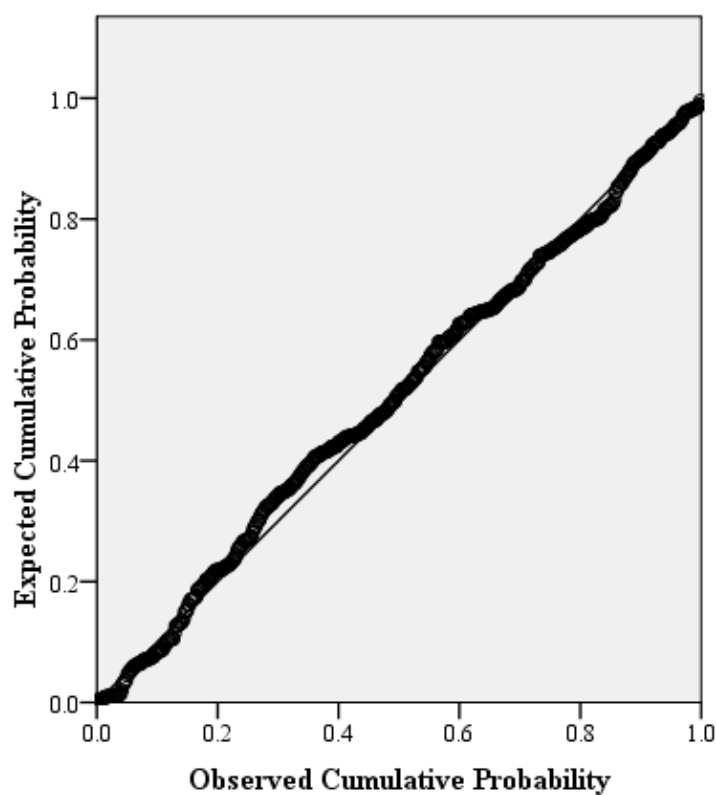
Figure G.1.1. Normal probability plot for ASQ.
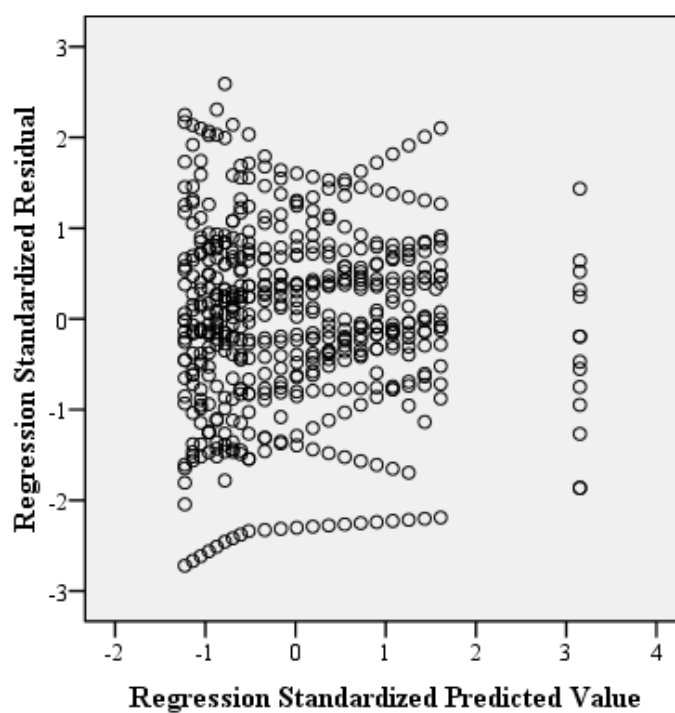
Figure G.1.2. Normal P-P plot of regression standardised residuals for ASQ.
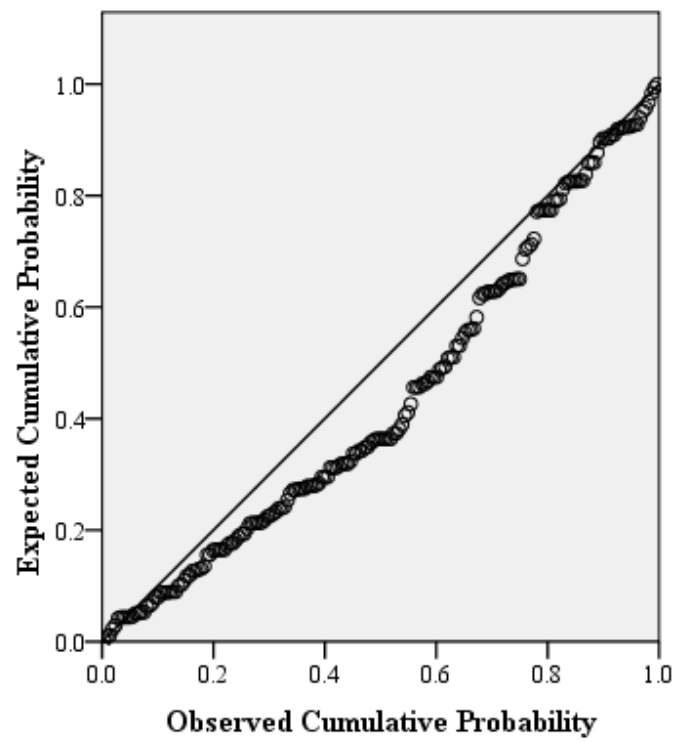
Figure G.2.1. Normal probability plot for stress impact.
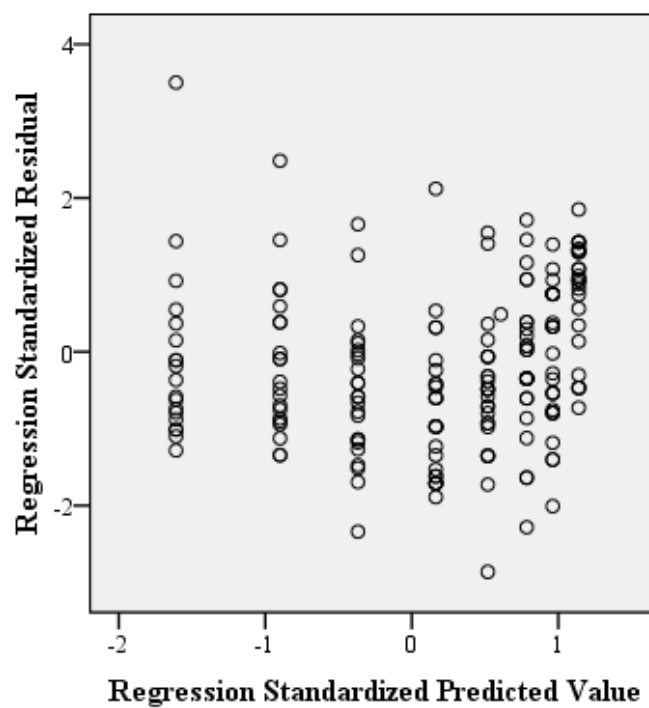
Figure G.2.2. Normal P-P plot of regression standardised residuals for stress impact.

