A TEST OF COMPETING MODELS TO PREDICT SUICIDALITY IN PATIENTS AND STUDENTS IN TAIWAN

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Table of Contents

List of Tables

List of Figures

Abstract

The aim of this research was to test a series of theoretical models based on Beck (1967) cognitive diathesis-stress and Kwon and Oei (1994) linear mediational models as well as earlier research findings to determine the best-fitting model to explain the aetiological processes of suicide attempts in Taiwanese people. The participants were patients diagnosed with Major Depressive Disorders (MDD) recruited from three hospitals in Taiwan. They were used for data analyses in both cross-sectional (main) study and longitudinal (follow-up) study. In addition, a sample of students recruited from three universities in Taiwan was used for data analyses in the generalized study to examine the generalization of the results from clinical depressed patients to nonclinical university students.

In the main study, by the application of structural equation modeling (SEM) techniques, four initial models were compared using the MDD patients ($N = 162$). The SEM analyses showed that two interactional models failed to provide an adequate fit to the given data, suggesting that the hypothesis of interaction between dysfunctional attitudes and negative life events in predicting the psychopathology of Taiwanese MDD patients was not supported. The SEM analyses supported two mediational models in terms of goodness-of-fit. Because the two mediational models were very similar, they were combined to form a combined mediational model. The SEM analyses indicated that the combined model provided an adequate fit to the given data. After modifying the model to improve its goodness-of-fit, the final modified combined mediational model was selected as the most appropriate in representing the data of Taiwanese MDD patients.

The final model revealed that dysfunctional attitudes mediated the relationship between negative life events and depressive hopelessness, which in turn increased depression, which then precipitated suicidal ideation, which finally resulted in suicide attempts. In addition, it was found that negative life events exerted direct influences on depressive hopelessness and suicide attempts; sex and age exerted direct influences on negative life events. However, social support

buffered the impact of negative life stress on dysfunctional attitudes and compliance with medications prevented the development of depression.

In the follow-up study, the final modified combined mediational model was validated and reexamined with two-wave panel data gathered from the same population of Taiwanese MDD patients who participated in assessments twice, separated by a six-month interval ($N = 142$). The SEM analyses showed that the model provided an adequate fit to the two-wave panel data, suggesting that the model can be applied for predicting suicide attempts over six months in Taiwanese MDD patients.

In the generalized study, the findings obtained from the MDD patients were replicated in a sample of Taiwanese university students ($N = 324$). Results revealed that the final modified combined mediational model failed to fit the given data. The result suggests that the most appropriate model for Taiwanese MDD patients can not be generalized to Taiwanese students.

Some cautions and limitations should be noted. First, the models obtained from clinical and nonclinical people in Taiwan should not be directly generalized to people outside Taiwan. Further research using clinical and nonclinical samples from other countries to cross-validate the models was suggested. In addition, the researcher's interventions during the follow-up period may disturb the relationship between predictor variables and subsequent suicide attempts. However, the problems appear to be unavoidable because of the research ethics of protecting participants from suicidal risk.

Statement

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying.

Signed

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CHAPTER ONE
INTRODUCTION

Suicide is not only a tragedy for those families involved and a burden for modern societies, but it also affects the human resources of a country. In this respect, it is the primary mission for clinicians, hence the main goal for the present study, to understand suicidal behaviours in order to further prevent suicide.

1.1   Suicide: A Serious Problem in Taiwan

In Taiwan, many people end their life by their own hands. In 2005, the standardized suicide rate in Taiwan was 16.6 per 100,000 people (0.0166%), with a total number of 4282 people killing themselves (Department of Health, Executive Yuan, 2006). This gives an average of 11.7 suicides per day, or one suicide every two hours (Taipei Times, 2006, July 2). In 2005, compared with other countries, the suicide rate in Taiwan was amongst the highest in the world (Peacetime Foundation of Taiwan, 2006). These figures indicate that suicide is a serious public health problem in Taiwan.

Earlier studies have shown that suicide occurs in association with psychiatric disorders, usually depression, schizophrenia, substance abuse or alcoholism in Western countries (J. Angst, F. Angst, & Stassen, 1999; Bernal et al., 2006; Fawcett et al., 1987; Tanney, 1992) and Eastern countries (Cheng, 1995; Cheng, Chen, Chen, & Jenkins, 2000; Cheng, Mann, & Chan, 1997; Chiou, Chen, & Lee, 2006). The most common psychiatric diagnosis is major depressive episode or major depressive disorder. Although a lot of studies have been conducted into suicide in Western depressed patients (Coryell et al., 2002; Coryell & Young, 2005; Fawcett et al., 1990; Gladstone et al., 2001; Schneider, Philipp & Müller, 2001; Krupinski et al., 1998; Malone et al., 2000; Mann, Waternaux, Haas, & Malone, 1999; Oquendo et al., 2004;

Sinclair, Harriss, Baldwin, & King, 2005, Sokero et al., 2003), there has been little research investigating the incidence of suicide of depressed patients in Taiwan. Knowledge of the causes and development of suicide in depressed Taiwanese patients is limited.

Based on Chinese culture, Taiwanese societies have a strong stigma toward suicide (Tzeng & Lipson, 2004) and psychiatric illness (Chiou et al., 2006). Many psychiatric patients who exhibit any kind of suicidal tendencies do not seek help from health professionals unless their suicidal behaviours are very serious. Because suicide in psychiatric patients has long been ignored, the idea of prevention or intervention is seriously impeded. Understanding the causes and clarifying the mechanisms of suicide in depressed Taiwanese patients is important in terms of prevention and intervention. This may increase public and medical awareness to identify depressed patients who are at high risk of suicide attempts so that prevention and intervention can be attempted to protect these patients from future suicide.

1.2 Methodological Issues in Suicide Research

Several methodological issues in research on suicide have been noted by earlier researchers. First, individuals are not available for direct study after committing suicide. Researchers often collect the data of suicide victims from their families and friends (e.g., Cheng et al., 2000; Sinclair et al., 2005). However, these retrospective studies suffer from several limitations. It is difficult to obtain complete or accurate psychopathological data of suicide victims. Retrospective data from victims' family or friends are likely to be distorted through selective attention and biased knowledge of the suicide (Fawcett et al., 1987; Pokorny, 1992; Tanney, 1992). To avoid the problem, some researchers suggest using substitute indices (e.g., suicidal ideation or suicide attempts) as surrogates of actual suicide (Johns &

Holden, 1997). This strategy assures that the subjects are alive at the time of admission to studies.

Many studies into suicidal ideation and attempts in depressed patients are cross-sectional (Dieserud, Røysamb, Ekeberg, & Kraft, 2001; Malone et al., 2000; Mann et al., 1999; Sokero et al., 2003). These studies collect the data of depressed patients at the same time, and thus preclude the inference of causal relationship between predictor variables and suicidal ideation or attempts.

There has been some longitudinal study with depressed patients (Fawcett et al., 1987, 1990; Gladstone et al., 2001; Schneider et al., 2001). However, these studies adopt case-control design to investigate risk factors, which separate those who attempt or commit suicide during follow-up from those who do not. This design restrains the examination of indirect effect and mutual influence of separated risk factors on suicide so that the aetiological process of suicide is not able to be clarified. Fawcett et al. (1987) have suggested that further studies are likely to benefit from analyzing the risk factors of suicide by using multivariate techniques to improve the problem of case-control study.

Some studies used only a single item from depression scales such as the Hamilton Rating Scale for depression (HAM-D) and the Beck Depression Inventory (BDI) to assess suicidal ideation (Alexopoulos et al., 1999; Lynch et al., 1999; Shaffer et al., 2000). However, suicidal ideation is a cluster of thoughts including plans and wishes to commit suicide in those who have not made the attempt (Beck, Kovacs, & Weissman, 1979). Thus, one item is not appropriate to represent suicide ideation. Future studies should consider standardized assessment tools which have a number of statements to assess suicidal ideation.

Another limitation of research on suicidal behaviour is that it often assumes that all patients in depressive episodes are homogenous. Many studies did not

differentiate between unipolar and bipolar disorder (e.g., Fawcett et al., 1987; Ranieri et al., 1987). However, the results of earlier studies on investigating risk factors and suicide rate between bipolar patients and unipolar patients have been mixed (Möller, 2003). This implies that the aetiology of suicide between the two groups may be different. Therefore, in future research, it is better to confine patients to only one single type of affect disorder such as major depressive disorder (MDD) to reduce some confounding variables.

Most depressed patients in suicide research are recruited from clinics or hospitals. Most of them are prescribed psychotropic medications at the time of admission to studies. Earlier research has indicated that antidepressants not only reduce depressive symptoms but also suicidality associated with depression (Möller, 2003). Thus, suicidal behaviours in the patients are influenced by the effect of treatment. In future research, it is necessary to control for patients' compliance with medications.

1.3   Theoretical Issues of Suicidal behaviours

Over the past decade many studies have adopted the demographic model, the environmental model or the individual differences model to explain suicidal behaviours (Braucht, 1979; Rickelman & Houfek, 1995). The demographic model focuses on demographic risk factors which distinguish suicidal from nonsuicidal individuals. The environmental model sees suicide as a result of environmental determinants; this leads to research that identifies environmental determinants distinguishing suicidal from nonsuicidal subjects. Finally, the individual differences (personological) model sees suicide as a result of personological determinants; this leads to research that searches for individual traits which separate those who commit suicide from those who do not.

Although the three models have contributed meaningful descriptive information, they each exhibit limitations when predicting the risk of suicide. Rickelman et al. (1995) indicated that the demographic model was less useful in assessing the suicide risk in psychiatric patients. Weishaar and Beck (1992) reported that suicide risk in psychiatric patients was more strongly related to clinical and proximate risk factors (e.g., depression) than to demographic characteristics. In the environmental model, despite the belief that stress is an important factor in the development of suicidal ideation, it is well known that not all depressed patients who are exposed to a stressful environment necessarily commit suicide. In the last model, individual vulnerability has been thought to be more useful than broadly defined and widely distributed risk factors in predicting suicide. However, depressed patients under different stressful environments seem to have different levels of suicidal tendencies. In short, the three models are of little value in independently predicting suicide. This implies that suicide is a complex behavioural outcome. Multiple explanations may be considered simultaneously to understand the causes of suicide.

Recent efforts to use diathesis-stress premises in suicide research appear promising. The basic premise is that stress activates a diathesis, transforming the potential of predisposition into the presence of psychological symptomatology (Monroe & Simons, 1991). One diathesis-stress theory of depression that has yielded a lot of empirical research is Beck's (1967, 1976, 1987) cognitive theory of depression. In later publications, Beck expanded his cognitive theory to explain suicide (Beck, Brown, Berchick, Stewart, & Steer, 1990, Beck, Steer, Beck, & Newman, 1993; Beck, Steer, Kovacs, & Garrison, 1985).

Beck (1967, 1976) hypothesized that when encountering negative life events, individuals with high dysfunctional attitudes are more likely to report depressive

symptoms than individuals with low dysfunctional attitudes. Such assumptions are thought to reflect the content of preexisting dysfunctional schemas. In addition, when people with dysfunctional schemas encounter negative life events, they tend to think negatively about their self, world and future (i.e., the cognitive triad), and in turn become depressed (Beck, 1967, 1970, 1987). The most important negative thinking in the cognitive triad is negative expectation about the future (i.e., hopelessness). It was found to be a better predictor of suicidal ideation (Minkoff, Bergman, Beck, & Beck, 1973; Wetzel, Margulies, Davis, & Karam, 1980), and eventual suicide (Beck, Brown, et al., 1990; Beck, Steer, et al., 1985) than was depression. According to Baron et al.'s (1986) concepts, dysfunctional attitudes play a role as a moderator which interacts with negative life events to generate depression. The cognitive triad can be best understood as a mediator, which is generated by the interaction of negative life events with dysfunctional attitudes and affects the occurrence of depression. Hopelessness also plays a role as a mediator. It is also generated by the interaction of negative life events with dysfunctional attitudes and affects the occurrence of suicidal behaviours. The combination of the moderating and mediating variables can lead to an integrated model of suicidal behaviours.

However, empirical validation of Beck's theory has been mixed. Some studies reported that dysfunctional attitudes interacted with stress to predict depressive symptoms (Abela et al., 2002; Joiner, Metalsky, Lew, & Klocek, 1999; Kwon et al., 1992; Oei & Kwon, 2007; Olinger, Kuiper & Shaw, 1987), but other studies did not (Barnett & Gotlib, 1988; Klocek, Oliver & Ross, 1997; Oei et al., 2005; Robins & Block, 1989; Robins, Block, & Peselow, 1990). Therefore, the interaction hypothesis of dysfunctional attitudes requires further investigation.

In addition, the mediation hypothesis of the cognitive triad may be problematic. Research by Hankin (2001) indicated that the cognitive triad did not

mediate the relationship between the interaction of dysfunctional attitudes with stress and depression. However, Joiner et al. (1999) reported a discrepant finding. Another study by Abela et al. (2002) indicated that hopelessness plays a mediating role in the development of depression. Thus, the mediation component of Beck's cognitive model requires further investigation. Also, the relative influence of the cognitive triad to that of hopelessness on depression is worthy of investigation.

It should be noted that Beck's cognitive model is one of many diathesis-stress cognitive models. There are several other diathesis-stress cognitive models that have been proposed to explain suicidal behaviours (Abramson et al., 2000; Abramson, Alloy, & Metalsky, 1988; Abramson, Metalsky, & Alloy, 1988, 1989; Grunebaum, 2006; Mann, Waternaux, Haas, & Malone, 1999; Oquendo et al., 2004; Rickelman & Houfek, 1995). However, this thesis concentrates mainly on Beck's model. A complete review of diathesis-stress cognitive models is beyond the scope of this thesis.

The diathesis-stress theory emphasizes the reciprocity of circumstances and cognitive thoughts to account for the development and maintenance of depressive symptoms and suicidality associated with depression. However, some studies reported that negative life events, as main effect, affect cognitive thoughts, which in turn, as main effect, influence psychopathology (Cheng & Chan, 2007; Dieserud, Røysamb, Ekeberg, & Kraft, 2001; Rudd, 1990). Thus, the linear mediational model hypothesized by Kwon and Oei (1994) is worthy of examination.

In addition, although demographic factors are of less value in identifying suicide risk, they may play causal roles in the occurrence of depression and suicidal behaviours. Moreover, poor social support has been reported to be a predictor of suicidal ideation among depressed patients (Sokero et al., 2003). These common variables are worthy of investigation as correlates of suicidal behaviours.

Another variable, compliance with medications, can improve the prediction of depression and suicidal behaviours. Earlier studies have indicated that psychotropic medications can reduce depression (Beck, Rush, et al., 1979) suicidal ideation (Teicher, Glod, & Cole, 1993), suicide attempts and eventual suicide (Isacsson, 2000; Möller, 2003). Demyttenaere et al. (2001) indicated that compliance with antidepressants could prevent relapse of depression. Therefore, it is also necessary to consider patients' compliance with medications when using the diathesis-stress model to explore suicidal behaviours in depressed patients.

1.4   Overall Objectives

So far, there is little knowledge about the nature of suicidal behaviours in depressed Taiwanese patients. Clarifying the causes and mechanisms of suicidal behaviours in depressed Taiwanese patients is important for the prevention and intervention of their suicide attempt. It is for these reasons that the present study was conducted.

The present research attempts to develop an integrated model to provide an adequate explanation for suicidal behaviours in depressed Taiwanese patients. The participants in this research were diagnosed with major depressive disorder (MDD). This research focused on suicidal ideation and suicide attempts because within the spectrum of suicidal behaviours, ideation and attempts are proximal to completed suicide, and hence are the best substitute indices of completed suicide. Moreover, this strategy ensures that all the patients are available for study at the time of testing so that interviewer bias from the victims' family or friends can be avoided.

In addition, to clarify causality, this study was designed as a prospective study. The findings from the data of Taiwanese MDD patients would be validated and re-examined with six-month two-wave panel data of the same population of MDD patients who participated in assessments twice. The panel design enables us to

clarify the causal relationships between predictor variables and subsequent suicide attempts.

Furthermore, the present study attempted to replicate the results derived from MDD patients in a sample of university students in Taiwan. The purpose of this replication study was to examine the extent to which the results of clinical MDD patients generalized to a sample from other populations of interest.

In order to obtain an integrated model that best explains the aetiological processes of suicidal behaviours in Taiwanese MDD patients, this study hypothesized a series of competing models based on Beck's cognitive diathesis-stress and Kwon et al.'s linear mediational models and earlier research findings. Using the strategy of competing models suggested by Jöreskog (1993), these competing models would be compared through structural equation modeling (SEM) procedures and then the best-fitting model would be selected as appropriate in representing the given data. Also, the strategy of model trimming (Houghton, 2000) was used to improve the goodness-of-fit of the selected model. By findings significant paths from predictor variables to suicidal behaviours in the selected model, the aetiological processes of suicidal behaviours among Taiwanese MDD patients could be scrutinised.

SEM techniques allow researchers to model complex relations involving chains of moderating and mediating variables, to evaluate the goodness-of-fit of a whole model, to investigate the direct and indirect effects of an independent variable on a dependent variable and the path coefficients between the involved variables (Dieserud et al., 2001; Kwon & Oei, 1992) as well as to modify the paths of a model according to the SEM modification indices. Therefore, by using SEM techniques, it is possible to compare the models in terms of their goodness-of-fit, to modify the

models to improve their goodness-of-fit, and to explore the possible paths that link the predictor variables to suicide attempts within the models.

Prior to data analyses, the assessment tools used in this study need to be translated from English into Chinese. The psychometric properties of the Chinese-language assessment tools will be examined. This examination is based on the need for obtaining reliable and valid Chinese-language assessment tools to accurately measure suicidal ideation, suicide attempts and their predictor variables in Taiwanese participants.

Specific aims will be outlined in more detail in Chapter 2. The overall objectives presented in this thesis were to:

(1)   translate scales from English into Chinese and examine the psychometric properties of the Chinese-language scales;

(2)   using SEM procedures to test a series of competing models with cross-sectional data gathered from MDD patients in Taiwan, and then select a best-fitting model to represent the given data;

(3)   discuss the findings from the competing models and the best-fitting model with the cross-sectional data of Taiwanese MDD patients;

(4)   test the best-fitting model again six months after initial tests with longitudinal data based on the same population of MDD patients to confirm whether the model is stable over time;

(5)   replicate the results obtained from the MDD patients in a sample of Taiwanese university students to examine the generalization of the results from clinical patients to nonclinical students;

(6)   discuss the implications of this study for suicide prevention and intervention in MDD patients and student populations in Taiwan.

1.5   Structure of this Thesis

This thesis presents an analysis of several competing models of suicide attempts. They were established based on Beck's diathesis-stress and Kwon et al.'s linear mediational models and earlier research findings. The aim of this study is to select an appropriate model to represent the given data and clarify the aetiological processes of suicide attempts among Taiwanese MDD patients. A general discussion of the objectives of this study is provided at the outset. Chapter 2 reviews the literature related to classification of suicide, the predictor variables of depression and suicidal behaviours, reviews and comments on suicide theories. Structural models of the theoretical models of suicide attempts will also be presented in this chapter. Chapter 3 is a pilot study, concentrating on the questionnaires employed in the present study, including the translation thereof from English to Chinese as well as the psychometric properties of the translated questionnaires assessed by several small samples.

Chapter 4 is concerned with the main study of this thesis involving a larger sample of MDD patients to investigate the factor structure of the Chinese-language scales used. In addition, the theoretical models of suicide attempts will be tested by SEM procedures in order to obtain an appropriate model. The aetiological processes of suicide attempts in the model will be discussed.

Chapter 5 considers a 6-month follow-up study of the results derived from the main study in Chapter 4. Six months after initial tests, the results obtained in the main study will be re-tested with the same MDD patient sample to check the stability thereof. Chapter 6 is concerned with a generalized study in which the results derived from the main study are replicated to another set of data from university students to clarify the generalization of the results from clinical to nonclinical populations. Chapter 7 presents an integration of the findings of the

present research. Furthermore, the final chapter presents a discussion of the implications and the limitations of this research, in addition to recommendations for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter is aimed at reviewing past research on the suicidal behaviours of depressed patients. First to be reviewed are the definitions, measurement, and prevalence of suicide and depression as well as the prevalence of suicidal behaviours of depressed patients. Next to be reviewed are the theories employed in suicide research, especially Beck's cognitive diathesis-stress theory, which is the basis of this present thesis. Also to be reviewed are previous empirical studies and discoveries related to Beck's theory and their limitations. Last to be reviewed are suicide-related factors found by previous studies that were not conducted under any theoretical frameworks. Finally, according to the literature reviewed, a series of competing models will be proposed for testing.

2.2 Suicide

Suicide is not a mental disorder. Though there is not such a diagnostic category in the fourth edition text revised of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association [APA], 2000) and the tenth edition of the International Classification of Disease (ICD-10; World Health Organization [WHO], 1991), suicidal ideation may be found in many mental disorders, such as major depressive episode and borderline personality disorder. In addition, self-destructive behaviours are scored from 1 to 20 on the DSM-IV-TR Axis V Global Assessment of Functioning Scale. In sum, suicide is a severe health problem. A detailed discussion of its classification, definition, assessment and prevalence will be given below.

2.2.1 Classification and Definition of Suicidal behaviour

Many suicide-related terms have been mentioned in previous research. The diversity of these terms causes difficulties in the coding, definition, diagnosis and prognosis of suicidal behaviours. Thus it is necessary to clarify these suicide-related terms first in order to facilitate the proceeding of the present thesis. First to be clarified is the classification and definition of suicidal behaviours. In 1972 to 1973, in the American National Institute of Mental Health's Center for the Studies of Suicide Prevention, a committee chaired by Aaron T. Beck developed a classification and nomenclature scheme of suicidal behaviour. According to this scheme, suicidal behaviours consist of three categories: completed suicide, suicide attempts and suicidal ideas. These categories may be specified by the following criteria: (a) certainty of the rater (b) lethality (c) intent to die (d) mitigating circumstances (e) method (Beck, Davis et al., 1973; Beck, Kovacs, & Weissman, 1979). However, Maris (1992a) criticized that the Beck et al. scheme was too simple, and that in this scheme all suicides, attempts, and ideation were considered in the same way. Therefore, they proposed a new scheme to categorize suicidal behaviours and employed a more elaborated method to assess them. Although the Maris et al. classification scheme is different from that of Beck et al., both the schemes view suicidal behaviours as a collection of cognitive and behavioural phenomena of purposely ending one's own life, and both suggest that suicidal behaviours should include completed suicide, suicide attempts and suicidal ideas. Another term that is often found in previous studies, suicidality, is often used to include the three above-mentioned suicidal phenomena (e.g., Abramson et al., 2000, Bernal et al., 2006). Thus, suicidality and suicidal behaviour can be used interchangeably.

Completed suicide, suicide attempts and suicidal ideation are overlapping yet at a certain degree distinct phenomena. According to the World Health

Organization (WHO), suicide is defined as "a suicidal act with fatal outcome," and a suicidal act is defined as "the self-infliction of injury with varying degrees of lethal intent and awareness of motive" (WHO, 1968, p. 11).

With respect to suicide attempts, it is a term usually used to describe a suicidal act that does not end in death. The WHO has defined suicide attempts as

> an act with non-fatal outcome, in which an individual deliberately initiates a non-habitual behaviour that, without intervention from others, will cause self-harm, or deliberately ingests a substance in excess of the prescribed or generally recognized therapeutic dosages, and which is aimed at realizing changes which the subject desired via the actual or expected physical consequences (Platt et al., 1992, p. 99).

This definition takes the idea of parasuicide into account, which was created by Kreitman in 1969. Parasuicide was used to describe ingestions or skin cutting, most often in girls and usually with a benign outcome (Shaffer & Greenberg, 2002).

With respect to suicidal ideation, it is "plans and wishes to commit suicide", and the planners or wishers "have not made any recent overt suicide attempt" (Beck, Kovacs, & Weissman, 1979, p. 344). Suicidal ideation ranges from flashes of despairing thought to suicidal contemplations and threats that last for a period of time.

The three types of suicidal behaviour represent a continuum of self-harming behaviours. Beck and his colleagues have suggested that suicidal ideation precedes and leads to suicide attempts, which ultimately leads to suicide completion (Beck, 1986; Beck, Kovacs, & Weissman, 1979; Beck, Steer, Kovacs, & Garrison, 1985). In a study of patients with MDD, Mann and Haas (1999) indicated that suicidal ideation distinguished psychiatric patients who had attempted suicide from those who had never attempted suicide. Similar findings were also reported by Malone et

al. (2000). In a study of suicide attempters and psychiatric patients, Dieserud, Røysamb, Ekeberg and Kraft (2001) reported that suicidal ideation exerted a direct influence on suicide attempts. In addition, a lot of studies have reported that past suicide attempts are the best predictors of eventual suicide (Bottlender et al., 2000; Fawcett et al. 1990; Krupinski et al., 1998; Schneider et al., 2001). These earlier findings provide empirical support for the continuum of completed suicide, suicide attempts and suicidal ideation.

Besides defining completed suicide, suicide attempts and suicidal ideation as a continuum of phenomena, many suicidologists suggest that each of these three categories has its subtypes. For example, Maris (1992) pointed out the there were at least 4 to 12 subtypes to completed suicide, including the categories suggested by Durkheim in 1897: egoistic, anomic, altruistic, and fatalistic suicides. However, Maris suggested that suicide is rare and thus not suitable to be categorized detailedly. The reason is that when doing statistical analysis, the case number of each dependent variable will be too small for statistical difference to be obtained. Thus Maris suggested that further sub-categorization of suicide should be stopped.

"Suicidal behaviour" is often used as a general term to group the ideas of suicidal ideation, suicide attempts and completed suicide. In the present thesis, when clear identification of suicidal category is not necessary, the general term suicidal behaviour will be employed; otherwise, a particular type of suicide will be designated.

The focus of this thesis is mainly on suicidal ideation and suicide attempts, because within the spectrum of suicidal behaviours, ideation and attempt are proximal to suicide completion. This strategy ensures that all patients are alive and available for interview so that the problem of interviewer bias from victims' family and friends can be avoided.

2.2.2 Measuring Suicidal Behaviours

As completed suicide is a completed fact, it is often verified according to prosecutors' and coroners' reports (e.g., Cavanagh, Owens, & Johnstone, 1999; Cheng, Chen et al., 2000; Mann, 2002). On the other hand, suicide attempts are acts that have been performed. They are often measured according to the patient's psychiatric records or through interview-based diagnoses, such as Diagnostic Interview Schedule (DIS; Robins, Helzer, Groughan, Williams, & Spitzer, 1981), to obtain the information related to the patient's suicide attempts (e.g., Sokero et al., 2003; Weissman et al., 1999).

With respect to suicidal ideation, it is a cluster of thoughts including plans, attitudes and wishes to commit suicide. Self-report inventories or questionnaires are usually used to measure suicidal ideation. The most common self-report inventories include the Scale for Suicide Ideation (Beck, Kovacs et al., 1979; Beck, Steer, & Ranieri, 1988) and the Index of Potential Suicide (Zung, 1974). These inventories consist of a number of statements. Each statement can be assigned a value, and a total score from the values represent the intensity of suicidal ideation. The higher the score, the more probable the patient is considered to commit suicide. Such a measurement allows suicidal ideation to be presented in a continuous score.

2.2.3 Prevalence of Suicidal Behaviours

In the United States, suicide is the eighth leading cause of death among the general population, accounting for about 30000 deaths per year (Mann, 2002). The suicide rate from 1995 to 2000 was about 0.017% per annum for males, and 0.004% per annum for females, making an average of about 0.01% per annum. The total number of suicides had reached 29319 people in 2000 (WHO, 2004). In Australia, the suicide rate from 1995 to 2001 was approximately 0.02% per annum for males, 0.005% per annum for females, with an average of 0.0125% per annum. The total

number of suicides was 2456 people in 2001 (WHO, 2004). In a selection of European countries, Murray and Lopez (1996) indicated that suicide accounted for 1.5% of total deaths for both sexes, and had ranked within the leading two causes of death among 15 to 34-year-old people.

With respect to suicidal ideation and suicide attempts, in a study of 40000 subjects from United States, Canada, Puerto Rico, France, West Germany, Lebanon, Taiwan, Korean and New Zealand, Weissman and his colleagues (1999) estimated that the lifetime prevalence of suicidal ideas ranged from 2.09% (Lebanon) to 18.51% (New Zealand), and the lifetime prevalence of suicide attempts ranged from 0.72 (Lebanon) to 5.9% (Puerto Rico). In a study of 21425 adults in six European countries, Bernal et al. (2006) reported that lifetime prevalence of suicidal ideation and suicide attempts was 7.8% and 1.3%, respectively.

In Taiwan, Yip (1996) reported that the average standardized suicide rate from 1981 to 1994 was 10.0 per 100,000 people (0.010%). Chuang and Huang (2006) reported that the average suicide rate from 1983 to 2001 was 13.73 per 100,000 people (0.0137%). The lifetime prevalence of suicidal ideas and suicide attempts was 5.28% and 0.75%, respectively (Weissman et al., 1999).

In recent years, however, the suicide rate in Taiwan has risen higher than that of America, Australia and European countries. In 2005, the standardized suicide rate rose to 16.6 per 100,000 people (0.0166%), with a total number of 4282 people killing themselves (Department of Health, Executive Yuan, 2006), and the suicide rate was amongst the highest in the world (Peacetime Foundation of Taiwan, 2006).

2.3 Suicidal Behaviours and Depression

Suicide is highly related to depression. It has been pointed out in many studies that the most common diagnosis on suicidal patients is a major depressive

episode or a major depressive disorder (Angst et al. 1999; Bernal et al., 2006; Cheng, 1995; Cheng, Chen, et al., 2000, 1997; Chiou et al., 2006; Fawcett et al., 1987; Tanney, 1992). As depression is a mental illness in itself, its definition, diagnosis, assessment and prevalence will be discussed below in detail.

2.3.1 Definition and Diagnosis of Depression

There are different definitions to depression. Coyne and Downey (1991) defined depression as "a recurrent, episodic condition with a heterogeneous course, associated with varying degrees of social impairment, recovery, and susceptibility to relapse" (p. 406). Hamilton and Halbreich (1993) described depression as a heterogeneous disorder, consisting of many subtypes or variants such as major depressive disorder, dysthymic disorder, atypical depression, anxious depression and seasonal affective disorder. Collins English Dictionary (2008) defined depression as "a mental state in which a person has feelings of gloom and inadequacy". Hyperdictionary (2008) defined depression as "a mental state of excessive sadness characterized by persistently low mood or extensive loss of pleasure and interest". These definitions differ widely from each other. According to the literature reviewed, Beck's description (1967) on depression seems to provide most coverage on all definitions enumerated above. Beck stated that depression "has been variously applied to designate a particular type of feeling or symptom, a symptom-complex (or syndrome), and a well-defined disease entity" (p. 6). In the first case, depression is used to designate a particular type of emotional state such as hopelessness or unhappiness. Anyone in this state may say he or she is suffering from depression. In the second case, depression is used to designate a complex pattern of deviations in feelings, cognition and behaviour. The cluster of symptoms is sometimes conceptualized as a psychopathological dimension in intensity ranging from mild to severe, but is not represented as a discrete psychiatric disorder. In the last case,

depression can be used to designate a disease entity, for example, reactive depression or agitated depression. In terms of Beck's conception, the definitions of Collins English Dictionary and Hyperdictionary view depression as a particular type of feeling or symptom; Coyne and Downey's definition regards depression as a syndrome, and Hamilton and Halbreich's definition considers depression as a disease entity.

In sum, the definition of depression is divergent. However, in the present study, depression is used to designate a collection of depressive symptoms assessed by self-report inventories rather than a clinical diagnosis. When clear discussion of a particular type of clinical depression is needed, the specific nosological denomination of the particular depressive disorders in clinical diagnosis will be employed.

2.3.2 Measuring Depression

Depression may be measured by interview-based diagnosis and self-report inventories. Examples of the former are DSM-IV-TR (APA, 2000) and ICD-10 (WHO, 1991). These diagnoses include descriptions of particular symptoms of depression, as well as operational criteria and algorithms to classify patients into a particular diagnostic category.

According to DSM-IV-TR (APA, 2000), for an individual to be diagnosed as Major Depressive Disorder they must have experienced at least one major depressive episode for two weeks or more, but no manic, hypomanic or mixed episodes. The criteria for major depressive episode are:

(A)   One or both of the following required elements need to be present during the same 2-week period and represent a change from previous functioning:

1.   depression (depressed mood), or

2.   loss of interest or pleasure

(B)   It is sufficient to have either of these symptoms in conjunction with four out of a list of other symptoms. These include:

1. changing appetite and marked weight gain or weight loss

2. disturbed sleep patterns, either insomnia or sleeping more than normal

3. changes in activity levels, restless or moving significantly slower than normal

4. fatigue, both mental and physical

5. feelings of worthlessness, guilt, helplessness, anxiety, and/or fear

6. decreased ability to concentrate or make decisions

7. thinking about death or suicide.

With respect to self-report inventories, the most commonly used in measuring depression are the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), the Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977), and the Zung Self-Rating Depression Scale (Zung, 1965). These questionnaires consist of statements related to depressive symptoms. Subjects are to value each statement and assign it a score. The total score represents the subject's depression intensity. However, it is to be emphasized that the score obtained in this method represents simply the intensity of depressive symptoms, not a particular type of depressive disorder. Therefore, a high score in self-report depression scale does not necessarily correspond to the diagnostic criteria for clinical depression (Coyne et al., 1991).

2.3.3 Prevalence of Depression

WHO (2008) indicated that depression affects about 121 million people worldwide. According to DSM-IV-TR (2000), the lifetime prevalence of MDD among women and men from community surveys is 10 to 25% and 5 to 12%, respectively. In a study of 43,000 adult in the United States, Hasin, Goodwin, Stinson and Grant (2005) reported that the prevalence of 12-month and lifetime MDD was 5.28% and 13.23%, respectively.

The prevalence rate of MDD in Taiwan was lower than that in U.S. and the rate reported in DSM-IV-TR. The prevalence of MDD among Taiwan National Health Insurance enrollees in year 2000 and among community populations in year 1985 was 0.35% and 1.14%, respectively (Chien, Chou, Lin, Bin, & Chou, 2004). The lifetime prevalence of MDD from community surveys was about 1.5% (Bland, 1997). In addition, it was estimated that the expenditure of National Health Insurance for affective disorders in Taiwan was about 45 billion NT dollars ($US 1.45 billion) annually (Chien, 2004).

2.3.4 Prevalence of Suicidal Behaviours in Depressed Patients

As suicide is very common among depressed patients, its prevalence has been reported in a lot of research. In an early review of literature, Fawcett et al. (1987) wrote that the annual suicide rate for depressed patients was 3.5 to 4.5 times higher than that of other psychiatric patients and 22 to 36 times higher than that of the general population. In a later review, Sokero et al. (2003) indicated that MDD inpatients in Scandinavia had about a 20-fold risk of suicide completion. In another review, Angst et al. (1999) indicated that between 12% to 19%, or on average about 15%, of MDD patients died by suicide. The lifetime suicide risk of 15% for MDD patients has been accepted widely for decades (Möller, 2003). However, a recent study by Blair-West and his colleagues argued that the 15% lifetime suicide risk of MDD patients was too high (Blair-West, Cantor, Mellsop, & Eyeson-Annan, 1999). Blair-West et al. further reported that the lifetime risk of suicide in the United States for male and female MDD patients were 7% and 1%, respectively, with an average of 3.4%.

With respect to suicidal ideation and suicide attempts, Bernal et al. (2006) reported that lifetime prevalence of suicide attempts and suicidal ideation in patients with major depressive episode in six European countries was 8.36% and 26.2%, respectively. Malone and his colleagues revealed that MDD patients in the United

States had a 40% probability of suicide attempts within five years after the lifetime onset of MDD (Malone, Haas, Sweeney, & Mann, 1995). In a more recent Finland study of 296 patients with MDD, Sokero et al. (2003) indicated that, during the current major depressive episode, 58% of all patients had experienced suicidal ideation, and 15% of all patients had attempted suicide. The prevalence of these suicidal acts varies according to statistical methods, time span of measurement, depression categories and used samples.

There is no knowledge about the prevalence of completed suicide, suicide attempts and suicidal ideation in MDD patients in Taiwan. As discussed in Chapter 1, many psychiatric patients who perform any kind of suicidal behaviour do not seek help from clinical settings because of stigma. The prevalence of suicidal behaviours based on the data of MDD patients from hospitals is undoubtedly underestimated. In addition, it is difficult to acquire the data of suicidal behaviours of MDD patients from community. For these reasons, there is no study to establish the prevalence of the suicidal behaviours among Taiwanese MDD patients. However, according to the studies of western countries, what can be sure is that the prevalence of suicide among Taiwanese MDD patients will be higher than that among the general population.

2.4 Review of the Literature: Perspective, Theories and Models of Suicidal behaviours

There have been many perspectives, theories and models used to approach suicidal behaviours. These perspectives, theories and models were originated from earlier investigation on the risk factors of suicide. Most of these studies have been correlational in nature. Many risk factors of suicide claimed in these studies were the variables which differentiated a suicidal group from a non-suicidal group.

An important review of suicide research between 1882 and 1969 is a 1972 book written by Lester. Though this book poses many criticisms on earlier suicide

studies, it also summarizes the demographic, sociological, psychopathological and other characteristics related to suicide.

Another important review of the topic is a 1974 book edited by Beck, Resnik, and Lettieri. In this book, a chapter by Diggory indicated the limitations of earlier studies on the prediction of suicide. The author strongly recommended using multiple-regression methods to investigate the causes of suicide.

Another useful review of suicide research was published in 1979 by Braucht. It summarised that almost all of the research knowledge of suicidal behaviours were implicated by two models: the environmental model and the individual differences (personological) model. The author indicated that each of the models had limitations in the explanation of suicide and further suggested that interactional models were more adequate to explain suicidal behaviours.

In a later review, Rickelman and Houfek (1995) summarised that, traditionally, suicide research adopted three models: the demographic model, the environmental model and the individual differences model. Rickelman et al. indicated that each of the three models has its own limitations with respect to the prediction of suicidal behaviours. The limitations of these models have been discussed in Chapter 1. Like Braucht (1979), Rickelman et al. also suggested that an interactional model should be employed to best account for suicidal behaviours.

It can be concluded from the review above that different perspectives have been used to account for suicidal behaviours by previous studies; however, these perspectives are uni-dimensional. They are criticized for their inability to account for suicidal behaviours thoroughly. In light of this, many researchers have suggested a multi-dimensional/interactional perspective. This idea stimulates the development of the diathesis-stress model.

2.4.1 Diathesis-Stress Theory

The concept of the diathesis-stress theory is that stress activates a preexisting diathesis, which in turn elicits the presence of psychopathology (Monroe & Simons, 1991). According to a review by Monroe et al., the term diathesis can be traced at least to the writings of Galen (131-201, A.D.) in his interpretations of Hippocratic theories of disease. A diathesis was initially conceptualized as constitutional predisposition to disease. Starting from over a hundred years ago, the term diathesis became more common in psychiatric vocabulary. On the other hand, it has been recognized that stress is an important factor in the development of psychological disturbance. Thus the two concepts are combined together to explain mental illness. Monroe et al. pointed out that the specific terminology "the diathesis-stress interactions" first appeared in the explanation to schizophrenia aetiology in Bleuler's writing (1963). After that, theories of depression have explicitly adopted such a model (e.g., Alloy, Hartlage & Abramson, 1988; Abramson, Alloy & Metalsky, 1988; Abramson, Metalsky, & Alloy, 1989; Bebbington, 1987; Beck, 1967, 1976, 1987; Beck, Rush, Shaw, & Emery, 1979; Metalsky & Joiner, 1992). More recently, diathesis-stress theory has been applied to suicide research (Abramson et al., 2000; Grunebaum et al., 2006; Mann, 2002; Mann, et al., 1999; Oquendo et al., 2004).

Two basic ideas implied by the diathesis-stress model are moderator and mediator. The difference between moderator and mediator is important but often confused in concept and methodology (Kwon & Oei, 1992). Baron and Kenny (1986) explained that "a moderator is a qualitative (e.g., sex, race, class) or quantitative (e.g., level of reward) variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent variable or criterion". In the analysis of variance (ANOVA) terms, "a basic moderator effect can be represented as an interaction between a focal independent variable and a factor that specifies the appropriate conditions for its operation" (Baron & Kenny, 1986, p.

1174). The basic property of a moderating variable is diagrammed in Figure 2.1. As can be seen, moderating variables always play the role of independent variables. On the other hand, mediators change roles from effects to causes. Kwon and his colleague explained that "a mediator is generated by an independent variable and changes the effect of the independent variable on a dependent variable by various transformation processes inside the organism" (Kwon & Oei, 1992, p. 311). The basic causal chain involved in mediation is diagrammed in Figure 2.2.

Predictor

Moderator ⟶ Dependent variable

Predictor × Moderator
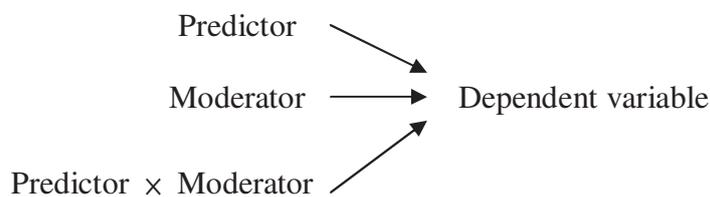
Figure 2.1. Moderator model.

Note. From "The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations," by R. M. Baron and D. A. Kenny, 1986, *Journal of Personality and Social Psychology, 51*, p. 1174. Copyright 1986 by D. A. Kenny. Reprinted with permission.

Mediator

Independent
variable ⟶ Dependent
variable
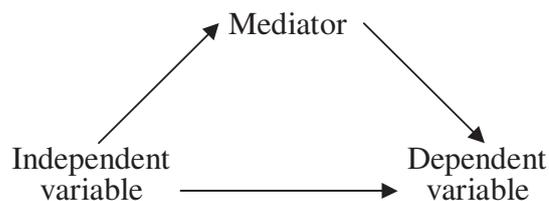
Figure 2.2. Mediational model.

Note. From "The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations," by R. M. Baron and D. A. Kenny, 1986, *Journal of Personality and Social Psychology, 51*, p. 1176. Copyright 1986 by D. A. Kenny. Reprinted with permission.

One diathesis-stress model of psychopathology that has yielded a lot of empirical research is Beck's (1967, 1976, 1987) cognitive model. It includes the concepts of moderator and mediator mentioned by Baron et al. (1986). The model was initially developed to explain the causes, development and maintenance of depression. More recently, Beck has expanded his cognitive model to explain suicide in depressed patients (Beck, Brown, et al., 1990; Beck, Steer et al., 1993; Beck, Steer et al., 1985). Because Beck's theory is complicated in its own right, the following section provides details about the content and the empirical research of the theory. It is to be emphasized here that there have been other diathesis-stress models proposed by other scholars since Beck's model. Among them, the hopelessness model of depression and suicidality proposed by Abramson et al. (1989, 2000) is the most conspicuous one. This model will be discussed later in Section 2.3.4.

2.4.2 Beck's Cognitive Diathesis-Stress Theory

Beck and his colleagues have argued that the major cause of depression is self-distress which results from cognitive distortions rather than a *need to suffer* as hypothesized by Freud (Beck, 1967, 1970, 1976; Beck, Rush, et al., 1979). As a result of dissatisfaction with the psychoanalytical viewpoint, he developed the cognitive theory of depression through systematic clinical observation and experimental testing on depressed patients. In a series of publications, he has expanded his ideas to include suicidal behaviours.

Beck and his colleagues hypothesized that most depressed patients have three cognitive characteristics: (1) negative or depressogenic schemas, (2) cognitive distortions, and (3) negative cognitive triad (Beck, 1967; 1976; Beck, Rush, et al., 1979; Beck, Weissman, Lester, & Trexler, 1974). When individuals have these three cognitive characteristics, they have a predisposition to the onset of depression, which in turn may lead to suicide.

(1)   Cognitive Schemas

The construct of schemas is central to Beck's cognitive theory of psychopathology. Beck (1967) pointed out that every individual had his particular point of view or thought patterns to regard and interpret the outer world. The viewpoints or patterns may be regarded as manifestations of cognitive organizations or structures. Beck employed the term, schema, to designate a cognitive structure. A schema has been defined by English and English (1958) as "the complex pattern, inferred as having imprinted in the organismic structure by experience, that combines with the properties of the presented stimulus object or of the presented idea to determine how the object or idea is to be perceived and conceptualized" (as cited in Beck, 1967, p.282). Beck borrowed the term and defined a schema as "a structure of screening, coding and evaluating the stimuli that impinge on the organism" (Beck, 1967, p. 283).

Beck (1967) hypothesized that when individuals process incoming information, cognitive schemas usually act as a filter. If incoming information is not consistent with one's self-schema, the information is difficult to be categorized and consequently easily overlooked. In addition, when there is a disagreement between incoming information and the self-schema, people tend to rely on their existing content of schemas and disregard new, conflicting data.

(2)   Cognitive Distortions

A way to infer the content of schemas is to ask direct questions about individuals' attitudes, goals, values and conceptions, or analyse their responses to psychological tests designed to measure their thoughts (Beck, 1967). From the observation of clinical depressed patients, Beck found that when encountering stressful events, they tended to think in dysfunctional and negative manner and then become depressed. The deviant thoughts include a series of cognitive distortions, which instruct the information processing of depressed patients.

A number of cognitive distortions have been indicated by Beck (1967, 1976), including *Arbitrary Inference, Selective Abstraction, Overgeneralization, Personalization, Magnification/Minimization* and *Dichotomous Thinking*. Arbitrary Inference means that one draws negative conclusion with little evidence to support it. Selective Abstraction indicates that one focuses on a single negative detail taken out of context. Overgeneralization means that one forms a sweeping conclusion based on an isolated incident. Personalization means that one blames oneself when there is no evidence of personal connection. Magnification/Minimization means that bad events are magnified, good events are minimized. Dichotomous (all-or-none) thinking implies that one's thinking or reasoning is extreme, so even a slight waiver from perfection is considered failure. Beck (1967) claims that these deviant thoughts or cognitive distortions reflect the negative or depressogenic schemas of depressed patients.

Depressogenic schemas are typically latent. Without the occurrence of negative life events, depressogenic schemas remain inactive and do not exert any influence on the information processing (Beck, 1967). When encountering negative life events, individuals with depressogenic schemas are more likely to have negative thoughts and thus generate depressive symptoms than individuals without such schemas (Beck, 1967, 1976). In other words, depressogenic schemas interact with negative life events to generate depression. Therefore, depressogenic schemas can be treated as a diathesis (Abela et al., 2002). In addition, according to Baron et al.'s (1986) explanation, depressogenic schemas play a role as a moderator in the relationship between negative life events and depression.

Beck (1967) hypothesized that a schema is a relatively enduring component of cognitive organizations, in contrast to a cognitive process, which is transient. In 1983, Beck proposed another theoretical formulation about cognitive organizations

or structures to depression, that is, depressive personality. Beck hypothesized that particular clusters of personality attributes were specifically related to particular types of depression that are aroused in a given situation. From clinical observation, Beck found that people who had problems involving social interactions tended to have *reactive depression*. Whereas, people who had problems related to autonomy seemed to develop *autonomous depression*. Thus, Beck hypothesized two types of depressive personality, which he has termed the *socially dependent type* and the *autonomous type* of personality.

(3) Measuring Cognitive Distortions

The Dysfunctional Attitude Scale (DAS; Weissman & Beck, 1978; Weissman, 1979) was specifically designed to measure the cognitive distortions or deviant thoughts of depressed patients, which were hypothesized to reflect the content of depressogenic schemas and depressive personality. Potential items for the DAS were derived from the suggestions of practicing clinicians on the basis of their experiences with depressed patients (Beck, Brown, Steer, & Weissman, 1979). The items were further refined by the author to resemble more closely the patterns of illogical thoughts of depressed patients described by Beck (1967). Specifically, deviant thinking patterns are reflected in the phrasing of items using inflexible and absolute language such as rigid quantifiers (*all, always, never*), categorical imperatives (*must, ought, have to*), and preemptive class assignments (*nothing-but*).

The DAS was originally designed as a 100-item scale. Beck, Brown, Steer and Weissman (1991) reported that the factor analyses of the DAS data obtained from a sample of general psychiatric outpatients (*N* = 2023) yielded nine factors: Vulnerability, Need for Approval, Success-Perfectionism, Need to Please Others, Imperatives, Need to Impress, Avoidance of Appearing Weak, Control Over Emotions and Disapproval-Dependence. Several of the factors are potentially

relevant to Beck's (1983) theoretical formulations of personality dimensions relevant to depression. Factors 2 (Need for Approval), 4 (Need to Please Others) and 9 (Disapproval-Dependence) correspond to the socially dependent dimension, whereas Factor 3 (Success-Perfection) relates to the autonomous dimension. In addition, all the items composing Factor 5 (Imperatives) reflect self-coercive ideation.

In 1979, Weissman developed two parallel 40-item scales (DAS-A and DAS-B) based on factor analysis on data of college students. Cane, Olinger, Gotlib, and Kuiper (1986) reported that the factor analysis of the DAS-A data obtained from a sample of undergraduates ($N = 664$) yielded two factors: Performance Evaluation and Approval by Others. The two factors are similar to two personality types hypothesized by Beck (1983), that is, autonomous and socially dependent types. The factors of the DAS-B were not reported.

In 1994, Power et al. argued that the 100-item and 40-item versions of the DAS are too long for clinical patients. Thus, Power et al. developed a 24-item version of the DAS (DAS-24). Factor analysis on the DAS-24 data obtained from the combined sample of undergraduates, depressed patients and the patients' first degree relatives ($N = 294$) yielded three factors: Achievement, Dependency and Self-Control. The Achievement and Dependency factors are similar to the dimensions of autonomy and social dependency, respectively. The items composing Self-Control factor reflect the systematic logical errors hypothesized by Beck (1967, 1976). Because of its brevity and good validity and reliability, the DAS-24 has been increasingly used in assessing cognitive distortions (e.g., Lam, Green, Power & Checkley, 1996; Lam, Wright, & Smith, 2004).

(4) Negative Cognitive Triad

Beck and his colleagues have also hypothesized that negative cognitive schemas provide the basis for forming negative concepts about one's self, world and

future, collectively known as the negative cognitive triad. Specific stressors impinging on negative or depressogenic schemas might set off the negative cognitive triad (Beck, 1967, 1970, 1983, 1987; Beck, Rush, Shaw, & Emery, 1979).

Negative thought about self means that individuals have a negative view about themselves. They are used to regarding themselves as people who are defective, inadequate, diseased or deprived. If their life is not perfect, their reaction is that they are flawed in some way. Negative thought about the world means that individuals tend to have a negative view about their environments. They believe that the obstacles in their environment are insurmountable so that they can not reach their life goal. Negative thought about the future means that individuals have a pessimistic view about any consequence in the future. They believe that everything will fail and lead to other negative events happening to them.

The negative cognitive triad can cause negative affects and motivations, which in turn leaded to a number of depressive symptoms, including increased dependency, negative affects (e.g., sadness), motivational symptoms (e.g., paralysis of the will, avoidance wishes), and suicidal wishes (Beck, 1967, 1979).

In later publication, Beck and other researchers have indicated that the most important component among the negative cognitive triad is negative thought about the future or hopelessness. Empirical research has found that hopelessness is a better predictor of suicidal ideation (Minkoff, Bergman, Beck, & Beck, 1973; Wetzel, Margulies, Davis, & Karam, 1980), and eventual suicide (Beck, Brown, et al., 1990; Beck, Steer, et al., 1985) than depression in clinical populations.

According to Baron et al.'s (1986) explanation, the cognitive triad plays a role as a mediator, which is generated by the interaction of negative life events with depressogenic schemas and then affects the development of depression. Also, hopelessness plays a role as a mediator in the relationship between negative life events × depressogenic schemas interaction and suicidal behaviours. As mentioned

earlier, depressogenic schemas can be regarded as a moderator, which is hypothesized to moderate the relationship between negative life events and depression. Therefore, the combination of the moderating and mediating components can lead to an integrated model of suicidal behaviours, as presented in Figure 2.3. In the model, dysfunctional attitudes, which reflect depressogenic schemas, interact with negative life events to affect depression, which in turn contributes to suicidal behaviours. On the other hand, the cognitive triad mediates the relationship between the interaction of negative life events with dysfunctional attitudes and depression. Hopelessness mediates the relationship between the interaction of negative life events with dysfunctional attitudes and suicidal behaviours.
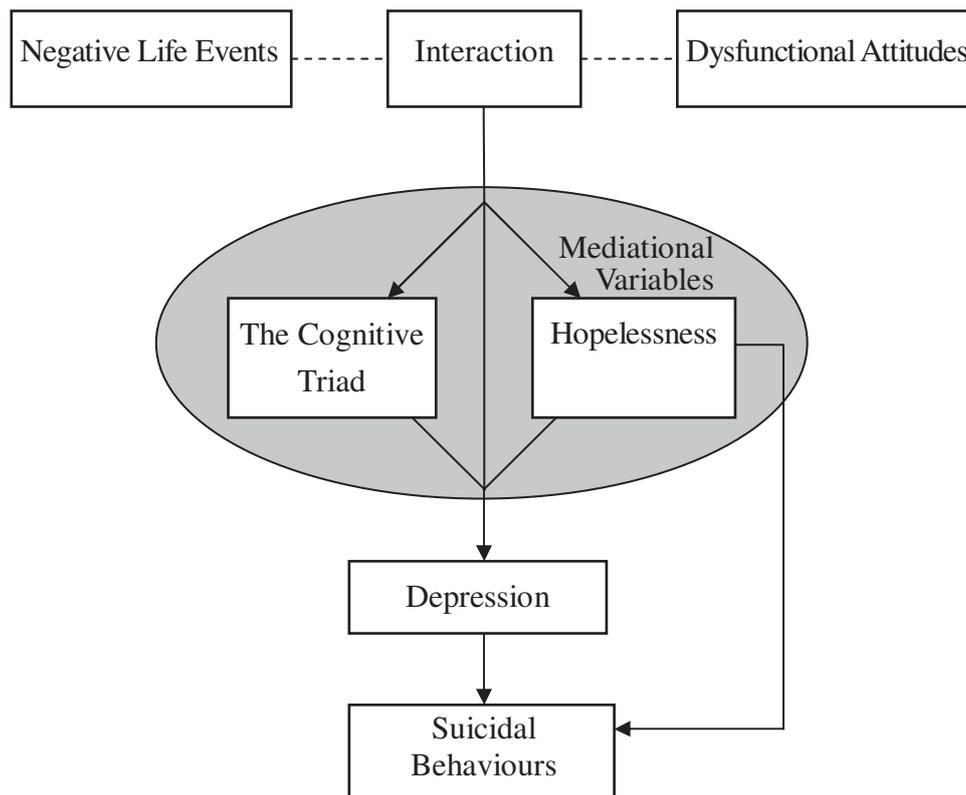
Figure 2.3. The model of suicidal behaviours derived from Beck's cognitive diathesis-stress theory.
Note. Solid lines represent causal paths hypothesized by the model. Dashed lines show that interaction term is correlated with, but cannot be caused by, constituent variables.

(5)   Measuring the Negative Cognitive Triad

Researchers have utilized various instruments to assess the constructs of the negative cognitive triad. The negative view of self has been reflected in the measurement of self-concept (Beck, Steer, Epstein, & Brown, 1990) or self-esteem (Wetzel & Reich, 1989). The negative view of the world has been associated with the measures of psychosocial dysfunction (Zauszniewski, Panitrat, & Youngblut, 1999) or negative interpretation of current experiences (Beck, Brown, Steer, Eidelson, & Riskind, 1987; Beck, Steer et al., 1990). The negative view of the future has been related to the measures of hopelessness for future (Alford et al., 1995; Beck, Weissman, Laster, & Trexler, 1974; Wetzel & Reich, 1989). The combination of the cognitive triad has been related to the measures of depressive cognitions of loss and failure (Beck, Brown, Steer, Eidelson, & Riskind, 1987; Hankin, 2001; Joiner et al., 1999).

It is worth pointing out that although Beck stressed that negative views of self, world and future are both correlated but separated, he has never developed an instrument to simultaneously quantify the three constructs of the triad. To fill this gap, Beckham et al. (1986) developed the Cognitive Triad Inventory (CTI) to simultaneously measure the negative views of self, the world and the future.

The CTI consists of 36 items (only 30 are scored; 6 are fillers), which are arranged in three subscales: View of Self, View of World and View of Future. Each of the subscales consists of 10 items phrased in both negative and positive directions. Scores for each subscale are a sum of 10 items in each subscale. The author claimed that the CTI had excellent internal consistency and concurrent validity. However, earlier studies of examining the factor validity of the CTI did not support the three-factor structure.

Anderson and Skidmore (1995) conducted a study to examine the factor structure of the CTI grounded in Beck's cognitive triad. Two hundred and sixty college undergraduates were tested by the 36-item CTI. A principal components analysis with varimax rotation yielded five factors. Anderson et al. concluded that the content and phrasing of the CTI items significantly influenced the factor structure.

Mcintosh and Fischer (2000) used both exploratory factor analyses (EFA) and confirmatory factor analyses (CFA) to examine the factorial validity of the CTI. Six hundred and forty-one undergraduates completed the 36-item CTI. Initial CFA indicated that the three-factor model of the CTI was not supported. Additionally, the three factors were highly interrelated. Next, EFA was carried out to modify Beck's three-factor model. A principle components analysis with oblique rotation generated a one-factor/23-item model. Again, CFA was conducted to evaluate the model. Results showed that the model was rejected. After the 23-item model was modified to 12 items, CFA results showed that the 12-item model fitted the given data well. Mcintosh et al. suggested that the components of the CTI are not discrete factors but are saturated by a single dominant factor, which could be regarded as a general negative attitude termed Self-Relevant Negative Attitude.

Besides the empirical findings of Anderson et al. (1995) and Mcintosh et al. (2000), many researchers have argued that the three components of the cognitive triad do not exist. Haaga, Dyck and Ernst (1991) noted that "the conceptual status of the triad hypothesis may be more problematic" (p. 218). The triad referred to a component of the self and two aspects related to the self, not three completely distinct entities. The future construct seems to refer to the future of the self, while the world construct is intermingled with the view of self. Bebbington (1985) indicated that the three components of the triad are highly interrelated and the triad's

elements are not equivalent. A negative view of the future obviously describes the interaction of the self and the world, that is, of the first two elements. Giles and Shaw (1987) suggested that the self construct is the core of the triad. Negative views of the world and the future may arise from the distortion of the self concept.

The three-factor structure of the CTI was not supported by earlier studies and the conceptual distinctiveness of the dimensions of the cognitive triad has been argued. Thus, the constructs of the triad are questionable and require further investigation. The present study will reexamine the components of the CTI to provide clarification on the constructs of the triad claimed by Beck as a multidimensional concept. It is very important to explore the concept of the cognitive triad because this is an initial step for research on Beck's diathesis-stress theory of psychopathology.

(6) Empirical Studies of Beck's Cognitive Diathesis-stress Theory

A lot of studies have been conducted to examine the hypotheses of dysfunctional attitudes and the cognitive triad grounded in Beck cognitive diathesis-stress theory. The following sections provide details about earlier research into the hypotheses of the two cognitive components.

(i) Studies about dysfunctional attitudes

As mentioned earlier, responses on measures of dysfunctional attitudes have occasionally been taken to show that depressed individuals possess negative or depressogenic schemas. It is hypothesized that individuals with high dysfunctional attitudes tend to report more depressive symptoms than individuals with low dysfunctional attitudes when they encounter stressful events.

There is a body of work that shows support for the interaction of dysfunctional attitudes with stressful life events in the prediction of depression. In a study of 132 undergraduates, Olinger, Kuiper and Shaw (1987) indicated that

dysfunctional attitudes and negative life events, as main effects, affect depressive symptoms. In addition, dysfunctional attitudes interacted with stressful life events to influence depressive symptoms. Olinger et al. concluded that increased vulnerability level and stress led to concomitant increases in depression level. In addition, dysfunctional attitudes moderated the relationship between stressful life events and depression.

Kwon & Oei (1992) compared a series of alternative models derived from Beck's diathesis-stress theory of depression. Three hundred and fifty-five undergraduates completed the questionnaires on negative life events, dysfunctional attitudes, automatic thoughts, and depressive symptoms. Kwon et al. found that dysfunctional attitudes did not exert a direct influence on depressive symptoms. However, the interaction of dysfunctional attitudes and negative life events exert a direct effect as well as an indirect effect, via automatic thoughts, on depressive symptoms. The result supports the hypothesis of dysfunctional attitudes as a cognitive moderator in the relationship between negative life events and depressive symptoms.

Joiner et al. (1999) studied 119 undergraduates to investigate whether dysfunctional attitudes interacted with stressful events to predict depressive symptoms. Results indicated that students with high dysfunctional attitudes experienced increase in depressive symptoms if they received a low midterm exam grade. However, students with high dysfunctional attitudes who received high grades did not experience increase in symptoms. The authors concluded that the dysfunctional attitudes × midterm outcome interaction contributed to depressive symptoms of students.

More recently, Abela and D'Alessandro (2002) conducted a longitudinal study to test the diathesis-stress component (i.e., moderator) of Beck's cognitive

theory. One hundred and thirty-six high school seniors applying to the University of Pennsylvania completed measures of depressed mood and dysfunctional attitudes one to eight weeks before receiving their admissions decision (Time 1). The assessment of dysfunctional attitudes was preceded by a priming task designed to activate latent depressogenic schemas. Participants also completed the measure of depressed mood shortly after they received their admissions decision (Time 2). Results indicated that dysfunctional attitudes predicted increases in depressed mood immediately following a negative admissions outcome. Abela et al. concluded that the present finding supported the moderation hypothesis of dysfunctional attitudes in Beck theory.

Although a lot of earlier studies yield support for the interaction of dysfunctional attitudes with negative life events, there are some studies failing to support the interaction hypothesis. In a cross-sectional study of 49 normal and 48 clinical college students, Wise and Barnes (1986) reported that, in the normal sample, there was a significant interaction between dysfunctional attitudes and negative life events in the prediction of depressed mood. However, in the clinical sample, the interaction was not significant and both dysfunctional attitudes and negative life events exerted a more direct influence on depressed mood.

Robins and Block (1989) conducted a cross-sectional study to test the interaction and mediation hypotheses of Beck's cognitive theory. Result showed that Beck's interaction hypothesis was not supported. In another cross-sectional study, Robins, Block and Peselow (1990) again revealed that dysfunctional attitudes did not interact with negative life events to affect depressive symptoms.

Barnett and Gotlib (1988) conducted a prospective study to investigate the effects of stressful life events and dysfunctional attitudes on depressive symptoms. One hundred and ninety-nine female and sixty-nine male college students completed

measures of depression twice, three months apart, and measures of dysfunctional attitudes and stressful life events. Hierarchical multiple-regression analyses indicated that, in both female and male students, dysfunctional attitudes did not have a main effect on subsequent depressive symptoms. In addition, dysfunctional attitudes did not interact with stressful life events to predict subsequent depression.

Another prospective study conducted by Klocek, Oliver and Ross (1997) examined the role of negative life events, dysfunctional attitudes in the prediction of depressive symptoms. One hundred and ninety-six undergraduates completed measures of negative life events, dysfunctional attitudes and depressive symptoms at three different times separated by five-week intervals. Hierarchical multiple-regression analyses revealed that the main effects for initial dysfunctional attitudes and negative life events on subsequent depressive symptoms were not significant. In addition, the interaction between dysfunctional attitudes and negative life events predicting subsequent depressive symptoms was not significant.

Oei, Hibberd and O'Brien (2005) conducted a study to test an integrated cognitive model of depression derived from Beck's theory. The model hypothesized that negative life events × dysfunctional attitudes interaction increased depressive symptoms by the mediating effect of negative autonomic thoughts. Participants were 101 Latin-American migrants living in Brisbane. SEM analyses indicated that the model failed to provide an adequate fit to the given data, suggesting that, in the Latin-American sample, Beck's cognitive diathesis-stress theory was not supported.

In sum, the research findings about the interaction effect of dysfunctional attitudes with negative life events on depressive symptoms are mixed. A lot of earlier studies supported that individuals with dysfunctional attitudes were likely to show increases in depressed mood following the occurrence of negative events (e.g., Abela et al., 2002; Joiner et al., 1999; Kwon et al., 1992; Olinger et al., 1987).

However, some other studies reported that dysfunctional attitudes did not interact with negative life events to contribute to increases in depressive symptoms (e.g., Barnett et al., 1988; Klocek et al., 1997; Oei et al, 2005; Robins et al., 1989; Wise et al., 1986). Therefore, the role of dysfunctional attitudes requires further investigation.

Furthermore, most of the afore-mentioned studies have centered on nonclinical students. The interaction effect of dysfunctional attitudes with negative life events on depressive symptoms in clinical patients is far from clear. As mentioned earlier, Beck's cognitive theory was derived from cognitive therapy research with depressed patients. The clinical depression of patients is severer than the depressed mood of students (Depue & Monroe, 1978). In addition, the symptoms of depression differ between clinical depressed patients and students (Golin & Hertz, 1979). Thus, results obtained from the data of students might not be representative of those from the data of clinical patients. Further studies are needed to use clinical depressed patients to test the moderation hypothesis of dysfunctional attitudes.

(ii)   Studies about the negative cognitive triad

Compared with the moderating role of dysfunctional attitudes, there are fewer studies on testing the mediating role of the negative cognitive triad and findings are mixed. In a study of 119 undergraduates, Joiner et al. (1999) indicated that the interaction of dysfunctional attitudes with midterm outcome contributed to depressive symptoms of students through the mediation of the combination of the cognitive triad measured by the Cognition Checklist (CCL; Beck, Brown, Steer et al., 1987).

Hankin (2001) conducted a longitudinal study to examine Beck's cognitive diathesis-stress theory. A total of 233 undergraduates completed the 40-items DAS, Negative Life Events Questionnaire, the BDI, the CCL twice separated by a

two-year interval. Result indicated that the cognitive triad measured by the CCL did not mediate the relationship between dysfunctional attitudes × negative life events interaction and subsequent depressive symptoms. The finding was contrary to the work of Joiner et al. (1999).

A study indicated that the negative cognitive triad had an association with depressive symptoms. Martin (2002) studied 112 adults living in the community to investigate the relationships between the cognitive triad and depression. Data were self-reported through the completion of the CTI and the Zung Self-Rating Depression Scale. Pearson's correlation showed that the cognitive triad was correlated with depressive symptoms. Martin concluded that individuals with higher scores on the CTI are more likely to be depressed.

Two studies reported that the triad would differentiate depressed patients from non-depressed patients. Zauszniewski and Rong (1999) tested the negative cognitive triad of Beck's theory in depressed inpatients, previously hospitalized and nonhospitalized outpatients, and undiagnosed adults. Zauszniewski et al. indicated that depressed inpatients had the more negative thoughts about themselves, their world and their future measured by the Cognitive Triad Inventory (CTI) than the other groups.

Giles and Shaw (1987) conducted a study to investigate the negative cognitive triad in female depressed inpatients, non-depressed psychiatric inpatients and normal medical inpatients. Each subject was randomly assigned to one of two task conditions: the Card Sorting task, for assessing nonsocial task, and the Mean-Ends Problem, for assessing social problem solving. Researchers hypothesized that depressed women, on both tasks, were expected to estimate lower likelihood of success (negative view of self), lower achievement than others attempting the task (negative view of the world) and lower likelihood of future

success (negative view of the future), as compared to non-depressed controls. Results indicated that the three components of the triad significantly differentiated depressed from non-depressed psychiatric and normal medical subjects. Giles and Shaw concluded that depressed women estimated less likelihood of achieving a given goal, set lower goals for themselves and anticipated lower likelihood of future success.

In sum, the mediating role of the negative cognitive triad was partially supported. Some studies confirmed that the negative cognitive triad had an association with depression and significantly differentiated depressed patients from non-depressed patients (Giles et al., 1987; Martin, 2002; Zauszniewski et al., 1999). A study by Joiner et al. (1999) indicated that the cognitive triad mediated the relationship between the interaction of stress with dysfunctional attitudes and depressive symptoms, but another study by Hankin (2001) reported a discrepant finding. Thus, the mediating role of the cognitive triad requires further investigation.

Most importantly, the conceptual distinctiveness of the cognitive triad is unclear. As mentioned earlier, the three-factor structure of the CTI was not supported (Anderson et al., 1995; Mcintosh et al., 2000). In addition, there has been no study to examine the factorial validity of the CCL. Therefore, the research findings about the cognitive triad derived from the data of the CCL and the CTI are questionable. Further research on investigating the mediating role of the cognitive triad is needed to first clarify the constructs of the cognitive triad.

(iii)   Studies about hopelessness

One component in the cognitive triad that has generated a lot of research is negative view about the future (i.e., hopelessness). It has been found that hopelessness plays a role as a mediator in the relationship between the interaction of dysfunctional attitudes with negative life events and depression. In a study of 136

high school students, Abela et al. (2002) indicated that the relationship between dysfunctional attitudes × negative admissions outcome interaction and increases in depressed mood was mediated by a negative view of the future, but not mediated by a negative view of the self.

Some studies reported that dysfunctional attitudes, by themselves, may cause hopelessness. In a study of 19 patients with major depressive disorder, Keller and Haase (1984) reported that dysfunctional attitudes were significantly related to hopelessness and hopelessness was causally dependent on dysfunctional attitudes. In another study of 138 outpatients with major depression, Cannon et al. (1999) revealed that dysfunctional cognitions offered non-redundant prediction of hopelessness scores.

With respect to suicidal behaviours, a lot of studies have reported that hopelessness has stronger association with suicidal behaviours than depression in clinical inpatients and outpatients. For example, in an early cross-sectional study of 68 suicide attempters admitted to a general hospital, Minkoff, Bergman, Beck, and Newman (1973) revealed that hopelessness was a common source of variance in the association between depression and suicidal intent.

In another cross-sectional study of 384 patients with suicide attempts, Beck, Kovacs and Weissman (1975) reported that among suicide attempters, hopelessness was more closely related to suicidal intent than was depression. In their study, the relation of hopelessness to the levels of depression and suicidal intent was explored both psychometrically and clinically. A clinician completed the Suicidal Intent Scale (SIS), the Beck Depression Inventory (BDI) and the Hopelessness Scale (HS) on the basic of interview with the suicide attempters admitted to two large metropolitan hospitals. The results support hopelessness as the key variable linking depression to suicidal behaviours. Hopelessness accounted for 96% of the association between

depression and suicidal intent. Beck et al. concluded that the result confirmed the previous finding by Minkoff et al. (1973). Hopelessness is a stronger indication of suicidal intent than depression itself.

In a later study, Beck, Steer, Beck, and Newman (1993) examined the relationships between depression, hopelessness and suicidal ideation. 1306 patients with at least one DSM-III-R mood disorder and 488 patients without any mood disorders completed the BDI, the HS, and the Scale for Suicide Ideation (SSI). Results indicated that suicidal ideation was positively associated with being diagnosed with a mood disorder, increasing severity of self-reported depression, and increasing levels of hopelessness. In addition, hopelessness was 1.3 times more important than depression for accounting for suicidal ideation.

In a 10-year prospective study of 207 patients hospitalized for suicidal ideation, Beck, Steer, Kovacs and Garrison (1985) indicated that hopelessness was a better predictor of eventual suicide than depression itself. In their study, subjects were observed during a follow-up period of 5 to 10 years after discharge. 14 of the original sample eventually completed suicide. Of all the data collected at the time of hospitalization, only the HS and the pessimism item of the BDI predicted the eventual suicides.

Similar results have also been found when predicting eventual suicide in an outpatient population. In a prospective study of 1958 psychiatric outpatients, Beck, Brown, Berchick, Stewart and Steer (1990) indicated that hopelessness, as measured by the HS, was significantly related to eventual suicide. A scale cutoff score of 9 or above identified 16 (94.2%) of the 17 patients who eventually committed suicide. Beck et al. concluded that the present result replicated the results of previous studies with hospitalized patients.

Besides Beck and his colleagues, other researchers have supported hopelessness as a stronger indicator of suicidal behaviours than depression itself. For example, in a comparative study of 50 hospitalized patients on suicide precautions and 50 nonsuicidal hospitalized controls, Schotte and Clum (1987) indicated that the suicidal precautions group and the nonsuicidal control group showed no difference in the level of depression. However, suicidal subjects reported a significantly greater level of hopelessness for the preceding year than did the nonsuicidal controls.

Wetzel, Margulies, Davis and Karam (1980) investigated the relationships between hopelessness, depression and suicide intent. 73 inpatients completed the SSI, the HS and the MMPI Depression Scale. Results indicated that suicide intent was more highly correlated with hopelessness than with depression. When the effect of hopelessness was removed statistically, there was no relationship between depression and suicide intent.

A study by Wetzel and Reich (1989) attempted to evaluate Beck's theory of the cognitive triad. The authors examined correlations between the negative view of the future assessed by hopelessness and suicide intent. In the study, 60 inpatients were rated daily by senior psychiatric residents. Results indicated that hopelessness contributed independently to suicide intent. The authors suggested that hopelessness was important in the development of suicide intent.

However, contrary to these findings, two studies revealed that depression was a better predictor of suicidal ideation than hopelessness. Rudd (1990) used 737 university students to test an integrative model of suicidal ideation, which showed the relationships between depression, hopelessness and suicidal ideation. All of them completed the Center for Epidemiologic Studies Depression Scale, the HS and Rudd's Suicidal ideation Scale. Results showed that depression was more strongly related to suicidal ideation than hopelessness.

In another study of 50 inpatients with mixed psychiatric disorders and 25 outpatients with affective disorders, Ranieri et al. (1987) found that depression was more strongly associated with suicide ideation than was hopelessness. Ranieri et al. suggested that hopelessness should not be automatically assumed to be the best predictor of suicidal risk in all clinical populations.

In sum, earlier studies showed that hopelessness mediated the relationship between the interaction of dysfunctional attitudes with negative life events and depressed mood (Abela et al., 2002). The result suggests that hopelessness may play a similar mediating role as the cognitive triad in the development of depression. Future research on investigating the relative contribution of hopelessness and the cognitive triad to depression may be of interest.

In addition, two earlier studies reported that hopelessness was a consequence of dysfunctional attitudes (Keller et al., 1984; Cannon et al., 1999). These findings fill the gap about the relationship between dysfunctional attitudes and hopelessness which is ignored in Beck's theory.

Moreover, research findings about the relationships between hopelessness, depression and suicidal behaviours are mixed. Many studies reported that hopelessness was a better predictor of suicidal behaviours than depression (Beck, Kovacs et al., 1975; Beck, Steer et al., 1985; Minkoff et al., 1973; Wetzel et al., 1980). However, two studies reported that depression was more strongly associated with suicidal behaviours than depression (Ranieri et al., 1987; Rudd, 1990). Therefore, precise relationships between depression, hopelessness and suicidal behaviours should be further studied.

(7)   Summary of Beck's Cognitive Diathesis-stress Theory

The essential elements in Beck's cognitive model are depressogenic schemas, cognitive distortions and the negative cognitive triad. Beck has hypothesized that

critical events are activators of the depressogenic schemas, which are a hypothetical construct to explain the persistence of the cognitive distortions and the cognitive triad (Beck, 1967; 1979; Bebbington, 1985; Weissman & Beck, 1978), which are the sufficient causes of depressive symptoms and suicidal behaviours.

As a diathesis-stress theory, Beck stresses the moderating effect of dysfunctional attitudes and the mediating effect of the negative cognitive triad on the development and maintenance of psychopathology. However, earlier research on testing the interaction of dysfunctional attitudes with negative life events has generated inconsistent findings. In addition, empirical validation of the mediating role of the cognitive triad is mixed. Furthermore, the concept of the three-factor structure of Beck's cognitive triad is unclear. It has been suggested that the three components of the triad may be non-existent (Anderson et al., 1995; Giles et al., 1987; Haaga et al., 1991; Mcintosh et al., 2000). As a result of these existing problems, Beck's theory is needed to advance research.

In spite of the controversies on Beck's theory, it was still adopted by many researchers in different forms to explain depression and suicide. This is because Beck's theory is suitable for research in itself. Beck's theory has influenced later researchers' interpretation of depression and suicidality, and from Beck's theory many other cognitive diathesis-stress theories related to depression and suicidality are derived. Based on the reasons given above, Beck's theory will be employed in the present thesis as a fundamental framework in exploring the suicide attempts of depressive patients in Taiwan.

2.4.3 Abramson's Cognitive Diathesis-Stress Theory

More recently, another diathesis-stress theory of suicidality that has drawn a lot of attention is the hopelessness theory of suicidality (Abramson et al., 2000). The theory is revised from the hopelessness theory of depression (Abramson, Metalsky,

& Alloy, 1989), which is derived from the reformulated theory of helplessness and depression (Abramson, Seligman, & Teasdale, 1978). It is beyond the present scope to review the literature on this topic in great detail; however, a brief overview is presented here to demonstrate the recent development of diathesis-stress theory in the research of suicidality.

(1) The Hopelessness Theory of Suicidality

According to Abramson et al. (2000), the most important components in the hopelessness theory of suicidality are negative cognitive style, event-specific interferences and hopelessness. Negative cognitive style is treated as individuals' cognitive vulnerability, which is generated from individuals' negative early experiences. Negative cognitive style provides the maintenance of the event-specific interferences. There are three different inferential styles: causal attributions, inferred consequences and inferred characteristics about the self. When confronted with negative life events, individuals with cognitive vulnerability may attribute negative event to stable, global causes, view these events as very important, infer that negative events will lead to other negative consequences, and infer that the occurrence of negative events means they are flawed. Individuals who make these negative inferences are likely to develop hopelessness, which, in turn, leads to hopelessness depression and suicidality. More specifically, Abramson et al. (1989) have postulated that hopelessness depression is a theoretical subtype of depression that overlaps considerably with DSM-IV major depression.

According to Baron et al.'s (1986) concepts, inferential style can be understood as a moderator, which interacts with negative life events to generate hopelessness. In addition, hopelessness plays a mediating role in the relationship between the interaction of negative life events with inferential styles and hopelessness depression as well as suicidality. There has been empirical support for

the moderating and mediating roles of Abramson's hopelessness theory of suicidality. For example, in a prospective study of 514 undergraduates, Cornette (2002) indicated that the each of the cognitive style × negative life event interactions predicted change in suicidal ideation, and hopelessness partially mediated the effect of these interactions on change in suicidal ideation.

(2)   Comparison to Beck's Cognitive Theory

The theoretical framework of Abramson et al.'s (2000) hopelessness theory is similar to that of Beck's cognitive theory. Both Abramson's theory and Beck's theory contain moderators (i.e., inferential styles and dysfunctional attitudes) and mediators (i.e., hopelessness and the negative cognitive triad), which are hypothesized to contribute to the development of depression as well as suicidal behaviours.

There has been limited research into comparing the two theories. In a factor analytic study with 673 undergraduates, Joiner and Rudd (1996) indicated that Abramson's attributional styles and Beck's dysfunctional attitudes were moderately correlated but loaded meaningfully on separate factors. In another study of 521 outpatients seeking treatment for depression or anxiety, Spangler and Burns (1999) found that attributional styles and dysfunctional attitudes comprised correlated but distinct factors. However, the attributional styles factor was not correlated with depression when controlling for its correlation with dysfunctional attitudes. In contrast, the dysfunctional attitudes factor was strongly correlated with depression when controlling for attributional styles. In an earlier study, Robins and Block (1989) evaluated the predictive power of Beck's (1967) model and Abramson et al.'s (1978) reformulated helplessness model on students' depressive symptoms and found that Beck's model was able to account for 32% of population variance in depressive symptoms, and Abramson et al.'s model accounted for 19%.

These studies exploring the degree of overlap in Abramson's and Beck's theories revealed that the measures of moderators in each theory are correlated but distinct. In addition, dysfunctional attitudes were more highly correlated with depression than were inferential styles. When the effect of dysfunctional attitudes was removed statistically, there was no relationship between inferential styles and depression. Moreover, Beck's (1967) cognitive model can explain more variance of depressive symptoms than the original model of Abramson et al. (1978). Based on the research above, it can be concluded that Beck's cognitive theory performs better than Abramson's theory in the prediction of psychopathology. These research results show the importance of Beck's theory strongly. Therefore, it is understandable why it is adopted by many researchers in their investigations of suicide. In view of this, it will also be adopted in the present thesis as a fundamental framework in the investigation of suicide attempts of depressive patients in Taiwan.

2.4.4 Summary of the Diathesis-stress Theory

The diathesis-stress theory emphasizes the reciprocity of individual's vulnerabilities and circumstances to account for the development and maintenance of psychopathology. It provides a sound foundation to explain why some people in environmental stress develop psychopathology when others do not. This model solves previous problems resulting from interpreting psychopathology via the environmental model or the individual differences model along.

The diathesis-stress perspective has encouraged research into the roles of individual's vulnerabilities in the development of psychopathology. Two famous diathesis-stress models of suicidality, Beck's (1967) cognitive model and Abramson et al.' (2000) hopelessness model of suicidality, have proposed a number of cognitive vulnerabilities, including dysfunctional attitudes, the negative cognitive triad, inferential styles and hopelessness. Research findings about the roles of these

factors are mixed and thus they require further investigation. In the present study, Beck's cognitive vulnerability factors are the focal concern.

In the following section, the literature related to life events and their role in the development of psychopathology will be reviewed. In addition, social support, demographic factors and compliance with medications may play causal roles in the development of suicidality. The literature related to these factors will also be reviewed.

2.5 Review of the Literature: Factors Implicated by Previous Research in the Aetiology of Suicidality

There have been many studies on the correlation between life events and suicidality. These studies were not conducted within theoretical models, particularly from the diathesis-stress model. The findings of these studies will be discussed in this section. In addition, some factors seem to increase an individual's ability to adjust the environment more than others and thereby lower the possibility of his/her committing suicide. Among them, social support is the most considered factor; therefore, it will be discussed in this section. Demographic factors are also pointed out to affect life pressure or suicide. Among them, sex and age, which are the most considered by previous researchers, will be discussed in this section. Psychiatric medications also affect suicide directly or indirectly; thus the influence of the compliance with medication on suicide will also be discussed in this section. It is to be noted that, besides the aforementioned factors, many other factors may affect suicidal behaviours. However, due to the limitation of this research, to discuss all possible factors is beyond the scope of the present thesis.

2.5.1 Life Events

There have been numerous studies into the relationship between life events and suicidal behaviours. These studies were not conducted within theoretical models.

Some were retrospective comparisons of the life events experienced by suicidal subjects and those experienced by controls. Most of the studies found that suicidal attempters experienced significantly more negative life events in the months or years prior to their suicide attempts compared with non-attempter controls (Cochrane & Robertson, 1975; O'Brien & Farmer, 1980; Paykel, 1974; Schotte & Clum, 1982; Schotte & Clum, 1987; Vanna et al., 1999). Others used multiple regression or path analyses to examine the cross-sectional or prospective associations of negative life events with suicidal behaviours. Results from these studies indicated that negative life events predicted suicidal ideation and suicide attempts not only by themselves directly but also by the mediating effect of increases in cognitive vulnerabilities (Cheng & Chan, 2007; Clum, Luscomb, & Patsiokas, 1991; Dieserud et al., 2001; Rudd, 1990).

Life events are directly related to suicide, but the correlation is also influenced by cognitive vulnerabilities. There are several possible forms of this influence process. One of them is the diathesis-stress model previously discussed in Section 2.4. The model in statistical viewpoints hypothesizes that life events interact with cognitive vulnerabilities to affect psychopathology. Another influence process is that life events, as main effect, affect cognitive vulnerabilities, which in turn, as main effect, influence psychopathology. Please refer to the studies by Cheng et al. (2007), Dieserud et al. (2001) and Rudd (1990) mentioned in the previous paragraph for examples of this model. In this model, there is no life events × cognitive vulnerabilities interaction. This model implies that there is no such influence of latent schema on psychopathology. Similar idea has been suggested by Kwon and Oei (1994). In their linear mediational model, they hypothesized that negative life events directly cause dysfunctional attitudes, which in turn, by themselves, increase the frequency of negative autonomic thoughts, which in turn lead to psychopathology. Though it has been pointed out by empirical studies that the linear

mediational model is less parsimonious than the diathesis-stress model (Oei & Kwon, 2007), the linear mediational model is still used as a comparison with other models by researchers when investigating the aetiology of depression (Oei, Hibberd, & O'Brien, 2005). In this respect, this model is viewed as very valuable in accounting for psychopathology. Thus, the model will be discussed in the present thesis as a comparison with Beck's diathesis-stress model.

The cause-effect sequence of life events and psychopathology is still under debate. In a large twin study ($N = 2164$), Kendler and Karkowski-Shuman (1997) reported that depression led to negative life events. This suggests the possibility of a feedback relationship between negative life events and psychopathology; that is, negative life events cause psychopathology that causes further negative life events. Suitable statistical technique for examining such a complex feedback relationship is not yet available. Therefore, this model will not be discussed in the present thesis.

The correlation between life events and psychopathology will be affected by the content of life event scale. Several researchers have argued that negative life events may have a more detrimental effect on psychopathology than positive life events (Brugha, Bebbington, Tennant, & Hurry, 1985; Chiriboga, 1977; Paykel, 1994; Paykel & Hollyman, 1984; Paykel, Myers et al., 1969; Paykel, 1974; Sarason, Johnson, & Siegel, 1978). Therefore, when investigating the life events of a suicide patient, it is best that the scale used includes negative life events so that the statistical correlation between life events and suicidal behaviours will be increased.

2.5.2 Social Support

That social support plays an important role in health maintenance and disease aetiology has aroused the interest of many researchers (Cohen & Wills, 1985; Sarason & Sarason, 1985). Many empirical studies indicated that those with mental or material support from friends, spouses and family members are healthier than

those without (Leavy, 1983; Mitchell, Billings, & Moos, 1982). In a study of 269 MDD patients, Sokero et al. (2003) indicated that poor perceived social support was a significant independent risk factor of suicidal ideation. In addition, social support has been found to ameliorate the detrimental effect of stress on depression (Klocek, Oliver, & Ross, 1997; Monroe, Bromet, Connell, & Steiner, 1986) and suicidality (Cheng et al., 2007; Rudd, 1990).

Though many studies have indicated that social support and health outcomes are correlated, such a correlation is formed via two different processes. One model hypothesizes that only when an individual is under pressure will social support be correlated with the individual's health outcomes. This model is termed the *buffering* model because it hypothesizes that social support buffers individuals from stress related diseases (Cohen & Wills, 1985). In the viewpoint of statistics, social support interacts with stressful events to affect individuals' health outcomes. The other model hypothesizes that, whether the individual is under pressure or not, social support has a beneficial effect. Such a model is termed the *main-effect* model. The proof of this hypothesis comes from the statistical findings that social support has a main effect on health outcomes without stress $\times$ social support interaction (Cohen & Wills, 1985).

Previous studies showed both models have their supporters. Those studies supporting the *buffering* model are Klocek, Oliver and Ross (1997) and Monroe, Bromet, Connell and Steiner (1986). Those supporting the *main-effect* model are Cheng et al. (2007) and Rudd (1990). However, in the present thesis, the *main-effect* model will be used as a basis to discuss the influence of social support on suicide attempts.

2.5.3 Demographic Characteristics

Although demographic variables make poorer predictors for psychopathology than do more specific risk factors, it has been noted that "a common, or nonspecific, variable can still play a causal role in the etiology of a

disorder if such a variable is one of several interacting causal factors in the disorder" (Garber & Hollen, 1991; as cited in Clark, 2004, p. 85). Therefore, researchers should not exclude demographic variables simply because they are common factors for psychopathology. A number of studies have suggested that gender and age influence suicidal behaviours not only by themselves directly but also through the mediation of sociological and cognitive factors. The relationships between gender, age, and suicidal behaviours are discussed below.

(1)   Gender, Age and Suicidal Behaviours

The epidemiological data of suicide show a strong gender factor, whereby males complete suicide more often than females (Blair-West, Cantor, Mellsop and Eyeson-Annan, 1999; Canetto & Sakinofsky, 1998; Garrison, 2004; Schmidtke et al., 1999; Möller, 2003), and a strong age effect, elderly people having a higher suicide rate than young people (Möller, 2003). However, there is a reverse relationship between the same psychosocial variables and suicide attempts; that is, women engage more frequently in suicidal thinking and more suicide attempts than men (Bernal et al., 2006; Chiou, 2006; Canetto & Sakinofsky, 1998; DeMan, 1998; Möller, 2003), and younger people have a higher risk for suicide attempts than older people (Möller, 2003).

These findings, however, were not always observed. Some studies revealed that gender and age had no significant association with suicidality. For example, in a study of 50 inpatients with mixed psychiatric disorders and 25 outpatients with affective disorders, Ranieri et al. (1987) indicated that gender and age were not significantly related to the score of the Scale for Suicidal Ideation (SSI) in either sample of patients. In a study of 908 psychiatric outpatients, Beck, Steer, and Brown (1993) indicated that gender and age were not significantly related to the scores of the SSI and past suicide attempts.

Some studies indicated that gender and age affected suicidality through the mediation of other variables. In a recent study of 1083 high school students in Hong Kong, Cheng and Chan (2007) indicated that, gender and age exerted an influence on suicidality via the mediating effects of depression and substance use. In a study of 737 university students, Rudd (1990) reported that gender affected suicide ideation by the mediating effects of depression and social support.

(2)   Gender, Age and Social Support

Most of the earlier studies examining gender differences in social support show that females report higher levels of global social support than males. In a study of 199 female and 69 male undergraduates, Barnett and Gotlib (1990) indicated that, compared with females, males reported significantly less social support. In another study of 6943 students (Grades 5 to 12), Schraedley, Botlib and Hayward (1999) indicated that, compared to boys, girls reported higher levels of social support. In a recent study of 1057 opposite-sex twin pairs, Kendler, Myers and Prescott (2005) reported that women reported higher levels of global social support than their twin brothers.

In addition, some studies have reported that there are gender differences in the relationship between social support and depressive symptoms. Kendler et al. (2005) reported that global social support predicted risk for subsequent episodes of major depression in women, while in men the association was modest and nonsignificant. Schraedley et al. (1999) found that social support had a greater impact on depressive symptoms for girls than boys.

In addition, several studies have found evidence of gender differences in the sources of social support. In a study of 737 university students, Rudd (1990) revealed that male students described themselves as receiving less support from their friendship networks than females. However, the perceived social support from

family for the two groups was similar. In a later study of 2105 high school students (Grades 7 to 11) in Hong Kong, Cheng and Chan (2004) revealed that girls reported more friends but less family support than boys. Cheng et al. provided some possible explanations for the finding. Teenaged girls were more likely to disclose to friends than boys were, and teenaged girls had more frustration than boys in their relationship with parents due to the need for autonomy from parents.

In comparison with Gender, findings about the relationship between age and social support are limited. In a study of 113 psychiatric patients, Hughes, DeMallie and Blazer (1993) reported that older patients were significantly lower in impaired subjective social support than younger patients. In addition, it was found that the impaired subjective support was a predictor of depressive symptoms for the younger patients but not for the older patients. Hughes et al. concluded that age influenced the association of social support with subsequent depression. In another study of 2105 high school students in Hong Kong, Cheng et al. (2004) indicated that older adolescents perceived less family support than younger ones. Cheng et al. provided some possible explanations for the finding. Older adolescents had a need for autonomy from parents and had increased conflicts with their parents.

However, the significant relationship between age and social support is not always observed. In a study of 737 university students, Rudd (1990) reported that age did not correlate with social support from friends and family.

(3) Gender, Age and Life Events

Findings of studies on gender differences in life events are not definitive. Some studies indicated that females reported more negative life events and perceived stressfulness than males. However, other studies indicated that there were no differences in life events.

In an early study of 172 college students, Sowa and Lustman (1984) reported that man reported experiencing more stressful life changes. However, women rated the impact of stressors more severely. In another study with samples of junior high ($N = 93$), senior high ($N = 140$) and college students ($N = 145$), Wanger and Compas (1990) reported that females in all the three samples reported more overall negative life events than did males. Females in the junior and senior high samples reported more negative interpersonal stresses than did males.

Contrary to previous findings, Kohn et al. (2001) reported that gender was not related to increased prevalence of negative life events in their study of 115 depressed patients. In a study of 204 patients with depressive disorders, Perris (1984) reported that there were no differences in the occurrence, or appraisal of life events between male and female patients. In addition, in a study of 109 women and 56 men, Wilhelm and Parker (1993) reported that no difference was seen between genders in experience or perceived impact of life events.

In addition, findings about the relationship between age and life events are inconsistent. Kohn et al. (2001) reported that younger MDD patients reported more negative life events than older patients. Perris (1984) reported that the older patients experienced significantly fewer life events prior to the onset of depression than the younger patients. However, in an early study of 185 subjects obtained from a combined sample of graduate students, supervisors and managers in the United States, Kipper and Furcon (1980) indicated that there were no relationship between age and the scores of the Social Readjustment Rating Scale.

In sum, there are debates about the relationships between gender, age and suicidality. Findings about the relationship between age and social support are inconsistent. In addition, conclusions about the relationship between gender, age and life events have not been reached. Therefore, the present study will examine the

causal roles of gender and age in the aetiology of suicide attempts in Taiwanese MDD patients and university students.

2.5.4 Compliance with Medications

Compliance with medications should be taken into account in suicide research because psychiatric medications have been indicated to influence the occurrence of depression and suicidality. Earlier studies have reported that psychotropic medications can ameliorate and prevent depression (Beck, Rush, et al., 1979) suicidal ideation (Teicher, Glod, & Cole, 1993), suicide attempts and eventual suicide (Isacsson, 2000; Möller, 2003). Tanney (1992) has noted that the relationship of suicide outcome to the predictor variable of mental disorders can be weakened by effective treatment. Demyttenaere et al. (2001) indicated that compliance with antidepressants could prevent relapse of depression.

A recent study by Demyttenaere et al. (2004) explored the predictors of compliance with medications in a sample of depressed patients using the Antidepressant Compliance Questionnaire (ACQ). Results indicated that the most cited reasons that influence patients' compliance with medications were social support and the perceived effect of antidepressants, for example: 'My doctor has explained depression sufficient to me', 'Your body can become addicted to antidepressants', 'My emotional problems are solved by the antidepressants' and 'My parent agrees that antidepressants are a suitable treatment for my condition'. The authors concluded that lack of good associations with doctors and families as well as having bad perspective on antidepressant treatment can decrease depressed patients' compliance with medications.

In sum, earlier studies have indicated that the effect of medications can influence depression and suicidality. Because all depressed patients in the present research are receiving psychotropic medications at the time of testing, it is necessary

to take into account the compliance with medications in this research. In addition, social support has been reported to influence compliance with medications. Thus, in this research, it is hypothesized that perceived social support increases patients' compliance with medications, which in turn ameliorate depression, and thus suicide attempts.

2.6 Summary of the Literature Review

Suicide is an abnormal behaviour commonly happening in different races. Presently, proof has indicated that suicide is more serious in depressed patients than in common people. There have been many theories proposed to account for suicidal behaviours. Among them, diathesis-stress theory is the most famous one. Diathesis-stress theory is a broad term used to include many related theories and models. One of the diathesis-stress theories that has generated many empirical studies is Beck's cognitive diathesis-stress theory. However, empirical validation of Beck's theory has been mixed. Findings about the moderating and mediating components in the relationship between negative life events and suicidality are inconsistent. The constructs of the negative cognitive triad are questionable. Thus, Beck's cognitive diathesis-stress theory is needed to advance examination.

Although the diathesis-stress model was popularly to be used to account for suicidal behaviours, many earlier studies on the aetiology of suicidal behaviours were not conducted under any theoretical models. These studies indicated that the influence of life events on suicidal behaviours may be another process; that is, life events, as main effect, affect cognitive vulnerabilities, which in turn, as main effect, influence suicidality. The process implies that there is no latent schema to affect psychopathology. Kwon et al. (1994) also proposed the same concept in his linear mediational model; therefore, the mediational model will also be discussed in the

present thesis as a comparison with Beck's diathesis-stress model. In addition, many common factors have been reported to be directly or indirectly related to suicidal behaviours. These factors include gender, age, social support and compliance with medication. However, their influences on suicidal behaviours are still under debate, and thus need further investigation.

2.7 Integrated Models of Suicidal Attempts

Suicide is a behavioural outcome of complicated causes. The outcome may be affected by many variables and may be reached through different paths. The present research attempts to develop an integrated model that best provides an adequate explanation for the aetiological processes of suicide attempts in depressed patients in Taiwan. In order to obtain a best integrated model, this research hypothesizes a series of competing models.

First, based on Beck's cognitive diathesis-stress theory and earlier findings described in the literature review of this research, a theoretical framework of interactional models of suicide attempts is proposed in this research, as depicted in Figure 2.4. The predictor variables of suicide attempts in the framework include sex, age, negative life events, social support, compliance with medications, dysfunctional attitudes, hopelessness, the negative cognitive triad, depression and suicidal ideation. In particular, dysfunctional attitudes play a role as a moderator; hopelessness and the cognitive triad play roles as mediator in the framework.
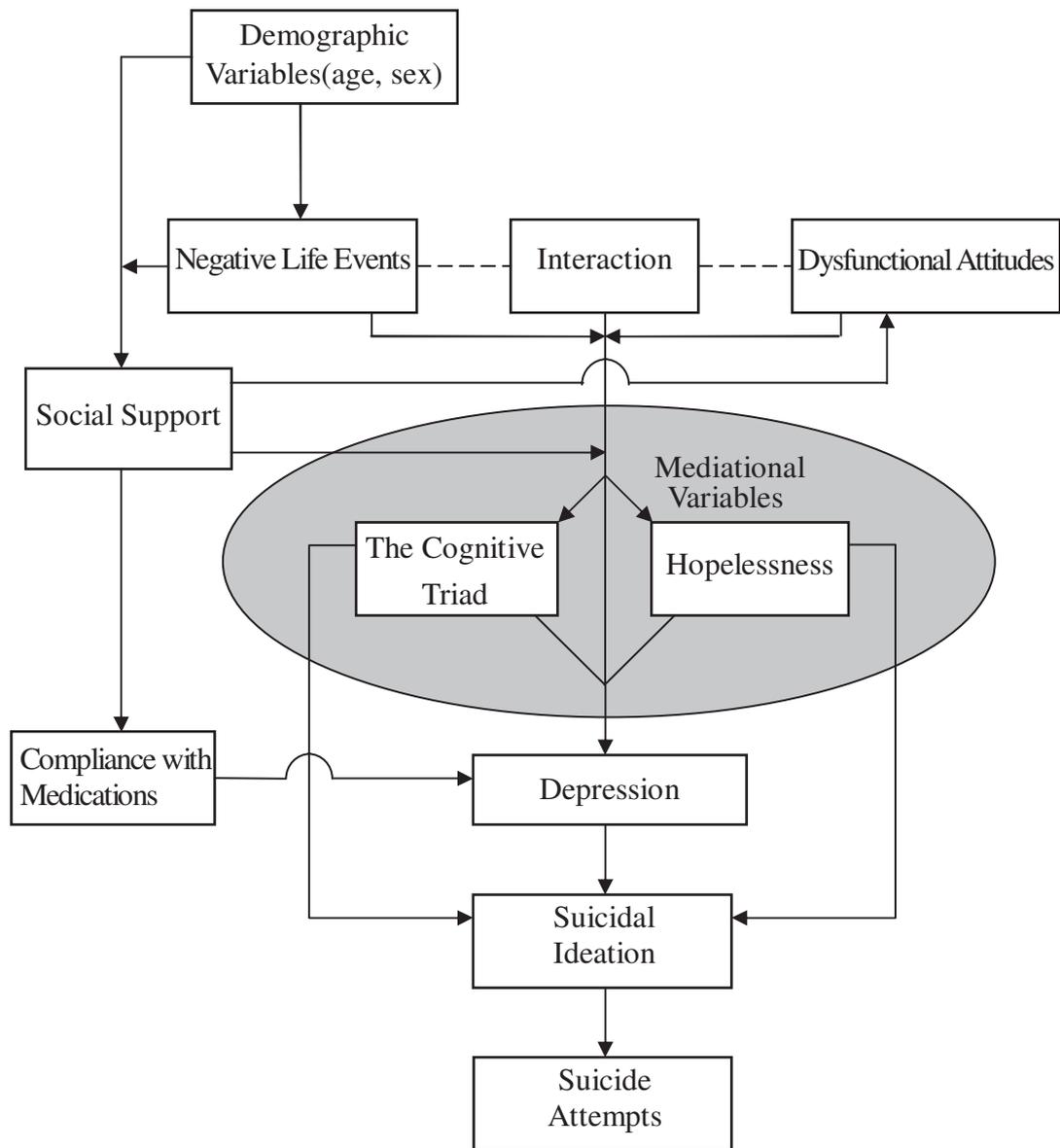
Figure 2.4. Theoretical framework of the interactional model of suicide attempts.

Note. Solid lines represent causal paths hypothesized by the present model. Dashed lines show that interaction term is correlated with, but cannot be caused by, their constituent variables.

Because the negative cognitive triad and hopelessness are highly correlated with each other, in order to avoid multicollinearity, these two variables have to be discussed separately. Therefore, based on the theoretical framework of Figure 2.4, two interactional models are hypothesized here. The diagram of each integrated interactional model and its proposed aetiological processes of suicide attempts can be seen in Figure 2.5. The first model, the interactional model A (IM-A), postulates that negative life events interact with dysfunctional attitudes to affect the cognitive triad, which in turn affect the development of depression, which in turn influence suicidal ideation, which finally leads to suicide attempts. In addition, negative life events $\times$ dysfunctional attitudes interaction affects depression. On the other hand, social support mediates the impact of negative life events on dysfunctional attitudes, the triad and depression. Social support also increases patients' compliance with medications, which in turn prevents the development of depression. Age and gender are also reflected in the model. They exert direct influence on negative life events and social support. Moreover, the model includes the possibility that both negative life events and dysfunctional attitudes have direct influences on the triad and depression, and the triad exerts direct influences on suicidal ideation. The second model, the interactional model B (IM-B), has the same assumptions of the IM-A. However, hopelessness replaces the triad to be the mediator.

(1) Interactional model A (IM-A)
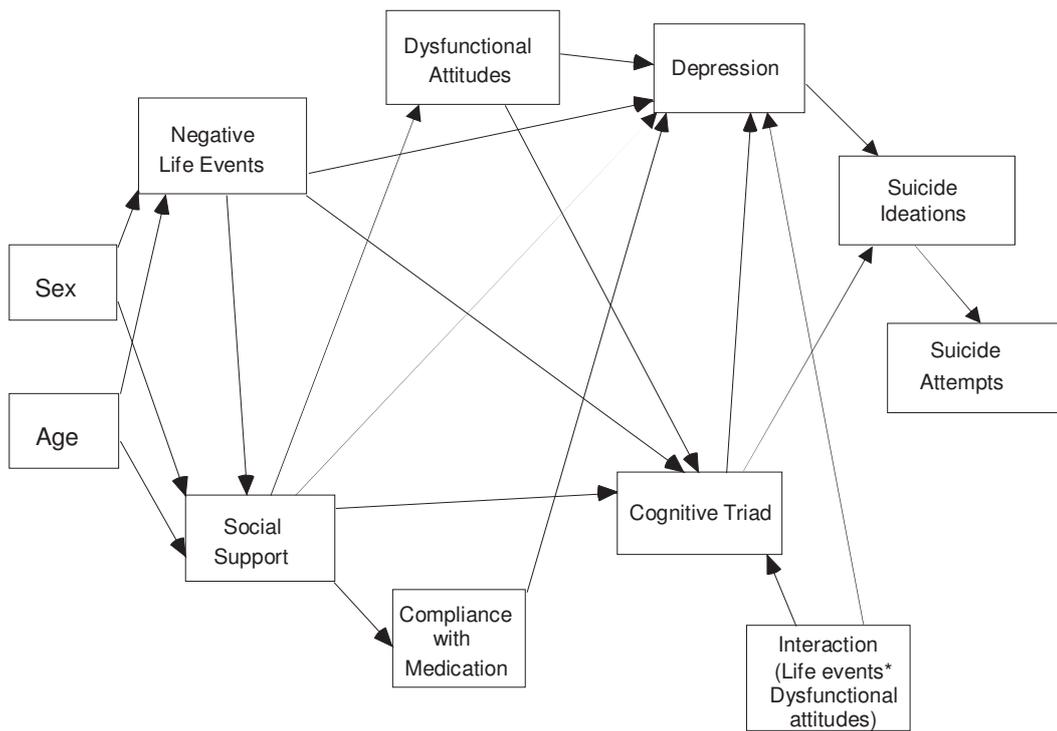
(2) Interactional model B (IM-B)
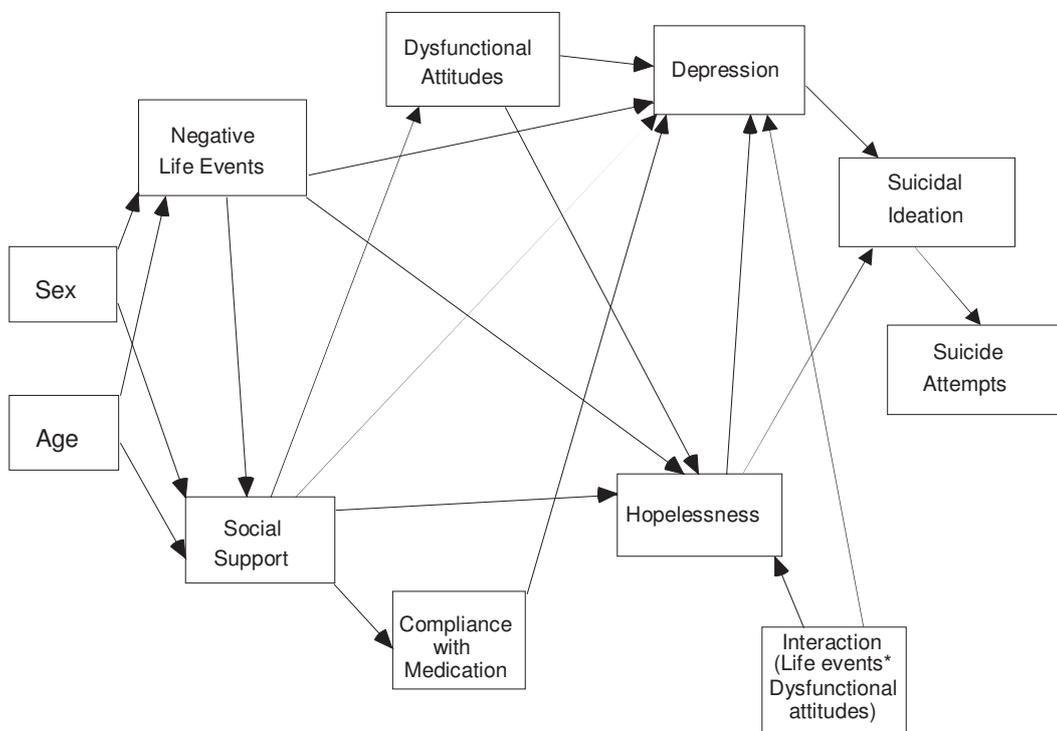
Figure 2.5. Integrated models of suicide attempts: (1) the interactional model A and (2) the interactional model B.

Second, based on Kwon et al.'s (1994) linear mediational model and earlier findings described in the literature review, another theoretical framework of mediational models is hypothesized in this research, as depicted in Figure 2.6. In the framework, dysfunctional attitudes, the triad and hopelessness play focal roles as mediators. As with the framework of the interactional models, the negative cognitive triad and hopelessness are highly correlated; therefore, the two variables have to be discussed separately to avoid multicollinearity. Based on the theoretical framework of Figure 2.6, two mediational models are hypothesized here. The diagram of each mediational model and its proposed aetiological processes of suicide attempts are shown in Figure 2.7. The two mediational models will be compared to the two interactional models of suicide attempts.

The first model, the mediational model A (MM-A), hypothesizes that negative life events influence dysfunctional attitudes to increase the frequency of the negative cognitive triad, which then leads to the development of depression, which in turn precipitate suicidal ideation, which finally result in suicide attempts. On the other hand, social support mediates the impact of negative life events on dysfunctional attitudes, the cognitive triad and depression. Social support also increases patients' compliance of medications, which in turn prevents the development of depression. Gender and age influence negative life events and social support. Moreover, the model includes the possibility that both negative life events and dysfunctional attitudes have direct influences on the triad and depression, and the triad has direct influences on suicidal ideation. The second model, the mediational model (MM-B), has the same assumptions of the MM-A. However, hopelessness replaces the triad to be the mediator in the MM-B.
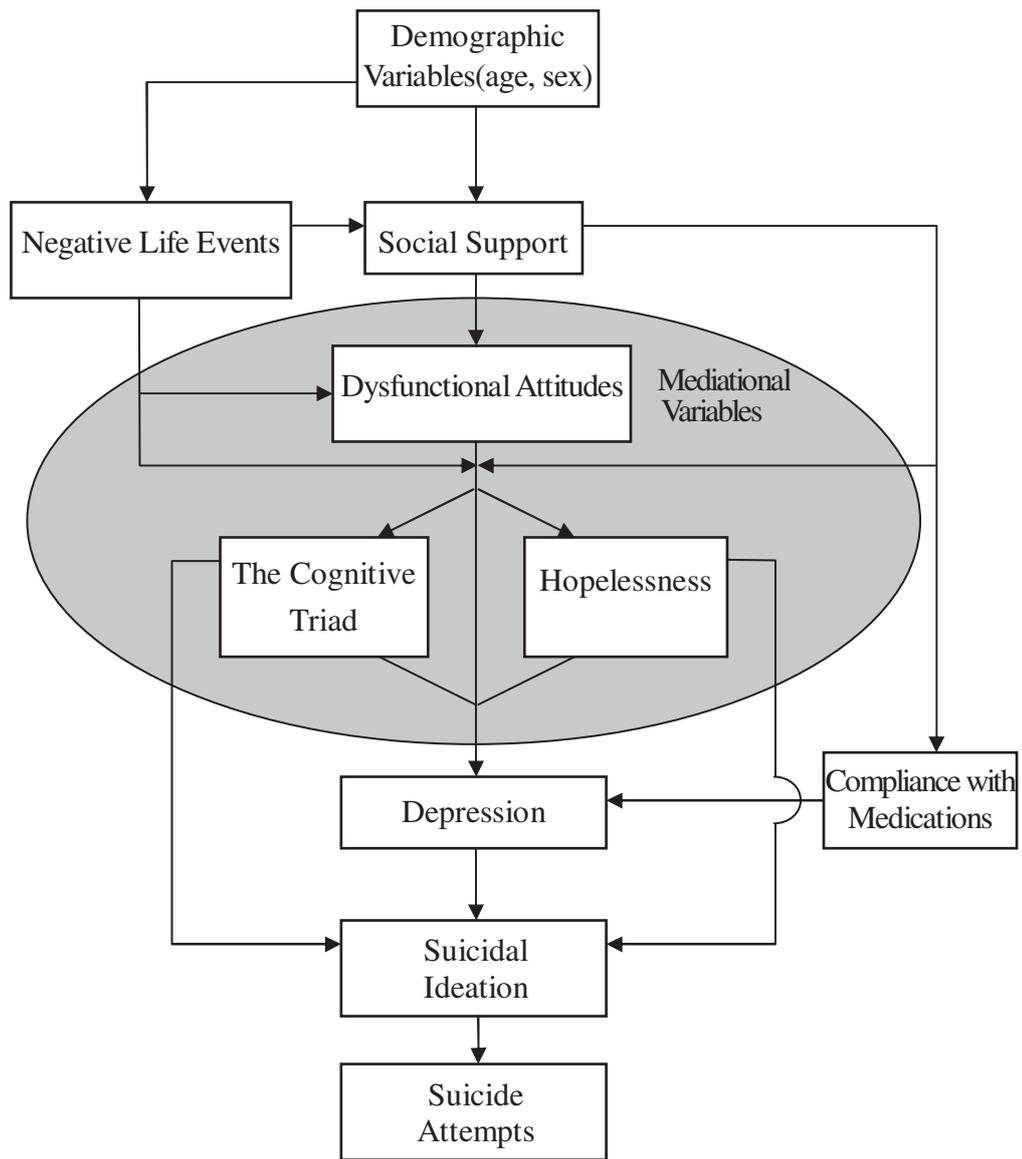
Figure 2.6. Theoretical framework of the mediational model of suicidal attempts.

(1) Mediational model A (MM-A)
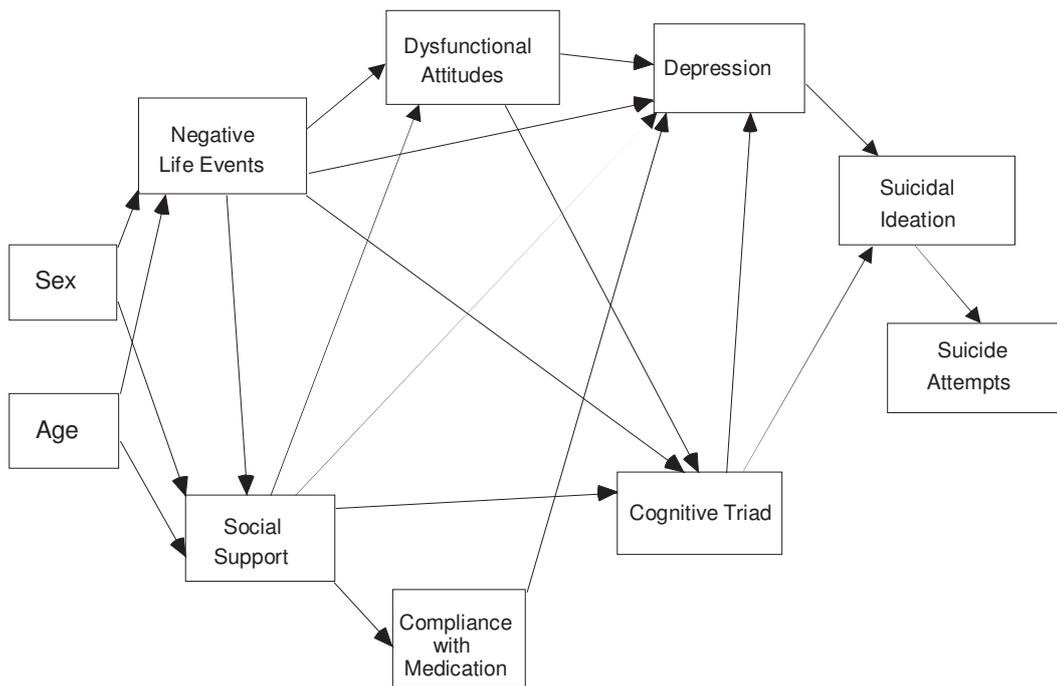
(2) Mediational model B (MM-B)
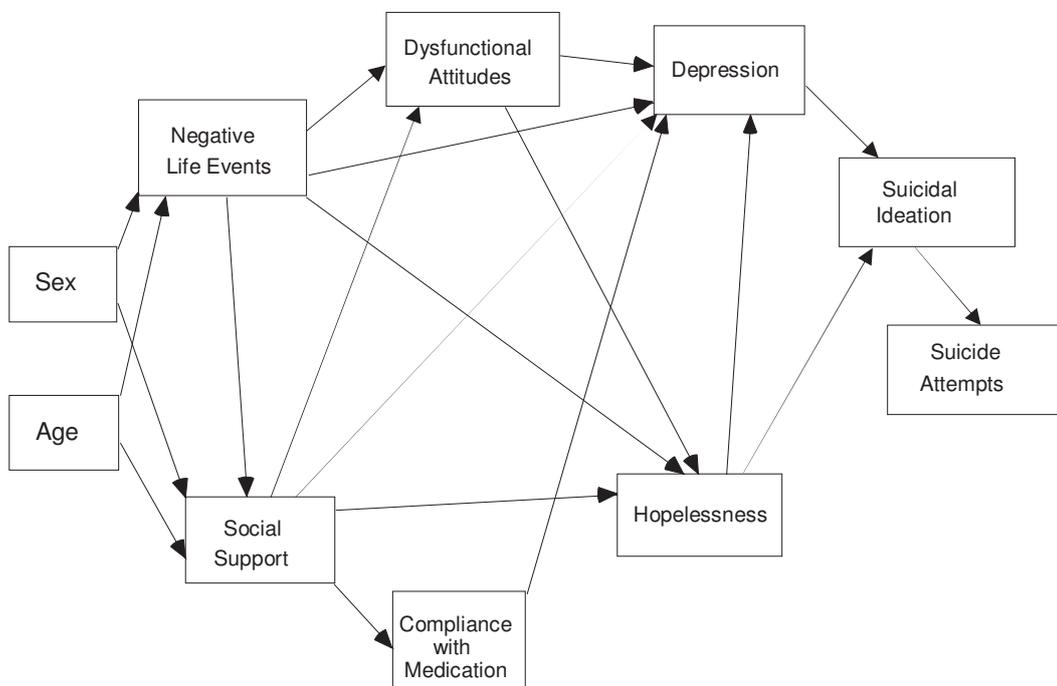
Figure 2.7. Integrated models of suicide attempts: (1) the mediational model A and (2) the mediational model B.

Using the strategy of Jöreskog (1993), all the hypothesized models will be tested by structural equation modeling (SEM) procedures and the best-fitting model will be selected as appropriate in representing the sample data. By the findings of significant paths from predictor variables to suicide attempts, the best-fitting model allows us to view the aetiological processes of suicide attempts among MDD patients in Taiwan.

2.8 Research Aims

Given the vast depression and suicidality literature, the aims of this dissertation are addressed below.

2.8.1 Aim 1: to translate scales from English into Chinese and examine the psychometric properties of the Chinese-language scales

Most of the scales to be used in this research are published in English versions and have no corresponding Chinese versions. Therefore, the first aim of this dissertation is to translate the used scales from English into Chinese. In addition, earlier studies have indicated that the construct of the negative cognitive triad is questionable. Therefore, the psychometric properties of the Chinese-language Cognitive Triad Inventory will be examined. As well, the psychometric properties of the other Chinese-language scales will be evaluated in this dissertation. The purpose of the examination is based on the need for obtaining reliable and valid Chinese-language assessment tools to accurately measure the variables investigated in this dissertation. The first aim will be conducted in Chapter 3 and Chapter 4.

2.8.2 Aim 2: to using SEM procedures to test a series of competing models with cross-sectional data gathered from MDD patients in Taiwan, and then select an appropriate model to represent the given data

The second aim is to test the competing models hypothesized in this dissertation with cross-sectional data gathered from Taiwanese MDD patients

through SEM procedures. The besting-fitting model will be selected to represent the given data. It should be noted that the study in this stage is exploratory. Therefore, besides comparing a priori hypothesized models to determine the best-fitting model, the strategy of model trimming (Houghton, 2000) will be used to modify the best-fitting model.

2.8.3   Aim 3: to discuss the findings from the competing models and the best-fitting model with the cross-sectional data of Taiwanese MDD patients

The third aim involves making a comprehensive examination of the predictor variables to suicide attempts in a sample of Taiwanese MDD patients, in a cross-sectional study. First, by the findings from the competing models, it is possible to compare the relative contribution of the cognitive triad and hopelessness to depression and suicidal ideation across different models. Second, by the findings of significant paths from predictor variables to suicide attempts in the best-fitting model, it is possible to examine the moderation hypothesis of the dysfunctional attitudes and the mediation hypothesis of the cognitive triad, to investigate whether Kwon et al.' (1994) linear mediational premise is supported or not, to compare the relative influence of depression and hopelessness on suicidal ideation, and to explore the causal roles of demographic factors, negative life events, social support and compliance with medications in the occurrence of suicide attempts in Taiwanese MDD patients.

2.8.4   Aim 4: to test the best-fitting model again six months after initial tests with longitudinal data based on the same population of MDD patients to confirm whether the model is stable over time

The aetiology processes in best-fitting model obtained from cross-sectional analyses is not able to clarify the causal relationship between the predictor variables and future suicide attempts in Taiwanese MDD patients. A more adequate test of the

causal relationship implied in the best-fitting model should be provided by a longitudinal study. If the predictor variables can predict suicide attempts as demonstrated in the best-fitting model with cross-sectional data, it will be expected that the results should be found in longitudinal data from MDD patients who are assessed at different times. Therefore, the fourth aim is to validate the best-fitting model with two-wave panel data based on the same population of MDD patients who participated in assessments twice, separated by a six-month interval.

2.8.5   Aim 5: to replicate the results obtained from the MDD patients in a sample of Taiwanese university students to examine the generalization of the results from clinical patients to nonclinical students

Although the sample of MDD patients is of interest, this research also attempts to replicate the previous findings obtained with MDD patients in the sample of university students. The purpose of the replicate study is to examine the extent to which the previous findings generalize in a sample from nonclinical populations of interest. The generalized study will provide information about the comparability of the results from clinical MDD patients and normal populations in Taiwan.

2.8.6   Aim 6: to discuss the implications of this study for suicide prevention and intervention in MDD patients and student populations in Taiwan

The last aim involves the discussion of implications of the findings in this research, and for suicide prevention and intervention in hospitals and universities in Taiwan as well as for future research.

The next chapter will introduce the scales used in this dissertation and describe the revision and translation of the scales from English into Chinese.

CHAPTER THREE

PILOT STUDY: TRANSLATING AND TESTING

MEASURES

3.1   Introduction

Most of the scales to be used in this study have not been previously translated from English into Chinese. Only some scales published in Taiwan have corresponding Chinese versions; however, their psychometric properties have not been evaluated. It is important to obtain reliable and valid measures because this is a necessary step for the present research on accurately measuring suicide attempts and their predictor variables in patients with Major Depressive Disorder in Taiwan. Therefore, the general purpose of this pilot study was to translate scales from English into Chinese and to test the reliability and validity of the Chinese versions of scales using a series of small groups of participants in Taiwan. Two stages were included in this study. The first stage describes the revision and translation of English-language scales into Chinese. The second stage examines the reliability and validity of the translated scales.

3.2   Stage I: Revision and Translation of Scales

3.2.1 Methods

(1)   Measures

As mentioned, the overall objectives of this research were to compare a series of competing models, and then select an appropriate model to represent the given data. The predictor variables in this research include: negative life events, social support, dysfunctional attitudes, the negative cognitive triad, hopelessness, depression, suicidal ideation, compliance with medications and demographic variables. Eight data sources were used in this study:

1)   the List of Threatening Experiences (LTE; Brugha & Cragg, 1990)

2)   the Multidimensional Support Scale (MDSS; H. Winefield, A. Winefield, & Tiggemann, 1992)

3)   the short-version of the Dysfunctional Attitude Scale (short-version DAS; Power et al., 1994)

4)   the Cognitive Triad Inventory (CTI; Beckham, Leber, Watkins, Boyer, & Cook, 1986; Fischer & Corcoran, 1994)

5)   the Chinese version of the Hopelessness Scale (C-HS; Chinese Behavioural Science Corporation, 2000)

6)   the Chinese version of the Beck Depression Inventory—Second Edition (C-BDI-II; Chinese Behavioural Science Corporation, 2000)

7)   the Chinese version of the Beck Scale for Suicidal ideation (C-BSS; Chinese Behavioural Science Corporation, 2000)

8)   Background-Demographic Information Questionnaire

The scales used in the current study are either protected by copyright or are in the public domain. Only those questionnaires that are permitted to be used publicly are listed in the appendix of the present thesis (see Appendix A). Except for Background-Demographic Information Questionnaire, all scales used here have been approved either by the authorized company or by their authors. Consent forms for permission to use the scales are shown in Appendix B. A detailed description of each of the scales is as follows.

(i)   List of Threatening Experiences (LTE)

The List of Threatening Experiences (LTE; Brugha & Cragg, 1990) is a 12-item instrument measuring life events that tend to be threatening. The instrument is designed to decrease the labor-intense time of respondents and the complexity of scaling of life events. Most of life event scales have been developed as longer and

more complex inventories. For example, the Social Readjustment Rating Scale (SRRS; Holmes & Rahe, 1967) consists of 43 stressful events. The life event scale designed by Paykel (1971) consists of 61 items. These long scales lengthen the time for clinical patients to complete the scales. In addition, these scales apply the predetermined weights to the life events reported by respondents. The predetermined weights method increases the complexity of scaling tasks.

The LTE, by virtue of its brevity, overcomes these difficulties in clinical applications. Clinical patients identify stressful events on the LTE over the past six months. A total score is computed by using the scaling method of simply counting the number of events. That is, each item of the LTE may be scored 1 if it is checked and 0 if not. The total score is the sum of all items. This method is as good as the method of predetermined weights. Many studies have shown that the total score computed by simple counting of events correlates highly with the score obtained from the predetermined weights (Chiriboga, 1977; Hurst, 1978; Lei & Skinner, 1980). In addition, all the items in the LTE are independent events; hence they will not be influenced by the recall of psychiatric patients. This avoids the circularity that might occur in retrospective studies of mental diseases where psychiatric disturbance often distorts patients' perception of life events. In a study of 50 psychiatric patients, the authors reported that the test-retest reliability for each item was satisfactory (Brugha & Cragg, 1990). Data on internal consistency are not available. Concurrent validity estimates were derived from the consistence between psychiatric patients' identification of stressful events and those identified by informants; there was a 90% agreement when assessed at a three-month period and a 70% agreement when assessed at six months. In the present study, the LTE would be translated from English into Chinese and the test-retest reliability and discriminant validity of the Chinese version of the LTE (C-LTE) would be evaluated in the pilot study.

(ii) Multidimensional Support Scale (MDSS)

The Multidimensional Support Scale (MDSS; H. Winefield, A. Winefield, & Tiggemann, 1992) consists of 19 items designed to assess the availability and adequacy of emotional, practical and informational support from three resources: confidants (e.g., family and closest friends); peers (e.g., other people with the same illness in a self-help group) and supervisors (e.g., health professionals). The MDSS has six factors reflecting sources of support: Confidant Adequacy, Confidant Availability, Supervisor Adequacy, Supervisor Availability, Peer Adequacy and Peer Availability. The total score on the MDSS is obtained by the sum of item scores for each individual factor, using a 4-point scale for availability and a 3-point scale for adequacy. Higher scores reflect higher perceived support. The MDSS has excellent internal consistency, with alphas for the subscales ranging from 0.81 to 0.90. It also has good concurrent validity with Rosenberg's Self-Esteem and Depressive Affect scales and the General Health Questionnaire. In this study, the MDSS was used to assess the adequacy of social support of the participants. The 19 items of the MDSS were first translated from English into Chinese and the reliability and validity status of the Chinese version of the MDSS (C-MDSS) was evaluated in the pilot study, and the factor structure of the C-MDSS was examined in the main study.

(iii) Short-version of the Dysfunctional Attitude Scale (short-version DAS)

The short-version of the Dysfunctional Attitude Scale (short-version DAS; Power et al., 1994) is a 24-item self-report scale designed to measure maladaptive attitudes. As discussed in the previous chapter, the 100-item DAS (Weissman & Beck, 1978) and Form A and Form B of the 40-item DAS (Weissman, 1979) are too long for clinical patients. Thus, Power and his colleagues developed the short-version DAS to avoid participants' fatigue. Similar to the original 100-item DAS, the items in short-version DAS are rated on a 7-point scale ranging from 7

(*totally agree*) through 4 (*neutral*) to 1 (*totally disagree*). 3 out of the 24 items are scored in a reverse direction. The total score is obtained by the sum of the item scores for each individual statement. Higher scores indicate more dysfunctional attitudes. The short-version DAS was derived from the factors of the Form A and Form B of the 40-item DAS. Power et al. indicated that factor analyses of two sets of the data obtained from a combined sample of mature students, depressed patients and the patients' first degree relatives each generated the same three factors: Achievement, Dependency, and Self-Control. The top eight loading items on each of the three factors were selected (value of loading ranging from 0.78 to 0.35) to establish the short-version DAS. Subsequently, the authors used another combined sample to confirm the three-factor model of the short-version DAS. Factor analytic results revealed that the three-factor model was supported. Most of the 24 items loaded on the hypothesized three factors derived from the DAS Form A and Form B. The analysis of the internal consistency of the three factors gave acceptable Cronbach's alphas of 0.847, 0.737 and 0.681 for the Achievement, Dependency, and Self-Control subscales, respectively. Pearson's correlations for the subscales were Achievement versus Dependency, 0.570, Achievement versus Self-Control, 0.506, and Dependency versus Self-Control, 0.248, all of which were significant at $p < 0.001$, with a sample size of $N = 277$.