Appendix H
Comparison of Results Using Different Data Set Exclusion Criteria

Table H.1

Multilevel Analysis Using the "Absolute" Data Set

		Parameter	Model A	Model B	Model C	Model D
Fixed Effects						
Initial Status (π_{01})	*Intercept*	$\breve{y}_{00}$	18.61***	24.37***	25.61***	23.74***
			(1.71)	(2.03)	(4.36)	(3.66)
	Stress Curve	$\breve{y}_{01}$	-	-	-0.89	-4.56
			-	-	(3.28)	(2.93)
	Attributional Style	$\breve{y}_{02}$	-	-	-	13.26**
			-	-	-	(3.88)
Rate of Change (π_{11})	*Intercept*	$\breve{y}_{10}$	-	-0.92***	-0.40*	-0.33
			-	(0.11)	(0.19)	(0.17)
	Stress Curve	$\breve{y}_{11}$	-	-	-0.41**	-0.29*
			-	-	(0.14)	(0.14)
	Attributional Style	$\breve{y}_{12}$	-	-	-	-0.45*
			-	-	-	(0.18)
Variance Components						
Level 1	*Within person*	σ^2_ε	62.31***	28.95***	28.42***	28.43***
			(3.87)	(1.85)	(1.84)	(1.84)
Level 2	*In initial status*	σ^2_0	78.46***	111.60***	118.73***	80.23***
			(21.79)	(30.79)	(33.89)	(23.41)
	In rate of change	σ^2_1	-	0.26**	0.17*	0.13**
			-	(0.09)	(0.06)	(0.05)
	Covariance	σ_ε	-	-2.43*	-2.93*	-1.65
			-	(1.23)	(1.18)	(0.85)
Pseudo R^2 Statistics and Goodness-of-fit						
		R^2_ε	-	0.54	0.54	0.54
		R^2_0	-	-	-0.06	0.28
		R^2_1	-	-	0.35	0.50
		Deviance	3,902.51	3,557.22	3,422.07	3,411.99
		AIC	3,908.51	3,569.92	3,438.07	3,431.99
		BIC	3,921.43	3,595.04	3,472.26	3,474.72

Table H.2

Multilevel Analysis Using the "Weekly" Data Set

		Parameter	Model A	Model B	Model C	Model D
Fixed Effects						
Initial Status (π_{01})	*Intercept*	$\breve{Y}_{00}$	18.54***	24.43***	25.61***	23.74***
			(1.77)	(2.10)	(4.36)	(3.66)
	Stress Curve	$\breve{Y}_{01}$	-	-	-0.89	-4.56
			-	-	(3.28)	(2.93)
	Attributional Style	$\breve{Y}_{02}$	-	-	-	13.26**
			-	-	-	(3.88)
Rate of Change (π_{11})	*Intercept*	$\breve{Y}_{10}$	-	-0.91***	-0.40*	-0.33
			-	(0.11)	(0.19)	(0.17)
	Stress Curve	$\breve{Y}_{11}$	-	-	-0.41**	-0.29*
			-	-	(0.14)	(0.14)
	Attributional Style	$\breve{Y}_{12}$	-	-	-	-0.45*
			-	-	-	(0.18)
Variance Components						
Level 1	*Within person*	σ^2_ε	62.65***	29.03***	28.42***	28.43***
			(3.91)	(1.87)	(1.84)	(1.84)
Level 2	*In initial status*	σ^2_0	81.14***	115.69***	118.73***	80.73***
			(22.92)	(32.47)	(33.89)	(23.41)
	In rate of change	σ^2_1	-	0.26**	0.17*	0.13**
			-	(0.09)	(0.06)	(0.05)
	Covariance	σ_ε	-	-2.54*	-2.93*	-1.65
			-	(1.28)	(1.18)	(0.85)
Pseudo R^2 Statistics and Goodness-of-fit						
	R^2_ε		-	0.54	0.55	0.55
	R^2_0		-	-	-0.03	0.30
	R^2_1		-	-	0.35	0.50
	Deviance		3,855.17	3,512.43	3,422.07	3,411.99
	AIC		3,861.17	3,524.43	3,438.07	3,431.99
	BIC		3,874.04	3,550.18	3,472.26	3,474.72

Table H.3

Multilevel Analysis Using the "Half-way" Data Set

		Parameter	Model A	Model B	Model C	Model D
Fixed Effects						
Initial Status (π_{01})	Intercept	$\breve{y}_{00}$	18.73***	24.92***	26.29***	24.47***
			(1.82)	(2.15)	(4.30)	(3.65)
	Stress Curve	$\breve{y}_{01}$	-	-	-1.21	-4.75**
			-	-	(3.24)	(3.87)
	Attributional Style	$\breve{y}_{02}$	-	-	-	12.79**
			-	-	-	(3.87)
Rate of Change (π_{11})	Intercept	$\breve{y}_{10}$	-	-0.93***	-0.51**	-0.45*
			-	(0.10)	(0.18)	(0.17)
	Stress Curve	$\breve{y}_{11}$	-	-	-0.36*	-0.26
			-	-	(0.14)	(0.14)
	Attributional Style	$\breve{y}_{12}$	-	-	-	-0.37
			-	-	-	(0.18)
Variance Components						
Level 1	Within person	σ^2_{ε}	61.82***	27.72***	27.70***	27.70***
			(3.91)	(1.80)	(1.80)	(1.80)
Level 2	In initial status	σ^2_0	83.11***	116.41***	115.48***	80.23***
			(23.89)	(33.25)	(32.99)	(23.45)
	In rate of change	σ^2_1	-	0.21**	0.16**	0.13**
			-	(0.07)	(0.06)	(0.05)
	Covariance	σ_{ε}	-	-2.46*	-2.63*	-1.61
			-	(1.22)	(1.13)	(0.85)
Pseudo R^2 Statistics and Goodness-of-fit						
	R^2_{ε}		-	0.55	0.55	0.55
	R^2_0		-	-	0.01	0.31
	R^2_1		-	-	0.24	0.38
	Deviance		3,748.63	3,391.92	3,381.98	3,372.75
	AIC		3,754.63	3,403.92	3,397.98	3,392.75
	BIC		3,767.42	3,429.51	3,432.10	3,435.41

Table H.4

Multilevel Analysis Using the "Relapse" Data Set

		Parameter	Model A	Model B	Model C	Model D
Fixed Effects						
Initial Status (π_{01})	Intercept	$\breve{Y}_{00}$	19.00***	25.22***	27.28***	24.81***
			(2.10)	(2.50)	(5.15)	(4.28)
	Stress Curve	$\breve{Y}_{01}$	-	-	-1.73	-5.05
			-	-	(3.82)	(4.28)
	Attributional Style	$\breve{Y}_{02}$	-	-	-	14.06**
			-	-	-	(4.28)
Rate of Change (π_{11})	Intercept	$\breve{Y}_{10}$	-	-0.86***	-0.39	-0.31
			-	(0.12)	(0.21)	(0.19)
	Stress Curve	$\breve{Y}_{11}$	-	-	-0.40*	0.29
			-	-	(0.16)	(0.15)
	Attributional Style	$\breve{Y}_{12}$	-	-	-	-0.46*
			-	-	-	(0.19)
Variance Components						
Level 1	Within person	σ^2_{ε}	65.42***	28.27***	29.29***	29.30***
			(4.38)	(2.01)	(2.01)	(2.01)
Level 2	In initial status	σ^2_0	93.91***	134.21***	131.82***	87.11***
			(29.26)	(41.53)	(40.79)	(27.39)
	In rate of change	σ^2_1	-	0.26**	0.19**	0.14*
			-	(0.09)	(0.07)	(0.06)
	Covariance	σ_{ε}	-	-3.34*	-3.47*	-2.01*
			-	(1.58)	(1.43)	(1.01)
Pseudo R^2 Statistics and Goodness-of-fit						
		R^2_{ε}	-	0.57	0.55	0.55
		R^2_0	-	-	0.02	0.35
		R^2_1	-	-	0.27	0.46
		Deviance	3,367.61	3,053.25	3,041.79	3,032.84
		AIC	3,373.61	3,065.25	3,057.79	3,052.84
		BIC	3,386.06	3,090.15	3,091.00	3,094.35