However, since Power et al's (1994) article, the psychometric properties of the short-version DAS have received no attention. In addition, the short-version DAS has not been translated into Chinese in Taiwan. In the present research, the short-version DAS was first translated from English into Chinese. The psychometric properties of the Chinese version of the DAS (C-DAS) were then established. The internal consistency, test-retest reliability and discriminant validity of the short-version C-DAS were evaluated in the pilot study, and the factor structure of the short-version C-DAS was examined in the main study.

(iv) **Cognitive Triad Inventory (CTI)**

The Cognitive Triad Inventory (CTI; Beckham, Leber, Watkins, Boyer, & Cook, 1986; Fischer & Corcoran, 1994) consists of 36 items (30 items are scored and 6 serve as fillers) designed to measure the cognitive triad in depressed persons. The items are arranged in three subscales: view of self; view of the world and view of the future. Each of the subscales consists of 10 items in which 5 items are negatively phrased items (e.g., "I am a failure", "Bad things happen to me a lot", "There is nothing left in my life to look forward to") and the other 5 items are positively phrased items (e. g., "I am as adequate as other people I know", "Most people are friendly and helpful", "The future holds a lot of excitement for me"). Items are answered on 7-point Likert-type scale (from 1 = *totally agree* to 7 = *totally disagree*). Positively phrased items are reverse coded prior to data analyses. Subscale scores are a sum of the items in each subscale. The total score is the sum of all items, with higher scores representing greater positive views and lower scores representing negative views. Six filler items (1, 2, 4, 7, 14 and 22) are not scored. The CTI had excellent internal consistency, with alphas of 0.91 for view of self, 0.81 for view of the world, 0.93 for view of the future and 0.95 for the total scale. The authors also reported that the CTI had high concurrent validity, correlating significantly (0.77) with the Beck Depression Inventory. However, they did not report the factorial validity of the CTI. Two studies using exploratory and confirmatory factor analyses to examine the factor structure of the CTI indicated that three-factor structure of the CTI was not supported (Anderson & Skidmore, 1995; Mcintosh & Fischer, 2000). Therefore, the factor structure of the CTI is not clear and should be further explored. In the present study, the CTI was first translated from English into Chinese, and the internal consistency, test-retest reliability and discriminant validity of the Chinese version of the CTI (C-CTI) were evaluated in

the pilot study. The factor structure of the C-CTI was evaluated in the main study by an exploratory factor analysis on the C-CTI data obtained from a sample of patients with MDD in Taiwan.

(v)   Chinese version of the Hopelessness Scale (C-HS)

The Chinese version of the Hopelessness Scale (C-HS; Chinese Behavioural Science Corporation, 2000) published in Taiwan was translated from the English-language Hopelessness Scale (HS, Beck, Weissman, Lester, & Trexler, 1974), which was developed to assess the spectrum of negative attitudes about the future in clinical patients. The English-language HS consists of 20 true-false statements of which 9 are keyed false and 11 are keyed true. Each statement is scored 0 or 1, and a total score is the sum of the scores on the individual items. The possible range of a total score is from 0 to 20. Beck, Weissman et al. (1974) reported that the HS had excellent reliability and validity. Based on a sample of 294 hospitalized suicide attempters, the coefficient alpha (KR-20) of the HS was .93. In addition, based on a sample of 59 depressed patients in the Hospital of the University of Pennsylvania, the correlation of the HS with the Stuart Future Test (Stuart, as cited in Beck, Weissman et al., 1974) was .60; the correlation with the pessimism item of the Depression Inventory (Beck, 1967) was .63. The factor analysis of the HS data obtained from the 294 suicide attempters yielded three factors: Feelings About the Future, Loss of Motivation and Future Expectations.

The Chinese version of the HS has been widely used to assess the severity of hopelessness in clinical patients in Taiwan. However, the reliability, validity and factor structure of the C-HS in Taiwanese samples has not been established. In this study, the internal consistency, test-retest reliability and discriminant validity of the C-HS were evaluated in the pilot study. The factor structure of the C-HS was examined in the main study.

(vi) Chinese version of the Beck Depression Inventory—Second Edition (C-BDI-II)

The Chinese version of the Beck Depression Inventory (C-BDI-II; Chinese Behavioural Science Corporation, 2000) published in Taiwan was translated from the English-language Beck Depression Inventory—Second Edition (BDI-II; Beck, Steer, & Brown, 1996), which is widely used for clinical and research purposes in both clinical and general populations aged 13 years and older. The English-language BDI-II is a 21-item self-report measure for the assessment of depressive symptoms corresponding to criteria for diagnosing depressive disorders listed in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition (DSM-IV; American Psychiatric Association, 1994). Each item of the BDI-II consists of 4 statements, scored from 0 to 3, reflecting the increasing levels of depressive severity with 0 being least serious. Participants are required to rate the intensity on 1 of the 4 statements in each item that best describes participants' feeling during the past two weeks. The ratings are summed to yield a total score, which can range from 0 to 63. In the BDI-II manual, Beck, Steer et al. (1996) reported that the factor analyses of the BDI-II data obtained from samples of American psychiatric outpatients ($N = 500$) and Canadian college students ($N = 120$) each generated two factors: Somatic-Affective and Cognitive dimension for the psychiatric outpatients as well as Cognitive-Affective and Somatic dimension for the college students. Beck, Steer et al. (1996) also reported that the BDI-II had excellent internal consistency, with coefficient alphas of 0.92 for the 500 psychiatric outpatients and 0.93 for the 120 college students.

The English-language BDI has been translated from English into different languages and been used in various cultures. Chan and Tsoi (1984) had first translated the original version of the BDI (Beck et al., 1961) from English into

Chinese in Hong Kong. Chan and Tsoi reported that the split-half reliability and test-retest reliability of the test were .62 and 72, respectively. Shek (1990) showed that the Chinese version of the BDI had two stable factors and the measure demonstrated high internal consistency (Alpha = 0.86) and split-half reliability (r = 0.78) in a sample of adolescents in Hong Kong (N = 2150). Recently, the C-BDI-II published in Taiwan has been widely used to assess the severity of depression in both Taiwanese students and clinical patients (Chinese Behavioural Science Corporation, 2000). However, the reliability and validity of the C-BDI-II in Taiwanese samples has not been reported. In the current study, the reliability and validity status of the C-BDI-II was evaluated in the pilot study and the factor structure of the C-BDI-II was examined in the main study.

(vii)   Chinese version of the Beck Scale for Suicidal Ideation (C-BSS)

The Chinese version of the Beck Scale for Suicidal ideation (C-BSS; Chinese Behavioural Science Corporation, 2000) published in Taiwan was modified from the self-report version of the Scale for Suicidal ideation (SSI; Beck, Steer, & Ranieri, 1988). The C-BSS consists of 21 items. The first 19 items represent an exact translation of the content of the original SSI. They include the ratings of frequency and duration of suicidal ideation and ability to control suicidal wishes, characteristics of contemplated attempts, purpose of contemplated attempts, availability and opportunity of method, and the relative strengths of the person's wish to live or die. Item 20 and Item 21 include the ratings of frequencies and intensity of past suicide attempts. Each item consists of 3 statements, scored from 0 to 2 with a total score that can range from 0 to 42.

Beck, Kovacs, et al. (1979) reported that the factor analyses of the original SSI data obtained from the sample of suicidal ideators (N = 90) yielded three factors: Active Suicidal Desire, Preparation and Passive Suicidal Desire. Holden, Mendonca

and Mazmanian (1985) indicated that the original SSI had two factors labeled Suicidal Desire and Suicide Preparation in their factor analytic study with a sample of 50 suicide ideators. Beck, Kovacs, et al. (1979) also reported that the original SSI had excellent reliability. The coefficient alpha (KR-20) was 0.89, and the interrater reliability coefficient was .83. The discriminant validity and construct validity of the original SSI were also excellent. Beck, Steer, & Ranieri (1988) reported that Cronbach's alpha of the self-reported SSI was .93 for the paper-and-pencil version and .96 for the computer version.

Recently, the C-BSS (Chinese Behavioural Science Corporation, 2000) has been used widely to assess the severity of suicidal ideation in both adults and adolescents in community and hospital environments in Taiwan. In this study, the first 19 items were used to measure suicidal ideation. Item 20, which relates to the frequencies of past suicide attempts, was used to measure suicide attempts. Finally, the C-BSS used in this study includes 20 items. The reliability and validity status of the scale was evaluated in the pilot study and the factor structure of the scale was examined in the main study.

(viii)   Background-Demographic Information Questionnaire

The following background-demographic information was collected: sex, age, marital status, employment status, years of education, duration of depression and compliance with medications. Compliance with medications was operationalized as a self-devised item relating to MDD patients' compliance with taking antidepressants. The item is rated on a 5-point Likert-type scale ranging from 1 (*totally no compliance*) to 5 (*full compliance*).

In conclusion, the LTE, the MDSS, the short-version DAS and the CTI were not translated into Chinese in Taiwan. The psychometric properties of these scales were not established in Taiwanese samples. Therefore, these measures would be

translated into Chinese and their reliability and validity status would be evaluated in the pilot study. In addition, the C-BDI-II, the C-HS and the C-BSS were published in Taiwan. However, the psychometric properties of the three scales were not reported. In this study, their reliability and validity status would be also examined. Except for the LTE, the factor structure of these scales was explored in the main study described in the next chapter.

(2)   Procedures of Revision and Translation of the Measures

(i)   Revision

In the MDSS, first, the instructions for subscale B and C were respectively revised as "Now, think of other hospital patients (if you are a student, think of your classmates) that you know", and "Lastly, think about the doctors (if you are a students, think of your teachers) who are helping you with your mental health (or schoolwork)". Second, original Item 3 (How often did they try to take your mind off your problems by telling jokes or chattering about other things?) in each subscale was not included in final version because it lowered internal reliability. Finally, original Item 4 in subscale C was revised as "How often did they look after your health (or help your schoolwork) in practical ways?"

(ii)   Translating the English-language scales into Chinese

After the revision of the above-mentioned English-language scale, the LTE, the MDSS, the short-version DAS and the CTI were translated into Chinese by the researcher of this study. The translated scales were then evaluated by a professional Taiwanese scholar, with the following qualifications: (a) he has published articles in academic journals related to the mental health of the general population; (b) he has more than ten years experience in developing psychological tests; and (c) he has more than ten years experience providing counseling or psychotherapy services to the general population. Using the strategy of Siu and Shek (2004), the scholar was

requested to complete a self-administered questionnaire (see Appendix C), which evaluated the equivalence in meaning between the items in the original English-language scales and those in the translated Chinese-language scales. The self-administered questionnaire is a 4-point Likert scale (from 1 = *in total disagreement* to 4 = *in total agreement*) on which the scholar rated the degree of agreement in meaning between the translated and the original items. If the degree of agreement between any original and translated items were rated as 1 (*in total disagreement*) or 2 (*mostly disagreement*), then they would be revised. The scholar also recorded further comments about any two items that were considered not equivalent. In addition, the reading level and the face validity of the Chinese translations were evaluated. These procedures aimed to ensure that the translated instrument agreed with the original instrument in meaning and the items are easy to read by most depressed patients.

(iii)   Retranslating the scales to English from Chinese

Using the strategy of Chan et al. (1984) and Siu et al. (2004), the Chinese versions of the scales were then independently retranslated to English from Chinese by a bilingual professional translator. The English translations were compared with the original English-language scales by an English-speaking professor. If there were any discrepancies between the items in the two versions of the scales, the items would be revised through the procedures described above to gradually reduce the discrepancies.

3.2.2 Results

After iterative revision processes, a satisfactory concordance between the English and Chinese versions of the LTE, the MDSS, the short-version DAS and the CTI was achieved. The results in the comparison of the items in the original English versions with those in the versions retranslated to English from Chinese are shown

in Appendix D. Subsequently, a study was conducted to examine the reliability and validity status of the Chinese versions of the scales. The details of the study are described below.

3.3 Stage II: Study for Reliability and Validity of the Chinese Versions of the Scales

Small groups of clinical and nonclinical participants, including patients diagnosed with MDD, patients diagnosed with neurotic depressive disorders (NDD), undergraduate students and adult students, were recruited to examine the reliability and validity of the Chinese versions of the LTE, the MDSS, the DAS, the CTI, the HS, the BDI-II and the BSS. The internal consistency of these scales was evaluated by using the group of MDD patients, and the test-retest reliability was evaluated by using the groups of MDD patients and undergraduate students. The discriminant validity of the scales was tested by using the groups of MDD patients, NDD patients and adult students. It was hypothesized that MDD patients were more likely to score higher on these scales than NDD patients and non-depressed adult students.

3.3.1 Methods

(1) Participants

First, forty-nine patients diagnosed with MDD in Taiwan were recruited. All the patients were between 18 and 75 years of age. They were recruited from three metropolitan general hospitals in Taiwan from July to August 2005. The inclusion criteria of this study were in accordance with the DSM-IV-TR (APA, 2000) definition for Major Depressive Disorder, including single episode—mild, moderate, severe without psychosis, severe with psychosis (diagnostic codes = 296.21 - 296.24) and recurrent—mild, moderate, severe without psychosis, severe with psychosis (diagnostic codes = 296.31 - 296.34). Patients who did not fulfill these MDD criteria

were excluded. Also excluded were patients for whom depressed mood is secondary to other predominant symptoms or disorders, for example, depression caused by neurotic reactions, schizophrenia, organic brain damage, alcoholism or drug addiction. The coexistence of a personality disorder does not in itself provide a ground for exclusion.

At the same time, 41 extra patients diagnosed with NDD were recruited from the three general hospitals in Taiwan. The inclusion criteria of neurotic depressive disorders included the DSM-IV-TR (APA, 2000) definition for dysthymic disorder (diagnostic code = 300.4) and depressive disorder not otherwise specified (diagnostic code = 311).

Finally, a sample of 45 adult students who participated in a career training programme in a community center offered by a medium-sized university in Taiwan (approximately 10,000 students) was recruited in August 2005. The adult group together with the MDD patient group and NDD patient group were used to test whether the Chinese versions of the scales could differentiate MDD patients, NDD patients and non-depressed adult students. Furthermore, 168 undergraduate students were recruited from on-campus courses offered by the university from August to September 2005. They were used to examine the test-retest reliability of the Chinese versions of the scales.

(2)   Measures

All the Chinese versions of the scales were stapled together to form one document and were then administered to participants. The first part of the questionnaire document was the Background-Demographic Information Questionnaire. The subsequent sequence of the questionnaires was as follows: the C-LTE, the C-MDSS, the C-DAS, the C-CTI, the C-HS, the C-BDI-II and the C-BSS. Only those Chinese questionnaire versions that are permitted to be used publicly are listed in the appendix of the present thesis (see Appendix E).

(3)   Procedures

The recruitment procedures for the clinical patients in the hospitals were different from those for the adults in the community center and the undergraduate students in the university. The procedures followed are described below.

(i)   Patients with Major Depressive Disorder

After obtaining written informed consent from the human research ethics committee of the three hospitals (see Appendix F), the researcher and an assistant were approved to enter the psychiatric departments of the hospitals to collect patients' data. Two inclusion criteria for the sample selection were applied: (1) patients who were admitted to the psychiatric departments for the treatment of MDD; (2) outpatients with MDD returning to consult their doctors in the psychiatric departments.

Inpatients.— A psychiatric doctor first had to determine whether or not his patients met the inclusion criteria. If so, the psychiatric doctor recruited the patients on a voluntary basis after their admissions. Subsequently, a psychologist interviewed the recruited patients. The psychologist and psychiatric doctor independently assessed the patients and compared their personal background with respect to their history of illness, episodes of disorder and presence of symptoms to decide which patients met the inclusion criteria. Patients who did not qualify were excluded from the sample list. Qualified patients were asked to sign an informed consent form (see Appendix G) and complete the questionnaire document administered by the research and his assistant for this study. They were informed that if they decided to participate in this main study, they would be contacted six months later to complete the questionnaires again; however, they were under no obligation to take part in the study, and, if at any point they felt they did not wish to continue, they could withdraw. The information sheet is shown in Appendix H. The measures were coded

by a corresponding number to ensure confidentiality. Patients were given a 50 NT dollar ($US 1.57) gift coupon if they decided to participate in this study. The testing session lasted from one to two hours. The procedure was repeated six months later.

Outpatients.— The recruitment was initiated by a psychiatric doctor after his depressed patients returned to consult the doctor in the psychiatric department. If patients met the inclusion criteria, they were then referred to the psychologist. Again, the psychologist interviewed the patient to assess their depressive symptoms and history of illness. If the patients' depressed symptoms assessed by the psychologist agreed with those assessed by the psychiatric doctor, the patients were asked to sign an informed consent form and complete the questionnaire document administered by the researcher of the present study. Verbal instructions for the outpatients were identical to those for the inpatients. The participants were given a 50 NT dollar ($US 1.57) gift coupon. Participation took approximately 1 to 2 hours. The procedure was repeated 6 months later.

Fifty-nine MDD inpatients and outpatients were interviewed by the psychologist but three were eliminated because they failed to meet the inclusion criteria. Of the 56 patients who fulfilled the necessary inclusion criteria, two failed to complete the questionnaires because they complained about the number of items; three expressed that they were not in the mood to answer any questions, and two patients were too old to be capable of understanding the questionnaires. Finally, 49 sets of data for patients diagnosed with MDD were collected. The response-rate of the MDD patients who participated in the research was 83%.

(ii)   Patients with neurotic depressive disorders

All the patients diagnosed with NDD were outpatients. Therefore, their recruitment procedures were the same as for those outpatients diagnosed with MDD and described above.

Forty-six NDD patients were interviewed and all the patients were retained on the sample list because they met the inclusion criteria. Of the 46 patients who fulfilled the inclusion criteria, one refused to participate in the study because they were concerned about anonymity and confidentiality; three expressed that they were not interest in the research, and one failed to complete the questionnaires because they complained there were too many items. Finally, 41 sets of data for NDD patients were collected. The response-rate of the NDD patients who participated in the research was 89%.

(iii)   Adult students

After obtaining the verbal consent of a teacher in charge of the career training programme, the researcher of the present study was approved to collect the data of adult students in a community center by a convenience sampling method. The researcher was present at the class and introduced the nature, purposes and methods of the research to students. The adult students who volunteered to participate in the study completed the measures during a regular class hour and were given course credit for their participation. They were also informed that they were under no obligation to take part in the study; if at any point they felt they did not wish to continue, they could withdraw. Participation took approximately 20 to 30 minutes.

All the 45 adult students of the career training programme participated in the study and completed the questionnaires. The response-rate of the students was 100%.

(iv)   Undergraduate students

The researcher of the present study was approved to collect undergraduate students' data in classes after obtaining the verbal consent of teachers in charge of the classes. The sample of the undergraduate students was recruited from Year 1 and

Year 2 on-campus courses by a convenience sampling method. The recruitment procedure of the undergraduate students was the same as with that of the adult students described above. Participation took approximately 20 to 30 minutes. The procedure was repeated 4 weeks and 8 weeks later. The measures were coded by a corresponding number to ensure confidentiality. A list of the students' corresponding numbers was maintained by the researcher to match Time 1 and Time 2 data.

One hundred and ninety-one university students participated in the study and completed the questionnaires. There are incomplete data for 23 students, leaving a total of 168 sets of data. The response-rate of the students who participated in the research was 88%. For the study of test-retest reliability, 44 students completed the C-LTE and the C-BDI-II again 4 weeks after the first test. Ninety-two students completed the C-MDSS again 8 weeks later. One hundred and sixty-one students completed the C-DAS again 8 weeks later. Eighty-five students completed the C-CTI again 8 weeks later. Forty-eight students completed the C-HS twice four weeks apart. All the 168 students completed the C-BSS again 4 weeks after the first test.

(4)   Statistical Analyses

Basic analyses of frequency distributions, mean scores and standard deviations were conducted to investigate the demographic characteristics of the samples. Analyses of variance (ANOVA), Student's *t*-tests and Chi-square tests were performed on continuous and categorical variables, respectively, to investigate the differences of demographic characteristics between major depressive patients, neurotic depressive patients, and adult students. The internal consistencies of the Chinese versions of the scales were evaluated through two methods. First, item-total correlations were computed. The item-total correlations measure the strength of the relationships between each item and the total score. A "good" item is one that

contributes significantly to the attributes that the total scale is measuring. Through primary item analyses, items which have negligible correlations with total scores are eliminated, bringing internal consistency to an acceptable level. It is worth noting that when one of the items was used to determine item-total correlation, that item was naturally dropped from the sum of the total score. The second method of evaluating internal consistency of a whole scale was the determination of the Kuder-Richardson formula 20 (KR-20; Kuder & Richardson, 1937) and Cronbach's alpha coefficients (Cronbach, 1951). KR-20 is used to measure internal consistency when the items of tests are scored "1" and "0", and Cronbach's alpha coefficients are used when items have more than two categories or are continuous. In addition, Intraclass Correlation Coefficients were used to evaluate test-retest reliability. Student's *t*-tests were performed on all data to test the discriminant validity of each of the scales. Effect sizes for each comparison of means were calculated by Cohen's *d* (Cohen, 1992). In the present study, all negatively phrased items were reverse coded prior to any data analysis.

3.3.2 Results

In the following sections, demographic characteristics of the four samples are described first. Subsequently, the psychometric properties of the Chinese versions of the scales are reported.

(1)   Demographic Characteristics

In the major depressive group, there were 21 (42.8%) males and 28 (57.2%) females, who ranged in age from 19 to 70 years, with a mean age of 40.86 (*SD* = 12.31) years. Of the 49 patients, 20 (40.8%) were married, 15 (30.6%) were single, and 14 (28.6%) were divorced, cohabited, separated or widowed. Their educational backgrounds ranged from no education to graduate school (Year 18), with a mean of

12.18 (SD = 3.68) years. Depression duration prior to the psychological testing of this study ranged from 1.25 to 35.56 years, with a mean of 7.18 (SD = 6.92) years. All the MDD patients were prescribed psychotropic medications at the time of testing.

In the neurotic depressive group, there were 10 (24.4%) males and 31 (75.6%) females. The mean age was 43.85 years (SD = 13.28), with a range from 20 to 71 years. Of the 41 patients, 23 (56.1%) were married, 8 (19.5%) were single, and 10 (24.4%) were divorced, cohabited, separated or widowed. Their educational backgrounds ranged from primary school (Year 6) to university (Year 16), with a mean of 10.92 (SD = 3.48) years. Depression duration prior to the psychological testing of this study ranged from .08 to 22.56 years, with a mean of 6.37 (SD = 5.20) years. The same as with MDD group, all the NDD patients were prescribed psychotropic medications at the time of testing.

In the group of adult students, there were 18 (40%) males and 27 (60%) females. The mean age was 39.65 years (SD = 8.00), with a range from 20 to 59 years. Of the 45 adults, 16 (35.5%) were married, 28 (62.2%) were single, and 1 (2.2%) was divorced. Their educational backgrounds ranged from junior high school (Year 9) to high school (Year 12), with a mean of 10.93 (SD = 1.45) years in education.

The demographic descriptions of the three groups of participants are summarized in Table 3.1. It shows that marital status was significantly different between the three groups (χ^2 [4] = 23.51, p < .001). However, the table shows no significant between-group differences in gender, age or educational level. The fact that the three groups did not differ significantly in most of the demographic variables suggests that the three groups can be used to test the discriminant validity of the Chinese versions of the scales. If there was any difference on scale scores between the three groups, the difference should have derived from the scale data of the participants rather than the participants' personal backgrounds.

Table 3.1

Demographic Characteristics of the Participants for the Pilot Study: Nature and Significance of Between-Group Differences

Demographic variables	Participants								
	MDD group ($N = 49$)		NDD group ($N = 41$)		Adult student ($N = 45$)				
	N	$(\%)$	N	$(\%)$	N	$(\%)$	χ^2	d.f.	P
Gender							3.69	2	.158
Male	21	(42.8)	10	(24.4)	18	(40.0)			
Female	28	(57.2)	31	(75.6)	27	(60.0)			
Marital status							23.51	4	<.001
Married	20	(40.8)	23	(56.1)	16	(35.5)			
Single	15	(30.6)	8	(19.5)	28	(62.2)			
Div/coh/sep/wid[a]	14	(28.6)	10	(24.4)	1	(2.2)			
	Mean	*(SD)*	Mean	*(SD)*	Mean	*(SD)*	F	d.f.	P
Age	41.29	(12.28)	44.30	(13.33)	39.65	(8.00)	1.83	2, 132	.165
Education (years)	12.18	(3.68)	10.92	(3.48)	10.93	(1.45)	2.63	2, 132	.076
	Mean	(SD)	Mean	(SD)	Mean	(SD)	t-value	d.f.	P
Duration of depression (years)	7.18	(6.92)	6.37	(5.20)	Nil		.62	88	.537

Note. [a] Divorced/Cohabited/Separated/Widowed.

In the group of undergraduate students who were used to examine the test-retest reliability of Chinese-language scales, there were 81 (48.2%) males and 87 (51.8%) females. The mean age was 22.68 years (*SD* = 3.41), with a range from 19 to 46 years. Five (3%) were married, and 163 (97%) were single. The demographic descriptions of the undergraduate group are summarized in Table 3.2.

Table 3.2

Demographic Characteristics of the Undergraduate Students for the Pilot Study

Demographic variables		Undergraduate student (N = 168)	
		N	*(%)*
Gender:	Male	81	(48.2)
	Female	87	(51.8)
Marital status:	Married	5	(3.0)
	Single	163	(97.0)
		Mean	*(SD)*
Age		22.68	(3.41)

(2)   Psychometric Properties of the Chinese Versions of the Scales

The psychometric properties of the C-LTE, the C-MDSS, the C-DAS, the C-CTI, the C-HS, the C-BDI-II and the C-BSS are reported as follows.

(i)   C-LTE

Reliability

To evaluate the test-retest reliability of the C-LTE, an Intraclass Correlation Coefficient was computed between the total C-LTE scores achieved 6 months apart by 35 out of the 49 major depressive patients. This yielded a stability coefficient of .57 ($p < .01$). In addition, the analysis of 4-week test-retest reliability on the data of 44 undergraduate students yielded a coefficient of .78 ($p < .001$). Internal consistency on the C-LTE data was not computed due to the fact that the scale merely measures the number of negative life events reported by the participants.

Discriminant validity

The ability of the C-LTE to discriminate life stress between the 49 MDD patients and the 41 NDD patients was tested by Student's *t*-tests. An independent sample *t*-test revealed that the mean frequencies of negative life events for the two groups were significant different. The mean frequency was 3.35 (*SD* = 2.84) for the

MDD patients and 1.63 ($SD = 1.40$) for the neurotic depressive patients, $t_{(88)} = 3.51$, $p < .001$, $d = .75$. In addition, comparisons of the C-LTE mean frequency of the 49 MDD patients and the 45 adult students yielded a significant between-group difference, $t_{(92)} = 6.27$, $p < .001$, $d = 1.30$. The mean frequency for the MDD patients was higher than that for the adult students ($M = .60$, $SD = .78$).

(ii)   C-MDSS

Internal consistency

The internal consistency of the C-MDSS was determined on the sample of the 49 major depressive patients. Item analyses showed that each item had a positive correlation with the total score and that all the coefficients were significant beyond the .05 level. The magnitudes of the correlations ranged from .36 to .71. The C-MDSS items and the item-total correlation coefficients are presented in Table 3.3. The overall internal consistency was analyzed by Cronbach's alpha, which indicated acceptable internal consistency (Cronbach's alpha = .86).

Test-retest reliability

To evaluate the test-retest reliability of the C-MDSS, 43 out of the 49 major depressive patients were contacted again six months after the first test. An Intraclass Correlation Coefficient indicated that the test-retest reliability of the C-MDSS was .46 ($p < .001$) for a six-month period. In addition, the analysis of 8-week test-retest reliability on the data of 92 undergraduate students yielded a coefficient of .62 ($p < .001$).

Table 3.3

Internal Consistency of the Chinese Version of the Multidimensional Support Scale (C-MDSS) for the 49 Major Depressive Patients

No. Item of the C-MDSS	Item-total Correlation	Sig.
A. Firstly, think of your family and close friends, especially the 2-3 who are most important to you.		
1. How often did they really listen to you when you talked about your concerns or problems?	.64	<.001
2. How often did you feel that they really trying to understand your problem?	.70	<.001
3. How often did they really make you feel loved?	.67	<.001
4. How often did they help you in practical ways, like doing things for you or lending you money?	.60	<.001
5. How often did they answer your questions or give you advice about how to solve your problems?	.71	<.001
6. How often could you use them as examples of how to deal with your problems?	.64	<.001
B. Now, think of other hospital patients that you know.		
1. How often did they really listen to you when you talked about your concerns or problems?	.49	<.001
2. How often did you feel that they really trying to understand your problem?	.49	<.001
3. How often did they help you in practical ways, like doing things for you or lending you money?	.36	.011
4. How often did they answer your questions or give you advice about how to solve your problems?	.44	.002
5. How often could you use them as examples of how to deal with your problems?	.40	.005
C. Lastly, think about the doctors who are helping you with your mental health.		
1. How often did they really listen to you when you talked about your concerns or problems?	.59	<.001
2. How often did you feel that they really trying to understand your problem?	.56	<.001
3. How often did they look after your health in practical ways?	.60	<.001
4. How often did they answer your questions or give you advice about how to solve your problems?	.56	<.001
5. How often could you use them as examples of how to deal with your problems?	.36	.011

Cronbach's alpha = .86

Comparisons of the mean C-MDSS scores for the 49 MDD patients and for the 41 NDD patients yielded a non-significant between-group difference. The mean score was 38.10 (SD = 8.58) for the MDD patients and 40.56 (SD = 9.55) for the NDD patients, $t_{(88)}$ = 1.29, p = .202, d = .30. In addition, the mean score for the 49 MDD patients was higher that that for the 38 adult students (M = 42.61, SD = 7.94). The difference provided to be significant, $t_{(85)}$ = 2.51, p < .05, d = .54.

(iii)　C-DAS

Internal consistency

The internal consistency of the C-DAS was determined on the sample of the 49 major depressive patients. The item-total correlations for each item and an overall reliability analysis are presented in Table 3.4. As can be seen, all the items except 6, 15 and 20 correlated significantly with the total score at p < .05. The magnitudes of the correlations ranged from .21 to .70. Cronbach's alpha for the total scores after deleting Items 6, 15 and 20 was .85.

Test-retest reliability

An Intraclass Correlation Coefficient was computed between C-DAS scores achieved 6 months apart by 39 out of the 49 major depressive patients. The test-retest reliability across 6 months for the C-DAS was found to be .51 (p < .01) for the total scale score. In addition, the analysis of 8-week test-retest reliability on the data of 161 undergraduate students yielded a stability coefficient of .81 (p < .001).

Table 3.4

Internal Consistency of the Chinese Version of the Dysfunctional Attitude Scale (C-DAS) for the 49 Major Depressive Patients

No. Item of the C-DAS	Item-Total Correlation	Sig.
1. If I fail partly, it is as bad as being a complete failure.	.63	<.001
2. If others dislike you, you cannot be happy.	.67	<.001
3. I should be happy all the time.	.45	.001
4. People will probably think less of me if I make a mistake.	.53	<.001
5. My happiness depends more on other people than it dose on me.	.58	<.001
6. I should always have complete control over my feelings.	.25	.080
7. My life is wasted unless I am a success.	.68	<.001
8. What other people think about me is very important.	.68	<.001
9. I ought to be able to solve my problems quickly and without a great deal of effort.	.33	.022
10. If I don't set the highest standards for myself, I am likely to end up a second rate person.	.70	<.001
11. I am nothing if a person I love doesn't love me.	.70	<.001
12. A person should be able to control what happens to him.	.35	.013
13. If I am to be a worthwhile person, I must be truly outstanding in at least one major respect.	.40	.005
14. If you don't have other people to lean on, you are bound to be sad.	.54	<.001
15. It is possible for a person to be scolded and not get upset.	.21	.140
16. I must be a useful, productive, creative person or life has no purpose.	.61	<.001
17. I can find happiness without being loved by other person.	.44	.001
18. A person should do well at everything he undertakes.	.32	.025
19. If I do not de well all the time, people will not respect me.	.52	<.001
20. I do not need the approval of other people in order to be happy.	.27	.059
21. If I try hard enough, I should be able to excel at anything I attempt.	.28	.050
22. People who have good ideas are more worthy than those who do not.	.49	<.001
23. A person doesn't need to be well liked in order to be happy.	.32	.026
24. Whenever I take a chance or risk I am only looking for trouble.	.30	.038
Cronbach's alpha = .85		

Discriminant validity

Comparisons of the mean C-DAS scores for the 49 major depressive patients and for the 41 neurotic depressive patients yielded a non-significant between-group difference. The mean score was 118.91 (SD = 19.70) for major depressive patients and 111.70 (SD = 20.58) for neurotic depressive patients, $t_{(88)}$ = 1.70, p = .094, d = .36. However, the mean score for the 49 MDD patients was higher than that for the 44 adult students (M = 91.14, SD = 16.24). The difference was significant, $t_{(91)}$ = 7.37, p < .001, d = 1.53.

(iv)   C-CTI

Internal consistency

The item-total correlations for each item and the overall reliability analysis of the C-CTI are presented in Table 3.5. As can be seen, each item had a positive correlation with the total score. All the items had item-total correlations in excess of .30. The magnitudes of the correlations ranged from .37 to .79. The overall internal consistency of the C-CTI was very high (Cronbach's alpha = .93).

Test-retest reliability

Thirty-eight out of the 49 MDD patients were contacted again six months after the first test to evaluate the test-retest reliability. The stability coefficient across 6 months for the C-CTI was found to be .57 (p < .01) for the total scale score. In addition, the analysis of 8-week test-retest reliability on the data of 85 undergraduate students yielded a stability coefficient of .85 (p < .001).

Table 3.5

Internal Consistency of the Chinese Version of the Cognitive Triad Inventory (C-CTI) for the 49 Major Depressive Patients

No. Item of the C-CTI	Item-Total Correlation	Sig.
1. I have many talents and skills. (filler)		
2. My job (housework, schoolwork, daily duties) is unpleasant. (filler)		
3. Most people are friendly and helpful.	.37	.008
4. Nothing is likely to work out for me. (filler)		
5. I am a failure.	.69	<.001
6. I like to think about the good things that lie ahead for me.	.42	.003
7. I do my work (job, schoolwork, house work) adequately. (filler)		
8. The people I know help me when need it.	.38	.007
9. I expect that things will be going very well for me a few years from now.	.64	<.001
10. I have messed up almost all the important relationships I have ever had.	.40	.005
11. The future holds a lot of excitement for me.	.47	.001
12. My daily activities are fun and rewarding.	.65	<.001
13. I can't do anything right.	.57	<.001
14. People like me. (filler)		
15. There is nothing left in my life to look forward to.	.64	<.001
16. My current problems or concerns will always be there in one way or another.	.41	.004
17. I am as adequate as other people I know.	.46	.001
18. The world is a very hostile place.	.49	<.001
19. There is no reason for me to be hopeful about my future.	.68	<.001
20. The important people in my life are helpful and supportive.	.63	<.001
21. I hate myself.	.69	<.001
22. I will overcome my problem. (filler)		
23. Bad things happen to me a lot.	.67	<.001
24. I have a spouse or friend who is warm and supportive.	.51	<.001
25. I can do a lot of things well.	.49	<.001
26. My future is simply too awful to think about.	.79	<.001
27. My family doesn't care what happens to me.	.58	<.001
28. Things will work out well for me in the future.	.77	<.001
29. I am guilty of a great many things.	.38	.008
30. No matter what I do, others make it difficult for me to get what I want.	.47	.001
31. I am a worthwhile human being.	.61	<.001
32. There is nothing to look forward to in the years ahead.	.59	<.001
33. I like myself.	.69	<.001
34. I am faced with many difficulties.	.62	<.001
35. I have serious flaws in my character.	.44	.002
36. I expect to be content and satisfied as the years go by.	.72	<.001
Cronbach's alpha = .93		

Discriminant validity

An independent samples *t*-test revealed that the mean scores of the C-CTI for the MDD and NDD patient groups were significantly different, $t_{(88)} = 2.67$, $p < .01$, $d = .53$. The mean score was 128.88 ($SD = 31.36$) for the 49 MDD patients and 111.90 ($SD = 32.35$) for the 41 NDD patients. In addition, the mean score for the 49 MDD patients was higher that that for the 45 adult students ($M = 71.45$, $SD = 21.33$). The difference proved to be highly significant, $t_{(92)} = 10.30$, $p < .001$, $d = 2.12$.

(v)   C-HS

Internal consistency

The item-total correlations for each item and the overall reliability analysis of the C-HS are presented in Table 3.6. Each item had a positive correlation with the total score and all the items had item-total correlations in excess of .5. The magnitudes of the correlations ranged from .54 to .92. The overall internal consistency was analysed by means of coefficient alpha (KR-20), which yielded an extremely high coefficient of .96.

Test-retest reliability

Thirty-nine out of the 49 major depressive patients were contacted again six months after the first test to evaluate the test-retest reliability. The stability coefficient across 6 months was found to be .70 ($p < .001$) for the total scale score. In addition, the analysis of 4-week test-retest reliability on the data of 48 undergraduate students yielded a stability coefficient of .78 ($p < .001$).

Table 3.6

Internal Consistency of the Chinese Version of the Hopelessness Scale (C-HS) for the 49 Major Depressive Patients

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NOTE:
This table is included on page 100 of the print copy of
the thesis held in the University of Adelaide Library.
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<u>*Discriminant validity*</u>

In accordance with expectations, the mean score for the 49 MDD patients (12.79, $SD = 4.88$) was higher than that for the 41 NDD patients (10.35, $SD = 5.23$). The difference proved to be significant, $t_{(88)} = 2.28$, $p < .05$, $d = .48$. In addition, the mean score for the 49 MDD patients was higher that that for the 45 adult students ($M = 3.26$, $SD = 3.75$). The difference proved to be highly significant, $t_{(92)} = 10.55$, $p < .001$, $d = 2.18$.

(vi)   C-BDI-II

Internal consistency

The item-total correlations for each item and the overall reliability analysis of the C-BDI-II are presented in Table 3.7. Each item had a positive correlation with the total score and all the items had item-total correlations in excess of .5. The magnitudes of the correlations ranged from .51 (Changes in Appetite) to .78 (Indecisiveness). The overall internal consistency of the C-BDI-II was extremely high (Cronbach's alpha = .94).

Test-retest reliability

Thirty-nine out of the 49 major depressive patients were contacted again six months after the first test to evaluate the test-retest reliability. The stability coefficient across 6 months was found to be .68 ($p < .001$) for the total C-BDI-II score. In addition, the analysis of 4-week test-retest reliability on the data of 44 undergraduate students yielded a stability coefficient of .81 ($p < .001$).

Discriminant validity

An independent samples *t*-test revealed that the mean scores of the C-BDI-II for the MDD and NDD patient groups were significantly different, $t_{(88)} = 2.01$, $p < .05$, $d = .44$. The mean score was 30.84 ($SD = 15.17$) for the 49 MDD patients and 24.35 ($SD = 14.58$) for the 41 NDD patients. In addition, the mean score for the 49 MDD patients was higher than that for the 45 adult students ($M = 8.45$, $SD = 9.83$). The difference proved to be highly significant, $t_{(92)} = 8.41$, $p < .001$, $d = 1.74$.

Table 3.7

Internal Consistency of the Chinese Version of the Beck Depression Inventory—Second Edition (C-BDI-II) for the 49 Major Depressive Patients

No. Item of the C-BDI-II	Item-Total Correlation	Sig.
1. Sadness	.69	<.001
2. Pessimism	.75	<.001
3. Past failure	.71	<.001
4. Loss of Pleasure	.72	<.001
5. Guilty Feelings	.61	<.001
6. Punishment Feelings	.64	<.001
7. Self-Dislike	.72	<.001
8. Self-Criticalness	.74	<.001
9. Suicidal Thoughts or Wishes	.73	<.001
10. Crying	.52	<.001
11. Agitation	.64	<.001
12. Loss of Interest	.74	<.001
13. Indecisiveness	.78	<.001
14. Worthlessness	.75	<.001
15. Loss of Energy	.73	<.001
16. Changes in Sleeping Pattern	.56	<.001
17. Irritability	.66	<.001
18 Changes in Appetite	.51	<.001
19. Concentration Difficulty	.62	<.001
20. Tiredness or Fatigue	.76	<.001
21. Loss of Interest in Sex	.58	<.001
Cronbach's alpha = .94		

(vii)   C-BSS

The analyses of psychometric properties of the C-BSS were performed on the data from the first 19 items, which were used to measure suicidal ideation. Items 20 and 21 were excluded from the data analyses because the two items were used to measure suicide attempts.

Internal consistency

The item-total correlations for each of the first 19 items of the C-BSS and its overall reliability analysis are presented in Table 3.8. Each item had a positive correlation with the total score. The magnitudes of the correlations ranged from .46 (Deception) to .88 (Deterrents to attempt). The overall internal consistency of the C-BSS was extremely high (Cronbach's alpha = .97).

Test-retest reliability

Thirty-nine out of the 49 major depressive patients were contacted again six months after the first test to evaluate the test-retest reliability. An Intraclass Correlation Coefficient showed a stability coefficient of .70 ($p < .001$) for the total C-BSS score. In addition, the analysis of 4-week test-retest reliability on the data of 168 undergraduate students yielded a stability coefficient of .80 ($p < .001$).

Discriminant validity

An independent samples *t*-test revealed that the mean scores of the C-BSS for the MDD and NDD patient groups were significantly different, $t_{(88)} = 2.71$, $p < .01$, $d = .58$. The mean score was 13.53 ($SD = 11.84$) for the 49 MDD patients and 7.48 ($SD = 8.65$) for the 41 NDD patients. In addition, the mean score for the 49 MDD patients was higher that that for the 45 adult students ($M = 2.22$, $SD = 4.74$). The difference proved to be highly significant, $t_{(92)} = 5.98$, $p < .001$, $d = 1.24$.

Table 3.8

Internal Consistency of the Chinese Version of the Beck Scale for Suicidal Ideation (C-BSS) for the 49 Major Depressive Patients

No. Item of the C-BSS	Item-Total Correlation	Sig.
1. Wish to live	.73	<.001
2. Wish to die	.82	<.001
3. Reason for living	.75	<.001
4. Active attempt	.82	<.001
5. Passive attempt	.77	<.001
6. Duration of thoughts	.86	<.001
7. Frequency of ideation	.80	<.001
8. Attitude toward ideation	.81	<.001
9. Control over action	.79	<.001
10. Deterrents to attempt	.88	<.001
11. Reasons for attempt	.56	<.001
12. Specificity of planning	.71	<.001
13. Availability/opportunity	.84	<.001
14. Capability	.82	<.001
15. Expectancy	.86	<.001
16. Actual preparation	.80	<.001
17. Suicidal note	.78	<.001
18. Final acts	.83	<.001
19. Deception	.46	<.001
Cronbach's alpha = .97		

The comparisons of the mean scores of the measures for the MDD patients, the NDD patients and the adult students are summarized in Table 3.9. As can be seen, non-significant between-group difference on C-MDSS mean scores was found. Tukey HSD post hoc analyses indicated that no significant differences were found between NDD patients and both the MDD patients and the adult students. However, MDD patients reported significantly more C-MDSS scores than adult students. Table 3.10 represents Tukey HSD post hoc analyses of the C-MDSS mean scores for the three groups.

Table 3.9

Comparisons of Mean Scores for Major Depressive patients, Neurotic Depressive Patients and Adult Students

Variable	Participants					
	MDD patients (*N* = 49)	NDD patients (*N* = 41)	Adult students (*N* = 45)			
	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	*F*	*d.f.*	*P*
C-LTE	3.35 (2.84)	1.63 (1.40)	.60 (0.78)	24.28	2,132	<.001
C-MDSS	38.10 (8.58)	40.56 (9.55)	42.61 (7.94)	2.90	2,125	.059
C-DAS	118.91 (19.70)	111.70 (20.58)	91.14 (16.24)	26.36	2,131	<.001
C-CTI	128.88 (31.36)	111.90 (32.35)	71.45 (21.33)	48.37	2,132	<.001
C-HS	12.79 (4.88)	10.35 (5.23)	3.26 (3.75)	52.18	2,132	<.001
C-BDI-II	30.84 (15.17)	24.35 (14.58)	8.45 (9.83)	34.02	2,132	<.001
C-BSS	13.53 (11.84)	7.48 (8.65)	2.22 (4.74)	18.56	2,132	<.001

Table 3.10

Tukey HSD Post Hoc analyses of the C-MDSS Mean Scores for Major Depressive patients, Neurotic Depressive Patients and Adult Students

Variable	Participant (I)	Participant (J)	Difference(I-J)	*S.E.*	*P*
C-MDSS	NDD patients	MDD patients	2.46	1.85	.378
		Adult students	-2.04	1.96	.551
	MDD patients	NDD patients	-2.46	1.85	.378
		Adult patients	-4.50*	1.88	.045

Note. * P < .05.

3.4　General discussion

The assessment of the psychometric properties of the C-LTE, the C-MDSS, the C-DAS, the C-CTI, the C-HS, the C-BDI-II and the C-BSS was based on the need for valid research instruments to accurately measure the critical constructs in the present study. This is an initial step for the subsequent main study to test the goodness-of-fit of the four hypothesized competing models of suicide attempts to data derived from these research instruments.

(1)　C-LTE

The test-retest reliability for the total C-LTE score across six months was .57. Brugha and Cragg (1990) did not report the test-retest reliability for the total score of the original LTE. According to Nunnally's (1978) standard, which suggests that a reliability coefficient of .70 is considered to be a minimal acceptable value, the C-LTE seems to be an unreliable measure. However, it is well known that test-retest reliability is affected by time interval between assessments. A six-month interval for test-retest reliability is very long. Therefore, in this study, four-week test-retest reliability was computed again. 44 extra university students recruited in Taiwan completed the C-LTE twice, four weeks apart. The analysis of test-retest reliability on the students' data showed that the coefficient of the C-LTE rose to .78 ($p < .001$). The result suggests that the C-LTE is a reliable measure for a four-week period.

Since the original LTE was designed as an instrument to assess an Axis IV diagnosis with the DSM-IV for psychiatric patients, the LTE may be expected to discriminate between groups who can be assumed to differ in degree of life events. In this study, the analyses of discriminant validity indicated that the C-LTE was able to differentiate the major depressive patients from the neurotic depressive patients and from the adult students in degree of life stress. The result supports the claim that the C-LTE is a valid measure.

(2)   C-MDSS

The results of the reliability analyses showed that the C-MDSS is reliable. Cronbach's alpha coefficients indicated that the C-MDSS was internally consistent, with alphas that ranged from .91 to .93 for three subscales and .86 for the total score with the 49 MDD patients in Taiwan. The values are higher than the findings reported by Winefield et al. (1992), which indicated that the alpha of the original MDSS ranged from .81 to .90 for subscales with 483 adults in Australia. The result suggests that the C-MDSS is more reliable than the MDSS in terms of Cronbach's alpha. In addition, item-total correlations showed that all items had significant correlations with total scores. No items needed to be deleted from the scale.

The six-month test-retest reliability of the C-MDSS was .46. The value seems to be poor for a stability coefficient. However, when 92 extra students recruited in Taiwan completed the scale at two points in time separated by 8 weeks, the test-retest reliability rose to .62 ($p < .001$). The result suggests that the scale is reliable.

The original MDSS was designed to measure social support in young adults. In accordance with expectation, the C-MDSS was unable to differentiate the MDD patients from the NDD patients in degree of social support. However, the C-MDSS was able to differentiate the MDD patients from the adult students. The result supports the claim that the C-MDSS is a valid measure.

(3)   C-DAS

The internal consistency analysis on the C-DAS data gave acceptable Cronbach's alpha of .85 for the 49 MDD patients. The result is close to the findings of a similar study by Power et al. (1994), which indicated that Cronbach's alpha was .898 for Form A and .860 for Form B of the 40-item DAS with a combined sample size of 277 depressed patients and mature students. Therefore, the present result of reliability analyses showed that the C-DAS was internally consistent.

The item-total correlation data showed that all the items except Item 6 (I should always have complete control over my feelings), Item 15 (It is possible for a person to be scolded and not get upset) and Item 20 (I do not need the approval of other people in order to be happy) were significantly correlated with the total score (see Table 3.3). A psychometric perspective would argue in favor of eliminating the three items. However, the present data were obtained from a small group of MDD patients ($N = 49$). When item analyses were conducted again on the C-DAS data of the combined sample of the 90 patients diagnosed with MDD and NDD, only Item 15 was not correlated significantly with the total score ($r = .08$, $p = .43$). The results suggest that only Item 15 should be eliminated from the C-DAS.

The test-retest reliability analysis of the C-DAS across 6 months yielded a mediocre correlation coefficient of .51 for the major depressive patients. It should be reiterated that Power et al. (1994) did not report the test-retest reliability of the original DAS-24. Only a similar study by Weissman (1979) indicated that the test-retest reliability coefficients of the DAS-40 over 8 weeks were .80 to .84 for a student sample (Fischer & Corcoran, 1994). Compared with Weissman's finding, the C-DAS has lower test-retest reliability. However, the time interval between assessments in Weissman's study is shorter than that in this study. In addition, Weissman used a student sample to investigate the test-retest reliability of the DAS-40. To compare with Weissman's finding, eight-week test-retest reliability of the C-DAS with university students was computed again. 161 extra university students recruited in Taiwan completed the C-DAS twice, eight weeks apart. The analysis of test-retest reliability on the students' data showed that the coefficient of the scale improved from .51 to .84 ($p < .001$), which suggests that the C-DAS is as reliable as the DAS-40.

An interesting finding from the analysis of discriminant validity is that the major depressive patients did not differ from the neurotic depressive patients on the total C-DAS score. However, Power et al. reported that the original DAS-24 was able to differentiate depressed patients from mature students in degree of dysfunctional beliefs. To compare with Power et al's finding, Student's *t*-test was conducted on the C-DAS data between the 49 major depressive patients and 44 extra adult students recruited in Taiwan. Results revealed a significant between-group difference. The mean C-DAS score was 118.91 (SD = 19.70) for the MDD patients and 91.14 (SD = 16.24) for the students, $t_{(91)}$ = 7.37, $p < .001$. The results suggest that, the same as with the DAS-24, the C-DAS is a valid measure in differentiating depressed patients from adult students in degree of dysfunctional beliefs. However, the C-DAS may not be useful in discriminating dysfunctional beliefs between severe and mild depressed patients.

(4)   C-CTI

Cronbach's alpha coefficient indicated that the C-CTI was internally consistent (alpha = .93). In addition, item analyses showed that the item-total correlations of the C-CTI ranged from .37 to .79 (see Table 3.4). The results suggest that all the items in the scale are homogeneous and measure the same psychological construct. No items need to be deleted from the scale.

The test-retest reliability of the C-CTI was .57 for a six-month interval. Beckham et al. (1986) did not report the test-retest reliability of the original CTI. According to Nunnally's (1978) suggestion, a reliability coefficient of .57 is not acceptable. The C-CTI seems to be an unreliable test. A possible explanation for the mediocre value is the interval between assessments. A six-month interval for test-retest reliability is rather long. When an Intraclass Correlation Coefficient was computed again between the C-CTI responses achieved eight weeks apart by 85

extra university students, the correlation coefficient of the scale rose to .85 (*p* < .001). The results suggest that the C-CTI is a reliable measure for an eight-week period.

The analyses of discriminant validity indicated that the C-CTI was able to differentiate the major depressive patients from the neurotic depressive patients and the adult students in degree of negative thoughts. The result suggests that the C-CTI has good discriminant validity.

(5)   C-HS

The C-HS was shown to be a reliable and valid self-report measure of hopelessness. The C-HS has good internal consistency reliability in terms of KR-20 (.96). Item analyses indicated that the item-total correlations of the C-HS ranged from .54 to .92 (see Table 3.5) for the 49 major depressive patients. These values are higher than the existing findings on the reliability status of the original HS (Beck, Weissman et al., 1974), which indicated that the scale's KR-20 was .93 and its item-total correlations ranged from .39 to .76 for 294 hospitalized patients with suicide attempts.

The test-retest reliability of the C-HS was .70 for six-month interval and .78 for 4-week interval. The value is higher than the earlier findings reported by Beck and Steer (1988), which indicated that the one-week test-retest reliability of the original HS was .69 and .66 for 21 and 99 psychiatric patients in Center for Cognitive Therapy, respectively. Therefore, the present result suggests that the C-HS is a reliable test.

The analysis of discriminant validity revealed that the C-HS has the ability to differentiate the MDD patients from the NDD patients and adult students in degree of hopelessness. The result supports the claim that the C-HS has good discriminant validity.

(6) C-BDI-II

Table 3.6 shows that the Cronbach alpha coefficient of the C-BDI-II was .94 and the item-total correlations ranged from .51 to .78 for the 49 major depressive patients. These values are higher than Beck, Steer et al.'s (1996) findings, which indicated that the original BDI-II had a coefficient alpha of .92 and the scale's item-total correlations ranged from .39 to .70 for 500 psychiatric outpatients. The results suggest that the items of the C-BDI-II are homogenous and measure the same psychological construct.

The six-month test-retest reliability of the C-BDI-II was .68 for the 49 major depressive patients. The value is lower than Beck, Steer et al.'s (1996) finding, which indicated that the one-week test-retest correlation of the BDI-II was .93 (p < .001) for 26 psychiatric outpatients. However, the interval between assessments for the C-BDI-II is much longer than that for the BDI-II. To compare with Beck et al's study, the four-week test-retest reliability of the C-BDI-II was computed again. 44 extra university students completed the C-BDI-II at two points in time separated by 4 weeks. The stability coefficient of the scale improved substantially from .68 to .81 (p < .001). The result suggests that the C-BDI-II is a stable measure for a four-week period.

Discriminant validity analyses revealed that the C-BDI-II was able to distinguish major depression patients from neurotic depression patients in degree of depression. The mean C-BDI-II score for the major depressive patients was higher than that for the neurotic depressive patients. The result is consistent with Ball and Steer's (2003) finding, which indicated that the mean BDI-II score of outpatients with Major Depressive Disorder was significantly (p < .001) higher than that of outpatients with dysthymic disorder. The present result is also consistent with the earlier finding of Beck and his colleagues. They reported that the mean BDI-II score

of outpatients with a severe major depressive episode was significantly higher than that of outpatients with a moderate depressive episode, which was in turn significantly higher than that of outpatients with a mild depressive episode (Steer, Brown, Beck, & Sanderson, 2001). In addition, the mean total BDI scores were higher for outpatients with recurrent-episode MDD than for outpatients with dysthymic disorders (Steer, Beck, Brown, & Berchick, 1987). The present result supports the claim that, as for the BDI-II, the C-BDI-II has good discriminant validity.

(7)   C-BSS

The Cronbach alpha coefficient of the C-BSS was .97 for the 49 major depressive patients. The value is higher than the earlier finding on the reliability status reported by Beck, Steer and Ranieri (1988), which indicated that the Cronbach alpha coefficient of the original SSI was .93 for 30 psychiatric outpatients. In addition, Table 3.7 shows that the item-total correlations of the C-BSS ranged from .46 to .88. These values are similar to the earlier findings reported by Beck, Steer and Ranieri, which indicated that the item-total correlations of the SSI ranged from .35 to .90 for 30 psychiatric outpatients. Therefore, the present results suggest that the items of the C-BSS are homogenous and measure the same psychological construct.

The test-retest reliability of the C-BSS was .70 over a six-month interval with the MDD patients and .80 for a 4-week period with the undergraduate students. The value reaches the minimal acceptable level of reliability coefficients (Nunnally, 1978). The result suggests that the C-BSS is stable across four weeks and six months.

The discriminant validity analysis of the C-BSS reveals an interest finding. The C-BSS was able to differentiate patients diagnosed with MDD from neurotic

depressive disorders in degree of suicidal ideation. Conceptually, the result is inconsistent with the work of Beck, Steer and Ranieri (1988), which indicated that the SSI did not differentiate psychiatric inpatients diagnosed with affective disorders from those with non-affective disorders in degree of suicidal ideation. That is, Beck et al's result did not support the contention that patients with affective disorders were more likely to describe suicidal ideation than those with non-affective disorders. The present result suggests that the C-BSS has better discriminant validity than the SSI. The C-BSS can discriminate suicidal ideation between major depressive patients and neurotic depressive patients.

In sum, all of the Chinese-language scales were observed to be internally consistent, to have acceptable test-retest reliability for 4-week or 8-week intervals. The C-HS and the C-BSS also have acceptable 6-month test-retest reliability. All the scales have satisfactory discriminant validity. These psychometric properties suggest that the Chinese-language scales are ideal tools to be used in the main study for measuring the relevant constructs in patients diagnosed with Major Depressive Disorder in Taiwan. In addition, as a result of their good reliability and validity in Chinese speaking populations, these scales are useful to other researchers to measure relevant variables in future research on suicidality involving Chinese speaking communities.

CHAPTER FOUR

MAIN STUDY: TESTING THE COMPETING MODELS

IN PATIENTS WITH MAJOR DEPRESSIVE DISORDER

4.1   Introduction

The objectives of the main study were to (1) compare a series of competing models to determine the best-fitting model in representing the given data, and (2) discuss the findings from the competing models and the best-fitting model. These investigations were based on previous theories and empirical findings described in the literature review of this research and on a survey of a clinical sample of patients with Major Depressive Disorder (MDD) conducted in Taiwan during 2005 and 2006.

This main study was designed as a cross-sectional study and used structural equation modeling (SEM) techniques to test the competing models. Prior to the testing of the competing models, exploratory factor analyses were performed on the data of the Chinese-language scales obtained from Taiwanese MDD patients. It was necessary to investigate the factor structure of these scales for Taiwanese MDD patients because the factor structure of the Chinese-language scales may be different to that of the English-language scales due to the discrepancy in psychological properties between MDD patients in Taiwan and those in Western countries. Therefore, the present study included two stages. The first stage examined the factor structure of the Chinese-language scales. In the second stage, SEM procedures were conducted on the data from the appropriate factors found in the Chinese-language scales to test the competing models hypothesized in this study.

4.2 Stage I: Factor Analytic Study of the Chinese Versions of the Scales in MDD Patients

4.2.1 Methods

(1) Participants

A group of 113 patients, including inpatients and outpatients, were drawn from three metropolitan general hospitals in Taiwan from June to September, 2006. As with the sample selection described in the pilot study, all patients were diagnosed with Major Depressive Disorder including single and recurrent episodes according to the DSM-IV-TR (APA, 2000). Patients who did not fulfill these MDD criteria were excluded. Details of their recruitment are given under Procedures, below.

The sample size of 113 patients may be insufficiently large in the application of factor analyses. Gorsuch (1983) has suggested that 100 is considered to be a minimum sample size and at least 5 individuals per item are required to make reliable conclusions. For example, if a scale has 30 items (e.g., the C-CTI), at least 150 participants are required in the application of factor analyses to the scale. However, acquiring clinical MDD patients in hospitals to take part in the research was difficult. It was not possible to obtain a very large sample of MDD patients due to time and resource constraints. Therefore, the 49 MDD patients recruited in the pilot study from June to August 2005 were added to the 113 MDD patients recruited in this study to yield a total of 162 patients. They were used in subsequent data analyses.

(2) Measures

The objective of Stage 1 was to examine the factor structure of the Chinese-language scales. Six scales were used in this study, including the C-MDSS, the C-DAS, the C-CTI, the C-HS, the C-BDI-II and the C-BSS. The factor structure of the C-LTE was not evaluated because all the items in the scale were independent events.

(3) Procedures

As with the recruitment procedures described in the pilot study, all the patients were first diagnosed by a psychiatric doctor and then referred to a psychologist. The diagnosis was reviewed by the psychologist to confirm that all relevant criteria were met and that possible exclusionary criteria were considered. The final diagnosis reflected a consensus between the psychiatric doctors and the psychologist. Qualified patients were asked to sign an informed consent form (see Appendix G) and complete the questionnaires administered by the researcher of this study. The patients were also informed that if they decided to participate in this main study, they would be contacted again six months later to complete the follow-up study; however, they were under no obligation to take part in this research and, if at any point they felt they did not wish to continue, they could stop. All the participants were given a 50 NT dollar ($ US 1.57) gift coupon. Participation took approximately 1 to 2 hours.

Of the 139 patients who fulfilled the inclusion criterion in the main study, 15 patients declined to participate, complaining about too many items; four expressed that they are not in the mood to answer any question; five were too old to be capable of understanding and answering the questionnaires, and two had incomplete data. Finally, 113 sets of data for patients diagnosed with MDD were collected. The response-rate of the MDD patients who participated in the main study was 81%. The 113 MDD patients and the 49 MDD patients collected in the pilot study were pooled and used to be the participants in the main study. All patients were receiving psychotropic medications at the time of testing.

(4) Statistical Analyses

Basic analyses of frequency distributions, mean scores and standard deviations were conducted to investigate the demographic characteristics of the 162

MDD patients. Exploratory factor analyses were performed on the data to investigate the factor structure of the Chinese-language scales.

4.2.2 Results

In the following sections, demographic characteristics of the 162 MDD patients are described. Subsequently, the results of the factor analyses for the Chinese versions of the scales are reported.

(1) Demographic Characteristics

There were 74 (45.7%) males and 88 (54.3%) females, who ranged in age from 19 to 75 years, with a mean age of 43.2 (SD =13.02) years. Of the 162 patients, 42 (25.9%) were inpatients, 120 (74.1%) were outpatients, 27 (16.7%) were diagnosed with single episode, 135 (83.3) were diagnosed with recurrent episode, 66 (40.7%) were married, 47 (29%) were single, 32 (19.8%) were divorced, 4 (2.5%) were cohabitating, one (0.6%) was separated, and 12 (7.4%) were widowed. Their educational background ranged from illiteracy to holding a master's degree (Year 18), with a mean of 10.9 (SD = 4.18) years. The duration of depression prior to the psychological testing ranged from 0.25 to 35.6 years, with a mean of 6.9 (SD = 5.93) years. All of the patients were prescribed psychotropic medications at the time of testing. The demographic descriptions of the 162 MDD patients are summarized in Table 4.1.

Table 4.1

Demographic Characteristics of the Patients with Major Depressive Disorder for the Main Study (N = 162)

Demographic variables		N	(%)
Gender:	Male	74	(45.7)
	Female	88	(54.3)
Status of patient:	Inpatient	42	(25.9)
	Outpatient	120	(74.1)
Type of episode	Single episode	27	(16.7)
	Recurrent episode	135	(83.3)
Age:	<20	1	(0.6)
	20 – 29	31	(19.1)
	30 – 39	33	(20.4)
	40 – 49	41	(25.3)
	50 – 59	45	(27.8)
	60 – 69	7	(4.3)
	70 – 75	4	(2.5)
Marital status:	Married	66	(40.7)
	Single	47	(29.0)
	Divorced	32	(19.8)
	Cohabited	4	(2.5)
	Separated	1	(0.6)
	Widowed	12	(7.4)
Education level:	Illiteracy	7	(4.3)
	Primary school	30	(18.5)
	Junior high school	23	(14.2)
	High school	50	(30.9)
	Technical Institute	24	(14.8)
	University	24	(14.8)
	Master	4	(2.5)
Duration of depression	< 5	73	(45.1)
(years):	5 – 9	55	(34.0)
	10 – 14	19	(11.7)
	15 – 19	6	(3.7)
	20 – 24	7	(4.3)
	> 25	2	(1.2)
		Mean	(*SD*)
Age		43.20	(13.02)
Years of education		10.94	(4.18)
Duration of depression (years)		6.91	(5.93)

(2)   Factor Analyses of the Measures

Factor analyses were carried out to examine the factor structure of the Chinese-language scales. Prior to data analyses, all negatively phrased items were reverse coded and all missing data were replaced with the regression estimation method implemented in SPSS v11.0.

(i)   C-MDSS

First, the C-MDSS data of the 162 MDD patients were analyzed with a principal component analysis. The Kaiser-Meyer-Olkin measure showed that the data of the C-MDSS were suitable for a factor analysis (KMO = 0.85). Three factors with eigenvalues in excess of one were found (Eigenvalues—5.93, 4.05 and 2.75). Further analyses of the scree test showed that the clear "scree" occurred after the third factor. These results were consistent with Winefield et al.' (1992) analysis of the MDSS. Therefore, a three-factor solution was chosen as the most appropriate. The factor scree plot of the C-MDSS is shown in Appendix I, Figure 1.

Next, a three-factor extraction using principal axis factoring was attempted. The three factors accounted for 75.16% of the total variance of the data. Considering items as acceptable measures of their factor only when the absolute values of factor loadings were 0.3 or higher, Promax rotation showed that all the 16 items loaded on the three factors. Table 4.2 displays the rotated factor loadings from the pattern matrix for the factor analysis with three extracted oblique factors. Factor loadings in bold type show loadings among the three factors in excess of .30. The correlations of Factor 1 versus Factor 2, Factor 1 versus Factor 3 and Factor 2 versus Factor 3 were .08 ($p > .05$), .34 ($p < .01$) and .16 ($p < .05$), respectively.

Table 4.2

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the Multidimensional Support Scale (C-MDSS) for Major Depressive Patients (N = 162)

C-MDSS item	Factor[a]		
	1	2	3
A. Firstly, think of your family and close friends, especially the 2-3 who are most important to you.			
1. How often did they really listen to you when you talked about your concerns or problems?	**.90**	-.07	-.02
2. How often did you feel that they really trying to understand your problem?	**.91**	.01	-.02
3. How often did they really make you feel loved?	**.90**	-.02	-.04
4. How often did they help you in practical ways, like doing things for you or lending you money?	**.70**	-.01	.06
5. How often did they answer your questions or give you advice about how to solve your problems?	**.87**	.06	.03
6. How often could you use them as examples of how to deal with your problems?	**.80**	.04	.02
B. Now, think of other hospital patients that you know.			
1. How often did they really listen to you when you talked about your concerns or problems?	-.04	**.90**	.03
2. How often did you feel that they really trying to understand your problem?	.04	**.96**	-.04
3. How often did they help you in practical ways, like doing things for you or lending you money?	-.01	**.86**	.03
4. How often did they answer your questions or give you advice about how to solve your problems?	.02	**.95**	-.03
5. How often could you use them as examples of how to deal with your problems?	-.01	**.85**	.01
C. Lastly, think about the doctors who are helping you with your mental health.			
1. How often did they really listen to you when you talked about your concerns or problems?	.02	-.02	**.84**
2. How often did you feel that they really trying to understand your problem?	.03	-.04	**.91**
3. How often did they look after your health in practical ways?	.02	.01	**.84**
4. How often did they answer your questions or give you advice about how to solve your problems?	-.05	.01	**.89**
5. How often could you use them as examples of how to deal with your problems?	-.01	.05	**.75**

Note. Numbers in bold type show factor loadings in excess of .30 among the three factors. Item numbers correspond with item numbers in Winefield et al., 1992.

[a] Factor 1 = Family Support, Factor 2 = Peer Support, Factor 3 = Supervisor Support.

Table 4.3

Items of the Factor Analysis of the C-MDSS Loaded on the Factors of Winefield et al. (1992) MDSS

C-MDSS			Winefield et al.'s (1992)
Factor	Item	Loading	MDSS Factor
F1: Family Support			
	1	.90	F1 (Family Support)
	2	.91	F1 (Family Support)
	3	.90	F1 (Family Support)
	4	.70	F1 (Family Support)
	5	.87	F1 (Family Support)
	6	.80	F1 (Family Support)
F2: Peer Support			
	1	.90	F2 (Peer Support)
	2	.96	F2 (Peer Support)
	3	.86	F2 (Peer Support)
	4	.95	F2 (Peer Support)
	5	.85	F2 (Peer Support)
F3: Supervisor Support	1	.84	F3 (Supervisor Support)
	2	.91	F3 (Supervisor Support)
	3	.84	F3 (Supervisor Support)
	4	.89	F3 (Supervisor Support)
	5	.75	F3 (Supervisor Support)

As can be seen, Factor 1 consisted of items with respect to family support. Factor 2 included items which concerned peer support. Factor 3 was composed of items which reflected doctor support. All the items in the C-MDSS exactly loaded on the three factors of Winefield et al. (1992) MDSS. Therefore, the three factors of the C-MDSS were labeled Family Support, Peer Support, and Supervisor Support, respectively. The comparisons of the factor structure of the C-MDSS and that of the original English-language MDSS are summarized in Table 4.3.

(ii)   C-DAS

Although the C-DAS consists of 24 items, factor analyses were conducted on 23 items of the scale. Item 15 (It is possible for a person to be scolded and not get upset) was eliminated from the analyses because it did not correlate significantly with the total C-DAS score in the item analyses as described in the Chapter three.

The same procedure as for the factor analyses on the C-MDSS was used; thus, the C-DAS data of the 162 MDD patients were factor analyzed with a principal axis factoring analysis. The Kaiser-Meyer-Olkin measure showed that the data of the C-DAS were suitable for a factor analysis (KMO = .77). After consideration of several criteria (the scree test, size of eigenvalues, interpretability and the previous analysis of the DAS-24 by Power et al. [1994]), a three-factor solution was chosen as the most appropriate. The three factors had eigenvalues greater than one (Eigenvalues—5.06, 3.13 and 1.70). The principal axis factoring accounted for 34.53% of the total variance of the data. The factor scree plot of the C-DAS is shown in Appendix I, Figure 2.

The three-factor solution pattern matrix after Promax rotation is presented in Table 4.4. As can be seen, 21 out of the 23 items loaded uniquely on one factor with loadings of .30 or higher. The correlations of Factor 1 versus Factor 2, Factor 1 versus Factor 3, and Factor 2 versus Factor 3 were .34 ($p < .01$), .36 ($p < .01$) and -.09 ($p > .05$), respectively. Item 9 (I ought to be able to solve my problems quickly and without a great deal of effort) and Item 24 (Whenever I take a chance or risk I am only looking for trouble) had factor factorings of less than .30. They were, therefore, discarded from the C-DAS and not used in subsequent data analyses.

The comparisons of the factor structure of the C-DAS and that of Power et al.'s analysis of the DAS-24 are summarized in Table 4.5. As can be seen, almost all the items in the C-DAS loaded on their appropriate factors. Seven out of the eight

items in the C-DAS Factor 1 loaded on the DAS-24 Factor 1 (labeled Achievement); all the 7 items in the C-DAS Factor 2 loaded on the DAS-24 Factor 3 (labeled Dependency), and 5 out of the 6 items in the C-DAS Factor 3 loaded on the DAS-24 Factor 2 (labeled Self-Control). Therefore, the three factors of the C-DAS were labeled Achievement, Dependency and Self-Control, respectively.

Table 4.5 also shows the factor structure of Beck, Brown et al. (1991) DAS-100. Similarly, most of the items in the C-DAS loaded on their appropriate factors. Items 1 and 5 in the C-DAS did not load on any factors of the DAS-100.

Table 4.4

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the Dysfunctional Attitude Scale (C-DAS) for Major Depressive Patients (N = 162)

C-DAS item	Factor[a]		
	1	2	3
1. If I fail partly, it is as bad as being a complete failure.	**.42**	.19	.01
2. If others dislike you, you cannot be happy.	.21	**.57**	.15
3. I should be happy all the time.	-.20	.31	**.43**
4. People will probably think less of me if I make a mistake.	**.60**	.11	-.09
5. My happiness depends more on other people than it dose on me.	.19	**.58**	.00
6. I should always have complete control over my feelings.	-.15	.02	**.55**
7. My life is wasted unless I am a success.	**.73**	-.13	-.06
8. What other people think about me is very important.	**.58**	.26	-.09
9. I ought to be able to solve my problems quickly and without a great deal of effort.	.16	-.05	.26
10. If I don't set the highest standards for myself, I am likely to end up a second rate person.	**.63**	-.07	.03
11. I am nothing if a person I love doesn't love me.	.23	**.52**	.01
12. A person should be able to control what happens to him.	-.05	.00	**.65**
13. If I am to be a worthwhile person, I must be truly outstanding in at least one major respect.	**.49**	-.05	.22
14. If you don't have other people to lean on, you are bound to be sad.	.21	**.44**	.08
16. I must be a useful, productive, creative person or life has no purpose.	**.45**	-.03	.27
17. I can find happiness without being loved by other person.	-.07	**.66**	-.15
18. A person should do well at everything he undertakes.	.17	-.07	**.49**
19. If I do not do well all the time, people will not respect me.	**.67**	.02	-.06
20. I do not need the approval of other people in order to be happy.	-.14	**.58**	.02
21. If I try hard enough, I should be able to excel at anything I attempt.	.21	-.19	**.34**
22. People who have good ideas are more worthy than those who do not.	.05	.02	**.44**
23. A person doesn't need to be well liked in order to be happy.	-.22	**.83**	.03
24. Whenever I take a chance or risk I am only looking for trouble.	.14	.28	-.22

Note. Numbers in bold type show highest factor loadings among the three factors in excess of .30. Item numbers correspond with item numbers in Power et al., 1994.

[a]Factor 1 = Achievement, Factor 2 = Dependency, Factor 3 = Self-Control.

Table 4.5

Items of the Factor Analysis of the C-DAS Loaded on the Factors of Power et al. (1994) DAS-24 and Beck, Brown et al. (1991) DAS-100

C-DAS			Power et al.'s (1994)	Beck, Brown et al.'s
Factor[a]	Item	Loading	DAS-24 Factor	(1991) DAS-100 Factor
Factor 1				
	7	.73	F1 (Achievement)	F3 (Success-Perfectionism)
	19	.67	F1 (Achievement)	F3 (Success-Perfectionism)
	10	.63	F1 (Achievement)	F3 (Success-Perfectionism)
	4	.60	F1 (Achievement)	F3 (Success-Perfectionism)
	8	.58	F3 (Dependency)	F2 (Need for Approval)
	13	.49	F1 (Achievement)	F3 (Success-Perfectionism)
	16	.45	F1 (Achievement)	F3 (Success-Perfectionism)
	1	.42	F1 (Achievement)	Nil
Factor 2				
	23	.83	F3 (Dependency)	F2 (Need for Approval)
	17	.66	F3 (Dependency)	F9 (Disapproval-Dependence)
	5	.58	F3 (Dependency)	Nil
	20	.58	F3 (Dependency)	F2 (Need for Approval)
	2	.57	F3 (Dependency)	F2 (Need for Approval)
	11	.52	F3 (Dependency)	F1 (Vulnerability)
	14	.44	F3 (Dependency)	F1 (Vulnerability)
Factor 3				
	12	.65	F2 (Self-Control)	F5 (Imperatives)
	6	.55	F2 (Self-Control)	F5 (Imperatives)
	18	.49	F2 (Self-Control)	F5 (Imperatives)
	22	.44	F1 (Achievement)	F3 (Success-Perfectionism)
	3	.43	F2 (Self-Control)	F5 (Imperatives)
	21	.34	F2 (Self-Control)	F5 (Imperatives)

Note. [a]Factor 1 = Achievement, Factor 2 = Dependency, Factor 3 = Self-Control.

(iii)   C-CTI

Before factor analyses were performed, six filler items (1, 2, 4, 7, 14 and 22) had been deleted from the C-CTI. In addition, all negatively phrased items had been reverse coded so that a higher score represented a more negative view and a lower score indicated a more positive view.

A principal axis factoring analysis was performed on the C-CTI data of the 162 MDD patients. The Kaiser-Meyer-Olkin measure showed that the data were suitable for a factor analysis (KMO=0.90). After considering the scree test, size of eigenvalues and interpretability, a two-factor solution was chosen as the most appropriate. The initial eigenvalues for the two factors were 11.3 and 2.46, respectively. The principal axis factoring solution accounted for 42.1% of the total variance of the data. The factor scree plot of the C-CTI is shown in Appendix I, Figure 3.

The two-factor solution pattern matrix after Promax rotation is displayed in Table 4.6. As can be seen, all the 30 items loaded uniquely on one factor with loading of .30 or higher; therefore, no items needed to be discarded in subsequent data analysis. Factor 1 and Factor 2 consisted respectively of negatively and positively phrased items about the self, the world and the future. It has been hypothesized that the cognitive thoughts as measured by the C-CTI can lead to the development of depression (Beckham et al., 1986). Therefore, the two factors of the C-CTI were labeled Negative Depressive Cognition and Positive Depressive Cognition, respectively. The correlation between Factor 1 and Factor 2 was .69 ($p < .001$). Because the C-CTI consisted of two factors rather than three factors claimed by Beck (1967), the cognitive triad was renamed Depressive Cognition in this study.

Table 4.6

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the Cognitive Triad Inventory (C-CTI) for Major Depressive Patients (N = 162)

C-CTI item[a]		Factor[b] 1	Factor[b] 2
3. Most people are friendly and helpful.	(PW)	-.14	.51
5. I am a failure.	(NS)	.51	.29
6. I like to think about the good things that lie ahead for me.	(PF)	-.27	.77
8. The people I know help me when need it.	(PW)	.01	.51
9. I expect that things will be going very well for me a few years from now.	(PF)	-.06	.72
10. I have messed up almost all the important relationships I have ever had.	(NS)	.77	-.29
11. The future holds a lot of excitement for me.	(PF)	-.24	.74
12. My daily activities are fun and rewarding.	(PW)	.19	.54
13. I can't do anything right.	(NS)	.58	.07
15. There is nothing left in my life to look forward to.	(NF)	.60	.14
16. My current problems or concerns will always be there in one way or another.	(NF)	.46	-.04
17. I am as adequate as other people I know.	(PS)	-.04	.67
18. The world is a very hostile place.	(NW)	.65	-.13
19. There is no reason for me to be hopeful about my future.	(NF)	.51	.26
20. The important people in my life are helpful and supportive.	(PW)	.01	.60
21. I hate myself.	(NS)	.70	.10
23. Bad things happen to me a lot.	(NW)	.73	-.05
24. I have a spouse or friend who is warm and supportive.	(PW)	.21	.43
25. I can do a lot of things well.	(PS)	.04	.63
26. My future is simply too awful to think about.	(NF)	.60	.22
27. My family doesn't care what happens to me.	(NW)	.50	.07
28. Things will work out well for me in the future.	(PF)	.19	.65
29. I am guilty of a great many things.	(NS)	.71	-.12
30. No matter what I do, others make it difficult for me to get what I want.	(NW)	.64	-.07
31. I am a worthwhile human being.	(PS)	.15	.64
32. There is nothing to look forward to in the years ahead.	(NF)	.52	.20
33. I like myself.	(PS)	.17	.62
34. I am faced with many difficulties.	(NW)	.73	-.14
35. I have serious flaws in my character.	(NS)	.57	-.04
36. I expect to be content and satisfied as the years go by.	(PF)	-.03	.70

Note. Numbers in bold type show factor loadings in excess of .30. Item numbers correspond with item numbers in Beckham et al., 1986.

[a] PS = positive self, NS = negative self, PW = positive world, NW = negative world, PF = positive future, NF = negative future.

[b] Factor 1 = Negative Depressive Cognition, Factor 2 = Positive Depressive Cognition.

(iv)   C-HS

A principal axis factoring analysis was performed on the C-HS data of the 162 MDD patients. The Kaiser-Meyer-Olkin measure showed that the data were suitable for a factor analysis (KMO=0.93). Three factors with eigenvalues in excess of one were found (Eigenvalues—9.77, 1.18 and 1.08). After considering the scree test, interpretability and a previous analysis of the HS by Beck, Weissman et al. (1974), three factors were extracted from the C-HS. The principal axis factoring solution accounted for 52.95% of the total variance of the data. The factor scree plot of the C-HS is shown in Appendix I, Figure 4.

The three-factor solution pattern matrix after Promax rotation is displayed in Table 4.7. Because Item 2 loaded substantially on two factors, it may be deleted from the C-HS and not used in subsequent data analyses. Factor 1, defined by Items 1, 3, 6, 8, 10 and 13, mainly revolved around positive expectations about the future such as enthusiasm, success and getting good things. The factor was labeled Future Confidence. Factor 2, which was labeled Motivation for the Future, was defined by Items 5, 9, 11, 12, 14, 16, 17, 19 and 20. The items with the heaviest loading were concerned with motivation: deciding not to want anything, and not trying to get something that is wanted. Factor 3, labeled Future Expectations, was defined by Items 4, 7, 15 and 18. The items included anticipations regarding what life will be like: not imaging what life would be like in the future; a dark future; having faith in the future, and the future being vague and uncertain. The correlations of Factor 1 versus Factor 2, Factor 1 versus Factor 3 and Factor 2 versus Factor 3 were .78, .77 and .78, respectively.

Table 4.7

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the Hopelessness Scale (C-HS) for Major Depressive Patients (N = 162)

NOTE:
This table is included on page 129 of the print copy of
the thesis held in the University of Adelaide Library.

Table 4.8

Items of the Factor Analysis of the C-HS Loaded on the Factors of Beck, Weissman et al. (1974) HS

C-HS			Beck, Weissman et al.'s (1974) HS
Factor[a]	Item	Loading	Factor
Factor 1	10	.88	F3 (Future Expectations)
	3	.86	F2 (Loss of Motivation)
	8	.61	F3 (Future Expectations)
	6	.55	F1 (Feelings about the Future)
	13	.50	F1 (Feelings about the Future)
	1	.47	F1 (Feelings about the Future)
Factor 2	20	.86	F2 (Loss of Motivation)
	16	.91	F2 (Loss of Motivation)
	14	.57	F3 (Future Expectations)
	17	.53	F2 (Loss of Motivation)
	12	.52	F2 (Loss of Motivation)
	9	.41	F2 (Loss of Motivation)
	19	.36	F1 (Feelings about the Future)
	11	.34	F2 (Loss of Motivation)
	5	.32	F1 (Feelings about the Future)
Factor 3	18	.86	F3 (Future Expectations)
	4	.78	F3 (Future Expectations)
	15	.73	F1 (Feelings about the Future)
	7	.63	F3 (Future Expectations)

Note. [a]Factor 1 = Future Confidence, Factor 2 = Motivation for the Future, Factor 3 = Future Expectations.

The comparisons of the factor structure of the C-HS with the original HS (Beck, Weissman et al., 1974) are summarized in Table 4.8. As can be seen, 3 out of the 6 items in the C-HS Factor 1 loaded on the HS Factor 1 (labeled Feelings about the Future); 6 out of the 9 items in the C-HS Factor 2 loaded on the HS Factor 2 (labeled Loss of Motivation), and 3 out of the 4 items in the C-HS Factor 3 loaded on the HS Factor 3 (labeled Future Expectations). The present results indicated that

the three-factor solution of the C-HS did not resemble the three-factor structure of the HS reported by Beck, Weissman et al. (1974).

(v)   C-BDI-II

A principal axis factoring analysis was performed on the C-BDI-II data of the 162 MDD patients. The Kaiser-Meyer-Olkin measure showed that the data were suitable for a factor analysis (KMO=0.94). Three factors with eigenvalues in excess of one were found (Eigenvalues—10.0, 1.27 and 1.10). After considering the scree test, interpretability and a previous analysis of the BDI-II by Beck, Steer et al. (1996), two factors were extracted from the C-BDI-II. The principal axis factoring solution accounted for 49.55% of the total variance of the data. The factor scree plot of the C-BDI-II is shown in Appendix I, Figure 5.

Results of the two-factor solution pattern matrix after Promax rotation are found in Table 4.9. The items with the heaviest loadings on the first factor included pessimism, loss of pleasure, loss of interest, indecisiveness, loss of energy and tiredness or fatigue. This factor appeared to represent the Somatic-Affective dimension of depressive symptomatology. Factor 2 consisted primarily of guilty feeling, punishment feelings, self-dislike, self-criticalness, suicidal thoughts, crying and agitation. As such, this factor appeared to represent a Cognitive symptom dimension. Item 17 (irritability) had relatively low factor loading in the rotated solution so it may be discarded from the C-BDI-II and not used in subsequent data analyses. The correlation between Factor 1 and Factor 2 was .77.

Table 4.9

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the Beck Depression Inventory—Second Edition (C-BDI-II) for Major Depressive Patients (N = 162)

	Factor[a]	
C-BDI-II item	1	2
1. Sadness	**.44**	.34
2. Pessimism	**.54**	.27
3. Past failure	.37	**.43**
4. Loss of Pleasure	**.61**	.21
5. Guilty Feelings	-.04	**.69**
6. Punishment Feelings	-.06	**.65**
7. Self-Dislike	.07	**.65**
8. Self-Criticalness	.03	**.72**
9. Suicidal Thoughts or Wishes	.12	**.63**
10. Crying	-.15	**.77**
11. Agitation	.24	**.50**
12. Loss of Interest	**.50**	.37
13. Indecisiveness	**.52**	.25
14. Worthlessness	**.45**	.34
15. Loss of Energy	**.89**	-.15
16. Changes in Sleeping Pattern	**.38**	.19
17. Irritability	.28	.25
18 Changes in Appetite	**.44**	.12
19. Concentration Difficulty	**.52**	.24
20. Tiredness or Fatigue	**1.07**	-.29
21. Loss of Interest in Sex	**.58**	-.02

Note. Numbers in bold type show the highest factor loadings among the three factors except for Item 17 because its loading is less than .30. Item numbers of the C-BDI-II correspond with item numbers in Beck, Steer et al., 1996.

[a] Factor 1 = Somatic-Affective dimension, Factor 2 = Cognitive dimension, Factor 3 = Somatic dimension.

Table 4.10

Items of the Factor Analysis of the C-BDI-II Loaded on the Factors of Beck, Steer et al. (1996) BDI-II

C-BDI-II			Beck, Steer et al.'s (1996)
Factor[a]	Item	Loading	BDI-II Factor
Factor 1	20	1.07	F1 (Somatic-Affective)
	15	.89	F1 (Somatic-Affective)
	4	.61	F1 (Somatic-Affective)
	21	.58	F1 (Somatic-Affective)
	2	.54	F2 (Cognitive)
	19	.52	F1 (Somatic-Affective)
	13	.51	F1 (Somatic-Affective)
	12	.49	F1 (Somatic-Affective)
	14	.45	F2 (Cognitive)
	18	.44	F1 (Somatic-Affective)
	1	.44	F2 (Cognitive)
	16	.38	F2 (Somatic-Affective)
	17	.28	F1 (Somatic-Affective)
Factor 2	10	.77	F1 (Somatic-Affective)
	8	.72	F2 (Cognitive)
	5	.69	F2 (Cognitive)
	7	.65	F2 (Cognitive)
	6	.65	F2 (Cognitive)
	9	.63	F2 (Cognitive)
	11	.50	F1 (Somatic-Affective)
	3	.43	F2 (Cognitive)

Note. [a]Factor 1 = Somatic-Affective dimension, Factor 2 = Cognitive dimension.

The comparisons of the factorial components of the C-BDI-II and those of Beck, Steer et al. (1996) BDI-II are summarized in Table 4.10. As can be seen, 9 out of the 13 items in the C-BDI-II Factor 1 loaded on the BDI-II Factor 1 (labeled Somatic-Affective dimension), and 6 out of the 8 items in the C-BDI-II Factor 2 loaded on the BDI-II Factor 2 (labeled Cognitive dimension). The results indicated that most of the items in the C-BDI-II loaded on their correct factors. Therefore, the

two C-BDI-II factors were given the same names as those of the BDI-II factors, that is, Somatic-Affective and Cognitive dimension.

(vi)   C-BSS

The C-BSS includes 21 items. Items 1 to 19 represent an exact translation of the original English-language SSI (Beck, Steer, & Ranieri, 1988), which are used to measure suicidal ideation. Items 20 and 21 of C-BSS represent the ratings of frequencies and intensity of past suicide attempts. Therefore, the two items were excluded in the factor analyses of the C-BSS.

As with the factor analyses used in the C-BDI-II, the C-BSS data were factor analysed with a principal axis factoring analysis. The Kaiser-Meyer-Olkin measure showed that the data were adequate for a factor analysis (KMO=0.95). Two factors with eigenvalues in excess of one were found (Eigenvalues—10.96 and 1.16). After considering the scree test, interpretability and the previous analysis of the BSS (Holden, Mendonca, & Mazmanian, 1985), two factors were extracted from the C-BSS. The principal axis factoring solution accounted for 59.69% of the total variance of the data. The factor scree plot of the C-BSS is shown in Appendix I, Figure 6.

The items and factor loadings from the pattern matrix with Promax rotation for the C-BSS factor analyses are presented in Table 4.11. As can be seen, Item 19 (deception) may be omitted because its factor loading was less than .30. Factor 1, defined by Items 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14 and 15, mainly included desire for suicide such as wish to live, wish to die, passive attempt and control over action. The factor was labeled Suicidal Wishes. Factor 2, defined by Items 12, 13, 16, 17 and 18, mainly revolved around plans for suicide such as specificity of planning, actual preparation, suicide note and final acts. This factor was labeled Suicidal Plans. The correlation between Factor 1 and Factor 2 was .77.

- 134 -

Table 4.11

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the Beck Scale for Suicidal ideation (C-BSS) for Major Depressive Patients (N = 162)

C-BSS item	Factor[a]	
	1	2
1. Wish to live	**.68**	.08
2. Wish to die	**.70**	.14
3. Reason for living	**.67**	.18
4. Active attempt	**.74**	.15
5. Passive attempt	**.69**	-.10
6. Duration of thoughts	**.52**	.35
7. Frequency of ideation	**.48**	.35
8. Attitude toward ideation	**.83**	.02
9. Control over action	**.93**	-.11
10. Deterrents to attempt	**.83**	.02
11. Reasons for attempt	**.67**	-.10
12. Specificity of planning	.18	**.58**
13. Availability/opportunity	.36	**.42**
14. Capability	**.63**	.21
15. Expectancy	**.73**	.19
16. Actual preparation	.17	**.61**
17. Suicidal note	-.11	**.84**
18. Final acts	-.18	**.99**
19. Deception	.25	.27

Note. Numbers in bold type show the highest factor loadings among the three factors except for Item 19 because its loading is less than .30. Item numbers of the C-BSS correspond with item numbers in Beck, Steer, & Ranieri, 1988.
a Factor 1 = Suicidal Wishes, Factor 2 = Suicidal Plans.

The comparisons of the factorial components of the C-BSS and those of the original SSI reported by Holden et al. (1985) are summarized in Table 4.12. As can be seen, 9 out of the 13 items in the C-BSS Factor 1 loaded on the SSI Factor 1 (labeled Suicidal Desire), and all the items in the C-BSS Factor 2 loaded on the SSI Factor 2 (labeled Suicidal Preparation). The results indicate that the factor structure of the C-BSS is similar to that of the original SSI reported by Holden et al. (1985).

Table 4.12

Items of the Factor Analysis of the C-BSS Loaded on the Factors of the SSI by Holden, Mendonca and Mazmanian (1985)

	C-BSS		Holden et al.'s (1985)
Factor[a]	Item	Loading	SSI Factor
Factor 1	9	.93	F1 (Suicidal Desire)
	8	.83	F1 (Suicidal Desire)
	10	.83	F2 (Suicidal Preparation)
	4	.74	F1 (Suicidal Desire)
	15	.73	F2 (Suicidal Preparation)
	2	.70	F1 (Suicidal Desire)
	5	.69	F2 (Suicidal Preparation)
	1	.68	F1 (Suicidal Desire)
	3	.67	F1 (Suicidal Desire)
	11	.67	F1 (Suicidal Desire)
	14	.63	F2 (Suicidal Preparation)
	6	.52	F1 (Suicidal Desire)
	7	.48	F1 (Suicidal Desire)
Factor 2	18	.89	F2 (Suicidal Preparation)
	17	.85	F2 (Suicidal Preparation)
	16	.72	F2 (Suicidal Preparation)
	12	.71	F2 (Suicidal Preparation)
	13	.52	F2 (Suicidal Preparation)

Note. [a] Factor 1 = Suicidal Wishes, Factor 2 = Suicide Plans.

4.2.3 Discussion

This stage was designed to check the factor structure of the standard Chinese-language scales for a sample of 162 MDD patients in Taiwan. The examination of the factor structure of these scales was based on the need for valid assessment tools to accurately measure suicide attempts and their predictor variables. Factor analyses showed that the factorial composition of the C-MDSS, the C-DAS

and the C-BDI-II clearly resembled those of the English versions of the MDSS (Winefield et al., 1992), the DAS-24 (Power et al., 1994), and the C-BDI-II (Beck, Steer et al., 1996), respectively. In addition, the factor structure of the C-BSS is similar to that of the SSI in a published report (Holden et al., 1985). However, it was found that Items 9 and 24 in the C-DAS, Item 17 in the C-BDI-II and Item 19 in the C-BSS may be omitted because these items had relatively low factor loadings or loaded substantially on two factors. Therefore, these items were not used in subsequent data analyses.

Factor analyses on the C-HS data from a sample of Taiwanese MDD patients yielded three factors labeled Future Confidence, Future Expectation and Motivation for the Future. The result is inconsistent with the work of Beck, Weissman et al. (1974), which reported three HS factors labeled Feelings about the Future, Loss of Motivation and Future Expectations in their factor analytic study with a sample of 294 patients who had made suicide attempts. Also, the present results of the C-HS factor analyses are inconsistent with the work of Nekanda-Trepka, Bishop and Blackburn (1983), which indicated that the English-language HS possessed five factors in their factor analytic study with a sample of 83 MDD patients. These discrepant findings suggest that the factor structure of the Hopelessness Scale may change in different clinical samples across different countries. In addition, the three factors of the C-HS were highly interrelated. They can be summed together into one large scale to measure general tendencies toward hopelessness in Taiwanese MDD patients. Moreover, it was found that Item 2 may be deleted from the calculation of hopelessness level and not used in subsequent data analyses because the item loaded substantially on two factors.

Of particular interest is the finding that the factor analysis of the C-CTI yielded two factors, Negative Depressive Cognition and Positive Depressive

Cognition. They consisted of positively and negatively worded items from the three components of the cognitive triad. The result fails to support Beck's three-factor model, which hypothesized that the components of the triad are three separable entities (Beck, 1967). However, the result is similar to the work of Greening et al. (2005), which indicated that the phrasing rather than the content of items significantly influenced the factor structure of the child version of the CTI in their factor analytic study with high-school students. In the present study, the responses of Taiwanese MDD patients to the C-CTI were influenced by their positive and negative overall expectations about the self, the world and the future. Several theories may be advanced to account for the findings. First, the sample used in this study consisted of patients with Major Depressive Disorder seeking treatment in hospitals. They may be severely sick and thus may be more likely to describe each negative thought of the cognitive triad in the same magnitudes.

Another possible explanation is that the cognitive triad claimed by Beck may not exist. So far, none of the studies (Anderson et al., 1995; Greening et al., 2005, Mcintosh et al., 2000) examining the factor structure of the triad as measured by the CTI have found support for the supposed three-factor structure. In this study, therefore, it is no surprise to find that there was no clear separation of negative thoughts about the self, the world and the future. Instead, the empirically derived factors of the C-CTI reflected the participants' overall depressive cognition in positive and negative ways.

To take the C-CTI model a step further, there was a high correlation between the two factors ($r = .69$, $p < .001$). The result suggests that the C-CTI is an instrument with two highly correlated subscales. Because the two factors represented a general cognition of MDD patients toward depression in positive and negative ways and had high correlation with each other, they could be added

together into one large scale and be used as one overall index to examine a general tendency toward depressive cognition in MDD patients. In the subsequent study of Stage 2, the combination of the two C-CTI factors, which was termed Depressive Cognition, was used for the data analyses of the competing models.

4.3   Stage II: Testing the Competing Models in MDD Patients

According to the strategy of competing models suggested by Jöreskog (1993), the procedures of the comparison of competing models include two steps. First, a researcher has specified several alternative or competing models, which are derived from developed theories. Second, following analysis of a single set of empirical data, the researcher selects the most parsimonious model in representing the sample data. Based on previous theories and empirical research findings described in the literature review of this research, four competing models were specified and compared in this stage. They were the interactional model A and B (IM-A and IM-B) and the mediational model A and B (MM-A and MM-B). These hypothesized models were compared through SEM procedures, and then the best-fitting model was selected to represent the given data. In addition, this study was exploratory; thus, the strategy of model trimming (Houghton, 2000) was used to improve the goodness-of-fit of the best-fitting model. Subsequently, by the findings of significant paths that directly or indirectly link the predictor variables to suicide attempts in the best-fitting model, the aetiological processes of suicidality among Taiwanese MDD patients were scrutinised.

4.3.1 Methods

(1)   Participants

The participants used in stage 2 are identical to the participants ($N = 162$) in Stage 1. As with the application of factor analyses, in the application of SEM

techniques, a sufficiently large sample size is required. Although there is no definite criterion about what sample size is sufficient, according to recent information (Crowley & Fan, 1997; Kline, 1998), 200 has been suggested to be a bottom-line number. However, the complexity of the model and the number of parameters to be estimated must also be considered. Five to ten participants per estimated parameter have been suggested to make reliable conclusions (Crowley et al., 1997). For example, if a model has 10 estimated parameters, at least 100 participants are required in the application of SEM techniques. In this study, there were 10 to 11 estimated parameters in the hypothesized competing models (see Figure 2.5). This suggests that at least 110 participants are required in the application of SEM. In the present study, therefore, the sample size of 162 participants was adequate for the required SEM techniques.

(2)   Measures

The assessment tools used in this study included C-LTE, C-MDSS, C-DAS, C-CTI, C-HS, C-BDI-II, C-BSS and the Background-demographic Information Questionnaire. All the Chinese-language scales were observed to be satisfactory in reliability and validity analyses (see Chapter 3). Most of the scales have appropriate factor structure except for the C-CTI and the C-HS. The cognitive triad measured by the C-CTI was renamed Depressive Cognition because the factorial components of the triad were two rather than three discrete factors as reported by Beck (1967). The two factors of the C-CTI were highly correlated, therefore, the combination of the two C-CTI factors was used to measure general tendencies toward depressive cognition in Taiwanese MDD patients. Likewise, as the three factors of the C-HS were highly correlated, they were summed together to measure general tendencies toward hopelessness in Taiwanese MDD patients. In addition, suicide attempts were operationalized as numbers of previous suicide attempts according to the WHO

definition. Thus, suicide attempts were measured by the Item 20 of the C-BSS, which was scored from 0 (no suicide attempt) to 2 (suicide attempts two times or more). Participants are required to rate an appropriate score on the item, which reflects the frequencies of suicide attempts experienced during the past 6 months. Compliance with medications was operationalized as a self-devised item relating to MDD patients' compliance with taking antidepressants. The item is rated on a 5-point Likert-type scale ranging from 1 (*totally no compliance*) to 5 (*full compliance*). The item is included in the self-devised Background-demographic Information Questionnaire. Finally, nine data sources were used in this study, as follows:

1) Negative life events as assessed by the Chinese version of the List of Threatening Experiences (C-LTE).

2) Social support as measured by the Chinese version of the Multidimensional Support Scale (C-MDSS).

3) Dysfunctional attitudes as measured by the Chinese version of the short-version of the Dysfunctional Attitude Scale (C-DAS).

4) Depressive cognition as measured by the Chinese version of the Cognitive Triad Inventory (C-CTI).

5) Hopelessness as measured by the Chinese version of the Hopelessness Scale (C-HS).

6) Depressive symptoms as measured by the Chinese version of the Beck Depression Inventory-II (C-BDI-II).

7) Suicidal ideation as measured by the Chinese version of the Beck Scale for Suicidal Ideation (C-BSS).

8) Suicide attempts experienced during the past six months as measures by the Item 20 of the C-BSS.

9) Patients' demographic information, including sex, age and compliance with medications, as measured by the self-devised Background-demographic Information Questionnaire.

All the questionnaires were stapled together to form one document and were then administered to participants, as in the previous studies of this research. The first part of the questionnaire document was the Background-Demographic Information Questionnaire. The subsequent sequence of the questionnaires was as follows: the C-LTE, the C-MDSS, the C-DAS, the C-CTI, the C-HS, the C-BDI-II and the C-BSS. Prior to data analyses in the present study, three items (9, 15 and 24) in the C-DAS were omitted from the sum of the total C-DAS score because they had relatively low factor loadings in the study of factor analyses and low item-total correlations in the study of internal consistency. In the C-CTI, the six filler items (1, 2, 4, 7, 14 and 22) were omitted from the sum of the total C-CTI score. As well, Items 5 (I am a failure), 21 (I hate myself), and 29 (I am guilty of a great many things) were omitted due to their inclusion in both the C-CTI and the C-BDI-II. In the C-HS, Item 2 was omitted because it loaded substantially on two factors in the C-HS factor analyses. In the C-BDI-II, Item 9 (suicidal thought) was omitted from the calculation of depression level due to its inclusion in the C-BSS. Item 17 in the C-BDI-II was also omitted because its factor loading was less than .30. Likewise, Item 19 in the C-BSS was omitted because its factor loading was less than .30.

(3)   Statistical Analyses

In order to compare the hypothesized competing models and investigate complex multivariate relations in the competing models, SEM techniques were applied. As compared to more traditional approaches, the use of SEM has several advantages. First, complex relations involving chains of moderating and mediating

variables can be modeled. Second, the goodness-of-fit of a whole model can be evaluated to indicate the extent to which a postulated model explains the variances and covariances in the data matrix. Third, SEM provides regular path coefficients and R^2 as well as direct and indirect effects of an independent variable on a dependent variable (Dieserud et al., 2001; Kwon & Oei, 1992). Therefore, by using SEM methodology, it is possible to formulate the hypothesized structure of the competing models, to compare the competing models simultaneously in terms of goodness-of-fit, and to investigate the possible paths that directly or indirectly link the predictor variables to suicide attempts within a model. In this study, prior to data analyses, all negatively phrased items were reverse coded and all missing data were replaced with the regression estimation method implemented in Statistical Package for the Social Sciences (SPSS) version 11.0 for Windows.

4.3.2 Results

(1)   Univariate Statistical Analyses and Statistical Assumptions

In SEM, either maximum likelihood (ML) or generalized least squares (GLS) estimation requires that the data of observed variables should be continuous and have a normal distribution. Therefore, it is necessary to examine the skewness and kurtosis of the current data. If the absolute values of univariate skew indices are greater than 3.0, or the absolute values of kurtosis indices are over 10.0, the data distribution can be regarded as nonnormal (Kline, 1998). Under these circumstances, the asymptotic distribution-free technique is more appropriate than ML and GLS.

Data normality was evaluated by using SPSS skewness and kurtosis estimation method. Results show that the skewness of the involved variables ranged from -1.48 to 1.41 and kurtosis ranged from -2.03 to 2.56 (see Table 4.13A). Therefore, the maximum likelihood estimation technique was used to estimate parameters.

Table 4.13A

Means, Standard Deviations, Skewness and Kurtosis of the Variables for MDD Patients in the Main Study (N = 162)

Variables	Mean	SD	Skewness	Kurtosis
Sex	.46	.50	.18	-1.99
Age	43.20	13.02	.05	-.72
Compliance with medications	4.25	.99	-1.48	1.84
Negative life events	2.68	2.39	1.41	2.56
Social support	28.93	7.94	.01	-.38
Dysfunctional attitudes	102.56	18.09	-.19	-.19
Dysfunctional attitudes (effect coding)	0.01	1.00	-0.03	-2.03
Depressive cognition	117.47	31.85	-.19	-.39
Hopelessness	12.55	5.47	-.76	-.47
Depression	29.02	13.97	-.36	-.74
Suicidal ideation	14.05	10.49	.18	-1.14
Suicide attempts	.96	.90	.08	-1.78
Interaction variable	0.56	4.36	0.08	-0.03

The interaction variable in the hypothesized interactional models (i.e., the IM-A and the IM-B) was derived from the product of negative life events and dysfunctional attitudes. When independent variables within a model become more highly correlated, it becomes more and more difficult to determine which variable is actually producing an effect on the dependent variable. This is referred to as the problem of multicollinearity (Williams, 2007). To avoid multicollinearity, researchers should convert parameters obtained by using original ratings to parameters obtained by using effect coding (i.e., -1, +1 coding) (Calvete & Cardeñoso, 2005). In the interactional models, dysfunctional attitudes, negative life events and their interaction are highly correlated with one another. Therefore, effect coding was used to represent high and low levels of the dysfunctional attitudes. The C-DAS scores were coded -1 if they were below the mean (102.56) and +1 if above the mean. Finally, the interaction variable was the product of the C-DAS scores

obtained by using effect coding and the original C-LTE scores. Moreover, the scores of the C-DAS in the mediational models were also converted from original scores to effect coding so that comparisons of the mediational models and the interactional models could be made. The skewness and kurtosis of the C-DAS with effect coding and the interaction variable were presented in Table 4.13A.

Table 4.13B

Frequencies and Percentages of the Variables for MDD Patients in the Main Study (N = 162)

Variables	N	(%)
Negative life events (Multiple responses):		
1. Serious illness or injury to subject	51	(31.5)
2. Serious illness or injury to a close relative	28	(17.3)
3. Death of first-degree relative	15	(9.3)
4. Death of close family or friend	22	(13.6)
5. Marital separation	16	(9.9)
6. Broke off a steady relationship.	31	(19.1)
7. Serious problem with a close friend, neighbor, or relative	59	(36.4)
8. Unemployed / seeking work for more than one month	67	(41.4)
9. Sacked from job	13	(8.0)
10. Major financial crisis	75	(46.3)
11. Problems with police and a court appearance	20	(12.3)
12. Something valuable lost or stolen.	17	(10.5)
Causes of no compliance with medications (Multiple responses):		
1. Feeling better	14	(8.6)
2. Fear of side effects (e.g., dizzyness, concentration difficulty)	34	(21.0)
3. Activities of daily lives disturbed by the side effects	22	(13.6)
4. Fear of drug addiction	25	(15.4)
5. Lack of efficacy	10	(6.2)
6. Lack of good associations with doctor	2	(1.2)
7. Lack of support from family	10	(6.2)
8. I have to solve my problems without drugs	16	(9.9)
9. Forgetting to take drugs	16	(9.9)
10. Others	8	(4.9)

Table 4.13B shows the frequencies and percentages of negative life events and causes of no compliance with medications for the 162 MDD patients. As can be seen, individual financial crisis and unemployment were reported to be the most important sources of negative life events in Taiwanese MDD patients. In addition, the leading three causes of no compliance with medications were fear of side effects (e.g., dizzyness and concentration difficulty), fear of drug addiction, medications disturbing daily life activities.

To assess goodness of overall model fit, the following fit indices suggested by Byrne (1989, 2001), Hu and Bentler (1995, 1999), Kline (1998) and Tanaka (1993) were used: First, the model chi-square was used; this statistic tests the hypothesis that the model is correct but it is sensitive to the size of correlations and to sample size; commonly, to overcome these problems, it is divided by the model degrees of freedom and a rule-of-thumb is that this value should be less than about two for a good fitting model; second, the Goodness-of-Fit Index (GFI) was used and values greater than about .90 were interpreted as indicating acceptable fit; third, the Comparative Fit Index (CFI) was evaluated and values greater than about .90 indicate acceptable fit; fourth, the Standardized Root Mean Square Residual (SRMR) was assessed and values less than .05 were taken to indicate good fit. Finally, the Root Mean Square Error of Approximation (RMSEA) was used; the RMSEA is a parsimony-adjusted index where values less than about .05 indicate close approximate fit and RMSEA greater than or equal to .10 suggests poor fit. These fit indices were calculated using AMOS version 4.0 software with the maximum likelihood estimation technique (Arbuckle, 1999).

An additional objective of this study was to explore causal paths that link the predictor variables to suicide attempts. The structural relationships of the four hypothesized models, which described the relations between the predictor variables

and suicide attempts, were of interest. Therefore, using the strategies of Oei and his colleagues (Kwon & Oei, 1992; Oei, Hibberd, & O'Brien, 2005; Oei & Kwon, 2007), all variables were treated as manifest variables in the models. That is, perfect measurement was assumed; there is no measurement error for the variables.

(2) Structural Equation Analyses of the Competing Models in MDD Patients

First, SPSS was used to evaluate Pearson product-moment correlations among the observed variables. As presented in Table 4.14, significant correlations are shown in bold type. A legend showing abbreviations used in the correlation matrix is presented in Table 4.15. Table 4.14 indicates that most correlations between the observed variables were significant, and varied from negligible (sex versus DAs: $r = -.01$) to rather strong (DC versus Hs: $r = .77$). Depressive cognition (DC), hopelessness (Hs), Depression (Dep) and suicidal ideation (SI) were quite strongly interrelated.

Table 4.14

Correlations between All Involved Variables in the Competing Models for MDD Patients in the Main Study (N = 162)

	Sex	Age	CMs	NLEs	SS	DAs	DC	Hs	Dep	SI	SAs	Int
Sex	1.00	**-.26*****	-.05	-.13	-.09	-.01	-.07	-.05	-.05	-.08	-.08	-.03
Age		1.00	**.19***	**-.23***	.09	-.04	-.07	-.07	-.12	**-.15***	**-.21***	-.03
CMs			1.00	-.15	.12	-.08	-.05	-.06	**-.18***	-.06	-.04	-.02
NLEs				1.00	**-.20***	**.21****	**.28*****	**.27*****	**.33*****	**.32*****	**.34*****	**.26*****
SS					1.00	**-.15***	**-.58*****	**-.51*****	**-.45*****	**-.40*****	**-.25****	-.12
DAs						1.00	**.32*****	**.25****	**.33*****	**.19***	.15	**.84*****
DC							1.00	**.77*****	**.72*****	**.57*****	**.33*****	**.24****
Hs								1.00	**.76*****	**.65*****	**.30*****	**.16***
Dep									1.00	**.76*****	**.47*****	**.26*****
SI										1.00	**.61*****	**.16***
SAs											1.00	.13
Int												1.00

Note. * $P < .05$, ** $P < .01$, *** $P < .001$.

Table 4.15

Legend of Abbreviations Used for Variables in Table 4.14 and Table 4.20

Abbreviation	Variable
CMs	Compliance with Medications
NLEs	Negative Life Events
SS	Social Support
DAs	Dysfunctional Attitudes (effect coding)
DC	Depressive Cognition
Hs	Hopelessness
Dep	Depression
SI	Suicidal ideation
SAs	Suicide Attempts
Int	Interaction (DAs * NLEs)
Parcel 1	Parcel 1: Hopelessness
Parcel 2	Parcel 2: Positive Depressive Cognition
Parcel 3	Parcel 3: Negative Depressive Cognition

Second, four competing models were tested by using AMOS 4.0. As outlined in Chapter one, the interactional model A (IM-A) hypothesizes that negative life events interact with dysfunctional attitudes to influence depression, which in turn affects suicidal ideation, which in turn leads to suicide attempts. Depressive Cognition mediates the interaction effect of negative life events and dysfunctional attitudes on depression. On the other hand, social support mediates the impact of negative life events on dysfunctional attitudes, depressive cognition and depression. Social support also increases patients' compliance with medications, which in turn prevents the development of depression. Age and sex exert direct influences on negative life events and social support. In addition, both negative life events and dysfunctional attitudes have direct effects on depressive cognition and depression, and depressive cognition exerts a direct effect on suicidal ideation. The interactional model B (IM-B) has the same hypotheses of the IM-A. However, hopelessness replaces the depressive cognition to be the mediator in the IM-B.

The mediational model A (MM-A) hypothesizes that negative life events influence dysfunctional attitudes to increase the frequency of depressive cognition, which then leads to the development of depression, which in turn precipitate suicidal ideation, which finally result in suicide attempts. On the other hand, social support mediates the impact of negative life events on dysfunctional attitudes, depressive cognition and depression. Social support also increases patients' compliance of medications, which in turn prevents the development of depression. Sex and age influence negative life events and social support. In addition, both negative life events and dysfunctional attitudes have direct effects on depressive cognition and depression, and depressive cognition has a direct influence on suicidal ideation. The mediational model B (MM-B) has the same hypotheses of the MM-A. However, hopelessness replaces the depressive cognition to be the mediator in the MM-B.

The maximum likelihood estimation method was used to estimate parameters because the analyses of skewness and kurtosis indicated that the data of the observed variables from the sample were normally distributed. A summary of goodness-of-fit indices for each model is presented in Table 4.16.

Table 4.16

Results of the AMOS Analyses of the Competing Models for MDD Patients in the Main Study (N = 162)

Model	χ^2	df	p	χ^2/df	GFI	CFI	SRMR	RMSEA
1. Interactional model A	255.62	35	<.001	7.30	.84	.67	.148	.198
2. Interactional model B	259.96	35	<.001	7.40	.84	.67	.149	.199
3. Mediational model A	42.43	26	.022	1.63	.95	.97	.066	.063
4. Mediational model B	45.54	26	.010	1.75	.95	.96	.065	.068

Note. df = degrees of freedom; GFI = Goodness-of-Fit Index; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation.

(i)   Interactional model A (IM-A) and interactional model B (IM-B)

The SEM analyses indicated that both the IM-A and the IM-B failed to provide an adequate overall fit to the sample data although most of the paths in the two models were significant. The rejection of the interactional models indicated that, for the present data, the hypotheses of the two models were not supported. The fit indices for the two interactional models are shown in Table 4.16. As can be seen, no fit index for the two models reached the acceptable threshold levels. The structural diagrams and standardized parameter estimates of the two interactional models are presented in Figure 4.1 with error variances omitted for clarity. As can be seen, the interaction effect of negative life events and dysfunctional attitudes on depressive cognition and depression in the IM-A was -.12 ($p > .05$) and -.01 ($p > .05$), respectively. The interaction effect of negative life events and dysfunctional attitudes on hopelessness and depression in the IM-B was -.20 ($p > .05$) and .05 ($p > .05$), respectively. The structural equation analyses show that dysfunctional attitudes did not interact with negative life event to predict the mediation components (i.e., depressive cognition and hopelessness) and depression. However, deleting the interaction variables improved the goodness-of-fit of the two models to the given data, the IM-A: χ^2 (27, $N = 162$) = 48.35, $p = .007$, χ^2/df = 1.79, GFI = .95, CFI = .95, SRMR = .07, RMSEA = .07, and the IM-B: χ^2 (27, $N = 162$) = 51.45, $p = .003$, χ^2/df = 1.90, GFI = .95, CFI = .95, SRMR = .07, RMSEA = .08.
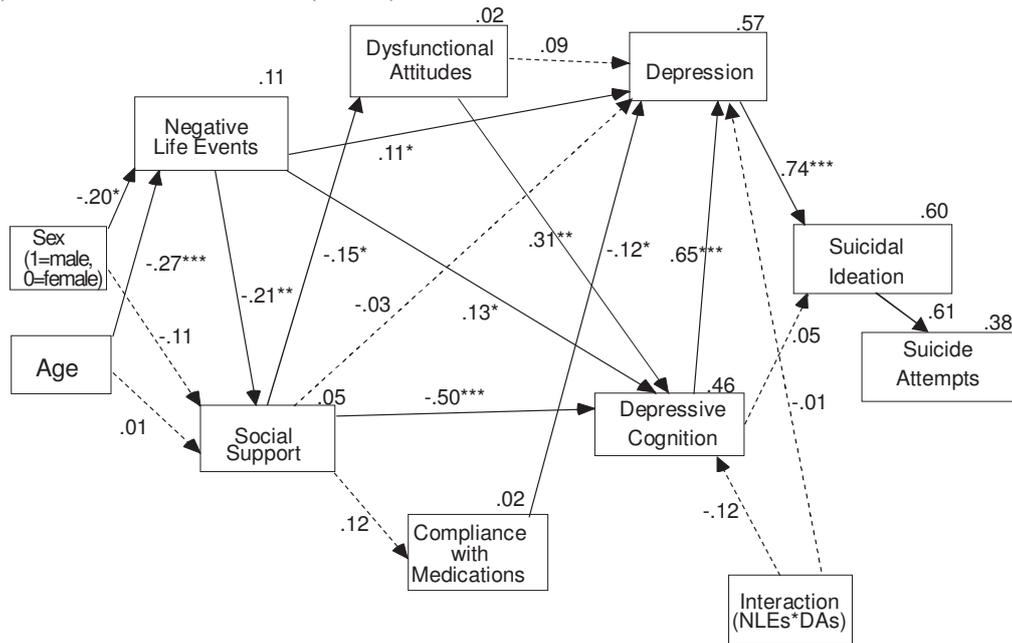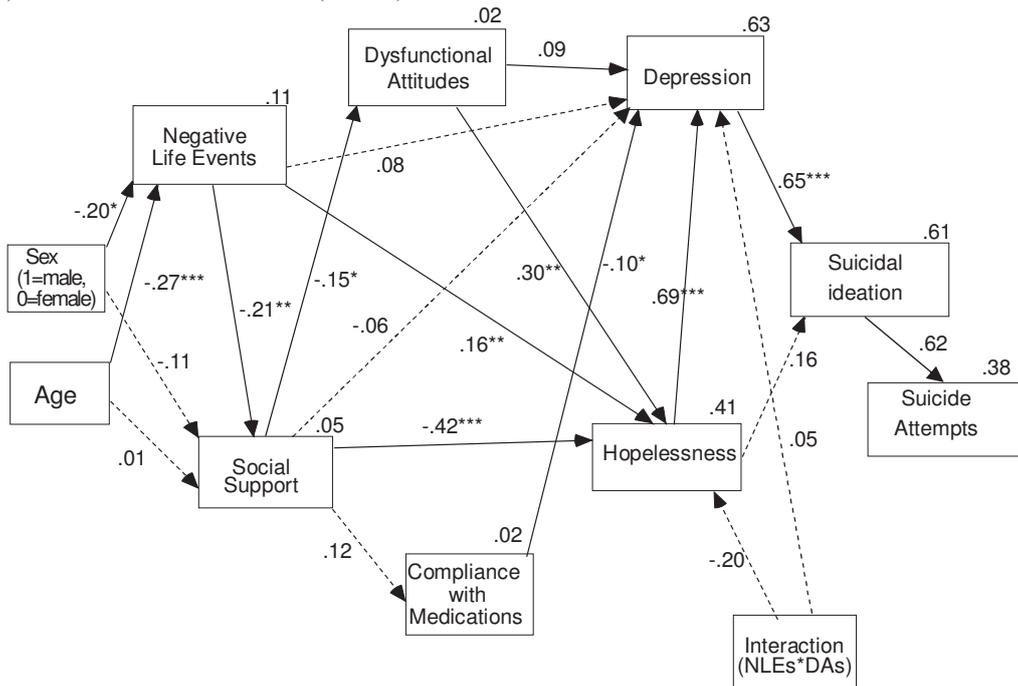
Figure 4.1. Standardized parameter estimates for the integrated interactional models in MDD patients: (1) interactional model A, and (2) interactional model B.

Dotted lines represent non-significant paths. Error variances have been omitted for purposes of presentation. Standardized regression path estimates (*p < .05, **p < .01, ***p < .001) indicate the change in the dependent variable for one standard deviation in the independent variable. Squared multiple correlations are shown at the top-right corner of variables.

The present findings are notably inconsistent with the theory of depressogenic schemas by Beck (1967, 1983), which hypothesizes that negative life events interact with dysfunctional attitudes to influence mediation components and depression. In order to explain the difference between the present findings and Beck's interaction concept, univariate ANOVAs were conducted to examine the interaction effects of negative life events with dysfunctional attitudes on the two mediation components and depression. The 2×2 ANOVAs split the data into groups based on the C-DAS scores (0 = low level, 1 = high level) and the C-LTE scores (0 = low level, 1 = high level) and the mean values of the C-DAS and the C-LTE were used as the cutoff values of the high and low levels of the C-DAS and the C-LTE, respectively. The ANOVAs revealed that the main effects of negative life events and dysfunctional attitudes on the two mediation components and depression were significant, but the interaction of negative life events with dysfunctional attitudes was not significant. The results from these analyses are shown in Table 4.17. Another method for examining the nature of this interaction is displayed graphically in Figure 4.2. As shown in Figure 4.2, each value of C-DAS defines a different line for predicting change in levels of depressive cognition, hopelessness and depression from C-LTE. In the first figure, when C-DAS is high, the slope of this line is positive, indicating a strong positive relationship between C-LTE and depressive cognition. When C-DAS is low, the slop of the line also indicates that C-LTE has a strong positive relation to depressive cognition. Likewise, the second and third figures in the Figure 4.2 show the results that C-LTE has positive relations to hopelessness and depression in both high and low values of C-DAS. In addition, these figures indicated that participants who had higher C-DAS when having higher C-LTE scores reported higher on depressive cognition, hopelessness and depression

than participants with lower C-DAS scores. Participants who had higher C-DAS but lower C-LTE scores also reported more depressive cognition, hopelessness and depression than participants with lower C-DAS scores. The results indicated that the effects of dysfunctional attitudes on depressive cognition, hopelessness and depression were not moderated by negative life events. These findings are further explained under Discussion, below.

Table 4.17

Univariate ANOVAs for Depressive Cognition, Hopelessness and Depression

Dependent variables			C-LTE		Significant results
			Low	High	
Depressive Cognition	C-DAS	Low	99.7 (3.9)	122.6 (5.7)	Sig. main effects, $F_s(1,158)$ = 17, $p < .001$ for C-LTE & 10.9, $p < .001$ for C-DAS; Non-sig. interaction effect, $F(1,158) = .53$, $p = .47$.
		High	118.8 (4.8)	134.7 (4.3)	
Hopelessness	C-DAS	Low	9.9 (0.7)	15.3 (1.0)	Sig. main effects, $F_s(1,158)$ = 19.4, $p < .001$ for C-LTE & 4.4, $p = .04$ for C-DAS; Non-sig. interaction effect, $F(1,158) = 3.1$, $p = .08$.
		High	13.3 (0.9)	15.6 (0.8)	
Depression	C-DAS	Low	21.4 (1.7)	33.9 (2.5)	Sig. main effects, $F_s(1,158)$ = 28.9, $p < .001$ for C-LTE & 10.4, $p < .001$ for C-DAS; Non-sig. interaction effect, $F(1,158) = .47$, $p = .49$.
		High	29.5 (2.1)	39.2 (1.9)	
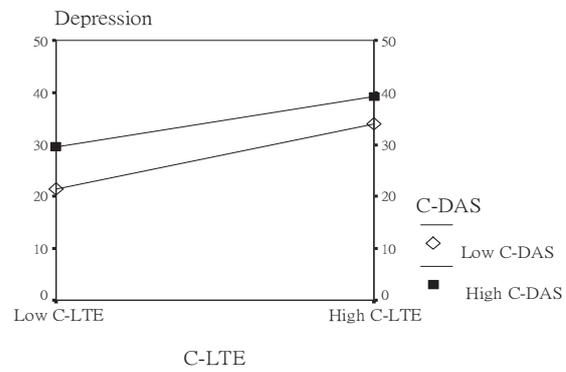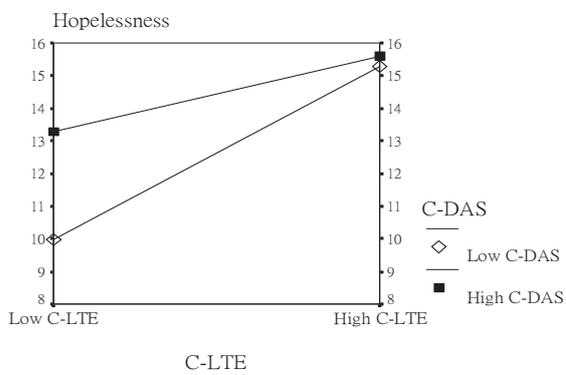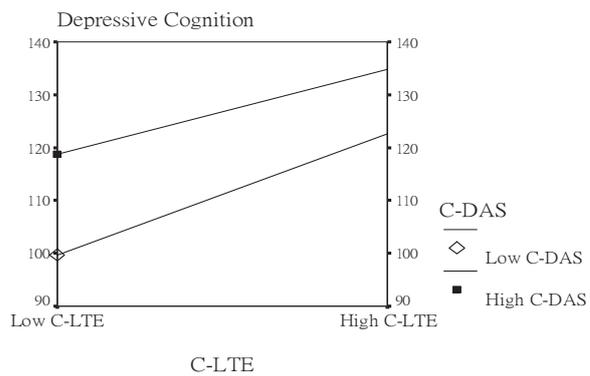
Figure 4.2. Non-significant interaction effects.

(ii)   Mediational model A

As can be seen in Table 4.16, the χ^2 statistic of the MM-A was significant, χ^2 (26, N = 162) = 42.43, p = .022, . This indicates that the overall fit of the present data to the MM-A was not adequate. However, the χ^2/ df ratio of 1.63 was acceptable for a good fitting model. In addition, the other fit indices for the MM-A indicated a good fit: the GFI was .95, which exceeded the acceptable criterion level of .90; the CFI was .97, which exceeded the .90 criterion; the SRMR was .066, which was close to the recommended .05 level, and the RMSEA was .06, below the acceptable threshold level of .10. The results indicated that the MM-A fitted the sample data well.

Figure 4.3 presents the structural diagrams and the standardized parameter estimates of the MM-A. As shown in Figure 4.3 (1), most of the pathways had appropriate parameter estimates. However, some pathways between independent variables and dependent variables were non-significant. Sex and age were not significantly related to social support (β = -.11 and β = .01, respectively); social support did not contribute significantly to dysfunctional attitudes (β = -.11), depression (β = -.03) and compliance with medications (β = .12). The direct effects of dysfunctional attitudes on depression (β = .09) and of depressive cognition on suicidal ideation (β = .05) were not statistically significant. In addition, the model shows that depression had stronger correlation with suicidal ideation than had depressive cognition. The model accounted for 37% of variance of suicide attempts.
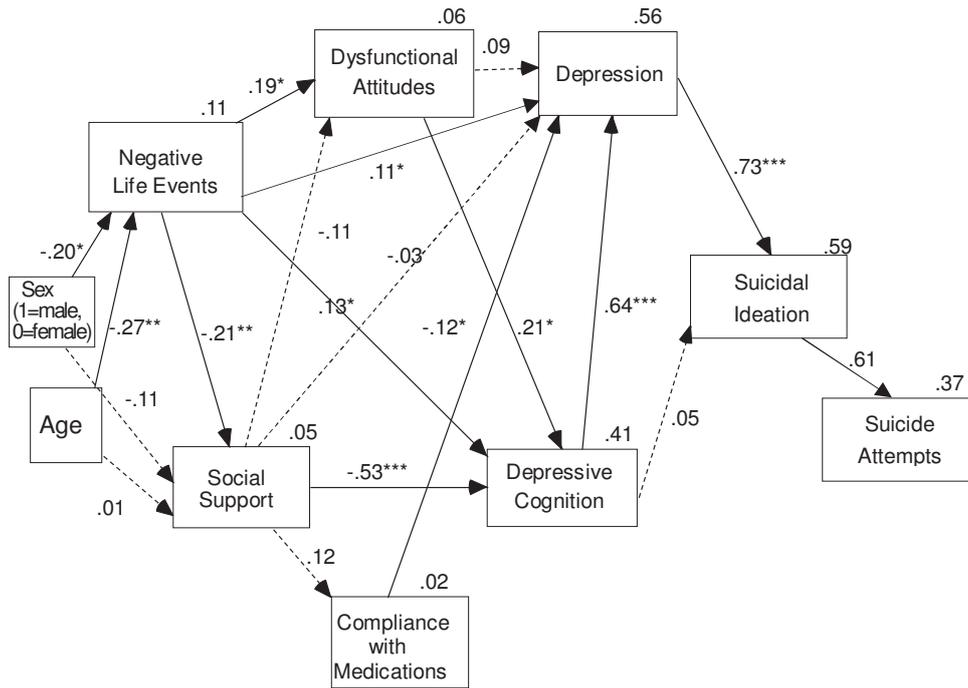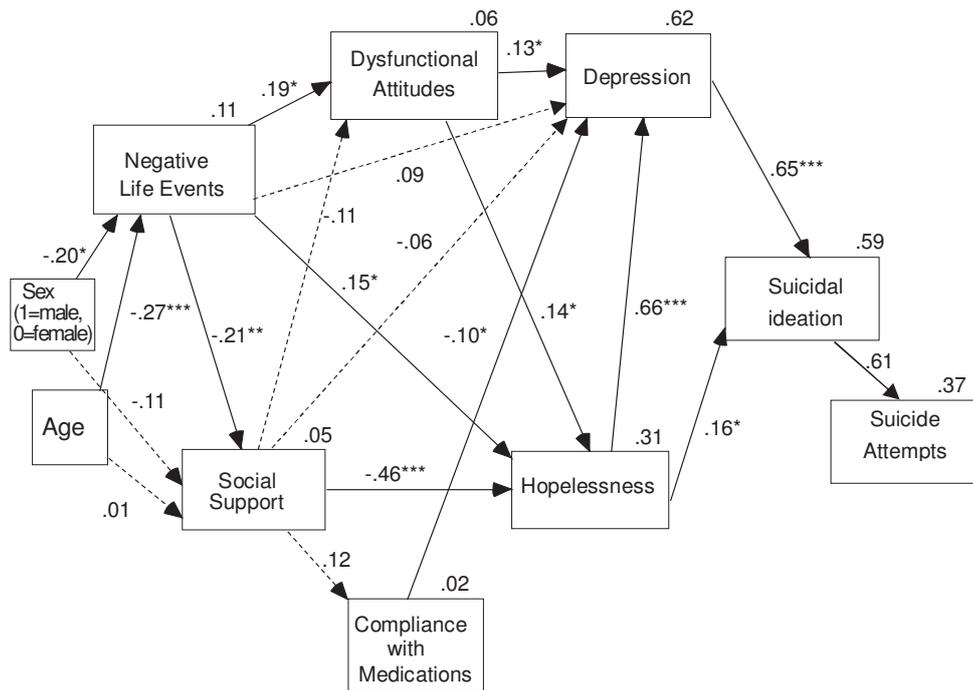
Figure 4.3. Standardized parameter estimates for the integrated mediational models in MDD patients (1) mediational model A, and (2) mediational model B. Dotted lines represent non-significant paths. Error variances have been omitted for purposes of presentation. Standardized regression path estimates (*$p < .05$, **$p < .01$, ***$p < .001$) indicate the change in the dependent variable for one standard deviation in the independent variable. Squared multiple correlations are shown at the top-right corner of variables.