Table H.5

Multilevel Analysis Using the "Complete" Data Set

		Parameter	Model A	Model B	Model C	Model D
Fixed Effects						
Initial Status (π_{01})	Intercept	$\breve{y}_{00}$	20.03***	26.08***	26.62***	25.90***
			(2.32)	(2.79)	(5.55)	(4.37)
	Stress Curve	$\breve{y}_{01}$	-	-	-0.48	-7.22
			-	-	(4.34)	(3.95)
	Attributional Style	$\breve{y}_{02}$	-	-	-	17.27**
			-	-	-	(5.07)
Rate of Change (π_{11})	Intercept	$\breve{y}_{10}$	-	-0.79***	-0.37	-0.35*
			-	(0.12)	(0.22)	(0.18)
	Stress Curve	$\breve{y}_{11}$	-	-	-0.38*	-0.16
			-	-	(0.17)	(0.17)
	Attributional Style	$\breve{y}_{12}$	-	-	-	-0.57*
			-	-	-	(0.21)
Variance Components						
Level 1	Within person	σ^2_ε	62.77***	27.64***	27.65***	27.67***
			(4.45)	(2.01)	(2.01)	(2.01)
Level 2	In initial status	σ^2_0	99.77**	144.86**	143.73**	87.66***
			(33.31)	(48.05)	(47.68)	(29.56)
	In rate of change	σ^2_1	-	0.25**	0.19**	0.13*
			-	(0.09)	(0.07)	(0.05)
	Covariance	σ_ε	-	-4.01*	-3.97*	-2.08*
			-	(1.79)	(1.64)	(1.05)
Pseudo R^2 Statistics and Goodness-of-fit						
	R^2_ε		-	0.56	0.56	0.56
	R^2_0		-	-	0.01	0.39
	R^2_1		-	-	0.24	0.48
	Deviance		2,977.58	2,689.63	2,680.35	2,670.98
	AIC		2,983.58	2,071.63	2,696.35	2,690.98
	BIC		2,995.68	2,725.83	2,728.62	2,731.31

Appendix I

Comparison of Results Using Different Numbers of Sessions

Table I.1

Multilevel Analysis Using the Data Set Including Sessions 0 to20

		Parameter	Model A	Model B	Model C	Model D
Fixed Effects						
Initial Status (π_{01})	*Intercept*	$\breve{y}_{00}$	19.03***	25.48***	26.29***	24.42***
			(1.84)	(2.20)	(4.42)	(3.74)
	Stress Curve	$\breve{y}_{01}$	-	-	-0.72	-4.38**
			-	-	(3.32)	(3.97)
	Attributional Style	$\breve{y}_{02}$	-	-	-	13.21**
			-	-	-	(3.97)
Rate of Change (π_{11})	*Intercept*	$\breve{y}_{10}$	-	-1.04***	-0.49*	-0.44*
			-	(0.13)	(0.22)	(0.21)
	Stress Curve	$\breve{y}_{11}$	-	-	-0.47**	-0.36*
			-	-	(0.17)	(0.17)
	Attributional Style	$\breve{y}_{12}$	-	-	-	-0.42
			-	-	-	(0.23)
Variance Components						
Level 1	*Within person*	σ^2_{ε}	59.30***	25.94***	25.89***	25.90***
			(3.81)	(1.71)	(1.71)	(1.71)
Level 2	*In initial status*	σ^2_0	84.44***	121.76***	121.71***	84.36***
			(24.25)	(34.79)	(34.77)	(24.40)
	In rate of change	σ^2_1	-	0.33**	0.25**	0.21**
			-	(0.11)	(0.08)	(0.07)
	Covariance	σ_{ε}	-	-3.10*	-3.29*	-2.14*
			-	(1.54)	(1.41)	(1.06)
Pseudo R^2 Statistics and Goodness-of-fit						
	R^2_{ε}		-	0.56	0.56	0.56
	R^2_0		-	-	0.00	0.31
	R^2_1		-	-	0.24	0.36
	Deviance		3,623.61	3,272.33	3,261.54	3,252.30
	AIC		3,629.61	3,284.33	3,277.54	3,272.30
	BIC		3,642.32	3,309.75	3,311.43	3,314.66

Table I.2

Multilevel Analysis Using the Data Set Including Sessions 0 to 2-Month Follow-Up

		Parameter	Model A	Model B	Model C	Model D
Fixed Effects						
Initial Status (π_{01})	Intercept	$\breve{y}_{00}$	18.73***	24.92***	26.29***	24.47***
			(1.82)	(2.15)	(4.30)	(3.65)
	Stress Curve	$\breve{y}_{01}$	-	-	-1.21	-4.75**
			-	-	(3.24)	(3.87)
	Attributional Style	$\breve{y}_{02}$	-	-	-	12.79**
			-	-	-	(3.87)
Rate of Change (π_{11})	Intercept	$\breve{y}_{10}$	-	-0.93***	-0.51**	-0.45*
			-	(0.10)	(0.18)	(0.17)
	Stress Curve	$\breve{y}_{11}$	-	-	-0.36*	-0.26
			-	-	(0.14)	(0.14)
	Attributional Style	$\breve{y}_{12}$	-	-	-	-0.37
			-	-	-	(0.18)
Variance Components						
Level 1	Within person	σ^2_{ε}	61.82***	27.72***	27.70***	27.70***
			(3.91)	(1.80)	(1.80)	(1.80)
Level 2	In initial status	σ^2_0	83.11***	116.41***	115.48***	80.23***
			(23.89)	(33.25)	(32.99)	(23.45)
	In rate of change	σ^2_1	-	0.21**	0.16**	0.13**
			-	(0.07)	(0.06)	(0.05)
	Covariance	σ_{ε}	-	-2.46*	-2.63*	-1.61
			-	(1.22)	(1.13)	(0.85)
Pseudo R^2 Statistics and Goodness-of-fit						
	R^2_{ε}		-	0.55	0.55	0.55
	R^2_0		-	-	0.01	0.31
	R^2_1		-	-	0.24	0.38
	Deviance		3,748.63	3,391.92	3,381.98	3,372.75
	AIC		3,754.63	3,403.92	3,397.98	3,392.75
	BIC		3,767.42	3,429.51	3,432.10	3,435.41