(iii)   Mediational model B

Turning to the statistics for the MM-B in Table 4.16, it was found that the fit indices of the model were very similar to those of the MM-A. The χ^2 statistic (45.54, $p = .01$) and χ^2 / df ratio (1.75) for the MM-B were very close to those for the MM-A (42.43 and 1.63, respectively). In addition, the GFI (.95), the CFI (.96), the SRMR (.065) and the RMSEA (.068) for the MM-B were very close to those for the MM-A. The results indicated that the fit of the present data to the MM-B was good.

The structural diagrams and standardized path estimates of the MM-B are presented in Figure 4.3 (2). As can be seen, the path coefficients for the MM-B are very similar to those for the MM-A. The model also accounted for 37% of variance of suicide attempts. The same as with the MM-A, the path coefficients for the effects of sex and age on social support were not statistically significant (β = -.11 and β = .01, respectively); the direct effects of social support on dysfunctional attitudes (β = -.11), depression (-.06) and compliance with medications (β = .12) did not reach statistical significance. Contrary to the MM-A, negative life events had no significant direct effect on depression, β = .09, while dysfunctional attitudes had significant direct effect on depression, β = .13, and the direct effect of hopelessness on suicidal ideation (β = .16) reached the significance level. In addition, the model shows that depression had stronger correlation with suicidal ideation than had hopelessness.

Of particular interest is the finding that the path coefficient for the effect of hopelessness on depression in the MM-B (β = .66) was very close to that of depressive cognition on depression in the MM-A (β = .64). This implies that hopelessness exerted similar effect on depression compared to depressive cognition. The result also implies that the two mediation components could reflect or represent a common latent variable. It is not necessary to select two very similar models to be

the best-fitting model in representing the given data. Therefore, this study tried to combine the two models to form a single model by merging the two mediation components, that is, depressive cognition and hopelessness.

(3)   Combination of the MM-A and the MM-B

An adequate way to incorporate depressive cognition with hopelessness is to extract a higher order latent construct from the two mediation components. Because the C-CTI consists of 27 items (3 items were omitted due to their inclusion in both the C-CTI and the C-BDI-II) and the C-HS consists of 20 items, parceling techniques were used to reduce the numbers of parameters. Forming parcels results in the estimation of fewer parameters and will thus result in greater stability of parameter estimates given a relatively small sample size (e.g., Bandalos, 2002; Houghton, 2000). Several parceling methods have been suggested by previous researchers. In this study, the internal-consistency approach was used to create parcels (Kishton & Widaman, 1994). The approach uses the facets of a scale as the criteria of grouping items. A parcel is the average of the items in the facet. Parcels are used as lower order manifest indictors of a higher order latent construct. However, prior to Kishton et al.'s item-parceling procedure, the dimensionality of the items to be parceled must be verified. Little, Cunningham and Shahar (2002) have suggested that when the dimensionality of a set of items is not known, the items could be prescreened by using an exploratory factor analysis (EFA) with an oblique rotation. Therefore, an EFA with oblique rotation was conducted on the 47 combined items from the C-CTI and the C-HS.

(4)   Exploratory Factor Analyses of the Combined Items

As with the procedure of factor analyses described above, the responses to the 47 items of the 162 MDD patients were factor analyzed with a principal axis factoring analysis followed by Promax rotation. Examination of the scree plot

provided evidence for a three-factor solution (see Appendix I, Figure 7). The principal axis factoring solution accounted for 44.7% of the total variance in the data. Considering items as acceptable measures of their factor only when the absolute values of factor loadings were 0.3 or higher, the Promax rotation showed all the 47 items loaded on the three factors. Table 4.18 presents the item loadings found for each of the three factors. The correlations of Factor 1 versus Factor 2, Factor 1 versus Factor 3 and Factor 2 versus Factor 3 were .65, .66 and .61, respectively.

The first factor consists of 19 out of 20 items from the C-HS. Therefore, this factor was labeled Hopelessness. The second factor consists of 15 items related to positive views about one's self, world and future; thus, it was labeled Positive Depressive Cognition. The third factor consists of 13 items related to negative views about one's self, world and future; thus it was labeled Negative Depressive Cognition.

Following Kishton et al. (1994), the three factors were used to create three parcels. The first parcel reflected Factor 1 and was the average of the 19 items of Factor 1. Likewise, the second parcel was the average of the 15 items of Factor 2 and the third parcel was the average of the 13 items of Factor 3. Figure 4.4 (Model 1) presents the combined mediational model, which includes eight observed variables and a latent variable labeled depressive hopelessness measured by the three parcels of items. As mentioned, the objective of this study was to explore causal paths that link the predictor variables to suicide attempts. Therefore, this study focused mainly on testing the structural model, which described relations between the involved variables.

Table 4.18

Rotated Factor Loadings from the Pattern Matrix of the Combined Items from the
C-HS and the C-CTI for MDD Patients in the Main Study (N = 162)

NOTE:
This table is included on page 160 of the print copy of
the thesis held in the University of Adelaide Library.

(5)   Structural Equation Analyses of the Combined Mediational Model in MDD Patients

As with the procedure of structural equation analyses described above, first, the skewness and kurtosis of the three parcels (i.e., Parcel 1: Hopelessness, Parcel 2: Positive Depressive Cognition and Parcel 3: Negative Depressive Cognition) were examined. Results showed that the data of the three parcels had a normal distribution, skewness ranged from -.77 to .08 and kurtosis ranged from -.67 to -.45 (see Table

4.19). Because all the other observed variables in the combined model were also normally distributed (see Table 4.13A), the maximum likelihood estimation technique was used to estimate parameters.

Table 4.19

Means, Standard Deviations, Skewness and Kurtosis of the Parcels Created by the C-CTI and the C-HS in the Main Study

Parcel	Mean	*SD*	Skewness	Kurtosis
Parcel 1: Hopelessness	.66	.29	-.77	-.48
Parcel 2: Positive Depressive Cognition	3.99	1.22	.08	-.67
Parcel 3: Negative Depressive Cognition	4.47	1.31	-.30	-.45

Table 4. 20

Correlations between All Involved Variables in the Combined Mediational Model for MDD Patients in the Main Study (N = 162)

	Sex	Age	CMs	NLEs	SS	DAs	Parcel 1	Parcel 2	Parcel 3	Dep	SI	SAs
Sex	1.00	-.26***	-.05	-.13	-.09	-.01	-.05	-.15	.03	-.05	-.08	-.08
Age		1.00	.19*	-.23*	.09	-.04	-.07	.05	-.18*	-.12	-.15*	-.21*
CMs			1.00	-.15	.12	-.08	-.07	-.06	-.03	-.18*	-.06	-.04
NLEs				1.00	-.20*	.21*	.29***	.24**	.26***	.33***	.32***	.34***
SS					1.00	-.15	-.50***	-.56***	-.50***	-.45***	-.40***	-.25**
DAs						1.00	.25**	.27***	.31***	.33***	.19*	.15
Parcel 1							1.00	.68***	.71***	.76***	.64***	.30***
Parcel 2								1.00	.65***	.61***	.50***	.27***
Parcel 3									1.00	.70***	.55***	.34***
Dep										1.00	.76***	.47***
SI											1.00	.61***
SAs												1.00

Note. * *P* < .05, ** *P* < .01, *** *P* < .001.

Pearson product-moment correlations among all the involved variables are presented in Table 4.20. Significant correlations are shown in bold type. A legend showing abbreviations used in the correlation matrix is presented in Table 4.15. As can be seen in Table 4.20, most correlations between the variables were significant. The intercorrelations between the three parcels were highly significant (Parcel 1 versus Parcel 2: $r = .68$, Parcel 1 versus Parcel 3: $r = .71$, and Parcel 2 versus Parcel 3: $r = .65$).

SEM with maximum likelihood estimation was performed on the data of the 162 MDD patients to test the combined model. Results indicated that the model provided an adequate fit to the present data (see Table 4.21, Model 1). The χ^2 statistic of the model was significant, $\chi^2 (44, N = 162) = 80.73$, $p < .001$, which indicated a significant deviation from fit; however, the χ^2 / df ratio of 1.61 was acceptable for a good fitting model. In addition, the GFI was .93, which exceeded the .90 criterion; the CFI was .95, which exceeded the .90 criterion; the SRMR was .06, which was close to the recommended .05 level. The index of parsimony also indicated that the model was acceptable (RMSEA = .072). The model accounted for 37% of variance of suicide attempts.

In terms of the measurement model, the individual reliability estimates of the three parcels exceed the .20 criterion (Jöreskog & Sörbom, 1989), $R^2 = .76$ for Parcel 1, $R^2 = .60$ for Parcel 2 and $R^2 = .68$ for Parcel 3 (see Figure 4.3, Model 1). The construct reliability coefficient (ρ_c) of the latent variable was .86, which exceed the .60 criterion (Bagozzi & Yi, 1988; $\rho_c = (\Sigma \lambda)^2 / [(\Sigma \lambda)^2 + \Sigma(\theta)] = (.87 + .77 + .83)^2 / [(.87 + .77 + .83)^2 + (.24 + .40 + .32)] = .86$). The average variance extracted (ρ_v) of the latent variable was .68, which exceed the .50 criterion (Bagozzi & Yi, 1988; $\rho_v = (\Sigma \lambda^2) / [\Sigma \lambda^2 + \Sigma(\theta)] = (.87^2 + .77^2 + .83^2) / [(.87^2 + .77^2 + .83^2) + (.24 + .40 + .32)] = .68$). The results indicated that the three parcels assessed the latent construct, depressive hopelessness, very well.

Table 4.21

Results of the AMOS Analyses of the Nested Models for MDD Patients in the Main Study (N = 162)

Model	χ^2	df	p	χ^2/df	GFI	CFI	SRMR	RMSEA	χ^2 difference
1. Combined mediational model	80.73	44	<.001	1.84	.93	.95	.062	.072	
2. Modified combined mediational model	95.82	52	<.001	1.84	.91	.91	.071	.072	
3. Add path: sex → suicide attempts	95.53	51	<.001	1.87	.91	.91	.070	.074	
Model 3 – 2 difference									.29
4. Add path: age → suicide attempts	92.15	51	<.001	1.81	.92	.92	.067	.071	
Model 4 – 2 difference									3.67
5. Add path: negative life events → suicide attempts	90.10	51	<.001	1.77	.92	.92	.066	.069	
Model 5 – 2 difference									5.72*
6. Add path: social support → suicide attempts	95.82	51	<.001	1.88	.91	.91	.071	.074	
Model 6 – 2 difference									.00
7. Add path: dysfunctional attitudes→suicide attempts	95.58	51	<.001	1.87	.91	.91	.070	.074	
Model 7 – 2 difference									.24
8. Add path: depressive hopelessness → suicide attempts	95.33	51	<.001	1.87	.91	.91	.072	.073	
Model 8 – 2 difference									.49
9. Add path: depression → suicide attempts	95.79	51	<.001	1.88	.91	.91	.071	.074	
Model 9 – 2 difference									.03
10. Add path: compliance with medications → suicide attempts	95.82	51	<.001	1.88	.91	.91	.071	.074	
Model 9 – 2 difference									.00

Note. df = degrees of freedom; GFI = Goodness-of-Fit Index; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation. *p < .05.

The pathways of the combined mediational model and their standard parameter estimates are present in Figure 4.4 (Model 1). As can be seen, all the three parcels had significant path coefficients ranging from .77 to .87. However, the path coefficients for the effects of sex and age on social support were not statistically significant (β = -.11 and β = .01, respectively); the direct effects of negative life events on depression (β = .03) and of dysfunctional attitudes on depression (β = .05) and of social support on dysfunctional attitudes (β = -.11), depression (β = .13) and compliance with medications (β = .12) did not reach the significance level. In addition, the direct effect of depressive hopelessness on suicidal ideation was not significant, β = .19. Accordingly, the model was modified by deleting the eight non-significant paths.

(6) Structural Equation Analyses of the Modified Combined Mediational Model in MDD Patients

The SEM analyses indicated that the modified combined mediational model provided an adequate fit to the sample data (see Table 4.21, Model 2). Compared with the original combined model, the modified model had slightly higher χ^2 statistic (95.82, p = .002) and the SRMR (.071), slightly lower value of the GFI (.91) and the CFI (.94), the same value of the χ^2/df (1.84) and the RMSEA (.072). The majority of the fit indices reached the acceptable threshold levels. Therefore, the model provided an adequate fit to the given data. The pathways of the modified combined mediational model and their standard parameter estimates are presented in Figure 4.4 (Model 2). As can be seen, all the pathways had appropriate parameter estimates. The model accounted for 37% of variance of suicide attempts.

Using the strategies of Houghton (2000), alternative nested models were then test to examine whether the goodness-of-fit might be improved by adding paths, unspecified a priori, from sex, age, negative life events, social support, dysfunctional

attitudes, compliance with medications, depressive hopelessness and depression to suicide attempts, respectively, in the model. As reflected in Table 4.21 (Model 5), the χ^2 difference test indicated that the addition of the path between negative life events and suicide attempts improved the goodness-of-fit, $\Delta\chi^2$ (1, N = 162) = 5.72, p < .05. The majority of the fit indices reached the acceptable threshold levels, χ^2 (51, N = 162) = 90.10, p < .001, χ^2 / df = 1.77, GFI = .92, CFI = .95, SRMR = .066, RMSEA = .069. The addition of the other respective paths created only a little and non-significant change in χ^2 values.

Figure 4.4 (Model 3) presents the pathways of the final modified combined mediational model and their standard parameter estimates. As can be seen, the beta weight of path from negative life events to suicide attempts was significant with value of .16. Sex and age had negative direct effects on negative life events (β = -.20 and β = -.27, respectively), indicating that female and older MDD patients reported more negative life events than male and younger MDD patients. Negative life events had positive direct effects on dysfunctional attitudes (β = .21), depressive hopelessness (β = .19) and suicide attempts (β = .16). Negative life events had a negative direct effect on social support, β = -.20. The path coefficients for the effects of social support on depressive hopelessness (β = -.53) and of compliance with medications on depression (β = -.12) were negatively significant. In addition, the path coefficients for the effects of dysfunctional attitudes on depressive hopelessness (β = .22) and of depressive hopelessness on depression (β = .83) were positively significant. The direct effects of depression on suicidal ideation and of suicidal ideation on suicide attempts were .76 (p < .001) and .56 (p < .001), respectively. The model accounted for 38% of variance of suicide attempts. Because the model was the combination of the MM-A and the MM-B and the model provided an adequate goodness of fit, it was selected as the most appropriate in representing the data of Taiwanese MDD patients.

Model 1: Combined mediational model
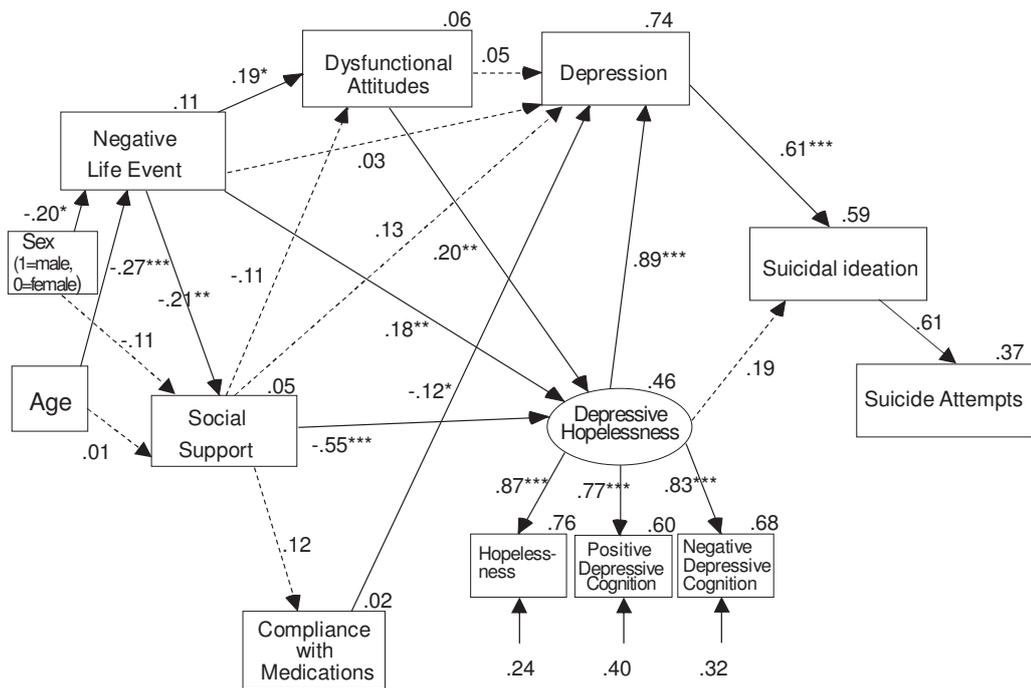
Model 2: Modified combined mediational model
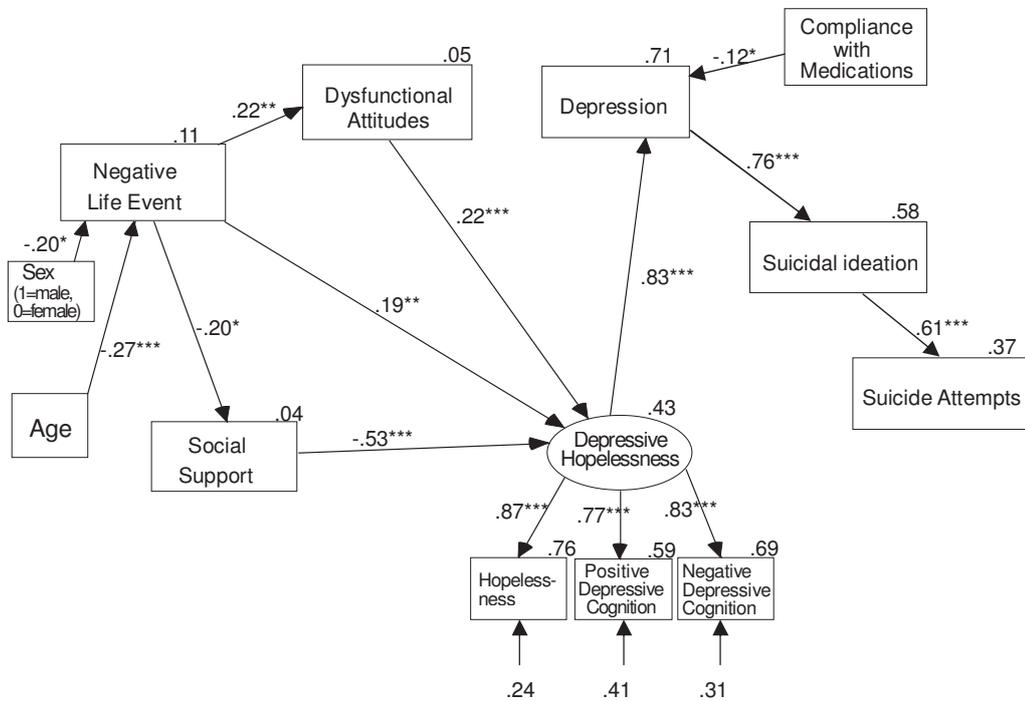
Figure 4.4. Standardized parameter estimates for the Model 1: initial combined mediational model, Model 2: modified combined mediational model and Model 3: final modified combined mediational model. Dotted lines represent non-significant paths. Squared multiple correlations are shown at the top-right corner of variables. *p < .05, **p < .01, ***p < .001.

Model 3: Final modified combined mediational model
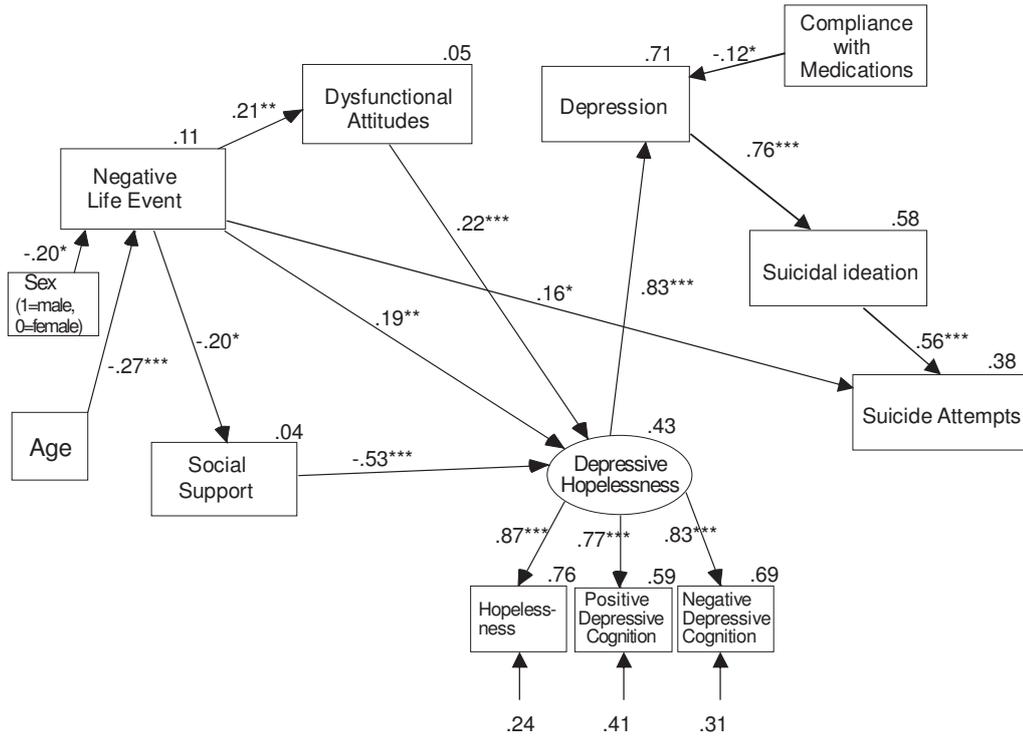
Figure 4.4. Continued.

4.3.3 Discussion

The present study included two stages. The first stage was designed to examine the factor structure of the Chinese-language assessment tools. The results of the factor analyses for the Chinese-language scales have been discussed above. The purposes of the second stage were to (1) compare a series of competing models and determine the best-fitting model to represent the given data, and (2) discuss the findings from the competing models and the best-fitting model. The following discussion covers the findings from the second stage of the research.

(1)   Comparisons between the Competing Models

The SEM analyses did not support the two interactional models, the IM-A and the IM-B. The two models mainly hypothesized that dysfunctional attitudes played the role of a moderator in the development of the mediation components and

depression; in addition, depressive cognition or hopelessness played the mediating role in the development of depression and suicidal ideation, which in turn resulted in suicide attempts. It was found that when all the predictor variables and the interaction of negative life events with dysfunctional attitudes were entered into the structural models at the same time, the interaction had no significant effects on the two mediation components and depressive symptoms (see Figure 4.1). However, when the interaction was deleted, the fit of the two models to the given data was improved. The results provide no support for the moderator hypothesis of dysfunctional attitudes.

Beck (1967, 1976, 1983) hypothesized that depressogenic schemas are typically latent. Without the occurrence of negative events, depressogenic schemas remain inactive and do not exert any influence on depression. In other words, in the presence of negative events, individuals who have depressogenic schemas are more likely to become depressed than are individuals who do not have such schemas. In the results of ANOVAs, it was found that the MDD patients who had higher C-DAS scores reported more hopelessness, depressive cognition and depression than the patients with lower C-DAS scores no matter what levels of negative life events the patients encountered (see Figure 4.2). The result indicated that negative life events did not interact with dysfunctional attitudes to influence depressive cognition, hopelessness and depression, suggesting that Beck's hypothesis was not supported.

The findings in this study are notably different from the results of some previous cross-sectional studies (Olinger et al., 1987) and longitudinal studies (Abela et al., 2002; Joiner et al., 1999; Kwon et al., 1992; Oei et al., 2007), which found significant interaction effects between dysfunctional attitudes and negative life events in predicting mediation components or depressive symptoms in student or community samples. However, the present results are consistent with the results of

some other studies with clinical (Robins et al., 1990) or nonclinical samples (Barnett et al., 1988; Klocek et al., 1997; Oei et al., 2005; Robins et al., 1989).

These discrepant findings are not easily explained. The most possible reason for failure to find support for the interaction hypothesis is a result of sample differences. All previous studies which supported Beck's interaction hypothesis used a variety of student or community samples (e.g., Abela et al., 2002; Joiner et al., 1999; Kwon et al., 1992; Oei et al., 2007; Olinger et al., 1987). In the only known study with major depressive patients, Robins et al. (1990) did not find an interaction between negative life events and dysfunctional attitudes in predicting depression. Robin et al.'s (1990) result provides initial support for the present findings in Taiwanese MDD patients. Depressed persons may be more sensitive than normal individuals to negative life events. Beck and his colleagues have argued that depressed persons not only tend to underestimate relative positive information, but also exaggerate the meaning and significance of negative information (Beck, Steer & Brown, 1993). Accordingly, it is possible to suggest that, even when negative life events are fairly rare or minor, the dysfunctional schemas of the Taiwanese MDD patients are still triggered. This leads to the result that when encountering minor negative life events, patients with higher dysfunctional attitudes reported more psychological symptomatology than the patients with lower dysfunctional attitudes. Robins et al. (1990) also suggest a similar interpretation that the original English-language DAS does not measure latent levels but rather, already activated levels of attitudes in their sample of major depressive patients.

In addition, most of the patients used in this study were diagnosed with recurrent-episode major depressive disorder (83.3%). Post and his colleagues have argued that, compared with first-episode depression, later episodes of depression become more autonomous, more spontaneous and less strongly linked to stressors

(Post et al., 1996). Accordingly, it is possible to suggest that, even in the absence of negative life events, the dysfunctional schemas of the patients in this study are still activated, and thus elicit depressive symptoms.

Another possible explanation is that Beck's hypothesis of latent depressogenic schemas is incorrect. If this is so, the role of the interaction of negative life events with dysfunctional attitudes in predicting the psychological symptomatology can be ignored.

Some researchers provide the other possible explanation. From Beck's (1983) theory, Barnett et al. (1988) suggested that only specific negative life events may match specific dysfunctional attitudes to yield interaction to predict depressive symptoms. If this is so, further studies on investigating diathesis-stress interaction should be addressed on particular events to which depressed patients are particularly sensitive.

The SEM analyses supported the two mediational models: the MM-A and the MM-B. The majority of goodness-of-fit indices showed that the MM-A provided nearly equivalent fit to the data compared to the MM-B. The two models mainly hypothesized that negative life events, as main effect, influence dysfunctional attitudes, which in turn, as main effect, affect the mediation components, which in turn, lead to the occurrence of depression and thus suicidality. In contrast to the IM-A and the IM-B, the MM-A and the MM-B did not have an interaction between negative life events and dysfunctional attitudes to produce depression. Conceptually, the present result can be interpreted as providing support for Kwon et al.'s (1994) linear mediational model.

Some interesting relationships among dysfunctional attitudes, mediation components, depression, suicidal ideation and suicide attempts were uncovered in the two mediational models. First, in the MM-A, when all the variables were entered

into the structural model at the same time, depressive cognition mediated a significant association between dysfunctional attitudes and increased depressive symptoms in Taiwanese MDD patients. As mentioned earlier, depressive cognition consisted of the components of the cognitive triad. Beck and his colleagues have long emphasized that the cognitive triad was a key contributor to depressive symptoms in depressed individuals (Beck, 1967, 1970, 1987; Beck, Rush et al., 1979). The present result can be interpreted as providing support for the important mediating role of the combination of the cognitive triad, which is analogous to the depressive cognition of this study.

In relation to suicidal ideation, it was found that depressive cognition did not exert a significant direct effect on suicidal ideation in Taiwanese MDD patients. The relationship between depressive cognition and suicidal ideation was mediated by depression. The results imply that the statistical correlation between depressive cognition and suicidal ideation is accounted for by depression. As can be seen in Table 4.14, the original correlation between depressive cognition (DC) and suicidal ideation (SI) was .57, but the direct effect, after allowing for depression, was reduced to .05 (see Figure 4.3 [1]). Conceptually, it is possible to interpret the present findings within the hypothesis of the cognitive triad, which directly affects depression (Beck, 1967, 1970, 1987; Beck, Rush et al., 1979) rather than suicide. In addition, the present results provide empirical support for the findings of some studies in Western countries, which revealed the important role of depression in predicting suicidal ideation (Bottlender, Jäger, Strauß, & Möller, 2000; Ranieri et al., 1987).

In the MM-B, it was found that hopelessness mediated the relationship between dysfunctional attitudes and depression and between dysfunctional attitudes and suicidal ideation. A lot of earlier studies have investigated the relationship

among dysfunctional attitudes, hopelessness, depression and suicidal ideation in clinical populations. Cannon et al. (1999) and Keller et al. (1984) reported that dysfunctional attitudes served as a key contributor to hopelessness in major depressive patients. Beck, Riskind, Brown and Steer (1988) and Hamilton et al. (1983) indicated that hopelessness was associated with depression in clinical patients. Beck, Brown et al., 1990, Beck, Steer, Beck et al. (1993), Beck, Steer et al. (1985), Minkoff et al. (1973) and Wetzel et al. (1980) revealed that the hopelessness factor predict suicidal ideation in clinical populations. The present result provides support for the cross-cultural generalizability of these Western studies.

Of particular interest was the finding that although the relationship between hopelessness and suicidal ideation was statistically significant, depression was more strongly related to suicidal ideation than was hopelessness. The results imply that the influence of hopelessness on suicidal ideation is diluted by depression. As shown in Table 4.14, the original correlation between hopelessness (Hs) and suicidal ideation (SI) was .65, but the direct effect, after allowing for depression, was reduced to .16 (see Figure 4.3 [2]). Although hopelessness has repeatedly been reported as a better predictor of suicidal ideation, suicide intent and eventual suicide than depression in clinical populations (Beck, Brown, et al., 1990; Beck, Kovacs, et al., 1975; Beck, Steer, Beck, et al., 1993; Beck, Steer, et al., 1985; Dyer & Kreitman, 1984; Ellis et al., 1986; Schotte et al., 1987; Wetzel et al., 1980), a study by Ranieri et al. (1987) reported that depression was a better predictor of suicidal ideation than hopelessness in patients with affective disorders.

Ranieri et al. (1987) have suggested a possible interpretation for these discrepant findings. The strong positive relationships between hopelessness, depression and suicidal ideation may cause multicollinearity among the three variables. When all variables are entered into multivariate analyses with each other,

the multicollinearity may inflate the statistical importance of slight differences in the magnitudes of one variable as opposed to another. These slight differences may be caused by sampling errors or the distinct backgrounds of the clinical samples being studied. Ranieri et al. suggested that hopelessness should not be automatically assumed to be the best predictor of suicidal risk in all clinical populations. The present results may be interpreted as providing support for Ranieri et al.'s viewpoints addressing both hopelessness and depression as the predictors of suicidal ideation. The sample used in this study consisted of patients who were diagnosed with Major Depressive Disorder and seeking treatment in hospitals. They may be severely sick and thus could report slightly more depressive symptoms than simply hopelessness. This may lead to the result that depression was more strongly related to suicidal ideation than was hopelessness in the Taiwanese MDD patients.

In both models, it was found that depression exerted an influence on suicide attempts by the mediation of suicidal ideation. The result provides support for previous empirical research of Dieserud et al. (2001), who reported that depression influenced suicide attempts by the mediation of suicidal ideation. Also, the present result can be interpreted as providing support for Beck et al.'s classification of suicidal behaviours, which suggests that suicidal ideation logically precedes suicide attempts (Beck, 1986; Beck, Kovacs, et al., 1979; Beck, Steer, et al., 1985).

(2)   Comparisons of Relative Contributions of Depressive Cognition and Hopelessness to Depression and Suicidal ideation

It was found that hopelessness in the MM-B exerted a significantly direct effect on suicidal ideation but depressive cognition in the MM-A did not. The finding suggests that hopelessness is a better predictor of suicidal ideation than depressive cognition. In addition, it was found that the two mediation components were very close in their path coefficients for the direct effects on depression. The

finding indicates that, compared with depressive cognition, hopelessness provided a similar contribution to depression. These results imply that hopelessness and depressive cognition play similar roles in the development of depression. Also, the results imply that it is not necessary to select between two very similar models the best-fitting model in representing the given data. Therefore, the two models was combined by merging the two mediation components. In this perspective, a series of procedures were conducted to extract a common latent variable from hopelessness and depressive cognition. A combined mediational model with the extracted latent variable (i.e., depressive hopelessness) was built to replace the MM-A and the MM-B. The SEM analyses indicated that the combined mediational model was supported. After eight non-significant paths were deleted from the model and an additional path was added to the model, the final modified combined mediational model was selected as the most appropriate model in representing the given data (see Model 3 in Figure 4.4). The total variance of suicide attempts explained by the final model was 38%, which was more than the total variances of suicide attempts accounted for by the MM-A and the MM-B, each 37%.

(3)   Findings from the Final Modified Combined Mediational Model

The final modified combined mediational model uncovered some interesting findings. First, in terms of the measurement model, it was found that a latent variable, which was termed depressive hopelessness, was extracted from depressive cognition and hopelessness. The latent variable influenced depressive symptoms more strongly. As shown in the final model, depressive hopelessness was found to exert more influence on depression ($\beta = .83$) than did depressive cognition in the MM-A ($\beta = .64$) and hopelessness in the MM-B ($\beta = .66$). The current result implies that both depressive cognition and hopelessness may not be core constructs. A latent construct, depressive hopelessness, may exist at a deeper level. This is the

first study that reports the new construct, depressive hopelessness, in Taiwanese MDD patients. Thus, the construct is needed to be reconfirmed using other samples of depressed patients from other countries. The implications of these findings for future research on depression are given under Practical Implications, below.

In terms of the structural model, depressive hopelessness was found to mediate the relationship between dysfunctional attitudes and depression. The result suggests that dysfunctional attitudes may increase the scores of the depressive hopelessness, which may then contribute to elevated depression. This makes sense because depressive hopelessness was extracted from depressive cognition and hopelessness; thus, the characteristics of depressive hopelessness are similar to those of hopelessness and depressive cognition. Accordingly, depressive hopelessness played a mediating role in the relationship between dysfunctional attitudes and depression in this model.

It was found that depression was more strongly related to suicidal ideation than was depressive hopelessness. As mentioned above, the characteristics of depressive hopelessness are similar to those of hopelessness and depressive cognition. The two mediation components were found to be worse indicators of suicidal ideation than depression. Therefore, it is not surprising to find a similar result in the relationship between depressive hopelessness and suicidal ideation.

Depression was found to exert a direct effect on suicidal ideation, which in turn affected suicide attempts. The result provides support for the work of Dieserud et al. (2001), which reported that depression influenced suicide attempts by the mediation of suicidal ideation in a mixed sample of suicide attempters and psychiatric patients. The present result also provides empirical support for Beck et al.'s classification of suicidal behaviours, which suggests that suicidal ideation logically precedes and leads to suicide attempts (Beck, 1986; Beck, Kovacs, et al.,

1979; Beck, Steer, et al., 1985). In addition, the present result provides additional support for the studies of Malone et al. (2000) and Mann et al. (1999), which indicated that suicidal ideation may distinguish psychiatric patients who had attempted suicide from those who had never attempted suicide in patients with major depressive disorder.

In relation to negative life events, they were found to directly affect dysfunctional attitudes, which in turn directly influence depressive hopelessness. Conceptually, the present result provides support for the linear mediational model proposed by Kwon et al. (1994). In addition, negative life events were found to directly affect depressive hopelessness. This indicates that increased life stress results in concomitant increases in depressive hopelessness. In addition, it was found that negative life events did not exert a direct influence on suicidal ideation. Instead, the relationship between negative life events and suicidal ideation was mediated by dysfunctional attitudes, depressive hopelessness and depression. The result indicates that the predictive power of negative life events to suicidal ideation was diluted when dysfunctional attitudes, depressive hopelessness, depression were included in the model. The result also implies that when encountering negative life events, the MDD patients may tend to think in a dysfunctional and hopeless manner, and then become depressed, and finally generate suicidal ideation.

Contrary to suicidal ideation, it was found that negative life events exerted a direct influence on suicide attempts after allowing for dysfunctional attitudes, depressive hopelessness, depression and suicidal ideation in the model. Earlier studies revealed that suicide attempters experienced significantly more life stress prior to their suicide attempts compared with controls from the general population or nonsuicidal hospitalized patients (Cochrane & Robertson, 1975; O'Brien & Farmer, 1980; Paykel, 1974; Schotte & Clum, 1987; Vanna et al., 1999). One study reported

that stress exerted an indirect influence on suicide attempts by the mediation of depression, hopelessness and suicidal ideation (Dieserud et al., 2001). However, with multivariate analyses in Taiwanese MDD patients, this study revealed a direct relationship between negative life stress and suicide attempts after controlling for the other risk factors. The current result suggests that negative life events are not only a distal but also a proximal risk factor of suicide attempts.

To take the negative life events a step further, it was found that Taiwanese patients reported that unemployment and individual financial crisis were the most important sources of negative life events (see Table 4.13B). The result seems to imply that economic risk factors are more predictive of suicide in Taiwanese MDD patients. Earlier studies have reported high rates of unemployment in samples of suicides in general and among patient populations in Western countries (Appleby, 2000). Similar results were also found in the work of Chuang and Huang (1996), which indicated that economic risk factors (i.e., unemployment rate) exerted a greater influence over national suicide rates in Taiwan than sociological variables (i.e., divorce rate). The present result provides additional support for the findings of the earlier studies.

In relation to social support, the model indicated a significant negative relationship between negative life events and perceived social support. This indicates that the more negative life events the MDD patients encountered, the less social support they reported. A possible explanation is that stressful events may worsen patients' supportive networks. Those with high negative life events may lose their friends and families. Thus, patients report that they have no social resources to cope with their difficulties. To take the model a step further, it was found that perceived social support had a negative effect on depressive hopelessness. This indicates that the more social support the MDD patients possessed, the fewer

negative thoughts they had. In other words, the less social support the MDD patients possessed, the more negative thoughts they had. A possible explanation is that a lack of social support may worsen patients' negative thoughts. When patients have poor supportive networks, they may think negatively about their future. The findings provide support for the main-effect model of social support (Cohen & Wills, 1985), which hypothesizes that social support, as main effect, affects psychopathology.

Sex and age were found to be significant predictors of negative life events. The path coefficients for the effects of sex and age on negative life events were significant, indicating that female patients reported more negative life events than male patients, and younger patients reported more negative life events than older patients. The results are consistent with earlier studies, which indicated that younger MDD patients reported more negative life events than older patients (Kohn et al., 2001; Perris, 1984), and females reported more perceived stressfulness of stress life events than males (Sowa et al., 1984; Wagner et al., 1990). However, sex and age did not have direct effects on suicidal ideation and suicide attempts. The relationships between the two demographic variables and suicidal ideation and attempts were mediated by a series of variables, including negative life events, dysfunctional attitudes, depressive hopelessness and depression. The results suggest that age and sex represent distal risk factors for the development of suicidal ideation and attempts in Taiwanese MDD patients.

Compliance with medications was found to be a significant predictor of depression. The path coefficient for the effect of compliance with medications on depression was negative, suggesting that the MDD patients who are compliant with psychotropic medications could show a decrease in depressive symptoms. In addition, compliance with medications could ameliorate suicidal ideation and suicide attempts through decreased depression. The present finding provides

empirical support for the important role of psychotropic medications on the prevention of depression (Beck, Rush, et al., 1979), suicidal ideation (Teicher et al., 1993) and eventual suicide (Isacsson, 2000; Möller, 2003).

4.4   Practical Implications

The present study attempted to disentangle the interplay of several predictor variables previously found to correlate with suicidal behaviours in Western depressed patients and to investigate the effects of the predictor variables on suicide attempts in a sample of Taiwanese MDD patients. This research makes a contribution in this area by comparing a series of competing models and examining possible paths in the best-fitting model through the application of SEM techniques. The current study supports previous theories and empirical findings about the mediating roles of depressive cognition and hopelessness rather than the moderating role of dysfunctional attitudes in the development of psychopathology in Taiwanese MDD patients. These findings have an important implication for research on depression. A diathesis-stress interaction model should not be hypothesized as the only model in research on depression. There may exist several other ways that the causal relationships among stress, cognitive vulnerability and depression occur. When exploring depressive symptoms in clinical patients, researchers should consider alternative models, for example, the linear mediational model, the symptom model, the recovery model or the alternative aetiologies model as hypothesized by earlier researchers (Brewin, 1985; Kwon & Oei, 1994; Parry & Brewin, 1988).

The present study showed very similar mediating effects of depressive cognition to that of hopelessness on the relationship between dysfunctional attitudes and depression. The finding implies that hopelessness and depressive cognition play similar roles in the development of depression. Further researchers may select any

one of the two variables to serve as a mediator in their research on depression. In addition, it is possible to extract a common latent construct, depressive hopelessness, from the two mediating variables. The extracted latent construct was found to exert more influence on depression than depressive cognition and hopelessness. The finding has important implications for research on depression. The mediation components of depression are far from straightforward as suggested by hopelessness theory of depression (Abramson et al, 1989) or the cognitive triad theory (Beck, 1967, 1970, 1987). Future research on reconstructing the mediation component of depression based on hopelessness and depressive cognition may be of interest. If the latent construct found in this study is confirmed, future researchers may develop an assessment instrument based on the construct, and thus clinical practitioners may benefit from using the new scale to predict depression more accurately in their patients.

In relation to suicidal ideation, depression has been shown as a more powerful predictor of suicidal ideation than hopelessness, depressive cognition and their latent variable (i.e., depressive hopelessness). Future researchers and clinical practitioners should consider the important role of depression in the development of suicidal ideation. In addition, the most powerful predictor of suicide attempts is suicidal ideation. Future researchers and clinical practitioners should consider the important role of suicidal ideation for predicting suicide attempts in clinical patients.

This study indicated that the combination of social support from patients' peers, family and health professionals may decrease the deleterious effects of negative life events on the development of negative thoughts, including depressive cognition, hopelessness and their latent variable (i.e., depressive hopelessness). Therefore, hospitals could design a programme to enhance the relationships among health professionals, patients' family and peers so as to provide enough social

support to decrease the impact of negative life events on MDD patients' negative thoughts.

In addition, the present study is the first to investigate the cognitive structures for suicidality that were originally developed in Western countries in patients with Major Depressive Disorder in Taiwan. The present results indicated that increased stress resulted in concomitant increases in dysfunctional attitudes and negative thoughts, which in turn affected the development of depression, which may then lead to suicidal ideation and attempts. This implies that the crucial cognitive structures of Taiwanese MDD patients may be similar to those of Western patients and suggests that Western-based cognitive therapy may be suitable for use in Taiwanese clinical patients. Therefore, suicide prevention and intervention may be enhanced through the use of cognitive activities designed to decrease patients' dysfunctional attitudes, negative thoughts and to cope with their depression.

4.5　Limitations of the Main Study

The research reported here has certain limitations. First, although the use of structural equation modeling in the present study involves several advantages over other multivariate analyses used in testing causal relationships, causality cannot be determined given the cross-sectional nature of the data. Therefore, a longitudinal study is needed in the future to confirm causal relationships between the predictor variables and future suicide attempts assessed over a period of time.

Second, the results of this main study were obtained from the data of clinical patients with Major Depressive Disorder in Taiwan. Therefore, the results should not be directly generalized to nonclinical populations or populations outside Taiwan. Further research is therefore needed to test the hypothesized models of suicide attempts across other sample groups.

4.6   Conclusion

The main study is an application of the strategy of competing models suggested by Jöreskog (1993). After comparing a series of alternative models by using SEM techniques, this study provides support for the mediating roles of depressive cognition and hopelessness rather than the moderating role of dysfunctional attitudes in the development of psychopathology in Taiwanese MDD patients. After combining the MM-A and the MM-B, the final modified combined mediational model with a latent variable, depressive hopelessness, was selected as the most appropriate model in representing the given data. By the finding of significant paths from negative life events to suicide attempts in the selected model, the study provides a preliminary framework within which to view the processes of suicide attempts among MDD patients. In the model, sex, age, and negative life events appear to be distal predictors of suicide attempts. Negative life events may increase the intensity of depressive hopelessness not only by itself but also by the mediation of dysfunctional attitudes. However, social support may mediate the deleterious influences of negative life events on depressive hopelessness, which in turn may exert an influence on suicidal ideation by the mediation of depression. Compliance in use of medications may have a direct effect on depression. In addition, negative life events may have a direct effect on suicide attempts. Suicidal ideation may be the strongest predictor of suicide attempts. Given the use of a cross-sectional design, however, it is premature to conclude that sex, age, negative life events, dysfunctional attitudes, depressive hopelessness, depression and suicidal ideation are causal in suicide attempts. Therefore, the next chapter will retest the final modified combined mediational model by a longitudinal analysis and examine how well these predictor variables predicted the future suicide attempts that occurred in a six-month follow-up period in the same clinical sample of Taiwanese MDD patients.

CHAPTER FIVE
FOLLOW-UP STUDY: RETESTING THE MOST APPROPRIATE MODEL FOR DEPRESSED PATIENTS IN TAIWAN SIX MONTHS LATER

5.1   Introduction

In the main study, the final modified combined mediational model was selected as the most appropriate model in representing the data of Taiwanese MDD patients. The model was modified by deleting some non-significant paths from, and adding a significant path, unspecified a priori, to the combined mediational model, which was composed of the MM-A and the MM-B. The final modified combined model implied that sex, age, negative life events, dysfunctional attitudes, social support, depressive hopelessness, depression, compliance with medications and suicidal ideation temporally preceded the occurrence of suicide attempts in direct or indirect manner. However, the model was based on cross-sectional analyses and thus was unable to determine whether any of these predictor variables could predict future suicide attempts in Taiwanese MDD patients. A more adequate test of the causal relationship implied in the model should be provided by a longitudinal or prospective study. If these variables could predict suicide attempts as demonstrated in the best-fitting model with cross-sectional data, it would be expected that the result should be found in longitudinal data from MDD patients who were assessed at different times. Therefore, the present study was designed to validate and reexamine the model with two-wave panel data gathered from the same population of MDD patients who participated in assessments twice, separated by a six-month interval.

In the main study of this research, it was found that both negative life events and suicidal ideation were significantly related to suicide attempts. However, the results require more adequate examination through a longitudinal study to determine

whether negative life events and suicidal ideation would predict future suicide attempts. Given the findings in the main study, two hypotheses are suggested:

1. Suicidal ideation assessed at the first assessment (Time 1) significantly predicts suicide attempts that occur in the six months after the first assessment (Time 2) in the model with the two-wave panel data.

2. Negative life events assessed at Time 1 significantly predict suicide attempts that occur at Time 2 in the model with the two-wave panel data.

In the main study, there was no evidence for any direct effects of sex, age, dysfunctional attitudes, social support, depressive hopelessness, depression, and compliance with medications on suicide attempts. Likewise, the prospective relationships between these predictor variables and future suicide attempts require further investigation through a longitudinal study. Based on the previous findings in the main study, the third hypothesis is suggested:

3. Sex, age, dysfunctional attitudes, social support, depressive hopelessness, depression and compliance with medications that are assessed at Time 1 do not directly predict suicide attempts that occur at Time 2 in the model with the two-wave panel data.

5.2 Methods

(1) Participants

The participants were drawn from the total of 162 MDD patients, who had taken part in the first assessment in the pilot and the main studies. Because a total of 20 patients among the 162 patients did not participate in the second assessment, which was conducted six months after the first assessment in the two studies, only data for the 142 patients who participated in both assessments were included in the analyses of the present study. Details of their recruitment and demographic characteristics are given under Procedure and Result, respectively, below.

(2)   Measures

The main objective of this study was to examine whether the predictor variables in the best-fitting model found in the previous study of this research could predict future suicide attempts over a six-month follow-up period. Thus, Item 20 of the C-BSS (i.e., suicide attempt item) was applied to the follow-up assessment. This item measures the frequencies of suicide attempts and is scored from 0 (no suicide attempt), 1 (suicide attempt one time), or 2 (suicide attempts two times or more). Participants are required to report the appropriate score on the item, which reflects the frequencies of suicide attempts during the six months prior to the second assessment. In addition, participants' demographic information was collected by using the self-devised Background-demographic Information Questionnaire.

(3)   Procedures

When the first assessment was performed on the original 113 patients in the main study, all the participants had been informed that they would be contacted again six months later to complete the second assessment. All the participants had indicated that they would be interested in taking part in the second-round research and had left their address and telephone number. Therefore, the procedures used to contact patients in the follow-up period consisted of the following steps: Whenever possible, patients were contacted in the hospital when they returned to consult their doctors. If the patients were inaccessible to the researcher in the hospital, they were contacted by telephone. If phone contact was unsuccessful, a follow-up letter was sent out to these patients, along with an information sheet, the relevant questionnaire and a reply-paid envelope. If such attempts also failed to produce results, home visits were made by the cooperating social workers of the hospitals. If the follow-up indicated that the patient was deceased, the relevant medical examiner's records were requested so that we could verify the cause of death and complete the suicide attempt item of the C-BSS.

Of the original 113 patients, 6 patients declined to participate in the second assessment and explained that they preferred not to participate; 4 were not contactable as a result of changes in address and telephone. Finally, 103 patients were successfully contacted six months after the first assessment. No patients committed suicide in the follow-up period of the six months.

As in the main study, the sample size of 103 MDD patients may be insufficiently large in the application of SEM techniques. Therefore, the 39 out of the 49 MDD patients used to evaluate six-month test-retest reliability for the C-BSS in the pilot study were added into the follow-up sample group. Data for these 39 patients were collected by using the same contact procedures as used for the follow-up study. When the pilot study was conducted, all the original 49 MDD patients had been informed that they would be contacted again six months later to complete the follow-up assessment. Of the 49 patients, 5 patients refused to answer the C-BSS again, 3 were not contactable due to changes in address and telephone, and 2 had incomplete data, leaving 39 patients with completed C-BSS data. As the contact procedures used for the 39 MDD patients were the same as with those used for the 103 patients in the follow-up study, the 39 patients can be added to the 103 MDD patients to yield a total of 142 patients. They were used in subsequent data analyses in the follow-up study. The total response rate of the MDD patients was 87.7%.

(4) Statistical Analyses

As in the main study, using SPSS version 11.0, basic analyses of frequency distributions, mean scores and standard deviations were conducted to investigate the demographic characteristics of the final follow-up group of respondents. Pearson product-moment correlations were performed to determine the extent of inter-relationships among observed variables. Using AMOS 4.0 (Arbuckle, 1999),

structural equation modeling techniques were utilized to confirm whether the best-fitting model obtained from the previous study of this research would fit the new data of the 142 respondents.

5.3 Results

(1) Demographic Characteristics

As can be seen in Table 5.1, 66 (46.5%) males and 76 (53.5%) females participated in the second assessment. Their ages ranged from 21.5 to 75.5 years, with a mean age of 43.9 (SD =13.0) years. The duration of depression prior to the second assessment ranged from .75 to 36.1 years, with a mean of 7.48 (SD = 5.88) years.

Table 5.1

Demographic Characteristics of MDD Patients at Time 2 in the Follow-up Study (N = 142)

Demographic variables		N	(%)
Gender:	Male	66	(46.5)
	Female	76	(53.5)
Age:	<20	0	(0.0)
	20 – 29	28	(19.7)
	30 – 39	29	(20.4)
	40 – 49	35	(24.6)
	50 – 59	39	(27.5)
	60 – 69	7	(4.9)
	70 – 76	4	(2.8)
Duration of depression (years):	< 5	56	(39.4)
	5 – 9	53	(37.3)
	10 – 14	18	(12.7)
	15 – 19	7	(4.9)
	20 – 24	6	(4.3)
	>= 25	2	(1.4)

	Min.	Max.	Mean	(SD)
Age	21.50	75.51	43.87	(12.97)
Duration of depression (years)	0.75	36.06	7.48	(5.88)

As can be seen from Table 5.2, there was little change in demographic characteristics for the respondents from Time 1 to Time 2. In the six-month follow-up period, the number of inpatients increased from 39 to 44 and outpatients decreased from 103 to 98; one patient became divorced; two patients graduated from high school and entered universities, and three patients recovered from depression and did not take any medication. In addition, patients reported slightly less compliance with medications at Time 2 ($M = 4.06$, $SD = 1.21$) compared to Time 1 ($M = 4.21$, $SD = 1.03$).

Table 5.2

Demographic Characteristics of MDD Patients at Time 1 and Time 2 (N = 142)

Demographic variables		Time 1		Time 2	
		N	(%)	*N*	(%)
Status of patients:	Inpatients	39	(27.5)	44	(31.0)
	Outpatients	103	(72.5)	98	(69.0)
Marital status:	Married	56	(39.4)	55	(38.7)
	Single	42	(29.6)	42	(29.6)
	Divorced	28	(19.7)	29	(20.4)
	Cohabited	4	(2.8)	4	(2.8)
	Separated	1	(0.7)	1	(0.7)
	Widowed	11	(7.7)	11	(7.7)
Education level:	Illiteracy	7	(4.9)	7	(4.9)
	Primary school	24	(16.9)	24	(16.9)
	Junior high school	21	(14.8)	21	(14.8)
	High school	43	(30.3)	41	(28.9)
	Technical Institute	22	(15.5)	22	(15.5)
	University	21	(14.8)	23	(16.2)
	Master	4	(2.8)	4	(2.8)
Compliance with medications:					
	Recovery and no taking drugs	0		3	(2.1)
	Totally no compliance	4	(2.8)	5	(3.5)
	Most of time no compliance	9	(6.3)	12	(8.5)
	Start to decrease compliance	12	(8.5)	11	(7.8)
	Most of time compliance	45	(31.7)	40	(28.2)
	Full compliance	72	(50.7)	71	(50.0)
		Mean (*SD*)		Mean (*SD*)	
Age		43.47 (12.97)		43.87 (12.97)	
Compliance with medications		4.21 (1.03)		4.06 (1.21)	

(2)   Statistical Assumptions

As can be seen in Table 5.3, the skewness of the observed variables ranged

from -1.42 to 1.41 and kurtosis ranged from -2.03 to 2.54. Kline (1998) suggests that

if the absolute values of univariate skew indices are greater than 3.0, or the absolute

value of kurtosis indices are over 10.0, the data distribution of observed variables can be regarded as extremely nonnormal. The present result indicated that the data did not violate the distributional assumption. With this result, therefore, SEM with maximum likelihood estimation technique was used to estimate parameters.

Table 5.3

Means, Standard Deviations, Skewness and Kurtosis of the Observed Variables for MDD Patients at Time 1 and Time 2 (N = 142)

Variables (1 = Time 1, 2 = Time 2)	Mean	*SD*	Skewness	Kurtosis
Sex 1	.46	.50	.14	-2.00
Age 1	43.37	12.97	.06	-.72
Compliance with Medications 1	4.21	1.03	-1.42	1.50
Negative Life Events 1	2.68	2.44	1.41	2.54
Social Support 1	29.30	7.93	-.06	-.44
Dysfunctional Attitudes 1	102.10	17.92	-.30	-.27
Dysfunctional Attitudes 1 (effect coding)	.01	1.00	-.03	-2.03
Parcel 1: Hopelessness 1	.67	.29	-.76	-.41
Parcel 2: Positive Depressive Cognition 1	3.95	1.18	.85	-.66
Parcel 3: Negative Depressive Cognition 1	4.48	1.27	-.40	-.26
Depression 1	29.07	13.79	-.41	-.63
Suicidal ideation 1	14.10	10.37	.17	-1.07
Suicide Attempts 2	.55	.80	1.00	-.68

As in the main study, the data of dysfunctional attitudes were converted from parameters coded by original scores to parameters coded by effect coding so the comparisons of the model in the follow-up study and that in the main study could be made. The means, standard deviations, skewness and kurtosis of the dysfunctional attitudes for the 142 MDD patients were presented in Table 5.3. In addition, the subjective indices of goodness-of-fit used in the follow-up study included the χ^2 and the χ^2/df (Byrne, 1989, 2001), the Goodness-of-fit Index (GFI; Jöreskog & Sörbom, 1989), the Comparative Fit Index (CFI; Bentler, 1990), the Standardized Root Mean

Square Residual (SRMR; e.g., Byrne, 2001) and the Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993). These fit indices were calculated using AMOS version 4.0 software with the maximum likelihood estimation technique (Arbuckle, 1999).

(3) **Structural Equation Analyses of the Final Modified Combined Mediational Model with Longitudinal Data**

First, Pearson product-moment correlations among the involved variables at Time 1 and Time 2 for the 142 respondents are presented in Table 5.4. Significant correlations are shown in bold type. A legend showing abbreviations used in the correlation matrix is presented in Table 5.5.

Table 5.4

Correlations between all Involved Variables for MDD Patients at Time 1 and Time 2, with a Six-month Interval (N = 142)

Variables (1 = Time 1, 2 = Time 2)	Sex1	Age1	CMs1	NLEs1	SS1	DAs1	Parcel 1: Hs1	Parcel 2: PDC1	Parcel 3: NDC1	Dep1	SI 1	SAs 2
Sex 1	1.00	**-.25***	-.07	-.12	-.11	-.01	-.01	-.12	.06	-.02	-.09	-.11
Age 1		1.00	**.23***	**-.22***	.09	-.09	-.04	.04	**-.18***	-.13	-.15	**-.17***
CMs 1			1.00	-.13	.13	-.09	-.05	-.05	-.05	-.17	-.05	-.02
NLEs 1				1.00	**-.20***	**.21***	**.28***	**.22***	**.32***	**.30***	**.30***	**.38***
SS 1					1.00	**-.17***	**-.48***	**-.54***	**-.53***	**-.47***	**-.39***	**-.25***
DAs 1						1.00	**.25***	**.26***	**.36***	**.32***	**.18***	.15
Parcel 1: Hs 1							1.00	**.65***	**.72***	**.74***	**.62***	**.25***
Parcel 2: PDC 1								1.00	**.66***	**.59***	**.45***	.14
Parcel 3: NDC 1									1.00	**.73***	**.56***	**.34***
Dep 1										1.00	**.75***	**.41***
SI 1											1.00	**.49***
SAs 2												1.00

*Note. * P < .05. ** P < .01, *** P < .001.*

Table 5.5

Legend of Abbreviations Used for Variables in Table 5.4

Abbreviation	Variable
CMs	Compliance with Medications
NLEs	Negative Life Events
SS	Social Support
DAs	Dysfunctional Attitudes
Parcel 1: Hs	Parcel 1: Hopelessness
Parcel 2: PDC	Parcel 2: Positive Depressive Cognition
Parcel 3: NDC	Parcel 3: Negative Depressive Cognition
Dep	Depression
SI	Suicidal ideation
SAs	Suicide Attempts

Second, SEM with maximum likelihood estimation was conducted on the two-wave data of the 142 MDD patients to test the final modified combined mediational model. With the two-wave panel data, the model hypothesized that suicide attempts at Time 2 was predicted by suicidal ideation at Time 1, which was directly or indirectly influenced by depression, depressive hopelessness, dysfunctional attitudes, social support, negative life events, and sex and age at Time 1. In addition, except for Time 1 negative life events and Time 1 suicidal ideation, none of the other predictor variables at Time 1 predicted suicide attempts at Time 2. This hypothesis is illustrated in the model presented in Figure 5.1.

Table 5.6 shows the fit indices for the integrated model. As can be seen, the majority of goodness-of-fit and parsimony indices indicated that the model provided an adequate fit to the two-wave panel data. The χ^2 statistic of the model was significant, χ^2 (51, N = 142) = 84.17, p = .002, which indicated a significant deviation from fit. However, the χ^2 / df ratio of 1.65 was acceptable for a good fitting model. In addition, the GFI exceed the .90 criterion; the CFI exceeded the .90 criterion, and the SRMR was close to the recommended .05 level. The index of parsimony also indicated that the model was acceptable (RMSEA = .068).

Table 5.6

Results of the AMOS Analyses of the Nested Models for MDD Patients in the Follow-Up Study (N = 142)

Model (T1 = Time 1, T2 = Time 2)	χ^2	df	p	χ^2/df	GFI	CFI	SRMR	RMSEA	χ^2 difference
1. Final modified combined mediational model	84.17	51	.002	1.65	.91	.95	.068	.068	
2. Add path: T1 sex→T2 suicide attempts	83.78	50	.002	1.68	.91	.95	.068	.069	
Model 2 – 1 difference									.39
3. Add path: T1 age→T2 suicide attempts	83.58	50	.002	1.67	.91	.95	.068	.069	
Model 3 – 1 difference									.59
4. Add path: T1 social support → T2 suicide attempts	83.85	50	.002	1.68	.91	.95	.068	.069	
Model 4 – 1 difference									.32
5. Add path: T1 dysfunctional attitudes → T2 suicide attempts	84.03	50	.002	1.68	.91	.95	.068	.069	
Model 5 – 1 difference									.14
6. Add path: T1 depressive hopelessness → T2 suicide attempts	84.07	50	.002	1.68	.91	.95	.068	.07	
Model 6 – 1 difference									.09
7. Add path: T1 depression → T2 suicide attempts	83.88	50	.002	1.68	.91	.95	.068	.069	
Model 7 – 1 difference									.29
8. Add path: T1 compliance with medications → T2 suicide attempts	83.96	50	.002	1.68	.91	.95	.068	.069	
Model 8 – 1 difference									.21

Note. df = degrees of freedom; GFI = Goodness-of-Fit Index; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation.

As with the main study, alternative nested models were then tested to examine whether the χ^2 might be improved by adding paths, unspecified a priori, in the model. As reflected in Table 5.6 (Model 2 to Model 8), a series of χ^2 difference tests indicated that the addition of each respective path produced only non-significant change in χ^2 values. Hence, the more parsimonious hypothesized model was retained. In addition, the standardized parameter estimates for the paths added in Models 2 to 8 were non-significant with values of -.05, -.06, -.04, .03, -.03, .06 and .03 for each path respectively. Thus, no additional paths between Time 1 predictors and Time 2 suicide attempts should be added in the model.

As shown in Figure 5.1, all the pathways had appropriate parameter estimates. Sex and age at Time 1 had negative direct effects on negative life events at Time 1 ($\beta = -.18$, $p < .05$ and $\beta = -.26$, $p < .001$, respectively). Time 1 negative life events had positive direct effects on Time 1 dysfunctional attitudes ($\beta = .21$, $p < .01$), Time 1 depressive hopelessness ($\beta = .20$, $p < .01$) and Time 2 suicide attempts ($\beta = .26$, $p < .001$). Time 1 Negative life events had a negative direct effect on Time 1 social support ($\beta = -.20$, $p < .05$). The path coefficients for the effects of Time 1 social support on Time 1 depressive hopelessness ($\beta = -.53$, $p < .001$) and of Time 1 compliance with medications on Time 1 depression ($\beta = -.11$, $p < .05$) were significant. In addition, the path coefficients for the effects of Time 1 dysfunctional attitudes on Time 1 depressive hopelessness ($\beta = .23$, $p < .001$) and of Time 1 depressive hopelessness on Time 1 depression ($\beta = .83$, $p < .001$) were significant. The path coefficient between Time 1 depression and Time 1 suicidal ideation was .74 ($p < .001$). The path coefficient between Time 1 suicidal ideation and Time 2 suicide attempts was .41 ($p < .001$). The model accounted for 28% of variance of Time 2 suicide attempts.
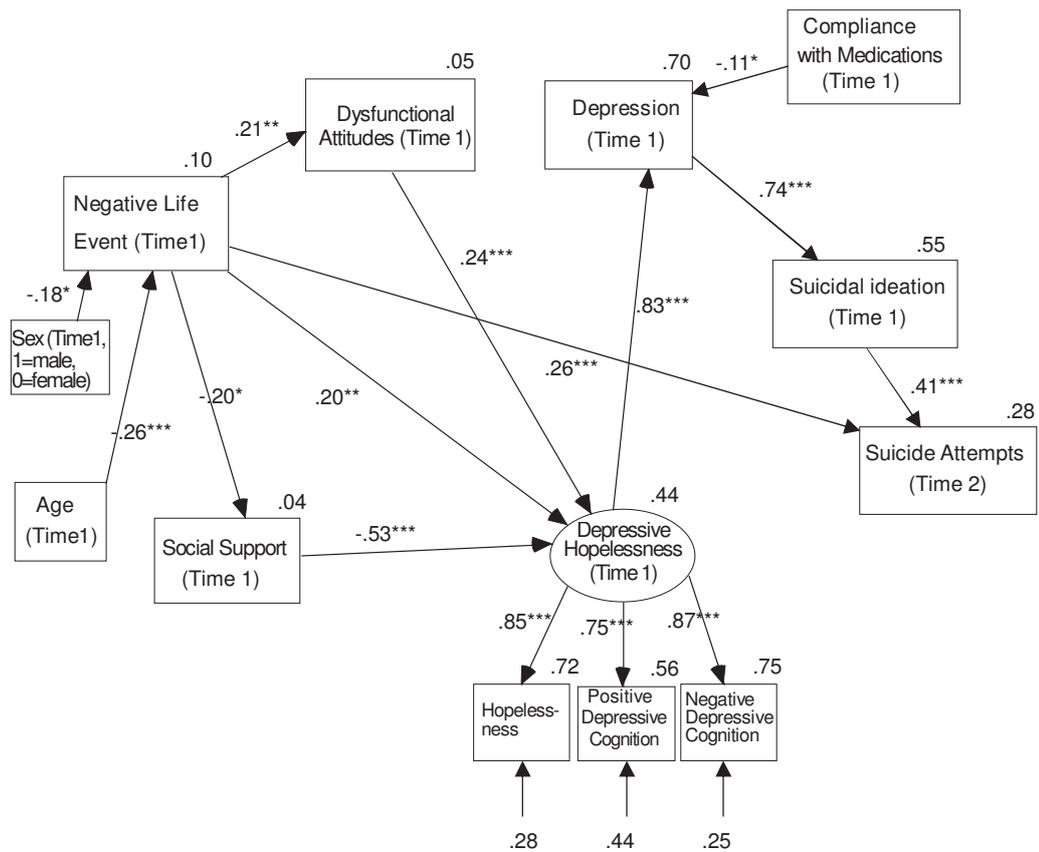
Figure 5.1. Standardized parameter estimates for the final modified combined mediational model with two-wave panel data obtained from 142 respondents. Squared multiple correlations are shown at the top-right corner of variables. *$p < .05$, **$p < .01$, ***$p < .001$.

5.4 Discussion

The present study was designed to examine three hypotheses about the predictor variables in the occurrence of future suicide attempts. The predictor variables included sex, age, negative life events, dysfunctional attitudes, social support, depressive hopelessness, depression, compliance with medications and suicidal ideation. The following discussion briefly covers the findings of the present study in the context of the research hypotheses. More comprehensive discussions will be deferred to General Discussion in Chapter 7, which will incorporate findings from all the studies of this research.

As can be seen from Table 5.2, the respondents appear to have changed little in terms of demographic characteristics in the six months since they first participated in the research. Given the overall lack of change, it is reasonable to regard the sample used in the follow-up study as representative of the larger sample used in the previous studies. The result suggests that if there are any differences in the final modified combined model between the follow-up study and the main study, the differences should not derive from the respondents' demographic characteristics.

The SEM analyses showed that the final modified combined model was confirmed with the two-wave panel data of the 142 MDD patients (see Table 5.6, Model 1). The result suggests that the model can be applied for predicting suicide attempts over six months in Taiwanese MDD patients. In addition, the model, with the two-wave panel data, uncovered some interesting relationships. First, it was found that Time 2 suicide attempts were predicted by the direct effect of Time 1 suicidal ideation (see Figure 5.1). The result supports the first hypothesis of the present study. The current result is also partially consistent with the continuum view of suicidal behaviours suggested by Beck and his colleagues (Beck, 1986; Beck, Kovacs, et al., 1979; Beck, Steer, et al., 1985). They have proposed that suicidal behaviours can be conceptualized as a continuum of suicidal ideation, suicide attempts and eventual suicide, in which suicidal ideation precedes and leads to suicide attempts, which ultimately lead to suicide completion.

Despite suicidal ideation being a significant predictor of suicide attempts, it was found that suicidal ideation exerted less direct effect on suicide attempts at Time 2 ($\beta = .41$) compared to Time 1 ($\beta = .56$; see Figure 4.4, Model 3). The finding suggests that the prediction of suicide attempts by suicidal ideation decreases with time. A possible explanation is that, during the six-month follow-up period, the change of suicidal ideation may affect subsequent suicide attempts. It should be

noted that although suicidal ideation is a continuous phenomenon, there are some differences in the intensity of suicidal ideation across a period of time. As reported in the pilot study of this research, the six-month test-retest reliability of suicidal ideation measured by the C-BSS was .70 (R^2 = .49) in major depressive patients. Earlier research also reported that the one-week test-retest reliability of suicidal ideation measured by the original SSI was .51 (R^2 = .26) in psychiatric outpatients who sought treatment for depression (Beck, Kovacs, & Weissman, 1979). Given the evidence of the present and earlier studies, it can be suggested that the intensity of suicidal ideation would fluctuate with time. The notable fluctuation may influence subsequent suicide attempts of MDD patients. Thus, the prediction of subsequent suicide attempts at Time 2 by the suicidal ideation at Time 1 may be weakened.

The change of suicidal ideation with time in MDD patients may be due to several reasons. A possible explanation is the natural fluctuation of suicidal ideation. This may influence subsequent suicide attempts of MDD patients. Another possible reason is researcher's interventions during the follow-up period. Earlier authors have pointed out that researcher's interventions are a general problem in longitudinal research (Pokorny, 1992; Tanney, 1992). When patients are found to have a strong suicide indicator, observers will immediately attempt to conduct a treatment to the patients to prevent their suicide. Such interventions will weaken the relationship of predictors to subsequent suicidal behaviours. The problem happened in the present study. When patients were found to have high suicidal ideation, their doctors would be suggested to change drug prescription to prevent patients' suicide outcome. It should be noted that researcher's interventions in the follow-up period obviously disturb patients' suicidal ideation. However, based on the research ethics of protecting participants, such preventive interventions appear to be unavoidable.

Another reason for the change of suicidal ideation is probably due to the intervention of social support during the follow-up period. Joiner and Rudd (2000) indicated that suicidal crises may elicit their own solution. For example, suicidal crises often prompt the solicitation of social support or the seeking of treatment. When the intensity of suicidal crises increases, patients who have social support may mobilize their resources to decrease suicidal crises. From Joiner et al.'s viewpoint, future longitudinal studies into the relationship between suicidal ideation and future suicide attempts may benefit from considering the influence of social support during the follow-up period.

It was found that Time 1 negative life events predicted Time 2 suicide attempts after controlling for the other predictor variables for Time 2 suicide attempts. The result supports the second hypothesis of the present study. It should be noted that, to date, there has been a dearth of longitudinal research on investigating the relationship between negative life events and suicide attempts in MDD patients with controlling for demographic, environmental and psychological variables for suicide attempts. A three-year longitudinal study by Yen et al. (2005) indicated that negative life events predicted suicide attempts in psychiatric patients after controlling for baseline diagnoses of borderline personality disorder, MDD, substance use disorders and a history of childhood sexual abuse. Using the longitudinal data obtained from Taiwanese MDD patients, this study confirmed that negative life events as significant predictors of suicide attempts after controlling for dysfunctional attitudes, depressive hopelessness, depression and suicidal ideation. The result demonstrates the important role of negative life events in predicting future suicide attempts in MDD patients.

Contrary to the finding for suicidal ideation, however, it was found that negative life events exerted more direct effect on suicide attempts at Time 2 ($\beta = .26$)

compared with Time 1 ($\beta = .16$; see Figure 4.4, Model 3). The result indicates that the prediction of suicide attempts by negative life events appears to improve with time. A possible explanation is that the path coefficient between negative life events and suicide attempts is influenced by the decreases of direct effect of suicidal ideation on suicide attempts with time. As shown in Table 5.4, the original cross-lagged correlation between Time 1 negative life events and Time 2 suicide attempts was .38, and their direct effect was slightly reduced to .26 after partialling out the effect of Time 1 suicidal ideation on Time 2 suicide attempts ($\beta = .41$; see Figure 5.1). On the other hand, the cross-sectional correlation between Time 1 negative life events and Time 1 suicide attempts was .34 (see Table 4.20), but their direct effect was reduced to .16 after partialling out the effect of Time 1 suicidal ideation on Time 1 suicide attempts ($\beta = .56$, see Figure 4.3, Model 3). The results suggest that the influence of Time 1 negative life events on Time 2 suicide attempts is less diluted by the effect of Time 1 suicidal ideation on Time 2 suicide attempts.

Hypothesis 3 was supported because no additional paths, unspecified a priori, between Time 1 predictors (i.e., sex, age, dysfunctional attitudes, social support, depressive hopelessness, depression and compliance with medications) and Time 2 suicide attempts should be added in the model. In addition, it was found that no paths, specified a priori, should be deleted from the model. The paths in the model with the two-wave panel data of the students across six months are consistent with those in the model with the cross-sectional data of the MDD patients. The results suggest that the causal paths in the model are stable over six months.

5.5 Limitations of the Follow-Up Study

Although results were consistent with a priori hypotheses, there are several cautions and limitations should be noted. First, the explained variance of the suicide

attempts at Time 2 was relatively small. With the two-wave panel data, the model only explained 28% of variance of Time 2 suicide attempts, leaving 72% of variance unexplained. The result implies that some variables relevant to suicide attempts may be not included in the model. In order to improve the explanation of the model, future studies should consider some variables, such as attributional style (Abramson et al., 1989), cognitive rigidity or poor problem-solving skills (Schotte & Cum, 1982, 1987), which may influence the occurrence of future suicide attempts.

Second, researcher interventions during the follow-up period may weaken the relationship of Time 1 predictors to Time 2 suicide attempts. However, the problems appear to be unavoidable because of the research ethics of protecting participants from suicidal risk.

Third, this study followed patients for only 6 months and measured suicide attempts only twice. Given that short-term predictors of eventual suicide differed from long-term predictors (Fawcett et al., 1990), future investigations in continuing to assess suicide attempts at repeated time points in a longer-term follow-up may be of interest.

Lastly, the results of the follow-up study were obtained from the two-wave panel data of clinical patients with Major Depressive Disorder in Taiwan. Therefore, the results should not be generalized to other nonclinical populations. Further studies are needed to test the model across other groups.

5.6 Conclusion

Earlier studies of suicide attempts were mainly retrospective and correlational, thereby precluding inferences of causal relationships between predictor variables and suicide attempts, and restraining the examination of aetiological processes of suicide attempts. The strength of the present study is the

application of a panel (Time 1 - Time 2) design and multivariate analyses. The research design and statistical analyses enable us to clearly reveal that negative life events and suicidal ideation would significantly predict subsequent suicide attempts occurring during the six-month follow-up even after controlling for the other predictors for suicide attempts. This research also reveals that sex, age, dysfunctional attitudes, social support, depressive hopelessness, depression and compliance with medications have indirect effects on future suicide attempts. The findings suggest that clinicians should consider these factors in identifying depressed patients who are at high risk of suicide attempts so that the patients can be monitored more closely. In addition, the present study clarifies the mechanism that links these factors to future suicide attempts. Therefore, treatment to prevent relapse or recurrence of depression and cognitive-based psychotherapeutic interventions that aim at dysfunctional attitudes or hopelessness can be provided to protect at-risk MDD patients from future suicide attempts.

However, the results were obtained from the data of MDD patients in clinical settings, which are contrived and therefore not representative of natural settings. Future research should replicate the findings of this study in other nonclinical environment. Therefore, the next chapter will examine the extent to which the results generalize in a large sample of university students in Taiwan.

CHAPTER SIX
GENERALIZED STUDY: REPLICATING THE RESULTS OF DEPRESSED PATIENTS IN A SAMPLE OF UNIVERSITY STUDENTS

6.1 Introduction

The final modified combined mediational model was confirmed to fit the data of Taiwanese MDD patients through the main and follow-up studies. However, the result was obtained from research on severely depressed patients. It is unclear if a similar result would be found in samples from different social class backgrounds. Therefore, the purpose of this study was to replicate the findings of the previous studies in a sample of Taiwanese university students.

Risk factors for suicidal behaviours differ between clinically depressed patients and student populations. As discussed earlier, dysfunctional attitudes, hopelessness and depression were identified as important predictors for suicide risk in depressed patients. However, some other factors were found to particularly contribute to suicide risk in adolescents or student populations, for example, previous history of mental health treatment, school-related problems, parent-child conflict and self-esteem (Chiou et al., 2006, Lewinsohn, Rohde, & Seeley, 1993; Martin, Richardson, Bergen, Roeger, & Allison, 2005; Rudd, 1990; Stewart et al., 1999). These inconsistent findings suggest a discrepancy in conceptualization between clinical patients and students. In the previous studies of this research, the sample was MDD patients, and therefore more ill. It is possible that the severely depressed patients may limit the degree to which the results of the previous studies can be generalized. This generalized study with university students would be an important extension, because it would provide information about the comparability of the results from clinical MDD patients and normal populations in Taiwan.

In this study, the final modified combined mediational model (see Figure 4.4, Model 3) was first replicated in a sample of Taiwanese university students. The model was tested by SEM procedures to determine the adequacy of its goodness-of-fit to the given data. Had the model fit the given data, the model would have been accepted. Whereas if the model did not fit the data well, the four initial alternative models hypothesized in this research (i.e., the IM-A, the IM-B, the MM-A and the MM-B) would have been retested. The best-fitting model would be selected to represent the given data and would provide an adequate explanation for the development of suicidal ideation in Taiwanese university students. Finally, the results from Taiwanese university students were used as a comparison for the results from the previous studies of Taiwanese MDD patients.

Before the generalized study, data from a small group of Taiwanese university students were collected to reexamine the psychometric properties of the Chinese versions of the scales. The purpose of this stage was to validate these scales for use in Taiwanese students. Subsequently, SEM procedures were performed on a larger sample of data from Taiwanese university students obtained from these scales to test the integrated models mentioned above.

6.2 Stage I: Validating the Chinese Versions of the Scales in University Students

6.2.1 Methods

(1) Participants

A sample of 255 students was recruited from three medium-sized universities in Taiwan (approximately 8000 to 15000 students). The students were evaluated from January to February, 2007. Details of their recruitment and demographic characteristics are given under Procedures and Results, below.

(2)   Measures

The objective of this stage 1 was to validate the Chinese versions of the scales in a sample of university students. All the Chinese-language scales used in the present study were stapled together to form one document and then administered to the participants. The first part of the questionnaire document was the Demographic-Background Information Questionnaire. The subsequent sequence of the questionnaires was as follows: the C-LTE, the C-MDSS, the C-DAS, the C-CTI, the C-HS, the C-BDI-II and the C-BSS.

(3)   Procedures

After obtaining the verbal consent of teachers in charge of classes, the researcher of the present study was approved to collect students' data in the classes. The students were recruited from Year 1 to Year 4 courses offered by three universities, including extension and on-campus courses. In the extension courses, students completed the questionnaire document under the supervision of their teachers, who were briefed beforehand on the nature and purposes of the questionnaires and the instructions to be given to their students. In the on-campus courses, the researcher of this study was present at classes, and introduced the nature, purposes and methods of the research to students. The students who volunteered to participate in the study then completed the questionnaire document and were given course credit for their participation. They were also informed that they were under no obligation to take part in the study; if at any point they felt they did not wish to continue, they could withdraw, and they did not have to put their names on the questionnaires. Participation took approximately 20 to 30 minutes.

A total of 7 classes were involved in this study. 275 students participated in the study and completed the questionnaires. Of the 275 students who completed the questionnaires, 255 were deemed eligible for analysis. The 20 questionnaires that

were considered unacceptable for analysis were either incomplete or illegible, or in some cases the answers provided by participants suggested they had not taken the exercise seriously. The response-rate of the students who participated in this study was 92.7%.

(4)   Statistical Analyses

Basic analyses of frequency distributions, mean scores and standard deviations were conducted to investigate the demographic characteristics of the 255 university students. Item-total correlations were computed to measure the strength of the relationships between each item and the total score. The Kuder-Richardson formula 20 (KR-20, Kuder et al., 1937) and Cronbach's alpha coefficients (Cronbach, 1951) were used to measure the overall internal consistency of the Chinese versions of the scales. Exploratory factor analyses were performed on the data of the student sample to investigate the factor structure of the Chinese-language Scales. Prior to any data analysis, all negatively phrased items were reverse coded and all missing data were replaced with the regression estimation method implemented in SPSS version 11.0.

6.2.2 Results

In the following sections, demographic characteristics of the student sample are first described. Subsequently, item-total correlations, Cronbach's alpha coefficients, Kuder-Richardson formula 20 and factor analyses were conducted on the sample data to examine the psychometric properties of the Chinese version of the scales.

(1)   Demographic Characteristics

The demographic descriptions of the samples are summarized in Table 6.1. As can be seen, there were 111 (43.5%) males and 144 (56.5%) females. Their age

ranged from 19 to 39 years, with a mean age of 23.22 (*SD* = 3.65) years. Of the 255

university students, 12 (4.7%) were married and 243 (95.3%) were single.

Table 6.1

Demographic Characteristics of University Students in Stage 1 of the Generalized
Study (N = 255)

Demographic variables			*N*	(%)
Gender:	Male		111	(43.5)
	Female		144	(56.5)
Age (years):	<20		18	(7.1)
	20 – 24		173	(67.8)
	25 – 29		50	(19.6)
	30 – 34		8	(3.1)
	35 – 39		6	(2.4)
Marital status:	Married		12	(4.7)
	Single		243	(95.3)
	Mean	*SD*	Min.	Max.
Age (years)	23.22	3.65	19	37

(2)   Internal Consistency

As with the pilot study of this research, item-total correlations were

computed to measure the strength of the relationships between each item and the

total score. An item that contributes significantly to the attribute that the total scale

is measuring can be regarded as a good item. Items which have negligible

correlations with the total scale can be eliminated, bringing internal consistency to

an acceptable level. In addition, the overall internal consistency of the scales was

analyzed by Cronbach's alpha or Kuder-Richardson formula 20. In this study, the

analyses of internal consistency were conducted on the data of all the scales except

for the C-LTE because all the items in the scale were independent events.

(i)   C-MDSS

The item-total correlations for each item of the C-MDSS are presented in Appendix J, Table 1. As can be seen, each item had a positive correlation with the total score at $p < .05$. The magnitudes of the correlations ranged from .45 (Item 1: How often did they really listen to you when you talked about your concerns or problems?) to .67 (Item 16: How often could you use them as examples of how to deal with your problems?) No items need to be deleted from the scale. Cronbach's alpha for the total score was .87.

(ii)   C-DAS

The item-total correlations for each item of the C-DAS are presented in Appendix J, Table 2. As can be seen, the magnitudes of the correlations ranged from .05 (Item 15: It is possible for a person to be scolded and not get upset) to .67 (Item 7: My life is wasted unless I am a success). Because the correlation of Item 15 with the total score was non-significant, the item was deleted from the scale with no loss of the internal-consistency of the C-DAS. In addition, it was found that the correlations of Item 18 (A person should do well at everything he undertakes) and Item 21 (If I try hard enough, I should be able to excel at anything I attempt) with the total score were relatively low ($r = .16$, $p = .013$ and $r = .19$, $p = .003$, respectively). The two items were also deleted from the scale. Cronbach's alpha for the total scores after deleting Items 15, 18 and 21 was .82.

(iii)   C-CTI

Six filler items (1, 2, 4, 7, 14 and 22) were not included in the data analyses. The analyses of internal consistency were conducted on the remaining 30 items of the C-CTI. First, the item-total correlations for each of the 30 items are presented in Appendix J, Table 3. As can be seen, each item had a positive correlation with the total score at $p < .05$. All the items had item-total correlations in excess of .30. The magnitudes of the

correlations ranged from .34 (Item 34: I am faced with many difficulties) to .74 (Item 32: There is nothing to look forward to in the years ahead). Thus, no items need to be deleted from the scale. In addition, the analysis of overall internal consistency on the C-CTI data indicated a high Cronbach's alpha coefficient of .93.

(iv)   C-HS

The item-total correlations for each item of the C-HS are presented in Appendix J, Table 4. As can be seen, each item had a positive correlation with the total score at $p < .05$. The magnitudes of the correlations ranged from .26 (Item 19: I can look forward to more good times than bad times) to .70 (Item 15: I have great faith in the future). The overall internal consistency was analysed by means of coefficient alpha (KR-20), which yielded a coefficient of .87.

(v)   C-BDI-II

As can be seen in Appendix J, Table 5, the item-total correlations on the C-BDI-II ranged from .41 (Item 5: Guilty Feelings) to .72 (Item 15: Loss of Energy). Each item had a positive correlation with the total score at $p < .05$. Thus, no items need to be deleted from the scale. The overall internal consistency of the C-BDI-II was very high (Cronbach's alpha = .90).

(vi)   C-BSS

As can be seen in Appendix J, Table 6, the item-total correlations on the C-BSS ranged from .48 (Item 18: Final acts) to .81 (Item 9: Control over action). Each item had a positive correlation with the total score at $p < .05$. Thus, no items need to be deleted from the scale. The overall internal consistency of the C-BSS was high (Cronbach's alpha = .93).

(3)   Factor Analyses

Next, factor analyses were carried out to examine the factor structure of the Chinese-language scales. As with the factor analytic procedures of the main study in

this research, exploratory factor analyses were performed on the data of the scales from the 255 university students. Factor analyses on the C-LTE data were not computed due to the fact that all the items in the scale were independent events.

(i)   C-MDSS

A principal axis factoring analysis was performed on the C-MDSS data of the 255 students. The Kaiser-Meyer-Olkin measure showed that the data were suitable for a factor analysis (KMO=0.86). Three factors with eigenvalues greater than one were found (Eigenvalues—5.58, 2.63 and 2.01). Further examination of the scree test showed that the clear "scree" occurred after the third factor. This provides evidence for a three-factor solution. The factor scree plot of the C-MDSS is shown in Appendix K, Figure 1.

Next, a three-factor extraction using principal axis factoring was attempted. The three factors accounted for 56.08% of the total variance of the data. The three retained factors were then rotated using an oblique Promax procedure based on the assumption that there would be correlations in the three factors. The three-factor solution pattern matrix after Promax rotation is displayed in Table 6.2. As can be seen, all the 16 items loaded uniquely on one factor with factor loadings of .30 or higher; therefore, no items need to be discarded from the scale. The correlations of Factor 1 versus Factor 2, Factor 1 versus Factor 3 and Factor 2 versus Factor 3 were .39 ($p < .001$), .25 ($p < .01$) and .40 ($p < .001$), respectively.

Factor 1 consisted of items with respect to teacher support. Factor 2 included items which concerned peer support. Factor 3 was composed of items which reflected family support. All the items in the C-MDSS exactly loaded on the three factors of the Winefield et al. (1992) MDSS. Therefore, the three factors of the C-MDSS were labeled Supervisor Support, Peer Support, and Family Support, respectively.

Table 6.2

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the Multidimensional Support Scale (C-MDSS) for University Students in the Generalized Study (N = 255)

C-MDSS item	Factor[a]		
	1	2	3
A. Firstly, think of your family and close friends, especially the 2-3 who are most important to you.			
1. How often did they really listen to you when you talked about your concerns or problems?	-.07	-.07	**.73**
2. How often did you feel that they really trying to understand your problem?	-.04	-.03	**.82**
3. How often did they really make you feel loved?	-.03	.05	**.70**
4. How often did they help you in practical ways, like doing things for you or lending you money?	.12	.04	**.56**
5. How often did they answer your questions or give you advice about how to solve your problems?	.02	.00	**.69**
6. How often could you use them as examples of how to deal with your problems?	.21	.06	**.34**
B. Now, think of your classmates that you know.			
1. How often did they really listen to you when you talked about your concerns or problems?	.01	**.73**	.04
2. How often did you feel that they really trying to understand your problem?	-.05	**.72**	.06
3. How often did they help you in practical ways, like doing things for you or lending you money?	-.08	**.77**	.04
4. How often did they answer your questions or give you advice about how to solve your problems?	.04	**.78**	-.01
5. How often could you use them as examples of how to deal with your problems?	.06	**.75**	-.12
C. Lastly, think of your teachers who are helping you with your school work.			
1. How often did they really listen to you when you talked about your concerns or problems?	**.91**	-.08	-.02
2. How often did you feel that they really trying to understand your problem?	**.87**	-.09	.02
3. How often did they help your schoolwork in practical ways?	**.68**	.01	.10
4. How often did they answer your questions or give you advice about how to solve your problems?	**.86**	.05	-.05
5. How often could you use them as examples of how to deal with your problems?	**.74**	.13	-.01

Note. Numbers in bold type show factor loadings in excess of .30 among the three factors. Item numbers correspond with item numbers in Winefield et al., 1992.

[a] Factor 1 = Supervisor Support, Factor 2 = Peer Support, Factor 3 = Family Support.

(ii)   C-DAS

A principal axis factoring analysis was performed on 21 out of the 24 items of the C-DAS. Items 15, 18 and 21 were eliminated from the analyses because they had relatively low or non-significant correlations with the total C-DAS score in the item analyses described above. The Kaiser-Meyer-Olkin measure showed that the C-DAS data were suitable for a factor analysis (KMO=0.84). Five factors with eigenvalues in excess of one were found (Eigenvalues—4.93, 2.60, 1.42, 1.15 and 1.12). After considering the scree test and interpretability, three factors were extracted from the C-DAS. The principal axis factoring for the three factors accounted for 33.49% of the total variance of the data. The factor scree plot of the C-DAS is shown in Appendix K, Figure 2.

The three-factor solution pattern matrix after Promax rotation is presented in Table 6.3. As can be seen, factor 1 was defined by Items 1, 4, 5, 7, 8, 10, 11, 13, 14, 16, 19 and 24. The factor was centered around issues about achievement, but it contained a number of dependency items; therefore, the factor was labeled Achievement/Dependency. Factor 2, defined by 2, 17, 20 and 23, and mainly included issues about dependency; the factor was labeled Dependency. Factor 3, defined by 3, 6, 9 and 12, reflected issues about self-control; the factor was labeled Self-Control accordingly. The correlations of Factor 1 versus Factor 2, Factor 1 versus Factor 3 and Factor 2 versus Factor 3 were .44 ($p < .001$), .11 ($p < .05$) and -.38 ($p < .001$), respectively.

Table 6.3

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the Dysfunctional Attitude Scale (C-DAS) for University Students in the Generalized Study (N = 255)

C-DAS item	Factor[a] 1	2	3
1. If I fail partly, it is as bad as being a complete failure.	**.54**	.01	.05
2. If others dislike you, you cannot be happy.	.33	**.41**	.03
3. I should be happy all the time.	-.02	.20	**.36**
4. People will probably think less of me if I make a mistake.	**.49**	.19	.15
5. My happiness depends more on other people than it dose on me.	**.39**	.21	-.25
6. I should always have complete control over my feelings.	.01	.12	**.66**
7. My life is wasted unless I am a success.	**.70**	-.03	.10
8. What other people think about me is very important.	**.50**	.29	.12
9. I ought to be able to solve my problems quickly and without a great deal of effort.	.15	-.03	**.45**
10. If I don't set the highest standards for myself, I am likely to end up a second rate person.	**.56**	-.03	.14
11. I am nothing if a person I love doesn't love me.	**.50**	.11	-.12
12. A person should be able to control what happens to him.	.03	.05	**.50**
13. If I am to be a worthwhile person, I must be truly outstanding in at least one major respect.	**.47**	-.18	.27
14. If you don't have other people to lean on, you are bound to be sad.	**.55**	.14	-.26
16. I must be a useful, productive, creative person or life has no purpose.	**.67**	-.17	.04
17. I can find happiness without being loved by other person.	.13	**.37**	-.32
19. If I do not do well all the time, people will not respect me.	**.56**	-.09	.03
20. I do not need the approval of other people in order to be happy.	-.16	**.77**	.28
22. People who have good ideas are more worthy than those who do not.	**.33**	-.21	.12
23. A person doesn't need to be well liked in order to be happy.	-.12	**.79**	.04
24. Whenever I take a chance or risk I am only looking for trouble.	**.35**	-.07	-.10

Note. Numbers in bold type show highest factor loadings among the three factors in excess of .30. Item numbers correspond with item numbers in Power et al., 1994.

[a]Factor 1 = Achievement/Dependency, Factor 2 = Dependency, Factor 3 = Self-Control.

(iii)   C-CTI

Before factor analyses were performed, six filler items (1, 2, 4, 7, 14 and 22) were deleted from the C-CTI. A principal axis factoring analysis was performed on the remaining 30 items of the C-CTI. The Kaiser-Meyer-Olkin measure showed that the data were suitable for a factor analysis (KMO=0.91). Five factors with eigenvalues in excess of one were found (Eigenvalues—10.09, 2.49, 1.68, 1.27 and 1.17). After considering the scree test and interpretability, a two-factor solution was chosen as the most appropriate. The principal axis factoring solution accounted for 37.83% of the total variance of the data. The factor scree plot of the C-CTI is presented in Appendix K, Figure 3.

The two-factor solution pattern matrix after Promax rotation is displayed in Table 6.4. Because Item 33 (I like myself) loaded substantially on two factors, it may be deleted from the scale and was not used in the subsequent data analysis. Factor 1 and Factor 2 consisted respectively of negatively and positively phrased items about the self, the world and the future. The two factors identified here resembled those of the previous analysis of the C-CTI with the 162 MDD patients (see Table 4.6). Thus, the two factors were labeled Negative Depressive Cognition and Positive Depressive Cognition, respectively. The correlation between Factor 1 and Factor 2 was .67 ($p < .001$).

Table 6.4

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the Cognitive Triad Inventory (C-CTI) for University Students in the Generalized Study (N = 255)

C-CTI item[a]		Factor[b] 1	Factor[b] 2
3. Most people are friendly and helpful.	(PW)	-.01	**.49**
5. I am a failure.	(NS)	**.64**	.15
6. I like to think about the good things that lie ahead for me.	(PF)	-.08	**.50**
8. The people I know help me when need it.	(PW)	-.25	**.82**
9. I expect that things will be going very well for me a few years from now.	(PF)	-.01	**.61**
10. I have messed up almost all the important relationships I have ever had.	(NS)	**.37**	.23
11. The future holds a lot of excitement for me.	(PF)	-.15	**.70**
12. My daily activities are fun and rewarding.	(PW)	.02	**.66**
13. I can't do anything right.	(NS)	**.63**	.12
15. There is nothing left in my life to look forward to.	(NF)	**.53**	.18
16. My current problems or concerns will always be there in one way or another.	(NF)	**.62**	-.19
17. I am as adequate as other people I know.	(PS)	-.11	**.62**
18. The world is a very hostile place.	(NW)	**.69**	-.05
19. There is no reason for me to be hopeful about my future.	(NF)	**.43**	.28
20. The important people in my life are helpful and supportive.	(PW)	-.11	**.61**
21. I hate myself.	(NS)	**.65**	.11
23. Bad things happen to me a lot.	(NW)	**.65**	.06
24. I have a spouse or friend who is warm and supportive.	(PW)	.13	**.53**
25. I can do a lot of things well.	(PS)	.00	**.68**
26. My future is simply too awful to think about.	(NF)	**.59**	.05
27. My family doesn't care what happens to me.	(NW)	**.33**	.12
28. Things will work out well for me in the future.	(PF)	.17	**.55**
29. I am guilty of a great many things.	(NS)	**.61**	-.27
30. No matter what I do, others make it difficult for me to get what I want.	(NW)	**.68**	-.06
31. I am a worthwhile human being.	(PS)	.19	**.50**
32. There is nothing to look forward to in the years ahead.	(NF)	**.67**	.13
33. I like myself.	(PS)	.38	.37
34. I am faced with many difficulties.	(NW)	**.62**	-.32
35. I have serious flaws in my character.	(NS)	**.58**	-.05
36. I expect to be content and satisfied as the years go by.	(PF)	-.09	**.52**

Note. Numbers in bold type show factor loadings in excess of .30 except for Item 33 because it loads substantially on the two factors. Item numbers of the scale correspond with item numbers in Beckham et al., 1986.

[a] PS = positive self, NS = negative self, PW = positive world, NW = negative world, PF = positive future, NF = negative future. [b] Factor 1 = Negative Depressive Cognition, Factor 2 = Positive Depressive Cognition.

(iv)   C-HS

A principal axis factoring analysis was performed on the C-HS data of the 255 university students. The Kaiser-Meyer-Olkin measure showed that the data were suitable for a factor analysis (KMO=0.89). Five factors with eigenvalues in excess of one were found (Eigenvalues—6.19, 1.53, 1.21, 1.11 and 1.01). After considering the scree test and interpretability, a two-factor solution was chosen as the most appropriate. The principal axis factoring solution accounted for 32.19% of the total variance of the data. The factor scree plot of the C-HS is shown in Appendix K, Figure 4.

The two-factor solution pattern matrix after Promax rotation is displayed in Table 6.5. Because the factor loading of Items 3 (When things are going badly, I am helped by knowing they can't stay that way forever) was less than .30, it may be deleted from the C-HS. Factor 1, defined by Items 2, 7, 9, 11, 12, 14, 16, 17 and 20, revolved around issues about negative expectations about the future. The factor was labeled Negative Future Expectations. Factor 2, defined by Items 1, 4, 5, 6, 8, 10, 13, 15, 18 and 19, were mainly concerned with issues about positive expectations about the future. As such, the factor was labeled Positive Future Expectations. The correlation of Factor 1 versus Factor 2 was .71 ($p < .001$).

Table 6.5

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the
Hopelessness Scale (C-HS) for University Students in the Generalized Study (N = 255)

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│                        NOTE:                            │
│   This table is included on page 217 of the print copy of │
│      the thesis held in the University of Adelaide Library. │
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(v)   C-BDI-II

As with the procedure of factor analyses used above, the C-BDI-II data of the 255 students were factor analyzed with a principal axis factoring analysis. The Kaiser-Meyer-Olkin measure showed that the data were suitable for a factor analysis (KMO=0.89). Four factors with eigenvalues in excess of one were found (Eigenvalues—7.35, 1.43, 1.17 and 1.14). After considering the scree test, interpretability and previous analyses (Beck, Steer et al., 1996; Shek, 1990), two factors were extracted from the C-BDI-II. The principal axis factoring solution for the two factors accounted for 35.97% of the total variance of the data. The factor scree plot of the C-BDI-II is shown in Appendix K, Figure 5.

Table 6.6 shows the rotated factor loadings of the two factors from the pattern matrix with Promax rotation. Item 5 (guilty feelings) had a relatively low factor loading in the rotated solution and Items 15 (loss of energy) and 19 (concentration Difficulty) loaded substantially on the two factors, so the three items may be discarded from the C-BDI-II and not used in subsequent data analyses. The items with the heaviest loadings on the first factor mainly included sadness, pessimism, self-dislike, suicidal thoughts, crying and worthlessness. This factor appeared to represent the Cognitive-Affective dimension of depressive symptomatology. Factor 2 consisted primarily of sleeping pattern, appetite, tiredness, loss of interest in sex. This factor appeared to represent a Somatic dimension. The correlation between Factor 1 and Factor 2 was .69 ($p < .001$). The two factors were extremely similar in content to those of Beck et al.'s analysis of the BDI-II with a sample of 120 university students (Beck, Steer et al., 1996) and similar to those of Shek's analysis of the C-BDI with a sample of 2150 secondary school students in Hong Kong (Shek, 1990). The comparisons of the factor structure of the C-BDI-II and those of Beck et al. BDI-II and Shek C-BDI are summarized in Table 6.7.

Table 6.6

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the Beck Depression Inventory—Second Edition (C-BDI-II) for University Students in the Generalized Study (N = 255)

	Factor[a]	
C-BDI-II item	1	2
1. Sadness	**.74**	-.14
2. Pessimism	**.65**	.01
3. Past failure	**.69**	-.04
4. Loss of Pleasure	**.39**	.18
5. Guilty Feelings	.12	.29
6. Punishment Feelings	**.46**	.05
7. Self-Dislike	**.72**	-.12
8. Self-Criticalness	**.37**	.20
9. Suicidal Thoughts or Wishes	**.61**	.02
10. Crying	**.50**	.04
11. Agitation	**.42**	.23
12. Loss of Interest	**.46**	.15
13. Indecisiveness	**.40**	.18
14. Worthlessness	**.80**	-.08
15. Loss of Energy	.38	.40
16. Changes in Sleeping Pattern	-.18	**.70**
17. Irritability	.25	**.39**
18 Changes in Appetite	.12	**.44**
19. Concentration Difficulty	.38	.37
20. Tiredness or Fatigue	-.01	**.77**
21. Loss of Interest in Sex	**-.02**	**.52**

Note. Numbers in bold type show the highest factor loadings among the two factors except for Items 5, 15 and 19 because Item 5 has low loadings of < .30 and Items 15 and 19 load significantly on the two factors. Item numbers of the C-BDI-II correspond with item numbers in Beck, Steer et al., 1996.

[a] Factor 1 = Cognitive-Affective dimension, Factor 2 = Somatic dimension.

Table 6.7

Items of the Factor Analysis of the C-BDI-II Loaded on the Factors of Beck, Steer et al. (1996) BDI-II and Shek (1990) C-BDI

C-BDI-II			Beck, Steer et al.'s (1996)	Shek's (1990) C-BDI
Factor[a]	Item	Loading	BDI-II Factor	Factor
Factor 1	14	.80	F1(Cognitive-Affective)	F1(General Depression)
	1	.74	F1(Cognitive-Affective)	F1(General Depression)
	7	.72	F1(Cognitive-Affective)	F1(General Depression)
	3	.69	F1(Cognitive-Affective)	F1(General Depression)
	2	.65	F1(Cognitive-Affective)	F1(General Depression)
	9	.61	F1(Cognitive-Affective)	F1(General Depression)
	10	.50	F1(Cognitive-Affective)	F1(General Depression)
	6	.46	F1(Cognitive-Affective)	F1(General Depression)
	12	.46	F1(Cognitive-Affective)	F2(Somatic Disturbance)
	11	.42	F1(Cognitive-Affective)	F1(General Depression)
	13	.40	F1(Cognitive-Affective)	F1(General Depression)
	4	.39	F1(Cognitive-Affective)	F1(General Depression)
	8	.37	F1(Cognitive-Affective)	F1(General Depression)
Factor 2	20	.77	F2(Somatic)	F2(Somatic Disturbance)
	16	.70	F2(Somatic)	F2(Somatic Disturbance)
	21	.52	F1(Cognitive-Affective)	F2(Somatic Disturbance)
	18	.44	F2(Somatic)	F2(Somatic Disturbance)
	17	.39	F1(Cognitive-Affective)	F2(Somatic Disturbance)

Note. [a]Factor 1 = Cognitive-Affective dimension, Factor 2 = Somatic dimension.

(vi)   C-BSS

The C-BSS data were factor analyzed with a principal axis factoring analysis. The Kaiser-Meyer-Olkin measure showed that the data were adequate for a factor analysis (KMO=0.9). Three factors with eigenvalues in excess of one were found (Eigenvalues—9.35, 1.89 and 1.24). After considering the scree test, interpretability and the previous analysis of the C-BSS in the main study of this research, a two-factor solution was chosen as the most appropriate. The principal axis factoring solution accounted for 54.57% of the total variance of the data. The factor scree plot of the C-BSS is shown in Appendix K, Figure 6.

Table 6.8 displays the rotated factor loadings of the two factors from the pattern matrix with Promax rotation. As can be seen, Item 7 (frequency of ideation) loaded substantially on the two factors so it may be discarded from the C-BSS. Factor 1 included Items 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 14 and 15. Factor 2 included Items 12, 13, 16, 17 and 18. The two factors were extremely similar in content to those of the previous analysis of the C-BSS with the 162 MDD patients (see Table 4.11). Therefore, Factors 1 and 2 identified here were labeled Suicidal Wishes and Suicidal Plans, respectively. The correlation between Factor 1 and Factor 2 was .64 ($p < .001$).

Table 6.8

Rotated Factor Loadings from the Pattern Matrix of the Chinese Version of the Beck Scale for Suicidal ideation (C-BSS) for University Students in the Generalized Study (N = 255)

C-BSS item	Factor[a]	
	1	2
1. Wish to live	**.69**	-.04
2. Wish to die	**.80**	-.15
3. Reason for living	**.68**	.09
4. Active attempt	**.77**	-.01
5. Passive attempt	**.76**	-.08
6. Duration of thoughts	**.48**	.36
7. Frequency of ideation	.30	.29
8. Attitude toward ideation	**.76**	.05
9. Control over action	**.90**	-.09
10. Deterrents to attempt	**.80**	.03
11. Reasons for attempt	**.65**	.02
12. Specificity of planning	-.07	**.90**
13. Availability/opportunity	-.06	**.84**
14. Capability	**.45**	.38
15. Expectancy	**.56**	.31
16. Actual preparation	.36	**.41**
17. Suicidal note	.03	**.63**
18. Final acts	.20	**.82**
19. Deception	**.75**	-.06

Note. Numbers in bold type show the highest factor loadings among the two factors except for Item 7 because it loads substantially on the two factors. Item numbers of the C-BSS correspond with item numbers in Beck, Steer, & Ranieri, 1988.

a Factor 1 = Suicidal Wishes, Factor 2 = Suicidal Plans.

(vii)   Factor analyses of the combined items from the C-CTI and the C-HS

In order to test the final modified combined mediational model in university students, a latent construct should be extracted from the combined items of the C-CTI and the C-HS with the data of university students. As with the extracting procedure described in Stage 2 of the main study, a factor analysis with oblique rotation was conducted on the students' responses to the combined items of the two scales so that the factors of the items could be determined. Subsequently, parcels would be made to represent these factors; each parcel is the average of the items in each individual factor. Then, these parcels would be used to build a latent variable. Prior to factor analyses, 6 filler items (1, 2, 4, 7, 14 and 22) in the C-CTI were omitted because they are not scored. Items 5, 21 and 29 in the C-CTI were also deleted because they are included in both the C-CTI and the C-BDI-II. If these three items were used to build parcels, they may cause multicollinearity in the model.

After deleting 9 items from the C-CTI, the responses to the 47 combined items of the 255 university students were factor analyzed with a principal axis factoring analysis. Examination of the scree test and eigenvalues provided evidence for a four-factor solution (see Appendix K, Figure 7). The principal axis factoring solution for the four factors accounted for 37.88% of the total variance in the data.

Considering items as acceptable measures of their factor only when items loaded uniquely on one factor with loadings of .30 or higher, the Promax rotation showed 41 items loaded on the four factors. Table 6.9 presents the item loadings found for each of the four factors. As can be seen, Items 3, 4 and 19 in the C-HS and Items 9, 30 and 32 in the C-CTI loaded substantially on two factors or had factor loadings of less than .30. The six items were, therefore, omitted and not used in subsequent analyses. The first factor consisted of 13 items (3, 6, 8, 11, 12, 17, 20, 24, 25, 28, 31, 33 and 36) from the C-CTI. They were related to issues about positive

view of the self, the world and the future. Thus, the factor was labeled Positive Depressive Cognition. The second factor consisted of 7 items (10, 13, 16, 18, 23, 34 and 35) from the C-CTI. They were mainly concerned with issues about negative views of the self, the world and the future; thus, the factor was labeled Negative Depressive Cognition. The third factor consisted of 9 negatively worded items (2, 7, 9, 11, 12, 14, 16, 17 and 20) from the C-HS and 4 items (15, 19, 26 and 27) from the C-CTI related to negative view of the future; thus, the factor was labeled Negative Future Expectations. The fourth factor consisted of 8 positively worded items (1, 5, 6, 8, 10, 13, 15 and 18) from the C-HS; thus, the factor was labeled Positive Future Expectations. The present finding is not consistent with the previous result in the main study, which reported three factors in the factor analyses of the combined items from the C-CTI and the C-HS with the MDD patients (see Table 4.18).

As with the item-parceling procedures described in Stage 2 of the main study, the four factors were used to create four parcels. The first parcel reflected Factor 1 and was the average of the 13 items of Factor 1. Likewise, the second parcel was the average of the 7 items of Factor 2; the third parcel was the average of the 13 items of Factor 3, and the fourth parcel was the average of the 8 items of Factor 4. The four parcels were used to indicate the latent variable which has been termed Depressive Hopelessness.

Table 6.9

Rotated Factor Loadings from the Pattern Matrix of the Combined Items from the
C-HS and the C-CTI for University Students in the Generalized Study (N = 255)

NOTE:
This table is included on page 225 of the print copy of
the thesis held in the University of Adelaide Library.

(4)   Reliability and Other Analyses

After deleting some non-significant items from the C-CTI, the C-HS, the C-BDI-II and the C-BSS by means of the factor analyses, Cronbach's alpha and KR-20 were recalculated to examine the overall internal consistencies of these scales. Alpha coefficients for the C-CTI, the C-BDI-II and the C-BSS were .92, .88 and .93, respectively. In addition, the coefficient KR-20 for the C-HS was .87. The results indicated that the final Chinese versions of the CTI, the HS, the BDI-II and the BSS were highly internally reliable.

The test-retest reliability of all the Chinese-language scales in undergraduate students has been reported in Stage 2 of the pilot study. The four-week test-retest reliability coefficients in students were .78, .78, .81 and .80 for the C-LTE, the C-HS, the C-BDI-II and the C-BSS, respectively. The eight-week test-retest reliability coefficients were .62, .81 and .85 for the C-MDSS, the C-DAS and the C-CTI, respectively.

6.2.3 Discussion

This stage reports a validation study in which the reliability and factor structure of the Chinese versions of the scales were examined using university students as subjects. This is a necessary step for the subsequent study in the next stage to use these assessment tools to accurately measure suicidal ideation and its predictor variables in a large sample of university students.

Item analyses showed that the item-total correlations in the C-MDSS, the C-CTI, the C-HS, the C-BDI-II and the C-BSS were statistically significant. The result suggests that all the items in these scales are homogeneous and measure the same psychological construct. In the C-DAS, however, it was found that the correlations of Items 15, 18 and 21 with the total score were non-significant or relatively low. The result suggests that the three items may be deleted from the scale. Analyses on the reliability of these scales showed that these scales were internally consistent with acceptable alpha coefficients. In addition, the pilot study of this research found that these scales had acceptable test-retest reliability.

Factor analyses on the C-MDSS data of the 255 university students yielded three factors labeled Supervisor Support, Peer Support and Family Support. The three factors are consistent in content with those of the previous analysis of the C-MDSS with the data of the MDD patients (see Table 4.2). In addition, the present

finding is consistent with the work of Winefield et al. (1992), which reported three MDSS factors in their factor analytic study with a sample of 483 adults in Australia. These consistent findings suggest that the factor structure of the MDSS is stable across different samples and cultures.

With respect to the C-DAS, it was found that the factors identified here with the data of the university students were not similar in content to those of the previous analysis of the C-DAS with the data of the MDD patients (see Table 4.4). The first factor of the C-DAS identified here (labeled Achievement/Dependency) included more dependency items than did the first factor of the previous analysis of the C-DAS. The second factor of the C-DAS identified here (labeled Dependency) consisted of fewer dependency items than did the second factors of the previous analysis of the C-DAS. The third factors identified here (labeled Self-Control) consisted of fewer self-control items than did the third factors of the previous analysis of the C-DAS. Lack of factorial congruence in the C-DAS between the student sample and the depressed patient sample suggests that the C-DAS factors may change in different samples. Moreover, the three C-DAS factors were significantly correlated. They can be added together into a large scale to measure a general tendency toward dysfunctional attitudes in Taiwanese university students.

Factor analyses on the C-CTI data of the 255 university students yielded two factors, Negative Depressive Cognition and Positive Depressive Cognition. The two factors consisted of negatively and positively phrased items about the self, the world and the future. The result clearly indicated that the phrasing rather than the content of the items significantly influenced the factor structure of the C-CTI. Anderson et al. (1995) observed a similar pattern for the wording of items in factors that emerged in their factor analysis of the CTI with college students. Furthermore, Greening et al. (2005) indicated that the phrasing rather than the content of items significantly

influenced the factor structure of the child version of the CTI in their factor analytic study with high-school students. The factor analysis of the C-CTI with the data of the 162 MDD patients in the main study also revealed a similar finding (see Table 4.6). These consistent findings suggest that the three separable constructs of the cognitive triad hypothesized by Beck (1967) may not exist. The self, the world and the future tend to be considered as a whole in positive and negative manner by respondents from Taiwan and Western countries. In addition, with the data of the university students, it was found that Item 33 may be deleted from the C-CTI because the item loaded substantially on two factors. Moreover, the two C-CTI factors were highly correlated. They can be added together into a large scale and be used as one overall index to measure a cognitive tendency toward depression in Taiwanese university students.

In the C-HS, it was found that one factor of negatively worded items and one factor including eight positively worded and two negatively worded items were extracted. The result indicated that the phrasing of the items significantly influenced the factor structure of the C-HS. The present finding is not consistent with the work of Beck, Weissman et al. (1974) and Nekanda-Trepka et al. (1983), which reported three and five HS factors, respectively, in their factor analytic studies with clinical patients. The present finding is also inconsistent with the result reported in the previous factor analysis of the C-HS with the MDD patients (see Table 4.7). These discrepant results suggest that the factor structure of the C-HS may change in different samples. In the present study, the empirically derived factors of the C-HS reflected the participants' overall hopelessness in positive and negative ways. In addition, it was found that the two factors of the C-HS were highly correlated. They can be added together into a large scale to measure a general tendency toward hopelessness in Taiwanese university students.

Of particular interest is the finding that two negatively worded items in the C-HS (4: I can't imagine what my life would be like in 10 years, and 18: The future seems vague and uncertain to me) were intermingled with the factor of positively worded items (i.e., Factor 2). A possible explanation is that Taiwanese university students worry about their future very much. They expect to encounter difficulties in their future. Taiwan has undergone economic instability and political tension during the past decade. In comparison to earlier years, Taiwanese adolescents have been reported to be under considerable anxiety about their future in the current political environment (Tosun Public Welfare Foundation, 2007). The problem is especially true for Taiwanese university students because they are faced with the choices of their career development. Thus, it is less surprising that Taiwanese university students considered the positively worded items and the two negative worded items in the same light.

Factor analyses for the C-BDI-II yielded two factors, which were termed Cognitive/Affective dimension and Somatic dimension. The finding of the two-factor solution is very similar to the work of Beck, Steer et al. (1996), which reported two BDI-II factors labeled Cognitive/Affective dimension and Somatic dimension in their factor analytic study with a sample of 120 university students. In addition, the present finding is similar to the work of Shek (1990), which indicated two factors of the C-BDI labeled General Depression and Somatic Disturbances in his factor analytic study with a sample of 2150 secondary school students in Hong Kong. These consistent findings suggest that that the factor structure of the Beck Depression Inventory is stable across different student samples and cultures. However, the present finding is inconsistent with the result reported in the previous factor analysis of the C-BDI-II with the 162 MDD patients (see Table 4.9). The discrepant findings suggest that the factor structure of the Beck Depression

Inventory may change in samples from university students to clinical MDD patients. Also, with the data of the university students, it was found that Items 5, 15 and 19 may be deleted from the scale because the items loaded substantially on two factors or had relatively low factor loadings of less than .30. Moreover, the two factors of the C-BSS were highly correlated; therefore, they can be added together into one large scale to measure general attitudes toward depression in Taiwanese university students.

In relation to C-BSS, it was found that two factors (Suicidal Wishes and Suicidal Plans) were extracted. The present finding is extremely similar to the result reported in the previous factor analysis of the C-BSS with the MDD patients (see Table 4.11). Also, the current finding is similar to the work of Holden et al. (1989), which revealed two factors of the BSS in his factor analytic study with a sample of 97 psychiatric patients in Canada. These similar results suggest that the factor structure of the C-BSS is stable across different samples and cultures. In addition, it was found that Item 7 may be deleted from the C-BSS because the item loaded substantially on two factors. Moreover, the two factors of the C-BSS had high correlation with each other. They can be added together into one large scale to measure general ideation toward suicide in Taiwanese university students.

Factor analyses on the students' responses to the combined items of the C-CTI and the C-HS yielded four factors. The finding is inconsistent with the result reported in the previous factor analyses of the combined items with data of the MDD patients. The discrepant results suggest that the factors in the combined items may change in different samples. Thus, when the final modified combined mediational model found in the previous study is replicated in university students, the latent variable in the model should be built by the factors obtained from factor analyses of the combined items of the C-CTI and the C-HS with data of university students.

In summary, this study shows that all the Chinese versions of the scales except for the C-LTE are internally consistent in Taiwanese university students. In addition, the scales have been reported to have acceptable test-retest reliability in Taiwanese university students (see the pilot study, Stage 2). Thus, the scales can be regarded as possessing acceptable psychometric properties and can be used as objective assessment tools to measure suicidal ideation and its predictor variables in Taiwanese university students. However, it was found that the factors of the C-DAS, the C-HS and the C-BDI-II obtained from factor analyses with data of university students did not resemble those obtained from analyses with data of clinical MDD patients. The result suggests that when the subscales of the three scales are utilized in university settings, it is necessary to use the subscales which are obtained from research on university students. In the subsequent study of Stage 2, the general attitudes toward social support, dysfunctional attitudes, depressive cognition, hopelessness, depression and suicidal ideation were mainly of interest. Thus, the total scores of the Chinese-language scales were used in all data analyses.

6.3 Stage II: Replicating the Previous Results for Depressed Patients in a sample of University Students

This stage was designed to replicate the previous results obtained with depressed patients in a larger sample of university students. As mentioned earlier, first, SEM procedures were used to test the goodness-of-fit of the final modified combined mediational model to the given data. Had the model fit the given data, the model would have been accepted as an appropriate model. Whereas the model did not fit the given data well, the four initial alternative models hypothesized in this research (i.e., the IM-A, the IM-B, the MM-A and the MM-B) would be retested to determine the best-fitting model in representing the given data.

Prior to the testing of these models, suicide attempts were deleted from all the models because suicide attempts seldom happen in university students. Similarly, compliance with medications was not included in the models because most of the university students did not receive psychopharmacological treatment at the time of testing.

6.3.1 Methods

(1)   Participants

324 university students were recruited from the aforementioned three universities in Taiwan from May to June, 2007. Details of their recruitment and demographic characteristics are given under Procedures and Results, below.

(2)   Measures

The variables investigated in the generalized study were assessed by the Chinese versions of the scales, which were observed to be satisfactory in reliability and validity analyses with a sample of university students in Stage 1 of this generalized study. However, in the present study two variables (i.e., suicide attempts and compliance with medications) were omitted from the integrated models because of the fact that few students attempted suicide and received psychotropic medications at the time of testing. Therefore, eight scales were used in this study, as follows:

(1)   Negative life events as assessed by the Chinese version of the List of Threatening Experiences (C-LTE).

(2)   Social support as measured by the Chinese version of the Multidimensional Support Scale (C-MDSS).

(3)   Dysfunctional attitudes as measured by the Chinese version of the short-version of the Dysfunctional Attitude Scale (C-DAS).

(4)   Depressive cognition as measured by the Chinese version of the Cognitive Triad Inventory (C-CTI).

(5)   Hopelessness as measured by the Chinese version of the Hopelessness Scale (C-HS).

(6)   Depressive symptoms as measured by the Chinese version of the Beck Depression Inventory-II (C-BDI-II).

(7)   Suicidal ideation as measured by the Chinese version of the Beck Scale for Suicidal Ideation (C-BSS).

(8)   Students' demographic information, including sex and age, as measured by the self-devised Background-demographic Information Questionnaire.

In addition, as mentioned above, the latent variable (i.e., depressive hopelessness) in the final modified combined mediational model was assessed by four item parcels. Each parcel was the average of the items in each of the four factors, which were extracted from the combined items of the C-CTI and the C-HS. All the scales were stapled together to form one document. The sequence of the scales was the same as that described in Stage 1 of this generalized study. Prior to data analyses in the present study, Items 15, 18 and 21 in the C-DAS, Items 1, 2, 4, 7, 14, 22 and 33 in the C-CTI, Item 3 in the C-HS, Items 5, 15, 19 in the C-BDI-II and Item 7 in the C-BSS were omitted. In addition, Items 5 (I am a failure), 21 (I hate myself) and 29 (I am guilty of a great many things) in the C-CTI were omitted due to their inclusion in both the C-CTI and the C-BDI-II. Item 9 (suicidal thought) in the C-BDI-II was omitted due to its inclusion in the C-BSS.

(3)   Procedures

The recruitment procedures for the university students in this stage were the same as those described in Stage 1 of this generalized study. After the researcher obtained the verbal consent of teachers in charge of classes, data of students were

collected from the classes of Year 1 to Year 4 extension and on-campus courses in the three universities. The students participated in the study on a voluntary basis. Participation took approximately 20 to 30 minutes.

A total of 10 classes were involved in this study. Three hundred and fifty-one university students participated in the study and completed the questionnaires. There are incomplete data for 27 students, leaving a total of 324 sets of data. The reasons for omitting certain participant responses from analysis were the same as in the first sample (see Section 6.2.1 [3] Procedures above); namely that they were incomplete, illegible or insincere. The response-rate of the university students who participated in this study was 92.3%.

(4) Statistical Analyses

Basic analyses of frequency distributions, mean scores and standard deviations were conducted to investigate the demographic characteristics of the 324 university students. SEM techniques were applied to test the integrated models. Prior to any data analysis, all negatively phrased items were reverse coded and all missing data were replaced with the regression estimation method implemented in SPSS version 11.0.

6.3.2 Results

(1) Demographic Characteristics

The demographic descriptions of the 324 university students are summarized in Table 6.10. There were 161 (49.7%) males and 163 (50.3%) females, who ranged in age from 19 to 38 years, with a mean age of 23.38 (SD =3.62) years. Of the 324 students, 20 (6.2%) were married, 304 (93.8%) were single.

Table 6.10

Demographic Characteristics of University Students in Stage 2 of the Generalized Study (N = 324)

Demographic variables			N	(%)
Gender:	Male		161	(49.7)
	Female		163	(50.3)
Age (years):	<20		26	(8.0)
	20 – 24		224	(69.1)
	25 – 29		51	(15.7)
	30 – 34		20	(6.2)
	35 – 39		3	(0.9)
Marital status:	Married		20	(6.2)
	Single		304	(93.8)

	Mean	*SD*	Min.	Max.
Age (years)	23.38	3.62	19	38

(2) Univariate Statistical Analyses and Statistical Assumptions

As with the procedure of structural equation analyses described in the main study, the skewness and kurtosis of the data of the involved variables were examined. Results showed that the data of the variables had a normal distribution, skewness ranged from -.05 to 2.13 and kurtosis ranged from -2.01 to 5.07 (see Table 6.11A). With this result, therefore, the maximum likelihood estimation technique was used to estimate parameters.

As with the main study, the data of dysfunctional attitudes in the integrated models were converted from parameters coded by original scores to parameters coded by effect coding so that the comparisons of the models for university students' data in this study and those for MDD patients' data in the main study could be made. In addition, the fit indices used to assess goodness of model fit in the generalized study included the χ^2, the χ^2/df, the Goodness-of-fit Index (GFI; Jöreskog & Sörbom, 1989), the Comparative Fit Index (CFI; Bentler, 1990), the Standardized Root Mean

Square Residual (SRMR; e.g., Byrne, 2001) and the Root Mean Square Error of

Approximation (RMSEA; Browne & Cudeck, 1993). The acceptable criteria levels

of these fit indices were described in the main study of this research.

Table 6.11A

Means, Standard Deviations, Skewness and Kurtosis of the Variables for University
Students in the Generalized Study (N = 342)

Variables	Mean	*SD*	Skewness	Kurtosis
Sex	0.50	0.50	.01	-2.01
Age	23.38	3.62	1.50	2.17
Negative Life Events	0.81	1.11	1.94	5.07
Social Support	43.83	6.82	0.11	0.53
Dysfunctional Attitudes	85.05	15.02	0.25	1.02
Dysfunctional Attitudes (effect coding)	0.02	1.00	-0.05	-2.01
Depressive Cognition	75.68	21.50	0.46	0.71
Hopelessness	4.95	4.41	1.18	0.86
Depression	8.48	7.65	1.40	1.81
Suicidal Ideation	2.34	4.42	2.13	3.91
Parcel 1: Positive Depressive Cognition	2.71	0.77	0.12	0.17
Parcel 2: Negative Depressive Cognition	3.20	1.07	0.52	0.36
Parcel 3: Negative Future Expectations	0.82	0.46	1.15	1.06
Parcel 4: Positive Future Expectations	0.28	0.29	0.98	-0.10
Interaction variable	0.23	2.11	0.42	0.11

Table 6.11B shows the frequencies and percentages of negative life events

for the 342 university students. As can be seen, death of close family, serious illness

to a close relative and broken off a steady relationship were reported to be the

leading three sources of negative life events in Taiwanese university students.

Table 6.11B

Frequencies and Percentage of Negative Life Events for University Students in the Generalized Study (N = 342)

Variables	N	(%)
Negative Life Events (Multiple responses):		
1. Serious illness or injury to subject	17	(5.2)
2. Serious illness or injury to a close relative	40	(12.3)
3. Death of first-degree relative	4	(1.2)
4. Death of close family or friend	53	(16.4)
5. Marital separation	3	(0.9)
6. Broke off a steady relationship.	36	(11.1)
7. Serious problem with a close friend, neighbor, or relative	29	(9.0)
8. Unemployed / seeking work for more than one month	14	(4.3)
9. Sacked from job	5	(15.0)
10. Major financial crisis	29	(9.0)
11. Problems with police and a court appearance	4	(1.2)
12. Something valuable lost or stolen.	23	(7.1)

(3)   Structural Equation Analyses of the Final Modified Combined Mediational Model in University Students

Pearson product-moment correlations among the variables in the final modified combined mediational model are presented in Table 6.12. Significant correlations are shown in bold type. A legend showing abbreviations used in the correlation matrix is presented in Table 6.13. As can be seen in Table 6.12, most correlations between the variables were significant.