Table I.3

Multilevel Analysis Using the Data Set Including Sessions 0 to 6-Month Follow-Up

		Parameter	Model A	Model B	Model C	Model D
Fixed Effects						
Initial Status (π_{01})	*Intercept*	$\breve{y}_{00}$	18.68***	24.62***	25.61***	23.74***
			(1.83)	(2.18)	(4.36)	(3.66)
	Stress Curve	$\breve{y}_{01}$	-	-	-0.89	-4.56
			-	-	(3.28)	(2.93)
	Attributional Style	$\breve{y}_{02}$	-	-	-	13.26**
			-	-	-	(3.88)
Rate of Change (π_{11})	*Intercept*	$\breve{y}_{10}$	-	-0.88***	-0.40*	-0.33
			-	(0.11)	(0.19)	(0.17)
	Stress Curve	$\breve{y}_{11}$	-	-	-0.41**	-0.29*
			-	-	(0.14)	(0.14)
	Attributional Style	$\breve{y}_{12}$	-	-	-	-0.45*
			-	-	-	(0.18)
Variance Components						
Level 1	*Within person*	σ^2_ε	62.04***	28.41***	28.42***	28.43***
			(3.91)	(1.84)	(1.84)	(1.84)
Level 2	*In initial status*	σ^2_0	83.79***	119.39***	118.73***	80.73***
			(24.08)	(34.08)	(33.89)	(23.41)
	In rate of change	σ^2_1	-	0.24**	0.17**	0.13**
			-	(0.08)	(0.06)	(0.05)
	Covariance	σ_ε	-	-2.80*	-2.93*	-1.65
			-	(1.31)	(1.18)	(0.85)
Pseudo R^2 Statistics and Goodness-of-fit						
	R^2_ε		-	0.54	0.54	0.54
	R^2_0		-	-	0.01	0.32
	R^2_1		-	-	0.29	0.46
	Deviance		3,778.62	3,434.09	3,422.07	3,411.99
	AIC		3,784.62	3,446.09	3,438.07	3,431.99
	BIC		3,797.44	3,471.73	3,472.26	3,474.72

Appendix J

Curve Estimation Analysis for All Clients

Client	Linear	Quadratic	Cubic	Preferred Form
57	0.64	0.69	0.73	Cubic
63	0.44	0.57	0.57	Cubic/Quadratic
66	0.34	0.38	0.63	Cubic
69	0.47	0.56	0.58	Cubic
84	0.75	0.80	0.82	Cubic
111	0.53	0.54	0.57	Cubic
113	0.40	0.65	0.85	Cubic
116	0.78	0.85	0.88	Cubic
133	0.57	0.73	0.75	Cubic
143	0.77	0.79	0.79	Cubic
160	0.72	0.74	0.74	Cubic
165	0.21	0.23	0.38	Cubic
169	0.78	0.93	0.98	Cubic
188	0.16	0.16	0.16	Cubic/Quadratic
195	0.24	0.41	0.42	Cubic
206	0.34	0.68	0.88	Cubic
218	0.60	0.80	0.87	Cubic
220	0.38	0.40	0.40	Cubic
223	0.52	0.82	0.87	Cubic
236	0.54	0.67	0.77	Cubic
244	0.84	0.85	0.89	Cubic
247	0.62	0.74	0.90	Cubic
262	0.21	0.21	0.35	Cubic
271	0.32	0.45	0.50	Cubic
273	0.52	0.56	0.63	Cubic
295	0.69	0.80	0.87	Cubic

Appendix K

Reliability Analysis of *IES-VF*

Table K.1
Reliability Analysis of IES-VF – Initial Item Analysis Using All Items

Session	All items included	Intrusion Items (α if item was deleted)							All items included	Avoidance Items (α if item was deleted)							
		1	2	3	4	5	6	7		1	2	3	4	5	6	7	8
1	.58	.59	.50	.50	.56	.56	.56	.52	.30	-.16	.39	.35	.46	.24	.14	.17	.38
3	.19	.44	n/a	-.29	-.08	-.03	.46	.21	.68	n/a	.69	n/a	.39	n/a	.66	.73	.55
5	.49	.21	.67	.39	.39	.59	.13	n/a	.28	.06	.34	n/a	.24	n/a	.31	n/a	n/a
8	.46	.34	.55	.15	.26	.21	.72	n/a	.47	.36	.63	.54	.54	n/a	.23	.07	n/a
10	.82	.79	.81	.80	.74	.77	.85	n/a	.48	.46	.50	.32	.53	n/a	.24	.55	.44
13	.71	.62	.67	.75	.72	.69	.53	n/a	.81	n/a	.84	n/a	.72	n/a	.76	.77	.77
16	.40	.65	n/a	.16	-.09	.04	.47	n/a	.61	n/a	.50	.63	.58	n/a	.55	.57	.54
20	.57	.70	.51	.36	.15	.12	.80	n/a	.87	n/a	.79	n/a	.80	n/a	.79	.94	.79

Note. Cells marked n/a had zero variance and were removed from the analysis.

Table K.2

Reliability Analysis of IES-VF – Second Item Analysis Using Nine Items

		Intrusion Items (α if item was deleted)								Avoidance Items (α if item was deleted)								
Session	All items included	1	2	3	4	5	6	7	All items included	1	2	3	4	5	6	7	8
1	.50			.27	.30	.34	.85		-.50		-.22		-.36		-.13	-.12	.40
3	.51			.36	.25	.48	.71		.68		.69		.39		.66	.73	.55
5	.54			.33	.28	.53	.73		.06		.60		-.21		-.52	n/a	n/a
8	.53			.37	.41	.38	.67		.62		.60		.77		.18	.46	n/a
10	.75			.66	.61	.68	.85		.28		.40		.35		-.16	.33	.14
13	.59			.53	.55	.37	.64		.81		.84		.72		.76	.77	.77
16	.65			.54	.43	.44	.82		.63		.53		.55		.65	.58	.58
20	.72			.65	.49	.43	.92		.87		.79		.80		.79	.94	.79

Note. Cells marked n/a had zero variance and were removed from the analysis.

Table K.3

Items Included in the Final Version of the IES-VF

Intrusion Items

- *Other things made me think about the stress*

- *I had waves of strong feelings about the stress*

- *Any reminder brought back feelings*

Avoidance Items

- *I tried not to think about the stress*

- *I had lots of feelings and didn't want to deal with them*

- *I avoided letting myself get upset*

- *I stayed away from reminders*

Appendix L

Depression Severity (*BDI-II*) Change Across Therapy

Client	Intake	*BDI-II Scores*			*Percentage Improvement from Intake*		
		End of Therapy	2-month FU	6-month FU	End of Therapy	2-month FU	6-month FU
57	21	4	-	-	81%	-	-
63	28	15	17	-	46%	39%	-
66	33	12	-	-	64%	-	-
69	46	0	1	-	100%	98%	-
84	115	1	-	-	93%	-	-
111	24	6	4	-	75%	83%	-
113	33	22	22	-	33%	33%	-
116	50	24	-	-	52%	-	-
133	43	11	7	-	74%	84%	-
143	18	8	7	-	56%	61%	-
160	37	18	16	-	51%	57%	-
165	26	2	3	5	92%	88%	81%
169	49	15	8	-	69%	84%	-
188	13	4	5	-	69%	62%	-
195	23	18	-	-	22%	-	-
206	21	6	2	-	71%	90%	-
218	42	0	2	-	100%	95%	-
220	19	3	1	0	84%	95%	100%
223	28	11	-	-	61%	-	-
236	37	3	-	-	92%	-	-
244	53	31	31	-	42%	42%	-
247	23	2	-	-	91%	-	-
262	25	11	-	-	56%	-	-
271	44	15	-	-	66%	-	-
273	24	16	13	22	33%	46%	8%
295	30	4	2	0	87%	93%	100%