The final modified combined mediational model was tested by using the SEM techniques of AMOS 4.0. With the data of the university students, the model hypothesizes that negative life events influence dysfunctional attitudes to increase depressive hopelessness, which in turn enhances depression, which in turn leads to suicidal ideation. On the other hand, social support mediates the impact of negative life events on depressive hopelessness. Sex and age influence negative life events and

they have direct effects on depressive hopelessness. This hypothesis is illustrated in the final modified combined mediational model presented in Figure 6.1.

Table 6.12

Correlations between the Variables in the Final Modified Combined Mediational Model for University students in the Generalized Study (N = 324)

	Sex	Age	NLEs	SS	DAs	Parcel 1	Parcel 2	Parcel 3	Parcel 4	Dep	SI
Sex	1.00	-.07	-.03	.11	-.08	-.003	-.11	-.08	-.05	-.01	.05
Age		1.00	-.04	**-.15****	-.10	**-.15****	**-.14****	**-.13***	-.13*	-.07	-.07
NLEs			1.00	**-.16***	**.16****	**.08**	**.30*****	**.29*****	**.26*****	**.42*****	**.38*****
SS				1.00	-.05	**-.31*****	**-.29*****	**-.22*****	**-.21*****	**-.30*****	**-.20****
DAs					1.00	**.18*****	**.36*****	**.33*****	**.27*****	**.35*****	**.25*****
Parcel 1						1.00	**.58*****	**.58*****	**.54*****	**.42*****	**.28*****
Parcel 2							1.00	**.71*****	**.61*****	**.64*****	**.43*****
Parcel 3								1.00	**.61*****	**.62*****	**.53*****
Parcel 4									1.00	**.61*****	**.50*****
Dep										1.00	**.64*****
SI											1.00

*Note. * $P < .05$, ** $P < .01$, *** $P < .001$.*

Table 6.13

Legend of Abbreviations Used for Variables in Table 6.12 and Table 6.14

Abbreviation	Variable
NLEs	Negative Life Events
SS	Social Support
DAs	Dysfunctional Attitudes (effect coding)
Parcel 1	Parcel 1: Positive Depressive Cognition
Parcel 2	Parcel 2: Negative Depressive Cognition
Parcel 3	Parcel 3: Negative Future Expectations
Parcel 4	Parcel 4: Positive Future Expectations
DC	Depressive Cognition
Hs	Hopelessness
Dep	Depression
SI	Suicidal ideation
Int	Interaction (DAs * NLEs)

The maximum likelihood estimation was performed on the data of the 324 university students to test the model. First, the measurement model in the model was examined. Result showed that the individual reliability estimates of the four parcels exceed the .20 criterion (Jöreskog & Sörbom, 1989), R^2 = .43, .71, .68 and .56 for Parcel 1, Parcel 2, Parcel 3 and Parcel 4, respectively (see Figure 6.1). The construct reliability coefficient (ρ_c) of the latent variable was .85, which exceed the .60 criterion (Bagozzi & Yi, 1988; $\rho_c = (\Sigma \lambda)^2 / [(\Sigma \lambda)^2 + \Sigma(\theta)] = (.66 + .84 + .82 + .75)^2 / [(.66 + .84 + .82 + .75)^2 + (.57 + .29 + .32 + .44)] = .85$). The average variance extracted (ρ_v) of the latent variable was .59, which exceed the .50 criterion (Bagozzi & Yi, 1988; $\rho_v = (\Sigma \lambda^2) / [\Sigma \lambda^2 + \Sigma(\theta)] = (.66^2 + .84^2 + .82^2 + .75^2) / [(.66^2 + .84^2 + .82^2 + .75^2) + (.57 + .29 + .32 + .44)] = .59$). The results indicated that the four parcels assessed the latent construct (i.e., depressive hopelessness) very well.

In relation to the structural model, the majority of the fit indices indicated that the final modified combined mediational model failed to provide an adequate fit to the given data. The GFI (.93) and the CFI (.91) exceeded the acceptable criterion level of .90. However, the χ^2, the χ^2 / df, the SRMR and the RMSEA indicated an inadequate fit, χ^2 (42, N = 324) = 153.86, $p < .001$, χ^2 / df = 3.66, SRMR = .07, RMSEA = .09. The structural diagram and the standardized parameter estimates of the model are presented in Figure 6.1. The fit indices for the model are presented in Table 6.15 for comparison with those of the other models.
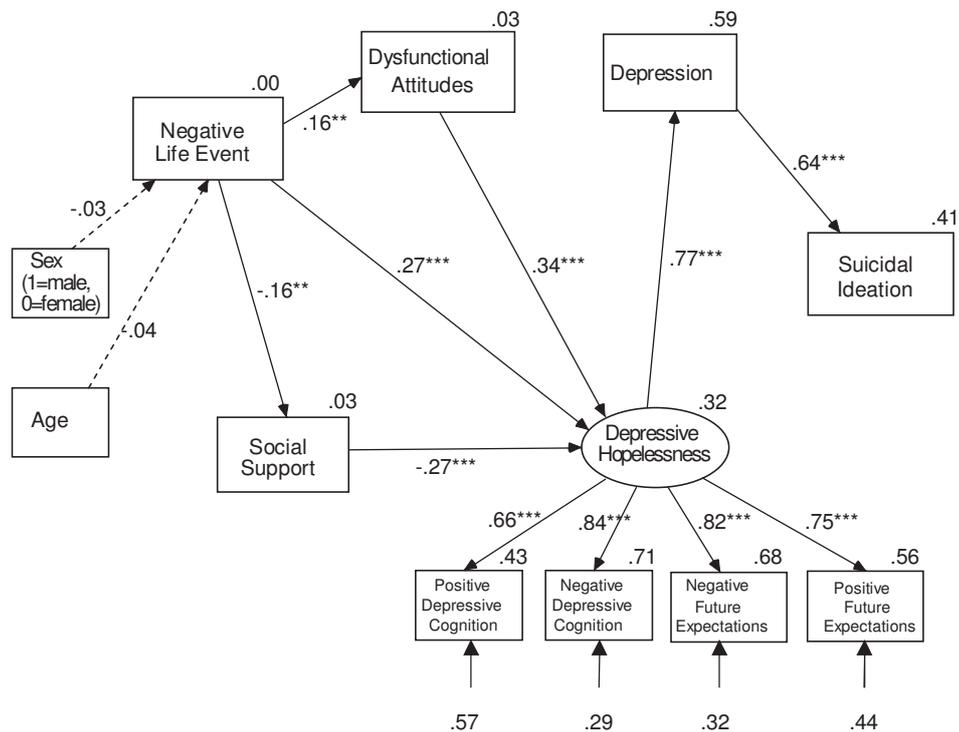
Figure 6.1. Standardized parameter estimates for the final modified combined mediational model in university students. Dotted lines represent non-significant paths. Squared multiple correlations are shown at the top-right corner of variables. **p < .01, ***p < .001.

(4)   Structural Equation Analyses of the Initial Alternative Models in University Students

Because the SEM analyses did not support the final modified combined mediational model, the four initial alternative models (i.e., the IM-A, the IM-B, the MM-A and the MM-B) were retested. First, SPSS was used to evaluate Pearson product-moment correlations among the observed variables. As presented in Table 6.14, significant correlations are shown in bold type. A legend showing abbreviations used in the correlation matrix was presented in Table 6.13. Table 6.14 indicates that most correlations between the observed variables were significant.

Table 6.14

Correlations between All Involved Variables in the Initial Alternative Models for University Students in the Generalized Study (N = 324)

	Sex	Age	NLEs	SS	DAs	DC	Hs	Dep	SI	Int
Sex	1.00	-.07	-.03	**.11***	-.08	-.06	**-.11***	-.01	.05	-.02
Age		1.00	-.04	**-.15****	-.10	**-.18****	**-.11***	-.07	-.07	-.08
NLEs			1.00	**-.16****	**.16****	**.23*****	**.31*****	**.42*****	**.38*****	**.36*****
SS				1.00	-.05	**-.33*****	**-.21*****	**-.30*****	**-.20*****	**-.11***
DAs					1.00	**.31*****	**.28*****	**.35*****	**.25*****	**.86*****
DC						1.00	**.66*****	**.60*****	**.43*****	**.34*****
Hs							1.00	**.66*****	**.55*****	**.32*****
Dep								1.00	**.64*****	**.40*****
SI									1.00	**.36*****
Int										1.00

Note. * $P < .05$, ** $P < .01$, *** $P < .001$.

The AMOS SEM procedures were used to test the goodness-of-fit of the four alternative models to the given data. With the data of the university students, the IM-A hypothesizes that negative life events interact with dysfunctional attitudes to influence depression, which in turn leads to suicidal ideation. Depressive Cognition mediates the interaction effect of negative life events and dysfunctional attitudes on depression. On the other hand, social support mediates the impact of negative life events on dysfunctional attitudes, depressive cognition and depression. Age and sex exert direct influences on negative life events and social support. In addition, both negative life events and dysfunctional attitudes have direct effects on depressive cognition and depression, and depressive cognition has a direct effect on suicidal ideation. This hypothesis is illustrated in the interactional model A presented in Figure 6.2. The IM-B is different from the IM-A by substituting depressive cognition with hopelessness, as illustrated in the interactional model B presented in Figure 6.2.

With the data of the university students, the MM-A hypothesizes that negative life events influence dysfunctional attitudes to increase depressive cognition, which then leads to depression, which in turn results in suicidal ideation. On the other hand, social support mediates the impact of negative life events on depressive cognition. Social support also prevents the development of dysfunctional attitudes and depression. Sex and age influence negative life events and social support. In addition, both negative life events and dysfunctional attitudes have direct effects on depressive cognition and depression, and depressive cognition has a direct influence on suicidal ideation. This hypothesis is illustrated in the mediational model A presented in Figure 6.3. The MM-B is different from the MM-A by substituting depressive cognition with hopelessness, as illustrated in the mediational model B presented in Figure 6.3.

A summary of the fit indices for each of the four models is presented in Table 6.15. As can be seen, no fit index for the interactional model A (IM-A) and the interactional model B (IM-B) reached the acceptable threshold levels. That is, the fit of the sample data to the IM-A and the IM-B is not adequate. The result suggests that the hypotheses of the two models are not supported. The structural diagrams and the standardized parameter estimates of the two models are illustrated in Figure 6.2. As can be seen, dysfunctional attitudes did not interact with negative life event to predict the mediation components (i.e., depressive cognition and hopelessness) and depression. However, deleting the interaction variables substantially improved the goodness-of-fit of the two models to the given data, the IM-A: χ^2 (13, N = 324) = 42.47, p = <.001, χ^2/df = 3.27, GFI = .97, CFI = .94, SRMR = .063, RMSEA = .084, and the IM-B: χ^2 (13, N = 342) = 36.43, p = <.001, χ^2/df = 2.80, GFI = .97, CFI = .96, SRMR = .056, RMSEA = .075.

Table 6.15

Result of the AMOS Analyses of the Competing Models for University Students in the Generalized Study (N = 324)

| Model	χ^2	df	p	χ^2/df	GFI	CFI	SRMR	RMSEA
1. Final modified combined mediational model	153.86	42	<.001	3.66	.93	.91	.069	.091
2. Interactional model A	543.58	19	<.001	28.61	.82	.47	.171	.292
3. Interactional model B	537.46	19	<.001	28.29	.82	.49	.169	.291
4. Mediational model A	34.41	12	.001	2.87	.98	.96	.052	.076
5. Mediational model B	28.37	12	.005	2.37	.98	.97	.044	.065
6. Modified mediational model B	32.47	16	.009	2.03	.98	.97	.052	.056
7. Final modified mediational model B	21.27	14	.095	1.52	.99	.99	.052	.040

Note. *df* = degrees of freedom; GFI = Goodness-of-Fit Index; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation.

Turning to the next two groups of statistics, it was found that the fit indices for the mediational models A and B (MM-A and MM-B) improved greatly in comparison to the interactional models. Except for the χ^2 statistic and the χ^2/df, all the fit indices for the two mediational models reached the acceptable threshold levels. In addition, it was found that the MM-B provided a more adequate fit to the data compared to the MM-A. The result indicates that the MM-B was superior to the MM-A. The structural diagrams and the standardized parameter estimates of the two models are presented in Figure 6.3.

Although the SEM analyses showed that the MM-B provided a relatively adequate fit to the data of the university students, there were some non-significant pathways among the variables. As can be seen in Figure 6.3 Model 2, the path coefficients for the effects of sex and age on negative life events were not statistically significant (β = -.03 and -.04, respectively). The direct effects of sex

on social support (β = .09) and social support on dysfunctional attitudes (β = -.03) did not reach the significance level. Accordingly, the model was modified by deleting the four non-significant paths.

(1) Interactional model A (IM-A)
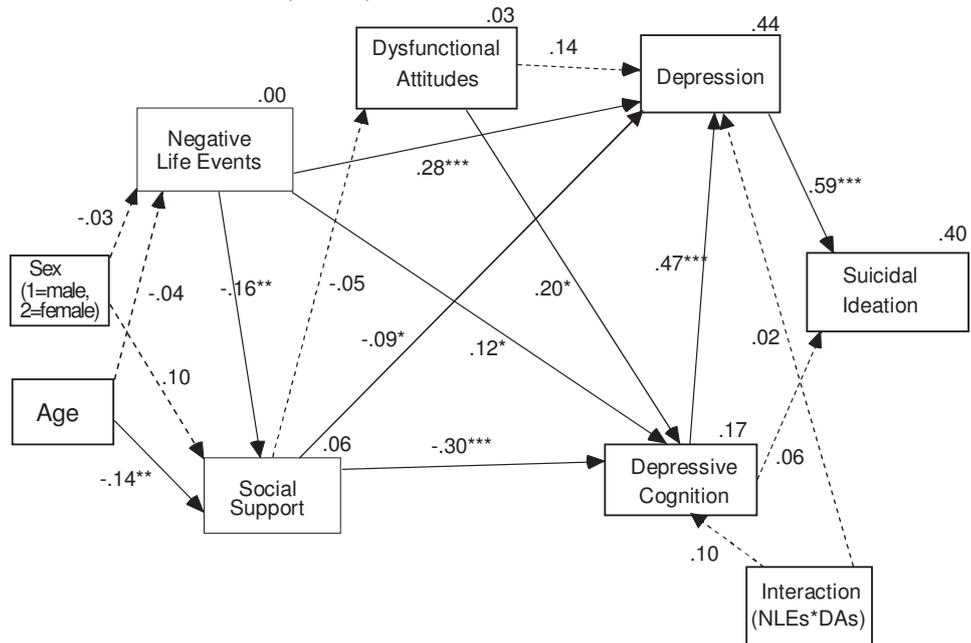
(2) Interactional model B (IM-B)

Figure 6.2. Standardized parameter estimates for the interactional models in university students: (1) the interactional model A, and (2) the interactional model B. Dotted lines represent non-significant paths. Squared multiple correlations are shown at the top-right corner of variables. * $p < .05$, ** $p < .01$, *** $p < .001$.
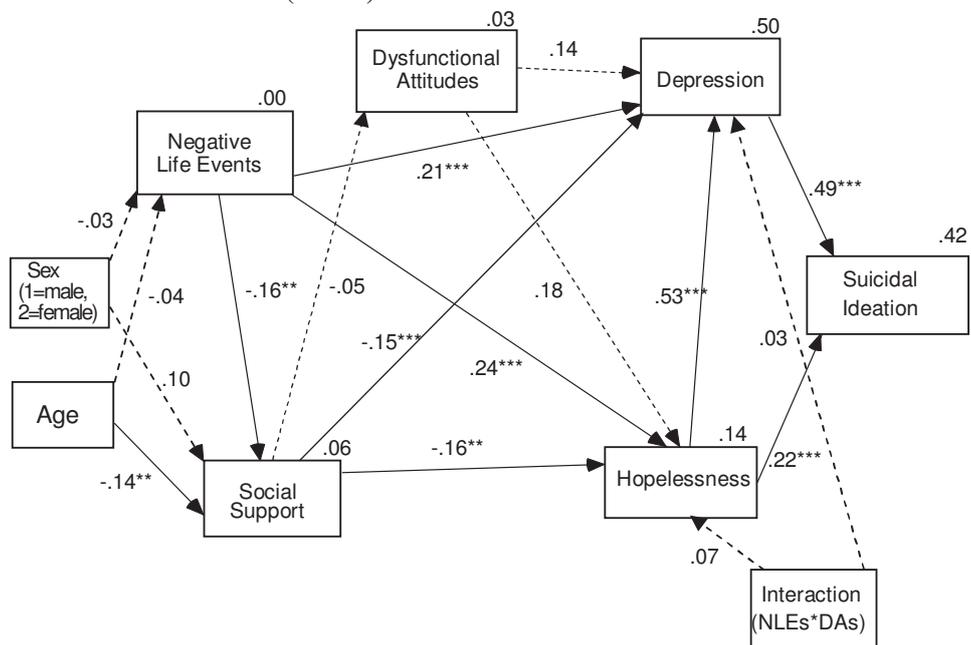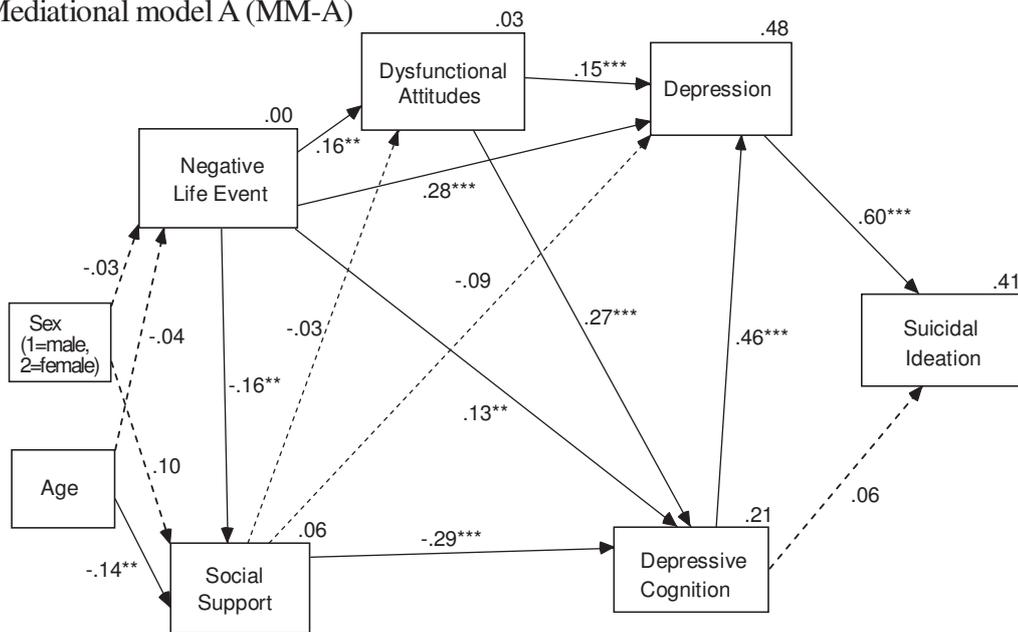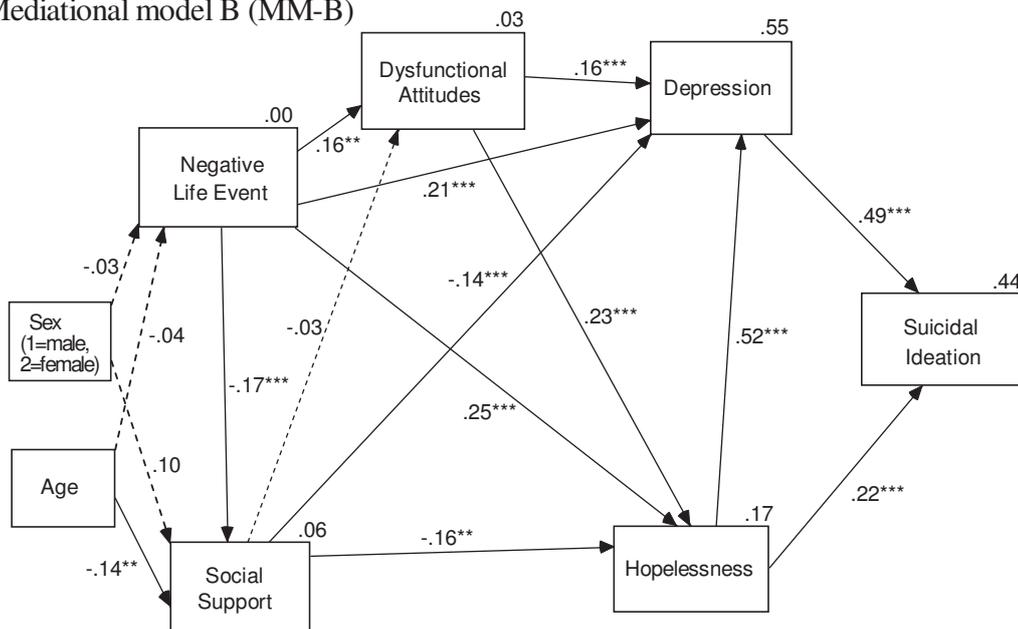
Figure 6.3. Standardized parameter estimates for the mediational models in university students: (1) the mediational model A, and (2) the mediational model B. Dotted lines represent non-significant paths. Squared multiple correlations are shown at the top-right corner of variables. * *p* < .05, ***p* < .01, ****p* < .001.

(5) Structural Equation Analyses of the Modified Mediational Model B in University Students

After deleting the non-significant paths in the MM-B, the majority of the fit indices showed that the modified MM-B provided an adequate fit to the data, GFI = .98, CFI = .97, SRMR = .052 and RMSEA = .056. However, the χ^2/df was still not acceptable for a good fitting model, $\chi^2 / df = 2.03$. Therefore, this study continued to modify the model. Based on previous literature and the modification indices provided in the AMOS, two paths (between sex and depression and between negative life events and suicidal ideation) were added to the model. The SEM analyses indicated that the final modified MM-B provided a good fit to the sample data. All the fit indices for the model reached the acceptable threshold levels, χ^2 (14, $N = 324$) = 21.27, p = .095, χ^2 / df = 1.52, GFI = .99, CFI = .99, SRMR = .052 and RMSEA = .040. The pathways of the model and their standard parameter estimates are presented in Figure 6.4. As can be seen, all the pathways had appropriate parameter estimates. The model accounted for 45% of variance in suicidal ideation.

In summary, the SEM analyses indicated that the final modified MM-B provided an adequate fit to the data of Taiwanese university students. As shown in Table 6.15, where several fit indices of the models tested in this study were presented for comparison, the final modified MM-B was superior to any of the other models in terms of goodness-of-fit. Thus, the final modified MM-B was chosen as the best-fitting model to represent the data of Taiwanese university students.
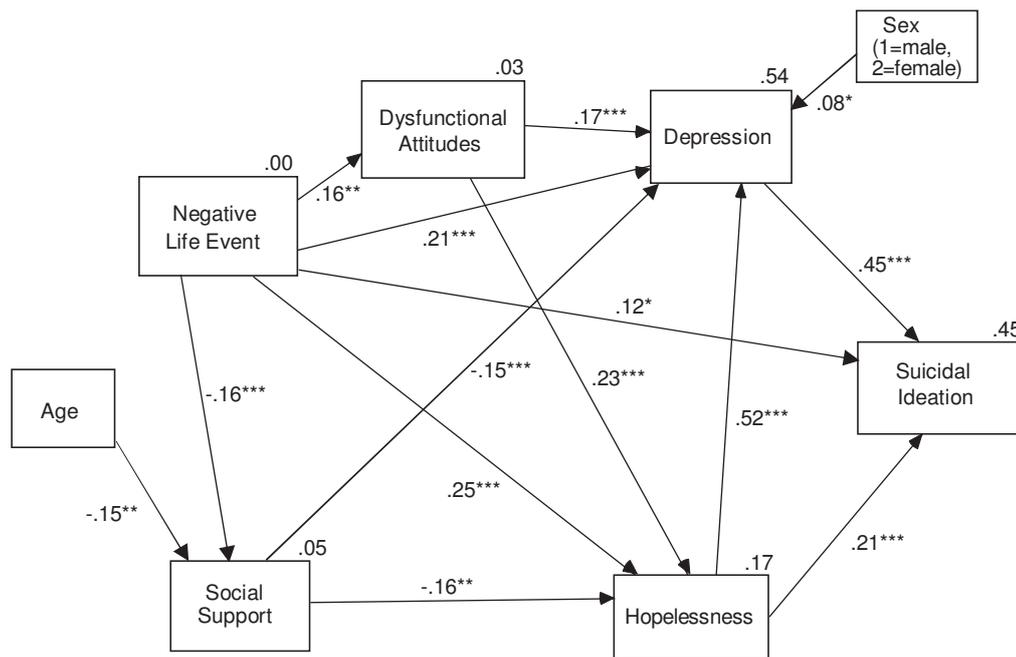
Figure 6.4. Standardized parameter estimates for the final modified mediational model B in university students.

Squared multiple correlations are shown at the top-right corner of variables.

* *p* < .05, **p* < .01, ***p* < .001.

6.3.3 Discussion

The SEM analyses showed that the final modified combined mediational model failed to provide an adequate fit to the data of Taiwanese university students. The result suggests that the hypothesis of the model is not supported. In other words, the model is misspecified for the data of the university students. A possible explanation is that the final modified combined mediational model was derived from research on clinical patients with major depression requiring treatment. The MDD patients are more severely sick than university students. Because of the discrepancy in nature between the two samples, the most appropriate model for MDD patients may not be replicated in university students.

The two interactional models (i.e., the IM-A and the IM-B) also failed to fit the given data. The result suggests that the hypotheses of the two interactional models are not supported. In addition, it was found that dysfunctional attitudes did not interact with negative life events to predict depression and the two mediation components (i.e., depressive cognition and hopelessness). However, when the interaction was deleted, the fit of the two models to the given data was prominently improved. The result implies that Beck's interaction hypothesis is not supported. A nonsignificant finding was also reported in the main study of this thesis with Taiwanese MDD patients. As mentioned in the literature review of this thesis, empirical validation on Beck's interaction hypothesis is mixed. These results indicate that the effect of interaction is unreliable in both clinical and nonclinical populations in Taiwan and Western countries.

As with the explanations for MDD patients in the main study, a possible reason for failure to find interaction hypothesis in the student sample is that only specific negative life events may match specific dysfunctional attitudes to yield interaction to predict depressive symptoms. If this is so, further studies on investigating diathesis-stress interaction should be addressed on particular events to which students are particular sensitive. Another possible explanation is that Beck's hypothesis of latent depressogenic schemas may be incorrect. If this is so, the hypothesis of negative life events × dysfunctional attitudes interaction can be ignored.

The two mediational models (i.e., the MM-A and the MM-B) showed relatively good fit to the data compared to the two interactional models. However, the fit of the MM-A to the data was poorer than that of the MM-B. That is, for the present data, the MM-B was superior to the MM-A in terms of goodness of fit. In order to improve its goodness-of-fit to the given data, five non-significant paths

were deleted from the MM-B and replaced with two significant, unspecified a priori paths. The resulting final modified MM-B was chosen as the best-fitting model to represent the data of Taiwanese university students.

The total variance of the students' suicidal ideation explained by the final modified MM-B was 45%, which was less than 58% of the total variance of the MDD patients' suicidal ideation accounted for by the final modified combined mediational model (see Figure 4.4, Model 3). The result indicated that the explanatory power of the final modified MM-B on students' suicidal ideation was less than that of the final modified combined mediational model on MDD patients' suicidal ideation. A possible explanation is that the risk factors for suicidal ideation in the final modified MM-B were mainly derived from research on clinically depressed patients. Some variables relevant to suicidal ideation in university students were not included in the model. Thus, the explanatory power of the model for suicidal ideation in the university students was decreased.

The final modified MM-B uncovered some interesting relationships among the variables. First, dysfunctional attitudes were found to directly affect hopelessness, which in turn, directly influenced depression and suicidal ideation. A lot of Western studies with clinical and nonclinical populations revealed that dysfunctional attitudes were associated with hopelessness (Cannon et al., 1999; Keller et al., 1984), and hopelessness was correlated with depression (Abela et al., 2002; Alford et al., 1995; Alloy & Clement, 1998; Beck, Riskind, et al., 1988; Beck, Weissman et al., 1974; Hamilton et al., 1983; Metalsky et al., 1992), suicidal ideation and completed suicide (Beck, Brown et al., 1990; Beck, Steer, Beck et al., 1993; Beck, Steer et al., 1985; Minkoff et al., 1973; Rudd, 1990; Schotte et al., 1982; Wetzel et al., 1980). Using the data obtained from Taiwanese university students, this study provides support for the cross-cultural generalizability of these Western studies.

Although the relationship between hopelessness and suicidal ideation was statistically significant, depression was found to correlate more strongly than hopelessness with suicidal ideation in Taiwanese students. The analysis of the MM-B with the data of Taiwanese MDD patients in the main study also revealed the same finding. As indicated in the main study, most of the earlier studies reported that hopelessness was a better predictor of suicidal ideation than depression in clinical and nonclinical populations (Beck, Steer, Beck, et al., 1993; Dyer & Kreitman, 1984; Minkoff et al., 1973; Schotte et al., 1982, 1987; Wetzel et al., 1980). Only two earlier studies indicated that depression was a better predictor of suicidal ideation than hopelessness in university students (Rudd, 1990) and in patients with affective disorders (Ranieri et al., 1987). These discrepant findings suggest that the relative contribution of hopelessness and depression to suicidal ideation in clinical and nonclinical samples is uncertain. Thus, hopelessness should not be automatically assumed to be the best predictor of suicidal ideation, as Ranieri et al. suggested.

In relation to negative life events, they were found to exert an influence on suicidal ideation not only by itself directly but also via mediational paths to hopelessness and depression. The result implies that when encountering negative life events, students may directly develop suicidal ideation. On the other hand, when encountering negative life events, students may tend to think in a hopeless and depressive manner, and finally have suicidal ideation. The result is consistent with the work of Rudd (1990), which indicated that negative life events influenced suicidal ideation in undergraduate students by itself directly and by the mediation of hopelessness and depression. These results suggest that the influence of negative life events on suicidal ideation is consistent across cultures in university student populations.

In addition, negative life events were found to directly affect dysfunctional attitudes, which in turn directly influenced hopelessness and depression. The result implies that increased life stress may result in concomitant increases in dysfunctional attitudes, which in turn may lead to increases in hopelessness and depression. Conceptually, the present result provides empirical support for Kwon et al.'s (1994) linear mediational model, which suggests that dysfunctional attitudes mediate the relationships between negative life events and Beck's autonomic thoughts, which in turn affect psychopathology.

Within the negative life events, sociological variables (e.g., death of close family, serious illness to a close relative and broken off a steady relationship) were found to be more important sources of negative life events for Taiwanese university students than economic variables (see Table 6.11B). The result is contrary to the finding of Taiwanese MDD patients reported in the main study. A possible explanation is that most of the Taiwanese students may obtain financial support from their families at the time of testing; thus, students answer that they worry less about their economic problems.

With respect to social support, it was found that negative life events had a negative direct effect on social support. The result indicated that increased negative life events led to concomitant decreases in social support. As with the explanation in the main study, stressful events may worsen students' supportive networks. Those with high negative life events may lose their friends and families, and thus they report no social resources to cope with their life stress. In addition, it is possible to hypothesize that negative life events often occur to individuals with poor social support because they lack for social resources to cope with their difficulties.

Furthermore, social support was found to have negative effects on hopelessness and depression. The result indicated that increased social support

resulted in concomitant decreases in hopelessness and depression. This implies that social support may ameliorate students' hopeless thoughts and depression. This makes sense because when students have supportive networks, they may think positively about their future, and thus feel less depressed. The findings provide important data on the cross-cultural generalizability of the main-effect model of social support (Cohen et al., 1985), which hypothesizes that social support, as main effect, affects symptomatology.

Demographic variables in the final modified MM-B proved to be significant predictors. First, it was found that sex exerted a significant direct effect on depression, indicating that female university students reported more depressive symptoms than male. This finding is concordant with the findings of earlier studies, which indicated that female students reported higher levels of depression than male students (Beck, Steer, & Brow, 1996; Cheng et al., 2007; Rudd, 1990; Schotte et al., 1982; Stewart et al., 1999). However, the present result is inconsistent with the finding in the previous analyses of the MM-B and the final modified combined mediational model with the data of the MDD patients, which indicated that sex did not significantly correlate with depression. A possible explanation for the discrepant findings is a result of sample differences. The MDD patients used in the main study were recruited from hospitals when they returned to consult their doctors or require treatment. Both male and female patients may be severely sick and thus there was no sex difference in the measures of depression.

The path coefficient for the effect of age on social support was significant, indicating that older students reported less social support than younger students. To further examine age differences in the sources of social support, Pearson product-moment correlations between age and the three subscales of the C-MDSS (i.e., family support, peer support and supervisor support) were computed. Result

showed that age was significantly correlated with peer support and supervisor support ($r = -.16$, $p < .01$, and $r = -.12$, $p < .05$, respectively). However, there was no age difference in family support. To date, there has been little research on age differences in social support among adult samples. In a study of 2105 high school students, Cheng et al. (2004) indicated that older adolescents perceived less family support than younger ones, but there was no age difference in students' perceptions of less friend support. In a study of 737 undergraduate students, Rudd (1990) reported that age did not correlate with social support from friends and families. However, the present result showed that older university students perceived less support from friends and teachers than younger ones. Discrepant findings between these studies are likely to be the result of age differences between the samples used in these studies. The sample of students in Cheng et al.'s study is in the developmental period of early and mid adolescence (from Grades 7 to 11, mean age = 14.8). Blos (1967) proposed that, during this period, adolescences may struggle to establish autonomy and thus lead to decreased emotional dependency on parents. However, their relationship with peers may be stronger than with others (Furman & Buhrmester, 1992). The majority of students in Rudd's study are in the developmental period of late adolescence (92.7% between 16 and 21 years of age, mean age = 18). Blos (1967) proposed that, during this period, parent-child conflict subsides as a rapprochement is reached in a new form of parent-offspring relationship (Furman & Buhrmester, 1992). In contrast, the students used in this study were in the developmental period of early adulthood (ages 19 to 38, mean age = 23.38). Erikson (1963) contended that, during this period, people establish intimate relationship and commit themselves to an occupation. Thus, the significance of personal relationships with peers and teachers may decrease.

6.4 Practical Implications

The AMOS SEM analyses supported the final modified MM-B rather than the final modified combined mediational model to be the best-fitting model in representing the sample data. The result has implications for educational counseling. When predicting suicidal risk or designing suicide prevention programmes for university students, teachers or counselors are advised to use a model derived from university students rather than a model from clinical patients.

In contrast to the final modified combined mediational model, the final modified MM-B used hopelessness instead of depressive hopelessness (i.e., the combination of depressive cognition and hopelessness) to be the mediation component in the relationship between dysfunctional attitudes and depression. The result implies that screening students for hopelessness may help universities gain a more accurate result in the prediction of students' depression. In addition, depression is the most powerful predictor of suicidal ideation. Educational counselors should also consider the screening of depression for predicting suicidal risk in university students.

The final modified MM-B demonstrates a mediational process from negative life events through dysfunctional attitudes and hopelessness to depressive symptoms and suicidal ideation. The model provides a conceptual framework for prevention and intervention programmes for use in Taiwanese university students with high suicide risk. Educational counselors can design a series of cognitive activities and emotional support programmes to change students' dysfunctional attitudes, hopeless thoughts, and to cope with their depression.

The model shows that the combination of social support from teachers, peers and family may mediate the impact of negative life events on hopelessness and

depression. Therefore, universities can design a programme to enhance the cooperation among teachers, families and students to decrease students' suicide risk. For example, universities can provide forums for teachers, parents and students to acquire and share accurate knowledge about youth suicide and its prevention. In addition, universities can enhance school-based screening for students with high suicide risk and refer them to psychiatric professionals for intervention.

6.5 Limitations of the Generalized Study

Some cautions and limitations should be noted in this study. First, although the final modified MM-B explained a large proportion of the variance in suicidal ideation, 55%, a considerable amount is left unexplained. As in the above explanation, some variables relevant to suicidal ideation in university students may be not included in the model. In order to improve the explanatory power of the model on students' suicidal ideation, future studies should consider some risk factors derived from research on student populations, for example, previous history of mental health treatment (Rudd, 1990), amount of schoolwork (Stewart et al., 1999), school-related problems, self-esteem and parent-child conflict (Chiou et al., 2006; Lewinsohn et al., 1993, Martin et al., 2005).

It has been suggested that cross-validation should be conducted whenever an initial model is modified (Kwon et al., 1992). This approach can allow researchers to be confident about the fit of the model in a new data set. Therefore, the modified MM-B needs to be reconfirmed using another sample of Taiwanese university students.

The final modified MM-B was obtained from the data of university students in Taiwan. Therefore, the model should not be directly generalized to student populations outside Taiwan. Further research is therefore needed to test the model across other sample groups from other countries.

This generalized study used a cross-sectional design, weakening any direct causal interpretation. In future research, it would be beneficial to conduct a longitudinal design to examine the relationships between current predictor variables and subsequent suicidal ideation in university students assessed over a period of time.

6.6 Conclusion

This study includes two stages. In Stage 1, this study reports a validation study in which the reliability and validity of the Chinese versions of the scales were reexamined using a nonclinical sample of Taiwanese university students. Result showed that the Chinese-language scales could be regarded as possessing acceptable psychometric properties and can be used as objective assessment tools to measure suicidal ideation and its predictor variables in Taiwanese university students.

In Stage 2, the generalizability of the results obtained from the MDD patients in the main study was investigated. Result showed that the final modified combined mediational model was not generalizable to Taiwanese university students. Instead, the MM-B provided a more adequate fit to the given data. After modifying the MM-B, the final modified MM-B was selected as the best-fitting model to represent the data of Taiwanese university students. By the finding of significant paths from negative life events to suicidal ideation, the final modified MM-B provides a framework within which to view the processes of suicidal ideation among university students. Based on the framework, educational counselors may design prevention and intervention programmes for use in Taiwanese university students with high suicide risk. However, the model should be reconfirmed using other samples of university students in Taiwan and from other countries.

CHAPTER SEVEN

GENERAL DISCUSSION

7.1   Introduction

This Chapter presents an integration of the findings of the present research. This chapter first discusses the rationale for the present research. Subsequently, this chapter presents the major findings from the Taiwanese MDD patients and university students. These are followed by discussions of practical implications for prevention and intervention of suicide as well as limitations of this research. Finally, this chapter makes a brief conclusion regarding the overall findings of this research.

7.2   Rationale for the Study

Earlier studies of suicide attempts were mainly correlational, restraining the examination of aetiological processes of suicide attempts. To reduce the limitation, recent research has used the diathesis-stress theory to explain the cause and developmental processes of suicide (Abramson et al., 2000; Beck, 1967, 1983, 1987; Grunebaum et al., 2006; Mann, 2002; Mann, et al., 1999; Oquendo et al., 2004; Rickelman et al., 1995). The theory hypothesizes that when one's threshold for stressful life events is breached, his or her preexisting vulnerability becomes activated, and thus elicits psychological symptomatology (Monroe et al., 1991). One diathesis-stress model that has generated a lot of empirical research is Beck's cognitive model (Beck, 1967, 1983, 1987). The model hypothesizes that dysfunctional attitudes interact with stress to predict depression. The cognitive triad mediates the relationship between stress $\times$ dysfunctional attitudes interaction and depression. In addition, one component of the cognitive triad, negative view about the future or hopelessness, is suggested to be the main predictor of suicidal

behaviours (Beck, 1986; Beck, Brown et al., 1990, Beck, Steer, Beck et al., 1993; Beck, Steer, Kovacs et al., 1985). According to Baron et al.'s (1986) concept, dysfunctional attitudes and the cognitive triad contribute both as a moderator and as a mediator, respectively, in the development of depression. In addition, hopelessness plays a role as a mediator in the occurrence of suicide. The combination of the moderating and mediating variables yields an integrated model of suicidal behaviours.

Empirical validation of Beck's (1967, 1983, 1987) theory has been mixed. Some studies demonstrated that dysfunctional attitudes interacted with stress to predict depressive symptoms (Abela et al., 2002; Joiner et al., 1999; Kwon et al., 1992; Oei et al., 2007; Olinger, et al., 1987), but some studies did not (Barnett et al., 1988; Klocek et al., 1997; Oei et al., 2005; Robins et al., 1989; Robins et al., 1990). Therefore, the interaction hypothesis of dysfunctional attitudes requires further investigation. In addition, earlier studies indicated that hopelessness mediated the relationship between stress × dysfunctional attitudes interaction and depression (Abela et al., 2002), but the cognitive triad did not (Hankin, 2001). The mediation hypothesis of the cognitive triad may be problematic. Therefore, the hypothesis of the cognitive triad requires further investigation. Also, the relative influence of the cognitive triad compared with that of hopelessness on depression are worthy of investigation.

Besides the diathesis-stress model, some studies reported that negative life events, as main effect, affect cognitive thoughts, which in turn, as main effect, influence psychopathology (Cheng et al., 2007; Dieserud et al., 2001; Rudd, 1990). Thus, the linear mediational model hypothesized by Kwon et al. (1994) is worthy of examination.

In addition, sex and age were reported to affect the occurrence of suicidal behaviours (Möller, 2003; Rudd, 1990). Social support and psychiatric medications

were reported to decrease the occurrence of depression and suicidal behaviours (Rudd, 1990; Beck, Rush et al., 1979; Monroe et al., 1986; Teicher et al., 1993; Isacsson, 2000). These common variables are worthy of investigation as correlates of suicidal behaviours.

The present study was designed to obtain an integrated model that best explained the aetiological process of suicide attempts in Taiwanese MDD patients. Using the strategy of competing models suggested by Jöreskog (1993), several competing models, which were derived from Beck's diathesis-stress and Kwon et al.'s linear mediational models and the empirical findings described in the literature review, were formulated. These competing models were tested through SEM procedures, and then the best-fitting model was selected to represent the given data. The best-fitting model provides a framework to explain the aetiological processes of suicide attempts among Taiwanese MDD patients. Subsequently, the model was validated with two-wave panel data gathered from the same population of MDD patients who participated in assessments twice. The panel (Time 1 – Time 2) design enables us to clarify the causal relationships between predictor variables and future suicide attempts. Furthermore, the findings from clinical MDD patients were replicated in a sample of Taiwanese university students. This generalized study aimed to provide information about the comparability of the results from clinical MDD patients and normal populations in Taiwan.

Prior to the testing of the competing models, the assessment tools used in this study needed to be translated from English into Chinese, and the psychometric properties of all the Chinese-language scales needed to be examined. This examination arises from the need for obtaining reliable and valid Chinese-language assessment tools to accurately measure suicide attempts and their predictor variables in Taiwanese participants.

From aforementioned discussions, the main objectives of this thesis were to:

(1)   translate scales from English into Chinese and examine the psychometric properties of the Chinese-language scales;

(2)   test a series of competing models using cross-sectional data gathered from MDD patients in Taiwan, and then select a best-fitting model to represent the given data;

(3)   discuss the findings from the the best-fitting model with the cross-sectional data of Taiwanese MDD patients;

(4)   test the best-fitting model again six months later with longitudinal data based on the same population of MDD patients to confirm whether the model is stable over time;

(5)   replicate the results obtained from the MDD patients in a sample of Taiwanese university students to examine the generalization of the results from clinical patients to nonclinical students;

(6)   discuss the implications of this study for suicide prevention and intervention in MDD patients and student populations in Taiwan.

7.3   Major Findings

7.3.1   Psychometric Properties of the Chinese-language Scales

In Stage 2 in the pilot study and Stage 1 in the generalized study, it was found that all the Chinese-language scales except for the C-LTE are internally consistent in Taiwanese MDD patients and university students. All the Chinese-language scales were reported to have acceptable 4-week test-retest reliability or 8-week test-retest reliability in Taiwanese university students. In addition, all the scales have satisfactory discriminant validity.

With respect to factorial validity, in Stage 1 in the main study, it was found that the factors of the C-DAS obtained from factor analyses with the data of Taiwanese MDD patients were similar in content to those of the English version of the DAS-24 derived from a combined sample of undergraduates, depressed patients and the patients' first degree relatives in Britain (Power et al., 1994). The consistent findings suggest that the factor structures of the DAS-24 are stable across clinical depressed patients in Chinese-cultural society and a combined sample in Western-cultural society. In addition, the factors of the C-BDI-II obtained from factor analyses with the data of Taiwanese MDD patients were similar in content to those of the BDI-II obtained from clinically depressed patients in America (Beck, Steer et al., 1996). The consistent finding suggests that the factor structures of the BDI-II are stable in clinically depressed patients across Chinese-cultural and Western-cultural countries.

The factors of the C-MDSS and the C-BSS obtained from factor analyses with Taiwanese MDD patients are similar to those of the MDSS obtained from a sample of community adults in Australia (Winefield et al., 1992) and to those of the SSI obtained from a sample of clinical patients with suicidal ideation in Canada (Holden et al., 1985), respectively. These consistent results suggest that the factor structures of the C-MDSS and the C-BSS are stable across different samples and cultures.

However, it was found that the factor components of the C-HS derived from the Taiwanese MDD patients are inconsistent in content with those of the English version of the HS obtained from clinical patients who had made suicide attempts (Beck, Weissman et al., 1974) and from clinical patients with major depression (Nekanda-Trepka et al., 1983). These discrepant results suggest that the factor structure of the HS may change in clinical samples across different countries. Also, lack of factorial congruence in the HS between Taiwanese patients and Western

patients suggests that the subscales of the HS derived from Western patients should not be directly used in Taiwanese patients. In this research, because the general attitude toward hopelessness was of interest, the total score of the C-HS was used for the data analyses.

Of particular interest is the discovery that the factor analyses of the C-CTI data of Taiwanese MDD patients yielded only two factors, which consisted of negatively and positively phrased items from the three components of Beck's (1967) cognitive triad (i.e., negative views about the self, the world and the future). The result clearly indicated that the phrasing rather than the content of the items significantly influenced the factor structure of the C-CTI, ailing to support the three-factor structure of the cognitive triad as measured by the C-CTI. To date, a lot of studies have indicated that the conceptual discrimination of the cognitive triad is problematic (Anderson et al., 1995; Bebbington, 1985; Giles et al., 1987; Greening et al., 2005; Haaga et al., 1991; Mcintosh et al., 2000). The present result provides additional support for these earlier studies. From these results, it is reasonable to suggest that the three subscales of the CTI should not be individually used in either Western or non-Western populations. This makes sense because the three separable constructs of Beck's cognitive triad may not exist. In the present study, it was found that the two C-CTI factors were highly correlated. They can be added together into one large scale and be used as one overall index to measure a cognitive tendency toward depression in Taiwanese MDD patients. Therefore, this study combined the two C-CTI factors and renamed the cognitive triad as Depressive Cognition. The total score of the Depressive Cognition was used for the data analyses of Taiwanese MDD patients.

In Stage 1 in the generalized study, it was found that the results of factor analyses of the C-MDSS, the C-TI and the C-BSS with Taiwanese university

students resembled the results of factor analyses of the three scales with Taiwanese MDD patients, respectively. The results suggest that the factor structures of the C-MDSS, the C-CTI and the C-BSS are stable across clinical and nonclinical samples in Taiwan. However, the factors of the C-DAS, the C-HS and the C-BDI-II obtained from factor analyses with data of university students did not resemble those obtained from analyses with data of clinical MDD patients. These discrepant results suggest that the factors of the C-DAS, the C-HS and the C-BDI-II may change in samples from clinical MDD patients to nonclinical university students in Taiwan. Therefore, when the subscales of the three scales are utilized in university settings, it is necessary to use the subscales which are obtained from research on university students. In this research, because the general attitudes toward social support, dysfunctional attitudes and depression were mainly of interest, the total scores of the three scales were used for the data analyses of Taiwanese university students.

In brief, this research indicates that all the Chinese-language scales have satisfactory internal consistency, test-retest reliability and discriminant validity although the factorial validity of some of the sub-scales should be re-established. These psychometric properties suggest that the Chinese-language scales are reliable and valid self-report measures. They can be used to accurately measure the observed variables in this research.

7.3.2 Testing the Competing Models using Cross-sectional Data Gathered from Taiwanese MDD Patients

The SEM analyses indicated that the two interactional models (i.e., the IM-A and the IM-B) failed to provide an adequate fit to the cross-sectional data of the Taiwanese MDD patients. Based on the diathesis-stress premise, the two models hypothesized that dysfunctional attitudes interacted with negative life events to increase psychological symptomatology in Taiwanese depressed patients. The

present result suggests that the diathesis-stress hypothesis of the two models is not supported. The finding is notably different from some earlier studies (Abela et al., 2002; Beck, 1967, 1976; Joiner et al., 1999; Kwon et al., 1992; Oei et al., 2007; Olinger et al., 1987).

A possible explanation for the discrepant findings is sample differences. The sample used in the main study consisted of MDD patients who sought treatment in hospitals. A lot of the patients were diagnosed with recurrent-episode major depressive disorder. Beck, Steer & Brown (1993) have argued that depressed persons not only tend to underestimate positive information, but also exaggerate the meaning of negative information. Post et al. (1996) have indicated that, compared with first-episode depression, later episodes of depression become more autonomous, more spontaneous and less strongly linked to stressors. The patients in this research are severely sick. Therefore, no matter what levels of negative life events occur, their dysfunctional attitudes may be activated, and thus elicit psychological symptomatology. Another possible explanation is that Beck's (1967, 1976) hypothesis of latent depressogenic schemas is incorrect. If this is so, the role of the interaction of negative life events with dysfunctional attitudes in predicting psychological symptomatology can be ignored.

The SEM analyses supported the two mediational models: the MM-A and the MM-B. The two models uncovered some interesting relationships among the variables. First, it was found that negative life events increased dysfunctional attitudes, which in turn increased depressive cognition in the MM-A and hopelessness in the MM-B, respectively. Conceptually, the present result is consistent with the hypothesis of Kwon et al.'s (1994) linear mediational model, which suggests that negative life events, as main effect, affect dysfunctional attitudes, which in turn, as main effect, influence autonomic thoughts, which in turn result in the occurrence of psychopathology.

In addition, in both models, depression was found to exert an influence on suicide attempts by the mediation of suicidal ideation. The result supports Beck et al.'s classification of suicidal behaviours, which suggests that suicidal ideation logically precedes suicide attempts (Beck, 1986; Beck, Kovacs, et al., 1979; Beck, Steer, et al., 1985), as well as supports the work of Dieserud et al. (2001), which reported that depression influenced suicide attempts by the mediation of suicidal ideation.

To take the two models a step further, in the MM-A, depressive cognition was found to mediate the relationship between dysfunctional attitudes and depression rather than suicidal ideation. The present result can be interpreted as providing support for the cross-cultural generalizability of the combination of the cognitive triad, which has been hypothesized to play a role as a mediator in the development of depressive symptoms (Beck, 1967, 1970, 1987; Beck, Rush et al., 1979) rather than suicide.

In the MM-B, hopelessness was found to play a role as a mediator in the relationships between dysfunctional attitudes and depression as well as between dysfunctional attitudes and suicidal ideation. The finding provides additional support for earlier studies with bivariate analyses among these variables in Western clinical and nonclinical populations (Abela et al., 2002; Beck, Brown et al., 1990; Beck, Riskind, et al., 1988; Beck, Steer, Beck et al., 1993; Beck, Steer et al., 1985; Cannon et al., 1999; Dobson et al., 1983; Hamilton et al., 1983; Martin et al., 1995).

With respect to suicidal ideation, depression was found to be more strongly related to suicidal ideation than to hopelessness. This result is inconsistent with the findings of earlier studies, which reported that hopelessness was a better predictor of suicidal ideation, suicide intent and eventual suicide than depression in clinical populations (Beck, Brown, et al., 1990; Beck, Kovacs, et al., 1975; Beck, Steer,

Beck, et al., 1993; Beck, Steer, et al., 1985; Dyer & Kreitman, 1984; Ellis et al., 1986; Schotte et al., 1987; Wetzel et al., 1980). A possible explanation is that the relationship uncovered between depression and suicidal ideation is unique to the sample of this study. As mentioned earlier, most of the depressed patients in this study were diagnosed with recurrent-episode major depressive disorder. They may experience more depressive symptoms than other patients reported in earlier studies. This may lead to the result that depression was more strongly related to suicidal ideation than was hopelessness.

It is of interest to compare the relative influences of depressive cognition in the MM-A and hopelessness in the MM-B on depression and suicidal ideation. First, it was found that hopelessness exerted an influence on suicidal ideation, but depressive cognition did not. A lot of earlier studies have reported that hopelessness predicts suicidal ideation and eventual suicide (Beck, Brown, et al., 1990; Beck, Steer, Beck et al., 1993; Beck, Steer, et al., 1985; Minkoff et al., 1973; Rudd, 1990; Schotte et al., 1982; Wetzel et al., 1980). In contrast, to date, no study has reported the combination of the cognitive triad as a risk factor for suicide. The present result suggests that hopelessness is a better predictor of suicidal ideation than depressive cognition, which is analogous to the combination of the cognitive triad.

Compared with depressive cognition, hopelessness was found to exert a similar influence on depression. Beck (1967, 1970, 1987) have hypothesized that the cognitive triad play a role as a mediator in the development of depression. The present result further suggests that hopelessness and depressive cognition play similar roles in the development of depression. The current result also implies that it is not necessary to select between two very similar models the best-fitting model in representing the given data. Thus, the MM-A and the MM-B were combined by extracting a latent variable from depressive cognition and hopelessness. The SEM

analyses indicated that the combined mediational model with the extracted latent variable, which was termed depressive hopelessness, provided an adequate fit to the given data. After deleting non-significant paths from and adding an additional path to the model, the final modified combined mediational model was selected as the most appropriate in representing the given data.

7.3.3 Findings from the Most Appropriate Model for Taiwanese MDD Patients

The final modified combined mediational model uncovered some interesting findings. First, in terms of the measurement model, it was found that depressive cognition and hopelessness were the factors of the latent variable, depressive hopelessness. The latent variable exerted larger influence on depression than did depressive cognition and hopelessness. The results imply that both the cognitive triad and hopelessness may not be core constructs. A latent construct, depressive hopelessness, may exist at a deeper level. Insofar as the present study was the first to find the new latent construct extracted from depressive cognition and hopelessness in Taiwanese MDD patients, the finding is in need of replication using other samples from other countries.

In terms of the structural model, the present data indicated that depression was a proximal cause of suicidal risk. Increased depression resulted in concomitant increases in suicidal ideation, which in turn leaded to increased suicide attempts. The result provides support for earlier studies, which reported that depression was a predictor of suicidal ideation (Ranieri et al., 1987; Rudd, 1990), as well as provides evidence for Beck et al.'s classification of suicidal behaviours, which suggests that suicidal ideation logically precedes and leads to suicide attempts (Beck, 1986; Beck, Kovacs, et al., 1979; Beck, Steer, et al., 1985).

The structural model also demonstrates that depressive hopelessness plays a mediating role in the relationship between dysfunctional attitudes and depression. Increased dysfunctional attitudes resulted in concomitant increases in depressive hopelessness, which in turn contributed to elevated depression. This makes sense because depressive hopelessness was extracted from depressive cognition and hopelessness; thus, the characteristics of depressive hopelessness are similar to those of the two mediation components. In this connection, it is important to note that depressive hopelessness served as a final common pathway from negative life events to depression. Negative life events enhanced depression via increasing dysfunctional attitudes and depressive hopelessness. The indirect effect of negative life events on depression via the mediational paths from dysfunctional attitudes to depressive hopelessness suggests poor cognitive functions towards stress in Taiwanese MDD patients. Thus, improving Taiwanese MDD patients' cognitive abilities to cope with stress may be a valid approach to decrease the intensity of depression. This may prevent the occurrence of suicide.

Negative life events were also found to exert a direct influence on suicide attempts in Taiwanese MDD patients even after controlling for other predictor variables. Although the fact that negative life events precede suicide attempts is widely know, most of the evidence are obtained from case-control studies with bivariate analyses (Cochrane & Robertson, 1975; O'Brien & Farmer, 1980; Paykel, 1974; Schotte & Clum, 1987; Vanna et al., 1999). With the multivariate analyses, the present study further demonstrates that negative life events are not only a distal but also a proximal risk factor of suicide attempts in Taiwanese MDD patients after controlling for the other risk factors related to suicide attempts. In particular, Taiwanese patients reported that unemployment and individual financial crisis were the most important sources of life stress. The result is consistent with the work of

Chuang and Huang (1996), which indicated that economic variables (e.g., unemployment rate) posed a greater influence over Taiwan national suicide rates than sociological variables (e.g., divorce rate). Chuang et al. explained the finding using economic theories of suicide. As Taiwan advanced to become an industrialized economy, its people also became more vulnerable to labor market fluctuations. Actually, in recent years, many Taiwanese labor-intensive industries have moved to other developing countries. This leads to increased difficulties for people, especially for a disadvantaged minority, to get a job. Another possible reason is stereotypes in the Taiwanese general population for mental disorders. Many Taiwanese psychiatric patients encounter job discrimination because they are regarded as incompetent to work (Chang, 2003).

Patients who experienced high negative life events tended to perceive less social support. A possible explanation is that stressful events may weaken patients' supportive networks. Those with high negative life events may lose their friends and families. Thus, patients report no social resources to cope with their problems. In addition, patients who perceived low social support tended to reported more depressive hopelessness. This makes sense because patients with inadequate supportive networks may perceive an unsafe life situation and thus think negatively about their future. The finding indicates the importance of supportive networks for depressed patients. The present results also provide support for the cross-cultural generalizability of the main-effect model of social support (Cohen et al., 1985), which hypothesized that social support, as main effect, affects psychological symptomatology.

Patients who were compliant with psychotropic medications reported a decrease in depressive symptoms. In addition, suicidal ideation and suicide attempts were ameliorated by compliance with medications through decreasing depression.

The present finding provides empirical support for earlier studies, which reported that psychotropic medications play important roles in the prevention of depression (Beck, Rush, et al., 1979), suicidal ideation (Teicher et al., 1993) and eventual suicide (Isacsson, 2000; Möller, 2003).

Finally, it was found that female patients experienced more negative life events than male patients, and younger patients reported more negative life events than older patients. The results appear to be true whether in Taiwanese patients or in Western patients (Kohn et al., 2001; Perris, 1984; Sowa et al., 1984; Wagner et al., 1990). In addition, sex and age did not have direct effects on suicidal ideation and suicide attempts. The result suggests that age and sex represent distal risk factors for the development of suicidal ideation and attempts in Taiwanese MDD patients.

7.3.4 Retesting the Most Appropriate Model for Taiwanese MDD Patients Six Months Later

The main study used a cross-sectional design, weakening any direct causal interpretation. The use of the follow-up study represents an important approach to confirm causal relationships between the predictor variables and future suicide attempts.

The SEM analyses indicated that the final modified combined model was confirmed with the six-month two-wave panel data of the MDD patients, suggesting that the model was stable over six months. The model with the two-wave panel data uncovered some interesting findings. First, it was found that Time 1 suicidal ideation exerted less direct effect on suicide attempts at Time 2 than at Time 1. The result suggests that the prediction of suicide attempts by suicidal ideation decreases with time. A possible explanation is that suicidal ideation is time-limited phenomena. During the six-month follow-up period, the natural fluctuation of suicidal ideation may influence subsequent suicide attempts of MDD patients. Thus, the prediction of

subsequent suicide attempts at Time 2 by the suicidal ideation at Time 1 may be weakened. Another possible reason is clinical interventions during the follow-up period. When participants were found to have high suicidal ideation, their doctors would be suggested to change drug prescription to prevent participants' suicide outcome. Many authors have pointed out that researcher's interventions are a general problem in longitudinal research (Pokorny, 1992; Tanney, 1992). However, based on the research ethics of protecting the participants, the preventive interventions appear to be unavoidable. Another reason is the intervention of social support during the follow-up period. Joiner and Rudd (2000) indicated that suicidal crises may elicit their own solution. When the intensity of suicidal crises increases, patients who have social support may mobilize their resources to decrease suicidal crises. From Joiner et al.'s viewpoint, future longitudinal studies into the relationship between suicidal ideation and future suicide attempts may benefit from considering the influence of social support which happens during the follow-up period.

In addition, using the two-wave panel data obtained from Taiwanese MDD patients, the follow-up study confirmed that negative life events as a significant predictor of future suicide attempts after controlling for dysfunctional attitudes, depressive hopelessness, depression and suicidal ideation. The result is similar to the finding of a longitudinal study by Yen et al. (2005), which indicated that negative life events directly predicted future suicide attempts in psychiatric patients after controlling for psychological symptomatology. These similar results indicate the important role of negative life events in predicting suicide attempts in both Taiwanese and Western psychiatric patients.

With respect to sex, age, social support, dysfunctional attitudes, depressive hopelessness, compliance with medications and depression, they were found to exerted indirect effects on Time 2 suicidal attempts. No paths, specified a priori,

among these variables should be deleted from the model with the two-wave panel data. The result suggests that the indirect predictions of these variables to suicide attempts are stable over six months.

7.3.5 Replicating the Results Derived from the MDD Patients in a Sample of University Students

The final modified combined mediational model was confirmed to fit the cross-sectional data and the two-wave panel of Taiwanese MDD patients. However, the result was obtained from research on severely depressed patients. It is unclear if a similar result would be found in samples from different social class backgrounds. Therefore, the generalizability of the findings from clinical MDD patients to nonclinical university students was examined.

The SEM analyses showed that the final modified combined mediational model failed to provide an adequate fit to the data of Taiwanese university students. The result suggests that the model is misspecified for the student data. It is well known that suicidal behaviours do not occur with the same frequency in nonclinical and clinical samples, and risk factors for suicidal behaviours also differ between the two samples. Thus, the most appropriate model for clinical depressed patients will not necessarily be replicated in university students.

The mediational model B (i.e., the MM-B) showed relatively good fit to the student data compared to the other models. After modifying the model to improve its goodness-of-fit to the given data, the modified MM-B was chosen as the best-fitting model to represent the data of Taiwanese university students. The modified MM-B uncovered some interesting findings. First, the model does not have the interaction term of dysfunctional attitudes with negative life events. Instead, dysfunctional attitudes serve as a mediator in the relationship between negative life events and hopelessness as well as depression. The result suggests that increased life stress may

result in concomitant increases in dysfunctional attitudes, which in turn may lead to increases in students' psychological symptomatology. The finding provides support for the hypothesis of Kwon et al.'s (1994) linear mediational model rather than Beck's (1967) interaction hypothesis with the data of Taiwanese university students. A similar result was also found in the final modified combined mediational model with the data of Taiwanese MDD patients. However, the present result is inconsistent with a study with Taiwanese students conducted by Liu (2002), which supported Beck's interaction hypothesis. Discrepant findings on Beck's interaction hypothesis were also reported in Western studies with clinical and nonclinical samples (Abela et al., 2002; Barnett et al., 1988; Joiner et al., 1999; Klocek et al., 1997; Kwon et al., 1992; Oei et al., 2005; Oei et al., 2007; Olinger et al., 1987; Robins et al., 1989; Robins et al., 1990; Wise et al., 1986). These discrepant findings suggest that Beck's interaction hypothesis is debatable in clinical and nonclinical populations in Taiwan and Western countries.

In addition, in the modified MM-B, hopelessness rather than depressive hopelessness played a role as a mediator in the relationship between dysfunctional attitudes and depressive symptoms as well as between dysfunctional attitudes and suicidal ideation. The result suggests that hopelessness is an important risk factor for depression and suicidal ideation in many Taiwanese university students. Compared to depressive hopelessness, hopelessness does not include the components of negative views about the self and the world. The result implies that Taiwanese university students concern more about the future than the self and the world. This makes sense because most of the students have no health problems and they live in a stable environment provided by their universities and families; thus, students worry less about themselves and their environment. However, because of social changes and

political tension in recent years in Taiwan, Taiwanese students may worry more about their career development in the future (Tosun Public Welfare Foundation, 2007).