Appendix M

Stress Impact (*IES-VF*) Change Across Therapy

	Stress Impact Scores		*Percentage Improvement from Intake*
Client	*Intake*	*End of Therapy*	*End of Therapy*
57	*4.29*	*2.29*	*47%*
63	*4.57*	*0.67*	*85%*
66	*4.14*	*1.57*	*62%*
69	*4.29*	*0.43*	*90%*
84	*4.20*	*0.50*	*88%*
111	*4.00*	*1.71*	*57%*
113	*4.60*	*1.40*	*70%*
116	*3.83*	*0.80*	*79%*
133	*5.00*	*1.14*	*77%*
143	*4.33*	*1.20*	*72%*
160	*3.20*	*1.20*	*63%*
165	*3.20*	*0.50*	*84%*
169	*4.60*	*0.83*	*82%*
188	*3.20*	*0.71*	*78%*
195	*3.00*	*2.57*	*14%*
206	*4.57*	*1.43*	*69%*
218	*4.29*	*0.29*	*93%*
220	*4.67*	*0.50*	*89%*
223	*4.40*	*1.20*	*73%*
236	*4.57*	*0.67*	*85%*
244	*4.25*	*4.00*	*6%*
247	*4.67*	*1.00*	*79%*
262	*4.40*	*2.00*	*55%*
271	*4.67*	*2.29*	*51%*
273	*3.67*	*0.60*	*84%*
295	*3.33*	*2.40*	*28%*

Appendix N

Attributional Style (*ASQ*) Change Across Therapy

| Client | | *ASQ Scores* | | | | *ASQ Improvement from Intake* | |
	Intake	End of Therapy	2-month FU	6-month FU	End of Therapy	2-month FU	6-month FU
57	-0.7	-2.8	-	-	-2.1	-	-
63	-2.5	1.3	2.2	-	3.8	4.7	-
66	3.0	5.2	-	-	2.2	-	-
69	-1.8	4.2	6.2	-	6.0	8.0	-
84	3.5	2.2	-	-	-1.3	-	-
111	-0.5	3.2	4	-	3.7	2.3	-
113	-4.7	0.2	22	-	4.8	3.2	-
116	1.2	4.3	-	-	3.2	-	-
133	-4.3	2.2	-1.5	-	6.5	8.3	-
143	2.8	1.8	2.7	-	-1.0	-0.2	-
160	-1.3	1.8	1.3	-	3.2	2.7	-
165	-0.2	3.2	2.7	4.2	3.3	2.8	4.3
169	-7.0	-3.5	-1.5	-	3.5	5.5	-
188	5.5	-0.2	0.8	-	-5.7	-4.7	-
195	4.2	0.5	-	-	-3.7	-	-
206	5.3	2.3	2.8	-	-3.0	-2.5	-
218	-5.3	3.5	3.8	-	8.8	9.2	-
220	1.5	3.0	4.8	3.5	1.5	3.3	2.0
223	-2.3	1.0	-	-	3.3	-	-
236	1.3	2.5	-	-	1.2	-	-
244	-1.3	0.7	2.0	-	2.0	3.3	-
247	-0.8	2.0	-	-	2.8	-	-
262	-0.2	7.3	-	-	7.5	-	-
271	-4.2	-3.5	-	-	0.7	-	-
273	0.8	1.7	0	-1.0	0.8	-0.8	-1.8
295	0	4.0	4.5	3.3	4.0	4.5	3.3

Appendix O1

Demographic Form 1

NAME: _____

ID NUMBER: _____

DEPRESSION STUDY
Personal Data Form

1. **Age** | years |

2. **Gender** *(tick one)*   Female ☐   Male ☐

3. **Marital Status** *(tick one)*   Never Married ☐   Divorced ☐

      Married ☐   Widow/ Widower ☐

4. **Ethnicity** *(tick one)*   Asian ☐   European/ Caucasian ☐

      Maori ☐   Pacific Islander ☐

      Other | _____ |

5. **Occupation**   _____

6. **Education** *(tick one)*   Some primary school ☐   Completed primary school ☐

      Some high school ☐   Completed high school ☐

      Technical training beyond high school ☐   Some university ☐

      Graduated from university ☐

7. **Have you received any mental health treatment in the past?**

   (psychotherapy, counselling, or medication, such as prozac)

   Yes   No

If yes, what kind of treatment and for approximately how long?

Type of treatment: _____   How long (approx.)? | Months |

Type of treatment: _____   How long (approx.)? | Months |

Type of treatment: _____   How long (approx.)? | Months |

Type of treatment: _____   How long (approx.)? | Months |

Appendix O2

Demographic Form 2

DEPRESSION STUDY
Personal Data Form
Part II: Extra Information

Marital Status

At beginning of therapy I was: Single
(Circle one)

Dating

De Facto

Married

Divorced

Widow / Widower

Occupation

- At beginning of therapy you told us your occupation at that time. What was it?

_____

- Were you actively engaged in that occupation at the time or was it a past occupation? (Circle one)

Current

Past

- If it was current, were you working: (Circle one)

Full time (35+ hours per week)

Part time

Family

Do you have Children?

Yes

No

If yes, how many children do you have?

Appendix P

Post-Hoc Correlation Analysis Incorporating Control Variables

	No. Stressors	Severity	BDI	BDI ROC	Stress Impact	Stress ROC	Attributional Style	Attributional Style ROC	Attributional Style (Avg)	Relationships	Autonomy	Financial	Control	Stress Curve	BDI Curve	Stress Severity	Chronicity	Stress Intake	Stress End	Therapy Complete	BDI Intake Category	Gender	Age at Intake	Marital Status	Job	Children	Past Therapy
No. Stressors																											
Severity	.16 (.43)																										
BDI	-.27 (.18)	-.14 (.49)																									
BDI ROC	-.20 (.34)	.15 (.48)	-.46* (.02)																								
Stress Impact	.24 (.24)	-.08 (.69)	.20 (.33)	-.32 (.11)																							
Stress ROC	-.44* (.03)	-.05 (.80)	.26 (.19)	.43* (.03)	-.66** (.00)																						
Attributional Style	.33 (.10)	.15 (.45)	-.62** (.00)	.48* (.01)	-.15 (.47)	-.07 (.74)																					
Attributional Style ROC	-.29 (.15)	-.29 (.15)	.22 (.27)	-.20 (.34)	.14 (.50)	.03 (.88)	-.51** (.01)																				
Attributional Style (Avg)	-.27 (.18)	-.30 (.14)	.48* (.01)	-.47* (.02)	.35 (.08)	-.16 (.42)	-.82** (.00)	.32 (.11)																			
Relationships	.21 (.31)	.02 (.88)	-.03 (.21)	-.25 (.74)	.07 (.74)	-.36 (.07)	-.02 (.92)	.05 (.79)	.17 (.41)																		
Autonomy	.18 (.38)	.04 (.86)	.32 (.11)	-.44* (.03)	.33 (.10)	-.18 (.39)	-.26 (.20)	-.20 (.32)	.36 (.07)	.15 (.46)																	
Financial	-.02 (.93)	-.08 (.68)	.11 (.58)	-.03 (.87)	.14 (.50)	-.06 (.76)	.21 (.29)	-.16 (.42)	-.07 (.75)	-.12 (.56)	.39 (.05)																
Control	.21 (.31)	.10 (.64)	-.04 (.86)	.08 (.71)	.25 (.22)	-.29 (.15)	.20 (.34)	.10 (.64)	-.16 (.45)	.19 (.35)	.01 (.97)	.31 (.13)															
Stress Curve	-.04 (.84)	.05 (.82)	-.07 (.72)	-.47* (.01)	.17 (.42)	-.37 (.06)	-.409* (.04)	.35 (.08)	.37 (.06)	.02 (.93)	.06 (.75)	-.19 (.35)	-.40* (.04)														
BDI Curve	.15 (.47)	.03 (.88)	-.40* (.04)	-.34 (.09)	-.01 (.96)	-.36 (.07)	.09 (.67)	.30 (.14)	-.08 (.60)	.11 (.60)	-.06 (.77)	-.05 (.79)	-.25 (.21)	.75** (.00)													
Stress Severity	.30 (.14)	.74** (.00)	-.12 (.56)	-.04 (.83)	.16 (.45)	-.15 (.48)	.14 (.23)	-.25 (.23)	-.18 (.39)	.00 (1.00)	.41* (.04)	.05 (.81)	.05 (.79)	.07 (.75)	.06 (.75)												
Chronicity	.24 (.23)	-.12 (.57)	-.35 (.08)	-.03 (.90)	.11 (.61)	-.33 (.10)	.21 (.29)	.06 (.78)	-.37 (.06)	-.23 (.26)	-.21 (.29)	.06 (.78)	.15 (.47)	.13 (.52)	.23 (.26)	.00 (1.00)											
Stress Intake	.00 (.99)	.01 (.96)	.09 (.68)	-.38 (.05)	.64** (.00)	-.52** (.01)	-.40* (.04)	.42* (.03)	.43* (.03)	.12 (.55)	.20 (.33)	.14 (.49)	.02 (.92)	.53** (.01)	.32 (.11)	.07 (.74)	.26 (.19)										
Stress End	-.24 (.24)	.01 (.95)	.28 (.16)	.04 (.83)	.14 (.48)	.35 (.08)	-.13 (.54)	-.19 (.35)	.10 (.63)	-.39 (.05)	.30 (.14)	.20 (.32)	-.27 (.18)	-.07 (.73)	-.32 (.11)	.17 (.42)	-.30 (.13)	-.09 (.65)									
Therapy Complete	-.33 (.10)	-.01 (.94)	.23 (.26)	.24 (.24)	-.32 (.11)	.56** (.00)	-.16 (.43)	.41* (.04)	-.04 (.84)	-.10 (.63)	-.33 (.10)	-.37 (.06)	-.01 (.34)	-.02 (.96)	-.10 (.92)	-.02 (.61)	-.04 (.91)	-.26 (.86)	.19 (.19)								
BDI Intake Category	-.20 (.32)	-.09 (.67)	.62** (.00)	-.35 (.08)	-.04 (.85)	.30 (.14)	-.48* (.01)	.46* (.02)	.29 (.13)	-.13 (.54)	.11 (.61)	.08 (.69)	-.24 (.23)	.28 (.17)	.14 (.48)	.00 (1.00)	-.18 (.37)	.07 (.72)	.09 (.66)	.37 (.07)							
Gender	.12 (.55)	.41* (.04)	-.27 (.18)	.13 (.53)	-.06 (.78)	.11 (.61)	.14 (.48)	-.28 (.17)	-.10 (.64)	.01 (.97)	.38 (.06)	-.12 (.57)	-.08 (.68)	-.06 (.75)	-.01 (.97)	.63** (.00)	-.14 (.51)	-.09 (.68)	.26 (.19)	-.13 (.53)	-.12 (.55)						
Age at Intake	.29 (.15)	-.08 (.70)	-.17 (.42)	-.12 (.57)	.15 (.45)	-.13 (.53)	.37 (.06)	-.17 (.39)	-.30 (.14)	-.09 (.66)	.31 (.12)	.14 (.49)	.16 (.43)	-.03 (.90)	.17 (.42)	.25 (.21)	.11 (.60)	-.21 (.29)	.22 (.29)	-.28 (.16)	-.12 (.58)	.47* (.02)					
Marital Status	-.08 (.71)	-.33 (.10)	-.18 (.37)	.08 (.70)	-.08 (.69)	.03 (.87)	.00 (.98)	-.13 (.54)	.17 (.40)	-.30 (.14)	.32 (.11)	.29 (.15)	-.31 (.13)	-.22 (.29)	.23 (.25)	-.10 (.63)	.11 (.60)	-.05 (.81)	-.01 (.97)	-.07 (.74)	.10 (.62)	.06 (.77)	.24 (.24)				
Job	.04 (.86)	.17 (.41)	-.02 (.93)	.06 (.79)	-.07 (.72)	.11 (.58)	-.09 (.68)	-.17 (.40)	-.02 (.94)	.18 (.38)	.08 (.71)	-.34 (.09)	-.03 (.89)	-.03 (.89)	-.06 (.78)	.06 (.78)	-.01 (.97)	-.12 (.57)	.10 (.61)	.01 (.96)	-.06 (.76)	.47* (.02)	.19 (.35)	-.07 (.72)			
Children	.15 (.45)	-.61** (.00)	.03 (.88)	-.25 (.22)	.16 (.43)	-.24 (.25)	.04 (.84)	.22 (.28)	.03 (.87)	.01 (.95)	-.06 (.76)	.24 (.24)	.02 (.91)	.28 (.17)	-.26 (.19)	-.51** (.01)	.25 (.21)	.18 (.38)	-.10 (.61)	-.13 (.52)	.18 (.38)	-.42* (.04)	.23 (.26)	.21 (.30)	-.20 (.33)		
Past Therapy	.23 (.26)	.24 (.23)	-.09 (.66)	.07 (.73)	.26 (.21)	-.25 (.21)	.27 (.19)	-.24 (.24)	-.10 (.64)	.42* (.03)	.17 (.41)	.42* (.03)	.51** (.01)	-.30 (.13)	-.13 (.54)	.27 (.18)	-.14 (.51)	.06 (.77)	.01 (.96)	-.32 (.11)	-.22 (.29)	.03 (.90)	-.04 (.86)	-.24 (.24)	.06 (.79)	-.29 (.16)	
Past Medication	.07 (.75)	.31 (.12)	-.12 (.55)	.23 (.26)	-.19 (.35)	.24 (.23)	-.08 (.71)	.02 (.93)	.03 (.87)	.17 (.41)	.12 (.56)	-.11 (.59)	.06 (.77)	-.10 (.63)	-.04 (.86)	.24 (.23)	-.21 (.30)	-.07 (.75)	.02 (.91)	.23 (.25)	.14 (.51)	.32 (.11)	-.12 (.55)	.08 (.70)	.22 (.27)	-.45* (.02)	.32 (.11)

Note. Shaded boxes indicate those correlations significant at least at the p<.1 level of significance (2-tailed; Pearson correlation).

Appendix Q

Post-Hoc Multilevel Analysis

	Parameter	Model D	Model F	Model G	Model H	Model I
Fixed Effects						
Initial Status (π_{01}) Intercept	$\check{y}_{00}$	24.47***	30.12***	19.54***	26.86***	28.65***
		(3.65)	(5.27)	(4.72)	(3.85)	(7.16)
Stress Curve	$\check{y}_{01}$	-4.75	-4.05	-4.78	-4.87	-4.05
		(3.87)	(2.85)	(2.77)	(2.80)	(3.04)
Attributional Style	$\check{y}_{02}$	12.79**	13.40**	13.01**	12.35**	11.43*
		(3.87)	(3.75)	(3.68)	(3.73)	(4.32)
Marital Status	$\check{y}_{03}$	-	-1.93	-	-	-
		-	(1.33)	-	-	-
Therapy Complete	$\check{y}_{04}$	-	-	6.48	-	-
		-	-	(4.07)	-	-
Gender	$\check{y}_{05}$	-	-	-	-5.32	-
		-	-	-	(3.56)	-
Chronicity	$\check{y}_{06}$	-	-	-	-	-1.47
		-	-	-	-	(2.15)
Rate of Change (π_{11}) Intercept	$\check{y}_{10}$	-0.45*	-0.73**	-0.71*	-0.50*	-0.26
		(0.17)	(0.25)	(0.27)	(0.18)	(0.35)
Stress Curve	$\check{y}_{11}$	-0.26	-0.29*	-0.26	-0.26	-0.24
		(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
Attributional Style	$\check{y}_{12}$	-0.37	-0.41*	-0.34	-0.36	-0.43*
		(0.18)	(0.18)	(0.18)	(0.18)	0.20
Marital Status	$\check{y}_{13}$	-	0.10	-	-	-
		-	(0.06)	-	-	-
Therapy Complete	$\check{y}_{14}$	-	-	0.28	-	-
		-	-	(0.23)	-	-
Gender	$\check{y}_{15}$	-	-	-	0.11	-
		-	-	-	(0.18)	-
Chronicity	$\check{y}_{16}$	-	-	-	-	-0.06
		-	-	-	-	(0.10)
Variance Components						
Level 1 Within person	σ^2_ε	27.80***	27.69***	27.63***	27.70***	27.70***
		(1.80)	(1.79)	(1.79)	(1.80)	(1.80)
Level 2 In initial status	σ^2_0	80.23***	73.98***	71.87***	73.62***	78.74***
		(23.25)	(21.52)	(20.91)	(21.41)	(22.84)
In rate of change	σ^2_1	0.13**	0.12**	0.13**	0.13**	0.13**
		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Covariance	σ_ε	-1.61	-1.31	-1.82*	-1.49	-1.68*
		(0.85)	(0.78)	(0.83)	(0.81)	(0.84)
Pseudo R^2 Statistics and Goodness-of-fit						
R^2_ε		-	0.00	0.01	0.00	0.00
R^2_0		-	0.08	0.10	0.08	0.02
R^2_1		-	0.08	0.00	0.00	0.00
Deviance		3,372.75	3,369.96	3,365.20	3,370.59	3,371.03
AIC		3,392.75	3,393.96	3,389.20	3,394.59	3,395.03

	Parameter	Model D	Model J	Model K	Model L	Model M
Fixed Effects						
Initial Status (π_{01})	Intercept $\check{y}_{00}$	24.47***	18.49*	21.65**	25.55***	29.33***
		(3.65)	(8.03)	(6.31)	(3.72)	(7.12)
	Stress Curve $\check{y}_{01}$	-4.75	-4.59	-4.45	-5.12	-4.87
		(3.87)	(2.88)	(2.95)	(2.88)	(2.89)
	Attribution al Style $\check{y}_{02}$	12.79**	11.46**	12.77**	13.08**	13.34**
		(3.87)	(4.10)	(3.85)	(3.81)	(3.89)
	Autonomy $\check{y}_{03}$	-	2.12	-	-	-
		-	(2.51)	-	-	-
	Finances $\check{y}_{04}$	-	-	1.12	-	-
		-	-	(2.05)	-	-
	Past Medication $\check{y}_{05}$	-	-	-	-5.04	-
		-	-	-	(4.91)	-
	Relation-ships $\check{y}_{06}$	-	-	-	-	-1.85
		-	-	-	-	(2.34)
Rate of Change (π_{11})	Intercept $\check{y}_{10}$	-0.45*	0.10	0.35	-0.51**	-0.13
		(0.17)	(0.36)	(0.30)	(0.18)	(0.34)
	Stress Curve $\check{y}_{11}$	-0.26	-0.27	-0.27	-0.24	-0.26
		(0.14)	(0.13)	(0.14)	(0.14)	(0.14)
	Attribution al Style $\check{y}_{12}$	-0.37	-0.23	-0.37	-0.38*	-0.34
		(0.18)	(0.19)	(0.18)	(0.18)	(0.18)
	Autonomy $\check{y}_{13}$	-	-0.20	-	-	-
		-	(0.12)	-	-	-
	Finances $\check{y}_{14}$	-	-	-0.04	-	-
		-	-	(0.10)	-	-
	Past Medication $\check{y}_{15}$	-	-	-	0.25	-
		-	-	-	(0.22)	-
	Relation-ships $\check{y}_{16}$	-	-	-	-	-0.12
		-	-	-	-	(0.11)
Variance Components						
Level 1	Within person σ^2_ε	27.80***	27.65***	27.69***	27.68***	27.67***
		(1.80)	(1.79)	(1.79)	(1.79)	(1.79)
Level 2	In initial status σ^2_0	80.23***	77.69***	79.26***	76.91***	78.40***
		(23.25)	(22.55)	(22.98)	(22.33)	(22.75)
	In rate of change σ^2_1	0.13**	0.11**	0.13**	0.12**	0.13**
		(0.05)	(0.04)	(0.05)	(0.05)	(0.05)
	Covariance σ_ε	-1.61	-1.36	-1.58	-1.44	-1.77*
		(0.85)	(0.79)	(0.84)	(0.81)	(0.85)
Pseudo R^2 Statistics and Goodness-of-fit						
	R^2_ε	-	0.00	0.00	0.00	0.00
	R^2_0	-	0.03	0.01	0.04	0.02
	R^2_1	-	0.15	0.00	0.08	0.00
	Deviance	3,372.75	3,369.92	3,372.43	3,371.21	3,368.92
	AIC	3,392.75	3,393.92	3,396.43	3,395.21	3,392.92
	BIC	3,435.41	3,445.11	3,447.61	3,446.40	3,444.10

	Parameter	Model D	Model N	Model O	Model P	Model Q
Fixed Effects						
Initial Status (π_{01}) _Intercept_	$\check{y}_{00}$	24.47***	24.91**	27.13***	26.40***	24.27*
		(3.65)	(8.43)	(7.01)	(4.36)	11.03
Stress Curve	$\check{y}_{01}$	-4.75	-4.73	-5.25	-5.42	-4.77
		(3.87)	(2.93)	(3.14)	(3.02)	(2.95)
Attributional Style	$\check{y}_{02}$	12.79**	12.70**	12.77**	12.83**	12.79**
		(3.87)	(4.07)	(3.86)	(3.83)	(3.97)
Age at Intake	$\check{y}_{03}$	-	-01	-	-	-
		-	(0.17)	-	-	-
Controllability	$\check{y}_{04}$	-	-	-1.10	-	-
		-	-	(2.44)	-	-
Past Therapy	$\check{y}_{05}$	-	-	-	-3.01	-
		-	-	-	(3.83)	-
Stress Severity	$\check{y}_{06}$	-	-	-	-	0.05
		-	-	-	-	(2.10)
Rate of Change (π_{11}) _Intercept_	$\check{y}_{10}$	-0.45*	0.05	-0.30	-0.40	-0.17
		(0.17)	(0.38)	(0.35)	(0.21)	(0.50)
Stress Curve	$\check{y}_{11}$	-0.26	-0.25	-0.30	-0.28	-0.24
		(0.14)	(0.14)	(0.16)	(0.15)	(0.14)
Attributional Style	$\check{y}_{12}$	-0.37	-0.43*	0.37	-0.37	-0.39*
		(0.18)	(0.19)	(0.18)	(0.18)	(0.18)
Age at Intake	$\check{y}_{13}$	-	-0.01	-	-	-
		-	(0.01)	-	-	-
Controllability	$\check{y}_{14}$	-	-	-0.06	-	-
		-	-	(0.12)	-	-
Past Therapy	$\check{y}_{15}$	-	-	-	-0.09	-
		-	-	-	(0.19)	-
Stress Severity	$\check{y}_{16}$	-	-	-	-	-0.06
		-	-	-	-	(0.10)
Variance Components						
Level 1 _Within person_	σ^2_ε	27.80***	27.65***	27.69***	27.70***	27.70***
		(1.80)	(1.79)	(1.79)	(1.79)	(1.79)
Level 2 _In initial status_	σ^2_0	80.23***	77.69***	79.26***	78.35***	79.35***
		(23.25)	(22.55)	(22.98)	(22.73)	(23.00)
In rate of change	σ^2_1	0.13**	0.11**	0.13**	0.13**	0.13**
		(0.05)	(0.04)	(0.05)	(0.05)	(0.05)
Covariance	σ_ε	-1.61	-1.36	-1.58	-1.68*	-1.57
		(0.85)	(0.79)	(0.84)	(0.85)	(0.84)
Pseudo R^2 Statistics and Goodness-of-fit						
R^2_ε		-	0.01	0.00	0.00	0.00
R^2_0		-	0.03	0.01	0.02	0.01
R^2_1		-	0.15	0.00	0.00	0.00
Deviance		3,372.75	3,369.92	3,372.43	3,371.08	3,372.30
AIC		3,392.75	3,393.92	3,396.43	3,395.08	3,396.30
BIC		3,435.41	3,445.11	3,447.61	3,446.27	3,447.48

		Parameter	Model D	Model R	Model S	Model T
Fixed Effects						
Initial Status _(π₀₁)_	Intercept	$\check{y}_{00}$	24.47*** (3.65)	23.64*** (3.93)	24.97*** (5.72)	8.39* (4.08)
	Stress Curve	$\check{y}_{01}$	-4.75 (3.87)	-5.20 (3.03)	-4.75 (2.92)	-6.20** (2.09)
	Attributional Style	$\check{y}_{02}$	12.79** (3.87)	12.96** (3.86)	12.78** (3.87)	6.82* (2.99)
	Children	$\check{y}_{03}$	- -	0.83 (1.54)	- -	- -
	Employment	$\check{y}_{04}$	- -	- -	-0.27 (2.33)	- -
	BDI Severity at Intake	$\check{y}_{05}$	- -	- -	- -	9.04*** (1.78)
		$\check{y}_{06}$	- -	- -	- -	- -
Rate of Change _(π₁₁)_	Intercept	$\check{y}_{10}$	-0.45* (0.17)	-0.40* (0.19)	-0.52 (0.27)	0.02 (0.24)
	Stress Curve	$\check{y}_{11}$	-0.26 (0.14)	-0.24 (0.14)	-0.26 (0.14)	-0.22 (0.13)
	Attributional Style	$\check{y}_{12}$	-0.37 (0.18)	-0.38* (0.18)	-0.37 (0.18)	-0.20 (0.18)
	Children	$\check{y}_{13}$	- -	-0.05 (0.08)	- -	- -
	Employment	$\check{y}_{14}$	- -	- -	0.03 (0.11)	- -
	BDI Severity at Intake	$\check{y}_{15}$	- -	- -	- -	-0.26* (0.10)
		$\check{y}_{16}$	- -	- -	- -	- -
Variance Components						
Level 1	Within person	σ^2_ε	27.80*** (1.80)	27.69*** (1.79)	27.70*** (1.80)	27.71*** (1.80)
Level 2	In initial status	σ^2_0	80.23*** (23.25)	79.35*** (23.00)	80.21*** (23.24)	38.57*** (11.65)
	In rate of change	σ^2_1	0.13** (0.05)	0.13** (0.05)	0.13** (0.05)	0.09* (0.04)
	Covariance	σ_ε	-1.61 (0.85)	-1.57 (0.84)	-1.61 (0.85)	-0.42 (0.49)
Pseudo R² Statistics and Goodness-of-fit						
	R^2_ε		-	0.00	0.00	0.00
	R^2_0		-	0.01	0.00	0.52
	R^2_1		-	0.00	0.00	0.31
	Deviance		3,372.75	3,372.30	3,372.65	3,354.13
	AIC		3,392.75	3,396.30	3,396.65	3,378.13
	BIC		3,435.41	3,447.48	3,447.84	3,429.31

Appendix R

Percentage Improvement in *BDI-II* Scores From Intake to Mid-Therapy

Client	BDI-II		
	Session 0	*Session 10*	*Percentage Change*
195	*23*	*24*	*-4.3%*
244	*53*	*53*	*0.0%*
63	*28*	*27*	*3.6%*
160	*37*	*32*	*13.5%*
116	*50*	*43*	*14.0%*
57	*21*	*18*	*14.3%*
143	*18*	*15*	*16.7%*
273	*24*	*18*	*25.0%*
113	*33*	*22*	*33.3%*
220	*19*	*12*	*36.8%*
84	*15*	*9*	*40.0%*
262	*25*	*15*	*40.0%*
111	*24*	*14*	*41.7%*
169	*49*	*27*	*44.9%*
66	*33*	*18*	*45.5%*
133	*43*	*23*	*46.5%*
69	*46*	*20*	*56.5%*
188	*13*	*5*	*61.5%*
271	*44*	*16*	*63.6%*
223	*28*	*10*	*64.3%*
295	*30*	*8*	*73.3%*
165	*26*	*6*	*76.9%*
247	*23*	*5*	*78.3%*
236	*37*	*7*	*81.1%*
218	*42*	*7*	*83.3%*
206	*21*	*3*	*85.7%*

Appendix S

Accepted Abstract for an Oral Paper Presentation at the World Congress of Behavioral and Cognitive Therapies (Boston, 2010)

Is the Black Dog Really a Dalmatian?
Final conclusions on whether Stress and Attributional Style lead to different outcomes for clients receiving 20 Sessions of Cognitive Behavioural Therapy for Depression

Kimberly S Good, Dr Paul L Merrick, Dr Richard Fletcher, Dr Nikolaos Kazantzis
Massey University, New Zealand (Doctorate of Clinical Psychology Student)

There is a need for greater clarity in the relationship between psychosocial stress and depression in terms of therapeutic outcomes in the domain of Cognitive Behavioural Therapy (CBT). While a preponderance of research to-date has focused on the causal relationship between stress and depression, research has also been limited by the traditional assumption that first-episode sufferers of mild to moderate depression are a somewhat homogeneous group. In actual fact, client heterogeneity may be a critical, but relatively overlooked factor within this field of research. In particular, factors such as the perceived intensity and type of stress impacting on an individual as well as their personal attributional style may create significant variations in the way clients respond to therapy and the rate at which they overcome depression.

The final results from a recent clinical trial will be presented to highlight how stress and depression severity correlate across twenty sessions of CBT. In addition, the hypothesis that attributional style moderates the relationship between stress impact and depression will be investigated. The use of state-of-the-art multilevel analysis permits a comprehensive review of both within-client and between-client change and several models of interaction will be compared.

Developments in the accurate measurement and assessment of stress will also be presented. In particular, a novel measure for assessing stress in an objective format will be introduced, along with a new therapist measure that aids in the identification of precipitating stressors in depression. Final results from the application of both of these measures to a clinical setting will be discussed.

Being process-oriented and employing multilevel analysis, this research provides a prime opportunity to explore session-by-session change across therapy. It is anticipated that greater insight into the determinants of outcome and variation across the course of CBT will enable clinicians to tailor treatment more effectively. Those stressor characteristics that appear most influential in terms of client recovery will be highlighted and the clinical implications of treating clients who present with different types and levels of psychosocial stressors will be discussed.