With the data of university students, the modified MM-B showed that depression correlated more strongly with suicidal ideation than did hopelessness. The analysis of the MM-B with the data of the MDD patients in the main study also revealed the same finding. These results are in agreement with the work of Rudd (1990) and Ranieri et al. (1987), but are inconsistent with the findings of many earlier studies with clinical and nonclinical samples (Beck, Steer, Beck, et al., 1993; Dyer & Kreitman, 1984; Minkoff et al., 1973; Schotte et al., 1982, 1987; Wetzel et al., 1980). These discrepant findings suggest that the relative contribution of hopelessness and depression to suicidal ideation is unstable in clinical and nonclinical populations in Taiwan and Western countries. Thus, hopelessness should not be automatically assumed to be a better predictor of suicidal ideation than depression.

With respect to negative life events, they were found to exert a direct influence on suicidal ideation after controlling for dysfunctional attitudes, hopelessness and depression. The result is similar to the work of Rudd (1990), which indicated negative life events directly influenced suicidal ideation in undergraduate students after controlling for hopelessness and depression. These similar results suggest the important role of negative life events on the prediction of suicidal ideation in both Taiwanese and Western students. Interestingly, the sources of life stress for Taiwanese students are different from those for Taiwanese MDD patients. Sociological variables (e.g., death of close family or friend, serious illness or injury to a close relative, broke off a steady relationship) emerged as stronger sources of life stress for Taiwanese university students than did economic variables (e.g., unemployment). A possible explanation is that most of the students may obtain

financial support from their families and universities at the time of testing; thus, students may answer that they worry less about economic problems.

In addition, increased negative life events led to concomitant decreases in social support, which in turn resulted in concomitant increases in hopelessness and depression. A similar result was also found in the MM-B with the MDD patients in the main study. These similar findings intensify support for the cross-cultural generalizability of the main-effect model of social support hypothesized by Cohen et al. (1985).

Female university students reported more depressive symptoms than their male counterparts. The finding is concordant with findings from other studies of Western students (Beck, Steer, & Brow, 1996; Cheng et al., 2007; Rudd, 1990; Schotte et al., 1982; Stewart et al., 1999). However, the present result is inconsistent with the finding in the previous analyses of the MM-B and the final modified combined mediational model with the data of the MDD patients, which indicated that sex did not significantly correlate with depression. A possible explanation for the discrepant findings is a result of sample differences. The sample used in the main study was MDD patients. They may be severely depressed and thus there was no sex difference in the measures of depression.

It was found that older Taiwanese students reported less social support from peers and supervisors than younger students. The result is inconsistent with findings of earlier studies with Western students. In a study of high school students, Cheng et al. (2004) indicated that older students perceived less family support than younger ones, but there was no age difference in participants' perception of peer-group support. In a study of undergraduate students, Rudd (1990) reported that age did not correlate with social support from friends and families. A possible explanation for these discrepant findings is a result of age differences between these samples. Cheng

et al.'s students were in the developmental period of early and middle adolescence (from Grades 7 to 11, mean age = 14.8). They may start to establish autonomy and thus lead to decreased emotional dependency on their parents, but they simultaneously come to rely more on peers for support (Furman & Buhrmester, 1992). Rudd's students were mainly in the developmental period of late adolescence (92.7% between 16 and 21 years of age, mean age = 18). Their parent-child conflicts may subside and a rapprochement is reached in a new form of parent-offspring relationship (Furman & Buhrmester, 1992). In contrast, the students of this study were in the developmental period of early adulthood (ages 19 to 38, mean age = 23.38). During this period, people may start to establish intimate relationship and commit themselves to an occupation (Erikson, 1963). Thus, the significance of personal relationships with peers and teachers may decrease with age.

7.4   Practical Implications

7.4.1 Implications for Future Research

With regard to the instruments used in this study, one of the ancillary projects here was the extensive translation and testing of scales that were originally developed in English speaking countries. As a result of the examination of their factor structure and reliability with Chinese speaking populations during the present study, these scales could be valuable instruments for measuring suicide related variables in future research on suicidality involving Chinese speaking communities.

With regard to the best-fitting models developed in this study, it was discovered that dysfunctional attitudes play a mediator rather than a moderator in the relationship between negative life events and depression in MDD patients and university students, which stands in contrast to previous findings (Abela et al., 2002; Joiner et al., 1999; Kwon et al., 1992; Oei & Kwon, 2007; Olinger et al., 1987). The

finding highlights the complicated relationships between stress, dysfunctional attitudes and depression. There may exist several other ways that the causal relationships among stress, dysfunctional beliefs and depression occur. Therefore, a diathesis-stress interaction model should not be hypothesized as the only model in research on depression in clinical and nonclinical populations. Future research on depression is needed to consider alternative models, for example, the linear mediational model, the symptom model, the recovery model or the alternative aetiologies model as suggested by earlier researchers (Brewin, 1985; Kwon et al., 1994; Parry et al., 1988).

Both depressive cognition and hopelessness were shown to mediate the relationship between dysfunctional attitudes and depression in Taiwanese MDD patients. However, there exists a common latent variable, depressive hopelessness, under the two mediation components. The influence of the latent variable on depression was larger than that of depressive cognition and hopelessness. The results imply that depressive cognition and hopelessness may not be core constructs. A latent construct may exist at a deeper level and may exert more influence on depression. The finding of a latent construct under hopelessness and depressive cognition is of particular importance and deserves further attention because it may have an important implication for the prediction of depression. If the latent construct is confirmed, future researchers may develop an assessment instrument based on the construct, and thus clinical practitioners may benefit from using the new instrument to predict depression more accurately in their patients.

Numerous earlier studies have reported that hopelessness is a more powerful predictor of suicidal ideation than is depression (Beck, Steer, Beck, et al., 1993; Dyer et al., 1984; Minkoff et al., 1973; Schotte et al., 1982, 1987; Wetzel et al., 1980). However, discrepant results were found in this research and some other

earlier studies with clinical patients and university students (Ranieri et al., 1987; Rudd, 1990). The finding has an important implication for future suicide research. Hopelessness should not be automatically assumed to be a better predictor of suicidal ideation than depression in clinical and nonclinical populations.

Suicidal ideation, suicide attempts and completed suicide have been suggested as a series of behaviours that are hierarchically related: suicidal ideation logically precedes suicide attempts, which in turn lead to suicide completion (Beck, 1986; Beck, Kovacs, & Weissman, 1979; Beck, Steer et al., 1985). The present research has confirmed that suicidal ideation predict suicide attempts in Taiwanese MDD patients. The finding highlighted the important role of suicidal ideation in the development of suicide attempts. In addition, this research indicated that negative life events predicted suicide attempts not only by itself directly but also via mediational paths from dysfunctional attitudes through depressive hopelessness and depression to suicidal ideation. Moreover, social support was found to mediate the impact of negative life events on depressive hopelessness. The findings highlighted the complicated aetiological processes of suicide attempts in MDD patients. Future research may not only rely on cognitive thoughts to account for the development and maintenance of suicide behaviours. Environmental variables such as negative life events and social support are also of importance in research on suicide attempts.

7.4.2 Practical Implications for Suicide Prevention and Treatment in Taiwanese MDD Patients

A remarkable result in this research was the final modified combined mediational model to be confirmed to fit the data of Taiwanese MDD patients through the cross-sectional and follow-up studies. The model was formulated based on Western-based cognitive theories, which emphasize that distorted cognitions or deviant thoughts play core roles in the development of psychopathology. Using the

data of Taiwanese MDD patients, it was discovered in the model that increased stress led to concomitant increases in dysfunctional attitudes and depressive hopelessness, which in turn resulted in psychopathology. The result highlights that the crucial cognitive constructs of Taiwanese MDD patients are similar to those of Western patients. This provides support for the idea that Western cognitive modification techniques for suicidal behaviours, which is primarily derived from the cognitive therapies developed to treat depression, are suitable for use in Taiwanese depressed patients. The cognitive techniques include rational examination of thoughts, transforming self-defeating talk into active coping, refuting irrational beliefs, modifying cognitive processes and teaching patients new skills (Freeman & Reinecke., 1993; Klingman & Hochdorf, 1993). These cognitive techniques may be also useful to decrease Taiwanese patients' dysfunctional attitudes, depressive hopelessness and thus to decrease their suicidal behaviours.

The present model also revealed that poor compliance with medications was an obvious obstacle in the treatments of mental illness. The causes of poor compliance included fear of drug addiction, medications disturbing daily life activities, forgetting to take drugs, lack of support from family and fear of side effects such as dizzyness and concentration difficulty. The findings have implications for the treatment of suicidal behaviours in Taiwanese MDD patients. Psychiatric doctors should prescribe drugs with fewer side effects for patients, if possible. In inpatients wards, health professionals should regularly monitor patients' drug use. In the community, family members should assist in the supervision of patients. In addition, hospitals may design programmes which emphasize educating patients about accurate knowledge towards mental illness and the function of different psychotropic drugs. This may improve patients' attitudes towards pharmacotherapy.

Population risk factors such as unemployment tend to play an important role in the occurrence of suicide attempts in Taiwanese MDD patients. Therefore, improving unemployment is likely to give benefit to depressed patients in decreasing their suicide rate. However, it is difficult for psychiatric patients to find a job on their own initiative (Appleby, 2000). Therefore, hospitals need to take the initiative to refer patients to institutions that can provide jobs or vocational training to the patients.

Social support from peer, family and health professionals may mediate the impact of life stress on patients' depressive beliefs. Therefore, health professionals need to enhance their relationship to patients so as to improve their treatment compliance. In addition, hospitals may organize support groups which consist of health professionals, patients' family and friends to provide multidimensional social support for depressed patients.

7.4.3 Practical Implications for Suicide Prevention in Universities

The SEM analyses indicated that the modified MM-B fitted the data of Taiwanese university students. The model provides a conceptual framework for suicide prevention and intervention programmes for use in Taiwanese students. First, the model shows that hopelessness instead of depressive hopelessness plays a mediating role in the development of depression. Therefore, universities can enhance school-based screening for students with hopelessness. This may help universities gain a more accurate result in the prediction of depression. According to the screening result, universities can refer at-risk students to health professionals. They can take action early to prevent at-risk students from attempting suicide.

The modified MM-B also highlighted the importance of dysfunctional attitudes in the development of psychological symptomatology in Taiwanese university students. Therefore, Western cognitive therapy for suicidal behaviour (e.g.,

Freeman et al., 1993; Klingman et al., 1993) may be suitable for use in Taiwanese students. Taiwanese universities can design a series cognitive activity programmes based on Western cognitive therapies to change students' dysfunctional thinking.

The combination of social support from teachers, family and peers may ameliorate students' hopeless thoughts and depressed mood. Therefore, universities can design a series of programmes to enhance the cooperation between teachers, family and peers. For example, universities can provide forums for teachers, families and students to acquire and share accurate information about youth suicide and its prevention. This may strengthen supportive networks for at-risk students. In addition, universities can design a curriculum-based programme which educates students about mental illness and the roles of different mental health professionals. This may improve students' willingness to seek help from health professionals (Esters, Cooker, & Ittenbach, 1998). Furthermore, universities can organize a team of counselors, which consists of a clinical psychologist, a social worker and a school counselor. The team can provide counseling services for students, their parents and teachers as well as provide early crisis intervention for a suicidal student.

7.5   Limitations

First, some critics might argue that one possible limitation of this research may be the use of self-report measures to collect data. Although objective measures are desirable where possible, none are available when investigating feelings and beliefs. However, this study has showed that the Chinese-language scales have acceptable psychometric properties in Taiwanese clinical and nonclinical samples. Thus, these self-report scales can be used as reliable and valid assessment tools to assess the observed variables in the participants of this study.

Second, although the follow-up study confirmed that the final modified combined mediational model fitted the data of Taiwanese MDD patients, the model only explained 28% of variance of Time 2 suicide attempts, leaving 72% of variance unexplained. The explained variance of Time 2 suicide attempts was relatively small. A possible explanation for the result is that some predictors of suicide may not be included in the model. To improve the explanatory power of the model, future studies should consider some variables which have been emphasized to influence clinical patients' suicide attempts such as attributional style (Abramson et al., 1989), cognitive rigidity or poor problem-solving skills (Schotte & Cum, 1982, 1987). Likewise, the generalized study indicated that the modified MM-B explained 41% of variance in students' suicidal ideation, leaving 59% of variance unexplained. Future studies need to examine some variables which may specifically influence students' suicidal ideation, such as school-related problems, self-esteem, locus of control and parent-child conflict (Chiou et al., 2006; Lewinsohn et al., 1993, Martin et al., 2005; Stewart et al., 1999).

Third, in the follow-up period, researcher intervention may disturb patients' subsequent suicidal behaviours. When participants were found to have high suicidal ideation, the researcher would suggest that their doctors change drug prescription to prevent patients' suicide outcome. It is well known that a good research should preclude method contamination. However, based on the research ethics of protecting participants, such interventions appear to be unavoidable.

Last, the study participants were clinical MDD patients and university students recruited from Taiwan. As a result, the best-fitting models from the two samples may not generalize directly to other clinical and nonclinical populations outside Taiwan. Future research is therefore needed to test the best-fitting models using other samples from other countries.

7.6   Conclusion

Suicide is an abnormal behaviour commonly happening in different races. The present thesis provides a chance to verify whether these depression and suicidality theories originated from the western world apply to Chinese-speaking people as well. To achieve this goal, the present thesis employs the newest statistical technique, that is, structural equation modeling, to compare a series of hypothesized models simultaneously. This statistical technique breaks through the limitation of traditional statistical techniques and allows researchers to model complex relations involving chains of moderating and mediating variables, to compare several models simultaneously in terms of goodness-of-fit, to examine causal paths within a model, and to modify the paths of a model to improve its goodness-of-fit. With this statistical technique, many goals that previous studies could not achieve can now be obtained.

In the cross-sectional study, a series of theoretical models were constructed to illustrate how negative life events, social support, dysfunctional attitudes, depressive cognition, hopelessness, depression and suicidal ideation mutually influence to produce cumulative risks for suicide attempts. After comparing these models by using SEM techniques, the final modified combined mediational model was selected as the most appropriate in representing the data of Taiwanese MDD patients. The model revealed that a latent variable, which was termed depressive hopelessness, was extracted from depressive cognition and hopelessness. The model also revealed that negative life events, as main effect, affected dysfunctional attitudes, which in turn, as main effect, influenced depressive hopelessness, which in turn, leaded to depression. The result supports the hypothesis of the linear mediational model proposed by Kwon et al. (1994). In addition, depressive

hopelessness increased suicide attempts through intensifying depression and suicidal ideation. Sex and age were distal predictors of suicide attempts. However, social support mediated the impact of negative life events on depressive hopelessness. Compliance with medications decreased suicide attempts through reducing depression. By the findings of significant paths from negative life events to suicide attempts in the model, the cross-sectional study allowed researchers to view the aetiological processes of suicide attempts among Taiwanese MDD patients.

In the follow-up study, the final modified combined mediational model was confirmed to fit the six-month two-wave panel data of the Taiwanese MDD patients. The result suggests that the final model was stable over six months in predicting future suicide attempts. By using a six-month prospective design, this study overcomes the limitations of earlier retrospective studies, which preclude the inferences of causal relationships between predictor variables and response variables.

The modified combined model has implications for the prevention and intervention of suicidal behaviours in Taiwanese depressed patients. First, as with Western depressed patients, distorted cognitions or deviant thoughts play core roles in the development of psychopathology of Taiwanese depressed patients. Thus, Western-based cognitive therapies are suitable for use in Taiwanese patients. In addition, poor compliance with medications is an obvious obstacle in the treatments of mental illness. Psychiatric doctors, medical staffs in wards and family members should pay attention to patients' drug use. Furthermore, environmental variables such as negative life events and lack of social support also play an import role in the increase of suicide attempts in Taiwanese depressed patients. Thus, hospitals need to take the initiative to improve patients' supportive networks and provide jobs or vocational training to patients to decrease their suicidal risk.

In the generalized study, the SEM analyses indicated that the final modified combined mediational model failed to provide an adequate fit to the data of Taiwanese university students. Instead, the modified MM-B provided a more adequate fit to the given data. The result suggests that the most appropriate model for MDD patients may not generalize to university students.

The modified MM-B, despite their limitations, provides frameworks for suicide prevention and intervention in Taiwanese university students. First, the model highlights the importance of deviant thoughts such as dysfunctional attitudes and hopelessness in the development of psychological symptomatology of Taiwanese university students. Universities can enhance school-based screening for students with these deviant thoughts and then refer the high-risk students to health professionals. In addition, the model shows the importance of the combination of social support from school staffs, family and peers. Universities can enhance the cooperation between teachers, family and peers or organize a team which consists of school counselors, social workers and other health professionals to provide counseling services for students.

List of Appendices

Appendix A: Questionnaires (English versions)

Part 1: Personal Demographic Information

1. Coded number:_____

2. Date of interview:_____

3. Address:_____Tel: (___)_____

4. Type of depressive disorders: _____

5. Status of patient: inpatients……….☐   Outpatient……….☐

6. Are you: Male……….☐   Female……….☐

7. Birth Date: Year_____Month_____

8. Marital status:
☐ 1. Married   ☐ 2. Single   ☐ 3. Divorced
☐ 4. Cohabited   ☐ 5. Separated   ☐ 6. Widowed

9. What is your occupation?_____

10. What is your education level?
☐ 1. Illiteracy   ☐ 2. Primary school   ☐ 3. Junior high school
☐ 4. High school ☐ 5. Technical Institute   ☐ 6. University
☐ 5. Master or above

11. When is your first onset?_____

12. Compliance with medications:
☐ 1. Totally no compliance
☐ 2. Sometimes having compliance, but most of time no compliance
☐ 3. Starting to decrease the amount of medications by yourself
☐ 4. Most of time compliance, but sometimes decreasing the amount of medications
☐ 5. Full compliance

13. Reasons of no compliance with medications: (Multiple response)
☐ 1. Feeling better
☐ 2. Fear of side effects of medications (e.g., dizzyness, concentration difficulty)
☐ 3. Activities of daily lives disturbed by the side effects of medications
☐ 4. Fear of drug addiction
☐ 5. Lack of efficacy
☐ 6. Lack of good associations with doctor
☐ 7. Lack of support from family
☐ 8. I have to solve my problems without drugs
☐ 9. Forgetting to take drugs
☐10. Others:_____.

Part 2: Questionnaires

List of Threatening Experiences (LTE)

Have any of the following life events or problems happened to you during the last 6 months? Please check the box in which any event happened or began.

1. You yourself suffered a serious illness, injury, or an assault.
2. A serious illness, injury, or assault happened to a close relative.
3. Your parent, child, or spouse died.
4. A close family, friend or another relative (aunt, cousin, grandparent) died.
5. You had a separation due to marital difficulties.
6. You broke off a steady relationship.
7. You had a serious problem with a close friend, neighbor, or relative.
8. You became unemployed or you were seeking work unsuccessfully for more than one month.
9. You were sacked from your job.
10. You had a major financial crisis.
11. You had problems with the police and a court appearance.
12. Something you valued was lost or stolen.

Multidimensional Support Scale (MDSS)

Below are some questions about the kind of help and support you have available to you in coping with your life at present. The questions refer to three different groups of people who might have been providing support to you IN THE LAST MONTH. For each item, please circle the alternative which shows your answer.

A. Firstly, think of your family and close friends, especially the 2-3 who are most important to you.

	How satisfied are you with that			
	Not at all satisfied	Not very satisfied	Quite satisfied	Very satisfied
1. How often did they really listen to you when you talked about your concerns or problems?	1	2	3	4
2. How often did you feel that they really trying to understand your problem?	1	2	3	4

3. How often did they try to take your mind off your problems by telling jokes or chattering about other things?	1	2	3	4
4. How often did they really make you feel loved?	1	2	3	4
5. How often did they help you in practical ways, like doing things for you or lending you money?	1	2	3	4
6. How often did they answer your questions or give you advice about how to solve your problems?	1	2	3	4
7. How often could you use them as examples of how to deal with your problems?	1	2	3	4

B. Now, think of other people of about your age that you know, who are like you in being employed, unemployed, or studying.

1. How often did they really listen to you when you talked about your concerns or problems?	1	2	3	4
2. How often did you feel that they really trying to understand your problem?	1	2	3	4
3. How often did they try to take your mind off your problems by telling jokes or chattering about other things?	1	2	3	4
4. How often did they help you in practical ways, like doing things for you or lending you money?	1	2	3	4
5. How often did they answer your questions or give you advice about how to solve your problems?	1	2	3	4
6. How often could you use them as examples of how to deal with your problems?	1	2	3	4

C. Lastly, think about the people in some sort of authority over you. If you are employed, this means your supervisors at work. If you are unemployed, it means your local CES staff. If you are a fulltime student, it means your lectures and tutors. Depending on which ones are relevant for you, answer for the 2-3 that you see most.

1. How often did they really listen to you when you talked about your concerns or problems?	1	2	3	4
2. How often did you feel that they really trying to understand your problem?	1	2	3	4
3. How often did they try to take your mind off your problems by telling jokes or chattering about other things?	1	2	3	4

4. How often did they fulfill their responsibilities Towards you in helpful ways?	1	2	3	4
5. How often did they answer your questions or give you advice about how to solve your problems?	1	2	3	4
6. How often could you use them as examples of how to deal with your problems?	1	2	3	4

Short-Version Dysfunctional Attitude Scale (DAS)

This scale lists different attitudes or beliefs which people sometimes hold. Please read each statement carefully and decide how much you agree or disagree with what it says. For each of the attitudes, please indicate your answer by placing a tick (∨) under the column that best describes how you think. Be sure to choose only one answer for each attitude. But please note that because people are different, there is no right or wrong to these statements. To decide whether a given answer is typical of your way of looking at things, simply keep in mind what you are like most of the time.

1	=	Totally agree	5	=	Disagree slightly
2	=	Agree very much	6	=	Disagree very much
3	=	Agree slightly	7	=	Totally disagree
4	=	Neutral			

1. If I fail partly, it is as bad as being a complete failure. 1 2 3 4 5 6 7

2. If others dislike you, you cannot be happy. 1 2 3 4 5 6 7

3. I should be happy all the time. 1 2 3 4 5 6 7

4. People will probably think less of me if I make a mistake. 1 2 3 4 5 6 7

5. My happiness depends more on other people than it dose on me. 1 2 3 4 5 6 7

7. I should always have complete control over my feelings. 1 2 3 4 5 6 7

8. My life is wasted unless I am a success. 1 2 3 4 5 6 7

9. What other people think about me is very important. 1 2 3 4 5 6 7

10. I ought to be able to solve my problems quickly and without a great deal of effort. 1 2 3 4 5 6 7

11. If I don't set the highest standards for myself, I am likely to end up a second rate person. 1 2 3 4 5 6 7

12. I am nothing if a person I love doesn't love me. 1 2 3 4 5 6 7

13. A person should be able to control what happens to him. 1 2 3 4 5 6 7

14. If I am to be a worthwhile person, I must be truly outstanding   1 2 3 4 5 6 7
in at least one major respect.

15. If you don't have other people to lean on,   1 2 3 4 5 6 7
you are bound to be sad.

16. It is possible for a person to be scolded and not get upset.   1 2 3 4 5 6 7

17. I must be a useful, productive, creative person or life   1 2 3 4 5 6 7
has no purpose.

18. I can find happiness without being loved by other person.   1 2 3 4 5 6 7

19. A person should do well at everything he undertakes.   1 2 3 4 5 6 7

20. If I do not de well all the time, people will not respect me.   1 2 3 4 5 6 7

21. I do not need the approval of other people in order to be happy.   1 2 3 4 5 6 7

22. If I try hard enough, I should be able to excel   1 2 3 4 5 6 7
at anything I attempt.

23. People who have good ideas are more worthy than those   1 2 3 4 5 6 7
who do not.

24. A person doesn't need to be well liked in order to be happy.   1 2 3 4 5 6 7

25. Whenever I take a chance or risk I am only looking for trouble.   1 2 3 4 5 6 7

Cognitive Triad Inventory (CTI)

This inventory lists different ideas that people sometimes have. For each of these ideas, show how much you agree with it by circling the answer that best describes your opinion. Be sure to choose only one answer for each idea. Answer the items for what you are thinking right now.

TA	=	Totally agree	SD =	Slightly disagree
MA	=	Mostly agree	MD =	Mostly disagree
SA	=	Slightly agree	TD =	Totally disagree
N	=	Neutral		

1. I have many talents and skills.   TA MA SA N SD MD TD

2. My job (housework, schoolwork, daily duties) is unpleasant.   TA MA SA N SD MD TD

3. Most people are friendly and helpful.   TA MA SA N SD MD TD

4. Nothing is likely to work out for me.   TA MA SA N SD MD TD

5. I am a failure.   TA MA SA N SD MD TD

6. I like to think about the good things that lie ahead for me.   TA MA SA N SD MD TD

7. I do my work (job, schoolwork, house work) adequately.   TA MA SA N SD MD TD

8. The people I know help me when need it.   TA MA SA N SD MD TD

9. I expect that things will be going very well for me a few years from now. TA MA SA N SD MD TD

10. I have messed up almost all the important relationships I have ever had. TA MA SA N SD MD TD

11. The future holds a lot of excitement for me. TA MA SA N SD MD TD

12. My daily activities are fun and rewarding. TA MA SA N SD MD TD

13. I can't do anything right. TA MA SA N SD MD TD

14. People like me. TA MA SA N SD MD TD

15. There is nothing left in my life to look forward to. TA MA SA N SD MD TD

16. My current problems or concerns will always be there in one way or another. TA MA SA N SD MD TD

17. I am as adequate as other people I know. TA MA SA N SD MD TD

18. The world is a very hostile place. TA MA SA N SD MD TD

19. There is no reason for me to be hopeful about my future. TA MA SA N SD MD TD

20. The important people in my life are helpful and supportive. TA MA SA N SD MD TD

21. I hate myself. TA MA SA N SD MD TD

22. I will overcome my problem. TA MA SA N SD MD TD

23. Bad things happen to me a lot. TA MA SA N SD MD TD

24. I have a spouse or friend who is warm and supportive. TA MA SA N SD MD TD

25. I can do a lot of things well. TA MA SA N SD MD TD

26. My future is simply too awful to think about. TA MA SA N SD MD TD

27. My family doesn't care what happens to me. TA MA SA N SD MD TD

28. Things will work out well for me in the future. TA MA SA N SD MD TD

29. I am guilty of a great many things. TA MA SA N SD MD TD

30. No matter what I do, others make it difficult for me to get what I want. TA MA SA N SD MD TD

31. I am a worthwhile human being. TA MA SA N SD MD TD

32. There is nothing to look forward to in the years ahead. TA MA SA N SD MD TD

33. I like my self. TA MA SA N SD MD TD

34. I am faced with many difficulties. TA MA SA N SD MD TD

35. I have serious flaws in my character. TA MA SA N SD MD TD

36. I expect to be content and satisfied as the years go by. TA MA SA N SD MD TD

Appendix B:

Letter for permission to use questionnaires and Figures

DAS-24
From: **mick power** (mjpower@staffmail.ed.ac.uk)
Sent: Wednesday, May 25, 2005 4:50:18 PM
To: Kuun_001@hotmail.com

Dear Yung-Li Ku,

Thank you for the request to use the DAS-24. I am happy for you to adapt it for use in Taiwan and look forward to hearing about your results.

With best wishes,
Mick Power.

Mick Power
Professor of Clinical Psychology
Section of Clinical and Health Psychology
Kennedy Tower
Royal Edinburgh Hospital
Edinburgh EH10 5HF.

RE: Request for permission to use the CTI

From: **Leber, William R. (HSC)** (William-Leber@ouhsc.edu)
Sent: Friday, May 13, 2005 10:25:25 PM
To: YUNG-LI KU (kuun_001@hotmail.com)

My apologies for not responding sooner. You certainly may use the CTI in your research. I am glad to hear that the instrument may be useful to you. No letter is necessary.

I recall receiving a letter, but have recently moved to a different office and I believe the letter was packed up without response.

Good luck with the project!

William Leber, Ph.D.

From: YUNG-LI KU [mailto:kuun_001@hotmail.com]
Sent: Thu 5/12/2005 1:13 PM
To: Leber, William R. (HSC)
Subject: Request for permission to use the CTI

Dear Professor William R. Leber,

My name is Yung-Li Ku, a PhD postgraduate student in the University of Adelaide, Australia. Last month I sent a letter to you for asking your permission to me to use the Cognitive Triad Inventory (CTI) in my PhD proposal entitled " Toward an Integrated Model of Suicidal Manifestations in Patients with Major Depressive Disorder. Did you Receive my letter? I am concerned about the progress of my request, because I have not receive your reply yet. I hope I can get your kind permission to use it. If you did not receive my letter, please tell me. I will send another consent letter to you.

Your early reply is my highest appreciation.

Your sincerely

Yung-Li Ku

Department of Psychology
The University of Adelaide
Australia

FW: FW: Request to use the List of Threatening Experiences (LEQ)

From: **Chenery, J.I.** (ire@leicester.ac.uk)
Sent: Friday, May 27, 2005 5:07:43 PM
To: kuun_001@hotmail.com

Dear Yung-Li Ku,
Thank you for your email and letter to Professor Brugha.
He has asked me to inform you that he gives his permission for you to use tl
I do hope this meets your requirements.

Kind regards,
Irene

Irene Chenery
University of Leicester
PA to Professor TS Brugha
Department of Health Sciences - Psychiatry
Brandon Mental Health Unit
Leicester General Hospital
Leicester LE5 4PW, UK
Voice: +44 (0) 116 225 6295
Fax: +44 (0) 116 225 6312

-----Original Message-----
From: Terry Brugha [mailto:TBrugha@socpsyle.u-net.com]
Sent: 25 May 2005 16:08
To: Chenery, J.I.
Subject: Re: FW: Request to use the List of Threatening Experiences
(LEQ)

Irene

Hence forth say yes (on condition it is a not for profit purpose. So not foi
commercial use. But ok for research, publicly funded healthcare,
teaching etc).

On 25 May 2005 at 15:02, Chenery, J.I. wrote:

Subject: FW: Request to use the List of Threatening Experienc
Date sent: Wed, 25 May 2005 15:02:19 +0100
From: "Chenery, J.I." <ire@leicester.ac.uk>
To: <tsb@leicester.ac.uk>

-----Original Message-----
From: Drew, P. [mailto:pd12@leicester.ac.uk]
Sent: 25 May 2005 14:34
To: ire@leicester.ac.uk
Subject: FW: Request to use the List of Threatening Experiences (LEQ)

-----Original Message-----
From: YUNG-LI KU [mailto:kuun_001@hotmail.com]
Sent: 25 May 2005 13:37
To: psychiatry@leicester.ac.uk

RE: request for approval of permission to use figures-moderator and mediational models published in J Pe

From: **Kenny, David** (david.kenny@uconn.edu)
Sent: Thursday, May 08, 2008 8:43:53 PM
To: YUNG-LI KU (kuun_001@hotmail.com)

> You have our permission.
>
> David A. Kenny
>
>
> -----Original Message-----
> From: YUNG-LI KU [mailto:kuun_001@hotmail.com]
> Sent: Thu 5/8/2008 8:42 AM
> To: Kenny, David
> Subject: request for approval of permission to use figures-moderator and mediational models published in J Pe
>
>
> Dear Professor David A. Kenny,
>
> My name is Yung-Li Ku, a PhD postgraduate student of the University of Adelaide in Australia. I am conducting research entitled "A test of competing models to predict suicidality in patients and students in Taiwan" supervised by Professor Helen Winefield. The purpose of this study is to obtain a best model to explain the aetiology of suicidality in clinical and nonclinical Taiwanese.
>
>
> The figures, Moderator model and Mediational model, which were published in the Journal of Personality and Social Psychology (1986, Vol. 51, 1173-1182) are of very importance. They clarify crucial concepts with respect to the diathesis-stress model. I am writing to ask for permission to use the figures in my thesis. I believe that Professor Reuben M. Baron was retired from University of Connecticut and would be grateful if you could give me permission to use the figures or, if that is not appropriate, seek permission from Professor Baron on my behalf. I would appreciate your reply, and am happy to share my findings with you.
>
>
> Yours sincerely
>
>
> Yung-Li Ku
> PhD postgraduate student
> School of Psychology
> The University of Adelaide
> Australia

Appendix C: Evaluated scales for the translated Chinese-language measures

Original English-language scale	Translated Chinese-language scale	Degree of Agreement			
List of Threatening Experiences (LTE) Have any of the following life events or problems happened to you during the last 6 months? Please check the box in which any event happened or began.	生活事件問卷(LTE) 在過去的**六個月內，**你是否有發生任何一件下列的生活事件或問題? 若有, 請在相對題號的空格內打(ˇ), 若沒有, 則不必勾選, 謝謝你的合作.	Please rate how well the meaning of the Chinese version agrees with that of the English version. 1 = in total disagreement 2 = mostly disagreement 3 = mostly agreement 4 = in total agreement			
1. You yourself suffered a serious illness, injury, or an assault.	1. 你本人受重傷, 生重病, 或遭受嚴重攻擊	1	2	3	4
2. A serious illness, injury, or assault happened to a close relative.	2. 你的親密親人受重傷, 生重病, 或遭受嚴重攻擊	1	2	3	4
3. Your parent, child, or spouse died.	3. 你父母, 孩子, 或配偶死亡	1	2	3	4
4. A close family, friend or another relative (aunt, cousin, grandparent) died.	4. 你親密的家人, 朋友, 或其他親屬(如祖父母、阿姨等)死亡	1	2	3	4
5. You had a separation due to marital difficulties.	5. 你因為婚姻出現問題而與配偶分離	1	2	3	4
6. You broke off a steady relationship.	6. 你中止了一段穩定的關係	1	2	3	4
7. You had a serious problem with a close friend, neighbor, or relative.	7. 你與親近的朋友, 鄰居, 或親人有嚴重的問題	1	2	3	4
8. You became unemployed or you were seeking work unsuccessfully for more than one month.	8. 你現在無業, 或你找不到工作超過一個月以上	1	2	3	4
9. You were sacked from your job.	9. 你被開除	1	2	3	4
10. You had a major financial crisis.	10.你出現重大經濟, 財務困難	1	2	3	4
11. You had problems with the police and a court appearance.	11.你違警, 觸犯法律, 或上法院	1	2	3	4
12. Something you valued was lost or stolen.	12.你的貴重財物損失, 遺失, 或被偷了.	1	2	3	4
Comment:					

Multidimensional Support Scale (MDSS)	多向度支持量表(MDSS)	
Below are some questions about the kind of help and support you have available to you in coping with your life at present. The questions refer to three different groups of people who might have been providing support to you IN THE LASTMONTH. For each item, please circle the alternative which shows your answer.	以下問題是一些有關於你所擁有的幫助與支持的種類, 它們能有效地幫你應付現在的日常生活, 這些問題牽涉到三群不同的人們, 他們可能在**過去一個月內**持續對你提供幫助. 請閱讀每一題目後, 圈選適合你的答案.	Please rate how well the meaning of the Chinese version agrees with that of the English version. 1 = in total disagreement 2 = mostly disagreement 3 = mostly agreement 4 = in total agreement
A. Firstly, think of your family and close friends, especially the 2-3 who are most important to you.	首先, 想想你的家人與親密朋友, 尤其是你覺得最重要的那二, 三個人.	
1. How often did they really listen to you when you talked about your concerns or problems?	1. 當你談及自己的擔憂與問題時, 他們時常聽你講話嗎?	1 2 3 4
2. How often did you feel that they really trying to understand your problem?	2. 你常覺得他們真的想去了解你的問題嗎?	1 2 3 4
3. How often did they really make you feel loved?	3. 他們時常讓你感覺到被關愛嗎?	1 2 3 4
4. How often did they help you in practical ways, like doing things for you or lending you money?	4. 他們常用實際可行的方法幫忙你, 例如爲你做事或借你錢?	1 2 3 4
5. How often did they answer your questions or give you advice about how to solve your problems?	5. 他們常回答你的問題, 或給你一些如何解決問題的建議嗎?	1 2 3 4
6. How often could you use them as examples of how to deal with your problems?	6. 你常把他們當成是自己如何處理問題的榜樣嗎?	1 2 3 4
B. Now, think of other hospital patients (if you are a student, think of your classmates) that you know.	第二, 現在想想你所認識的其他相同情況的病友們 (如果你是在學生, 想想你的同學們)	
1. How often did they really listen to you when you talked about your concerns or problems?	1. 當你談及自己的擔憂與問題時, 他們時常聽你講話嗎?	1 2 3 4

2. How often did you feel that they really trying to understand your problem?	2. 你常覺得他們真的想去了解你的問題嗎?	1	2	3	4
3. How often did they help you in practical ways, like doing tings for you or lending you money?	3. 他們常用實際可行的方法幫忙你, 例如為你做事或借你錢?	1	2	3	4
4. How often did they answer your questions or give you advice about how to solve your problems?	4. 他們常回答你的問題, 或給你一些如何解決問題的建議嗎?	1	2	3	4
5. How often could you use them as examples of how to deal with your problems?	5. 你常把他們當成是自己如何處理問題的榜樣嗎?	1	2	3	4
C. Lastly, think about the doctors (if you are a student, think of your teachers) who are helping you with your mental health (or schoolwork).	第三, 現在想想那些照顧你心理健康的醫師們(如果你是在學生, 想想你的老師們)				
1. How often did they really listen to you when you talked about your concerns or problems?	1. 當你談及自己的擔憂與問題時, 他們時常聽你講話嗎?	1	2	3	4
2. How often did you feel that they really trying to understand your problem?	2. 你常覺得他們真的想去了解你的問題嗎?	1	2	3	4
3. How often did they look after your health (or help your schoolwork) in practical ways?	3. 他們常用實際可行的方法照顧你的健康(或學業)嗎?	1	2	3	4
4. How often did they answer your questions or give you advice about how to solve your problems?	4. 他們常回答你的問題, 或給你一些如何解決問題的建議嗎?	1	2	3	4
5. How often could you use them as examples of how to deal with your problems?	5. 你常把他們當成是自己如何處理問題的榜樣嗎?	1	2	3	4
Comment:					
Short-version Dysfunctional Attitude Scale (short-version DAS) This scale lists different attitudes or beliefs which people sometimes hold. Please read each statement carefully and decide how	簡式失功能態度量表 (short-version DAS) 此量表包括了人們有時候會有的不同態度或信念, 請小心閱讀每一個敘述後, 決定你同意或不同	Please rate how well the meaning of the Chinese version agrees with that of the

much you agree or disagree with what it says. For each of the attitudes, please indicate your answer by placing a tick (∨) under the column that <u>best describes how you think</u>. Be sure to choose only one answer for each attitude. But please note that because people are different, there is no right or wrong to these statements. To decide whether a given answer is typical of your way of looking at things, simply keep in mind what you are like <u>most of the time</u>.	意這些敘述, 對這些每一個態度, 藉由勾選(∨)那個**最佳描述你想法**的答案, 回答你有多同意這些敘述, 請確定每一個態度只能夠勾選一個答案, 因爲每個人不一樣, 所以答案無對錯之分, 你只要按照自己的看法回答即可.	English version. 1 = in total disagreement 2 = mostly disagreement 3 = mostly agreement 4 = in total agreement

		1	2	3	4
1. If I fail partly, it is as bad as being a complete failure.	1. 假如我有部分失敗, 就和完全失敗一樣地糟.	1	2	3	4
2. If others dislike you, you cannot be happy.	2. 若別人不喜歡你, 你不可能幸福.	1	2	3	4
3. I should be happy all the time.	3. 我應該要永遠幸福.	1	2	3	4
4. People will probably think less of me if I make a mistake.	4. 我若犯錯, 別人很可能更看輕我.	1	2	3	4
5. My happiness depends more on other people than it dose on me.	5. 我的幸福靠他人來決定, 自己比較不能掌握.	1	2	3	4
6. I should always have complete control over my feelings.	6. 我應該要完全控制住自己的感情.	1	2	3	4
7. My life is wasted unless I am a success.	7. 除非我是成功者, 否則我的人生便浪費了.	1	2	3	4
8. What other people think about me is very important.	8. 別人對我的看法非常重要.	1	2	3	4
9. I ought to be able to solve my problems quickly and without a great deal of effort.	9. 我應該要能夠快速地解決我的問題, 而且不需要花很多的力氣.	1	2	3	4
10. If I don't set the highest standards for myself, I am likely to end up a second rate person.	10. 如果我不對自己設定最高的標準, 最後我就很可能變成次等的人.	1	2	3	4
11. I am nothing if a person I love doesn't love me.	11. 若我所愛的人不愛我, 我就是沒用的人.	1	2	3	4
12. A person should be able to control what happens to him.	12. 人們應該要能夠控制住發生在他身上的事.	1	2	3	4

13. If I am to be a worthwhile person, I must be truly outstanding in at least one major respect.	13. 如果想要成為有用的人，我必須至少有一項非常傑出的專長.	1	2	3	4
14. If you don't have other people to lean on, you are bound to be sad.	14. 若你沒有人可以依靠，則你註定要悲哀.	1	2	3	4
15. It is possible for a person to be scolded and not get upset.	15. 人若受到批評但卻不覺得心煩意亂是有可能的事.	1	2	3	4
16. I must be a useful, productive, creative person or life has no purpose.	16. 我必須是個有用，有生產力或有創造力的人，否則人生便無義意.	1	2	3	4
17. I can find happiness without being loved by other person.	17. 即使沒有人愛我，我也能找到幸福.	1	2	3	4
18. A person should do well at everything he undertakes.	18. 人們應該做好任何他所從事的事情.	1	2	3	4
19. If I do not de well all the time, people will not respect me.	19. 如果我總是做不好，那就不會有人尊重我.	1	2	3	4
20. I do not need the approval of other people in order to be happy.	20. 我不需要別人的贊同來獲得快樂.	1	2	3	4
21. If I try hard enough, I should be able to excel at anything I attempt.	21. 若我夠努力，我應該能夠做好我所嘗試的任何事.	1	2	3	4
22. People who have good ideas are more worthy than those who do not.	22. 具有好主意的人，比沒有主意的人更有價值.	1	2	3	4
23. A person doesn't need to be well liked in order to be happy.	23. 為了要能夠幸福，人們不需要被別人完全喜歡.	1	2	3	4
24. Whenever I take a chance or risk I am only looking for trouble.	24. 不論何時，當我冒險時，我只是在自找麻煩.	1	2	3	4

Comment:

Cognitive Triad Inventory (CTI)	認知三元素問卷(CTI)	Please rate how well the meaning of the Chinese version agrees with that of the English version.
This inventory lists different ideas that people sometimes have. For each of these ideas, show how much you agree with it by circling the answer that best describes your opinion. Be sure to choose only one answer for each idea. Answer the items for what you are thinking right now.	本問卷列出一些人們有時候會有的不同想法，對這些每一個想法，藉由圈選那個最佳描述你意見的答案，回答你有多同意這些想法. 請確定每一個想法只能夠圈選一個答案，請現在開始作答.	1 = in total disagreement 2 = mostly disagreement 3 = mostly agreement 4 = in total agreement

1. I have many talents and skills.	1. 我有許多才幹與技能.	1	2	3	4
2. My job (housework, schoolwork, daily duties) is unpleasant.	2. 我的工作(如家事, 學校作業, 日常工作)令我不愉快.	1	2	3	4
3. Most people are friendly and helpful.	3. 大部分的人是友善及有幫助的.	1	2	3	4
4. Nothing is likely to work out for me.	4. 對我而言, 似乎沒有事情是進行順利的.	1	2	3	4
5. I am a failure.	5. 我是個失敗者.	1	2	3	4
6. I like to think about the good things that lie ahead for me.	6. 我喜歡去想我將面臨的好事情 .	1	2	3	4
7. I do my work (job, schoolwork, house work) adequately.	7. 我能勝任地做我的工作(如公事, 家事, 學校課業).	1	2	3	4
8. The people I know help me when need it.	8. 我認識的人在我需要時都會幫我.	1	2	3	4
9. I expect that things will be going very well for me a few years from now.	9. 從現在開始的幾年內, 我預期事情將會進行非常順利。.	1	2	3	4
10. I have messed up almost all the important relationships I have ever had.	10. 我已經搞砸了幾乎我所有的重要人際關係.	1	2	3	4
11. The future holds a lot of excitement for me.	11. 對我而言，未來有許多刺激.	1	2	3	4
12. My daily activities are fun and rewarding.	12. 我的日常活動是有趣的.	1	2	3	4
13. I can't do anything right.	13. 我不能做好任何事情.	1	2	3	4
14. People like me.	14. 人們喜歡我.	1	2	3	4
15. There is nothing left in my life to look forward to.	15. 在我的生命中, 已經沒有剩下任何好事情值得去期待了.	1	2	3	4
16. My current problems or concerns will always be there in one way or another.	16. 我現在的問題或憂慮將總會以某種方式存在著.	1	2	3	4
17. I am as adequate as other people I know.	17. 我的勝任能力和我所認識的人一樣好.	1	2	3	4
18. The world is a very hostile place.	18. 這個世界是一個非常有敵意的地方.	1	2	3	4
19. There is no reason for me to be hopeful about my future.	19. 關於我的未來, 沒有理由會有希望.	1	2	3	4
20. The important people in my life are helpful and supportive.	20. 在我生命中的重要人物都是有幫助及有支持的.	1	2	3	4
21. I hate myself.	21. 我討厭我自己.	1	2	3	4

22. I will overcome my problem.	22. 我將會克服我的問題.	1	2	3	4
23. Bad things happen to me a lot.	23. 很多壞事都發生在我的身上.	1	2	3	4
24. I have a spouse or friend who is warm and supportive.	24. 我有一個溫暖及有助的好配偶或好朋友.	1	2	3	4
25. I can do a lot of things well.	25. 我能做好許多事.	1	2	3	4
26. My future is simply too awful to think about.	26. 我的未來簡直可怕到不能去想像.	1	2	3	4
27. My family doesn't care what happens to me.	27. 我的家人不關心我發生了什麼事.	1	2	3	4
28. Things will work out well for me in the future.	28. 在未來, 事情將會進行順利.	1	2	3	4
29. I am guilty of a great many things.	29. 我對許多事情感到內疚.	1	2	3	4
30. No matter what I do, others make it difficult for me to get what I want.	30. 無論我做什麼事, 別人都刁難它, 讓我很難去達到我要的東西.	1	2	3	4
31. I am a worthwhile human being.	31. 我是個有價值的人.	1	2	3	4
32. There is nothing to look forward to in the years ahead.	32. 在未來幾年, 沒有什麼好事情值得去期待.	1	2	3	4
33. I like my self.	33. 我喜歡我自己.	1	2	3	4
34. I am faced with many difficulties.	34. 我面臨許多困難.	1	2	3	4
35. I have serious flaws in my character.	35. 我的人格有嚴重缺點.	1	2	3	4
36. I expect to be content and satisfied as the years go by.	36. 隨著歲月經過, 我預期我會變得滿足.	1	2	3	4
Comment:					

Appendix D: Comparisons between the scale items in the original English-language scales and those in the scales retranslated to English from Chinese

Scale items of original English versions	Scale items retranslated to English from Chinese
LTE	**Retranslation of LTE**
Have any of the following life events or problems happened to you during the last 6 months? Please check the box in which any event happened or began.	Hello, ladies and gentlemen, In the past six months, did any of the life events of problems listed below happen to you? If yes, please check the box corresponding to the number. If no, please leave the boxes unchecked. Thank you for your cooperation.
1. You yourself suffered a serious illness, injury, or an assault.	1. You yourself are heavily injured, seriously ill or severely attacked.
2. A serious illness, injury, or assault happened to a close relative.	2. Your close relative is heavily injured, seriously ill or severely attacked.
3. Your parent, child, or spouse died.	3. Your parent, child, or spouse passed away.
4. A close family, friend or another relative (aunt, cousin, grandparent) died.	4. Your close family, friend, or other relative (such as grandparent or aunt, etc.) passed away.
5. You had a separation due to marital difficulties.	5. You are separated from your spouse because problems occur in your marriage.
6. You broke off a steady relationship.	6. You have terminated a steady relationship.
7. You had a serious problem with a close friend, neighbor, or relative.	7. You have serious problems with your close friend, neighbor, or relative.
8. You became unemployed or you were seeking work unsuccessfully for more than one month.	8. Your have been unemployed, or you cannot find a job, for over a month.
9. You were sacked from your job.	9. You are fired.
10. You had a major financial crisis.	10. Your have major economic difficulty or financial crisis.
11. You had problems with the police and a court appearance.	11. You defied the police, violated the law, or went to court.
12. Something you valued was lost or stolen.	12. Your valuables are lost or stolen.

MDSS	Retranslation of MDSS
Below are some questions about the kind of help and support you have available to you in coping with your life at present. The questions refer to three different groups of people who might have been providing support to you IN THE LASTMONTH. For each item, please circle the alternative which shows your answer.	The questions below are about the kinds of help and support that you own. They may help cope with your daily life effectively. These questions involve three different groups of people, who may provide you with help continuously in the past one month. After reading each question, please circle the answer suitable for you.
A. Firstly, think of your family and close friends, especially the 2-3 who are most important to you.	First, think about your family and close friends, especially the 2 or 3 people that are most important to you.
1. How often did they really listen to you when you talked about your concerns or problems?	1. When you talk of your worries and problems, do they often listen to you?
2. How often did you feel that they really trying to understand your problem?	2. Do you often feel that they really want to understand your problems?
3. How often did they really make you feel loved?	3. Do they often make you feel being concerned about?
4. How often did they help you in practical ways, like doing things for you or lending you money?	4. Do they often help you in a practical way, such as do things for you or lend you money?
5. How often did they answer your questions or give you advice about how to solve your problems?	5. Do they often answer your questions, or offer suggestions for solving the problems?
6. How often could you use them as examples of how to deal with your problems?	6. Do you often take these suggestions as examples to solve your problems?
B. Now, think of other hospital patients (if you are a student, think of your classmates) that you know.	Second, now think of other patients (if you are a student, think of your classmates) in similar situations.
7. How often did they really listen to you when you talked about your concerns or problems?	7. When you talk of your worries and problems, do they often listen to you?
8. How often did you feel that they really trying to understand your problem?	8. Do you often feel that they really want to understand your problems?
9. How often did they help you in practical ways, like doing things for you or lending you money?	9. Do they often help you in a practical way, such as do things for you or lend you money?
10. How often did they answer your questions or give you advice about how to solve your problems?	10. Do they often answer your questions, or offer suggestions for solving the problems?
11. How often could you use them as examples of how to deal with your problems?	11. Do you often take these suggestions as examples to solve your problems?

C. Lastly, think about the doctors (if you are a student, think of your teachers) who are helping you with your mental health (or schoolwork).	Third, now think of your doctors (if you are a student, think of your teachers) who are helping you with your mental health (or schoolwork).
12. How often did they really listen to you when you talked about your concerns or problems?	12. When you talk of your worries and problems, do they often listen to you?
13. How often did you feel that they really trying to understand your problem?	13. Do you often feel that they really want to understand your problems?
14. How often did they look after your health (or help your schoolwork) in practical ways?	14. Do they often look after your health (or helping your schoolwork) in practical ways?
15. How often did they answer your questions or give you advice about how to solve your problems?	15. Do they often answer your questions, or offer suggestions for solving the problems?
16. How often could you use them as examples of how to deal with your problems?	16. Do you often take these suggestions as examples to solve your problems?
Short-version DAS This scale lists different attitudes or beliefs which people sometimes hold. Please read each statement carefully and decide how much you agree or disagree with what it says. For each of the attitudes, please indicate your answer by placing a tick (∨) under the column that <u>best describes how you think</u>. Be sure to choose only one answer for each attitude. But please note that because people are different, there is no right or wrong to these statements. To decide whether a given answer is typical of your way of looking at things, simply keep in mind what you are like <u>most of the time</u>. 1. If I fail partly, it is as bad as being a complete failure. 2. If others dislike you, you cannot be happy. 3. I should be happy all the time. 4. People will probably think less of me if I make a mistake. 5. My happiness depends more on other people than it dose on me.	**Retranslation of short-version DAS** This scale lists various positions or beliefs that people sometimes hold. Read each statement carefully and decide how much you agree or disagree with what it says. For each of these positions, please answer how much you agree with it by placing a tick (∨) under the column that best describe your opinion. Please make sure that you choose only one answer for each of these positions. There is no right or wrong to these statements. Please answer following your own positions. . 1. If I fail partly, it's as bad as being a total failure. 2. If people don't like you, you will not be happy. 3. I should be happy all the time. 4. If I make a mistake, people will probably think that I am not so good 5. My happiness depends more on other people than on me.

6. I should always have complete control over my feelings.	6. I should gain full control of my emotions.
7. My life is wasted unless I am a success.	7. Unless I am a successful person, my life is a waste.
8. What other people think about me is very important.	8. What people think about me is very important.
9. I ought to be able to solve my problems quickly and without a great deal of effort.	9. I should be able to solve my problem quickly, and solve it without much effort.
10. If I don't set the highest standards for myself, I am likely to end up a second rate person.	10. If I don't set the highest standards for myself, I may end up as an inferior.
11. I am nothing if a person I love doesn't love me.	11. I am nothing if a person I love does not love me.
12. A person should be able to control what happens to him.	12. People should be able to control things that happen to them
13. If I am to be a worthwhile person, I must be truly outstanding in at least one major respect.	13. I must have at least one outstanding skill to be a useful person.
14. If you don't have other people to lean on, you are bound to be sad.	14. You are bond to be sad if you don't have any one to rely on.
15. It is possible for a person to be scolded and not get upset.	15. It is possible that people do not feel frustrated when they are blamed
16. I must be a useful, productive, creative person or life has no purpose.	16. I have to be useful, productive or creative, or my life is meaningless
17. I can find happiness without being loved by other person.	17. I can find my happiness even if no one loves me.
18. A person should do well at everything he undertakes.	18. People should do whatever they are undertaking well.
19. If I do not de well all the time, people will not respect me.	19. If I cannot do things well invariably, people won't respect me.
20. I do not need the approval of other people in order to be happy.	20. If I work hard enough, I should be able to do whatever I am trying to do well.
21. If I try hard enough, I should be able to excel at anything I attempt.	21. If I work hard enough, I should be able to do whatever I am trying to do well.
22. People who have good ideas are more worthy than those who do not.	22. Whenever I take chances, I am simply asking for trouble.
23. A person doesn't need to be well liked in order to be happy.	23. We don't need other's fondness to be happy.
24. Whenever I take a chance or risk I am only looking for trouble.	24. Whenever I take a chance, I am only asking for trouble.

CTI	Retranslation of CTI
This inventory lists different ideas that people sometimes have. For each of these ideas, show how much you agree with it by circling the answer that best describes your opinion. Be sure to choose only one answer for each idea. Answer the items for what you are thinking right now.	This questionnaire lists various thoughts that people sometimes have. For each of these thoughts, please answer how much you agree with it by circling the answer that best describe your opinion. Please make sure that you choose only one answer for each of these thoughts. Please start now.
1. I have many talents and skills.	1. I have many talents and skills.
2. My job (housework, schoolwork, daily duties) is unpleasant.	2. My work (housework, school assignment, and daily routine, etc.) makes me unhappy.
3. Most people are friendly and helpful.	3. Most people are friendly and helpful.
4. Nothing is likely to work out for me.	4. Nothing seems to go along smoothly for me.
5. I am a failure.	5. I am a failure.
6. I like to think about the good things that lie ahead for me.	6. I like to think about the good things that will happen to me.
7. I do my work (job, schoolwork, house work) adequately.	7. I am competent for my work (business, housework, and school assignment, etc.).
8. The people I know help me when need it.	8. People I know will help me when I need help.
9. I expect that things will be going very well for me a few years from now.	9. I expect things to go along smoothly for several years from now on.
10. I have messed up almost all the important relationships I have ever had.	10. I screwed up almost all my important relationships.
11. The future holds a lot of excitement for me.	11. Future is full of excitement for me.
12. My daily activities are fun and rewarding.	12. My everyday activities are fun.
13. I can't do anything right.	13. There is nothing I can do well.
14. People like me.	14. People like me.
15. There is nothing left in my life to look forward to.	15. There is nothing good left to be expected in my life.
16. My current problems or concerns will always be there in one way or another.	16. My problem or worry will always exist in some way.
17. I am as adequate as other people I know.	17. I, like other people I know, are competent.
18. The world is a very hostile place.	18. This world is a place full of hostility.
19. There is no reason for me to be hopeful about my future.	19. As for my future, there is no reason that there will be hope.
20. The important people in my life are helpful and supportive.	20. Those important persons in my life are helpful and supportive.

21. I hate myself.	21. I hat myself.
22. I will overcome my problem.	22. I will overcome my problem.
23. Bad things happen to me a lot.	23. A lot of bad things happened to me.
24. I have a spouse or friend who is warm and supportive.	24. I have a good spouse or friend who is warm and helpful.
25. I can do a lot of things well.	25. I can do many things well.
26. My future is simply too awful to think about.	26. My future is too horrible to imagine.
27. My family doesn't care what happens to me.	27. My family doesn't care about what happened to me.
28. Things will work out well for me in the future.	28. In the future, things will go along smoothly.
29. I am guilty of a great many things.	29. I feel guilty for many things.
30. No matter what I do, others make it difficult for me to get what I want.	30. Whatever I do, people make it hard for me to get what I want.
31. I am a worthwhile human being.	31. I am a worthwhile person.
32. There is nothing to look forward to in the years ahead.	32. For the next few years to come, nothing good is worth expecting.
33. I like myself.	33. I like myself.
34. I am faced with many difficulties.	34. I am facing many difficulties.
35. I have serious flaws in my character.	35. There are serious flaws in my personality.
36. I expect to be content and satisfied as the years go by.	36. I expect that as time goes by, I will become contented.

Appendix E: Questionnaires (Chinese versions)

第一部份：個人背景

1. 編號：＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

2. 會談日期：＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

3. 住址：＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿ 電話：(＿＿)＿＿＿＿＿＿＿

4. 憂鬱症類別：＿＿＿＿＿＿＿＿＿＿＿＿＿＿

5. 住院否：

6. 性別：男………□ 女………□

7. 出生日期：＿＿＿＿＿＿＿＿年＿＿＿＿＿＿＿＿月

8. 婚姻狀態：

　　□ 1. 已婚　　□ 2. 單身　　□ 3. 離婚
　　□ 4. 同居　　□ 5. 分居　　□ 6. 喪偶

9. 職業：＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿．

10. 教育程度：　□1. 國小　　□2. 國中　　□3. 高中、職
　　　　　　　　□4. 專科（二、三、五專）　　□5. 大學
　　　　　　　　□6. 研究所碩士班以上

11. 初次發病日期：＿＿＿＿＿＿年＿＿＿＿＿＿月

12. 服藥順從性：
　　□ 1. 從未服藥
　　□ 2. 有時候會服藥，但大部分時間沒服藥
　　□ 3. 開始自己減低服藥量
　　□ 4. 大部分時間按規定服藥，但有時候減低藥量
　　□ 5. 完全照規定服藥

13. 未照醫囑服藥的理由：
　　□ 1. 感覺變好了
　　□ 2. 害怕有副作用(如頭昏、嗜睡、注意力減退等)
　　□ 3. 服藥會影響日常生活的活動
　　□ 4. 害怕上癮，以後會依賴藥物
　　□ 5. 自覺藥物沒效
　　□ 6. 與醫師關係不佳，缺乏信任感
　　□ 7. 缺乏家屬的支持
　　□ 8. 我相信自己可以解決問題，故不需依賴藥物
　　□ 9. 忘記服藥
　　□ 10.其他：＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿．

第二部份:問卷

生活事件問卷

（本量表已獲得英國 Leicester General Hospital, Dr. T. S. Brugah 之授權同意使用）

在過去的 **六個月內** ，下列的生活事件或問題是否發生過? 若有，請在相對題號的空格內打（∨），若沒有，則不必勾選，謝謝你的合作.

	生活事件	六個月內的經驗
1	你本人受重傷、生重病、或遭受嚴重攻擊(你現在的憂鬱症不算)	＿＿＿
2	你的近親受重傷、生重病、或遭受嚴重攻擊	＿＿＿
3	你的父母、孩子、或配偶死亡	＿＿＿
4	你親近的家人、朋友、或其他親屬（如祖父母、阿姨等）死亡	＿＿＿
5	你因爲婚姻出現問題而與配偶分離	＿＿＿
6	你中止了一段穩定的關係	＿＿＿
7	你與親近的朋友、鄰居、或親人有嚴重的問題	＿＿＿
8	你現在失業、或你找不到工作超過一個月以上	＿＿＿
9	你被解僱	＿＿＿
10	你的財務狀況出現重大危機	＿＿＿
11	你違抗警察、觸犯法律、或上法院	＿＿＿
12	你的貴重財物遺失或被偷了	＿＿＿

多向度支持量表

(本量表已獲得澳洲ADELAIDE大學心理系Dr. Helen R. Winefield之授權同意使用)

> 以下問題是關於你所能獲得有效地幫你應付現在的日常生活的幫助與支持，這些問題牽涉到三群可能在 **過去一個月內** 持續對你提供幫助的人，請閱讀每一題目後，圈選適合你的答案.

首先，想想你的家人與親密朋友，尤其是你最重要的那二，三個人.

	你對此有多滿意			
	完全不滿意	不是很滿意	滿意	非常滿意
1. 當你談及自己的擔憂與問題時，他們常認真聽你講話嗎?	1	2	3	4
2. 你常覺得他們真的想去了解你的問題嗎?	1	2	3	4
3. 他們時常讓你感覺到被關愛嗎?	1	2	3	4
4. 他們常用實際上有幫助的方法幫忙你，例如為你做事或借你錢?	1	2	3	4
5. 他們常回答你的問題，或給你一些如何解決問題的建議嗎?	1	2	3	4
6. 你常把家人與親密朋友當成是自己如何處理問題的榜樣嗎?	1	2	3	4

現在，想想你所認識的其他病友們.

7. 當你談及自己的擔憂與問題時，他們常認真聽你講話嗎?	1	2	3	4
8. 你常覺得他們真的想去了解你的問題嗎?	1	2	3	4
9. 他們常用實際上有幫助的方法幫忙你，例如為你做事或借你錢?	1	2	3	4
10. 他們常回答你的問題，或給你一些如何解決問題的建議嗎?	1	2	3	4
11. 你常把你的病友當成是自己如何處理問題的榜樣嗎?	1	2	3	4

最後，想想那些照顧你心理健康的醫師們.

12. 當你談及自己的擔憂與問題時，他們常認真聽你講話嗎?	1	2	3	4
13. 你常覺得他們真的想去了解你的問題嗎?	1	2	3	4
14. 他們時常用實際上有幫助的方法照顧你的健康嗎?	1	2	3	4
15. 他們常回答你的問題，或給你一些如何解決問題的建議嗎?	1	2	3	4
16. 你常把你的醫生當成是自己如何處理問題的榜樣嗎?	1	2	3	4

失功能態度量表

(本量表已獲得英國 University of Edinburgh, Dr. M. J. Power 之授權同意使用)

此量表包括了人們有時候會有的不同態度或信念，請仔細閱讀每一個敘述後，藉由圈選**最能描述你想法**的答案，回答你有多同意這些敘述，每一個態度只能夠圈選一個答案，因為每個人不一樣，所以答案無對錯之分，你只要按照自己的看法回答即可.

	完全同意	相當同意	有點同意	一半同意一半反對	有點不同意	相當不同意	完全不同意
1. 假如我有部分失敗，就和完全失敗一樣地糟.	1	2	3	4	5	6	7
2. 若別人不喜歡你，你不會覺得幸福.	1	2	3	4	5	6	7
3. 我應該要永遠幸福.	1	2	3	4	5	6	7
4. 我若犯錯，別人很可能看輕我.	1	2	3	4	5	6	7
5. 我的幸福靠他人來決定，自己比較不能掌握.	1	2	3	4	5	6	7
6. 我應該要完全控制住自己的情緒.	1	2	3	4	5	6	7
7. 除非我是成功者，否則我的人生便浪費了.	1	2	3	4	5	6	7
8. 別人對我的看法非常重要.	1	2	3	4	5	6	7
9. 我應該要能夠快速地解決我的問題，而且不需要花很多的力氣.	1	2	3	4	5	6	7
10. 如果我不對自己設定最高的標準,最後我很可能變成次等的人.	1	2	3	4	5	6	7
11. 若我所愛的人不愛我，我就是沒用的人.	1	2	3	4	5	6	7
12. 我們應該要能夠控制住發生在自己身上的事.	1	2	3	4	5	6	7
13. 如果想要成為有用的人,我必須至少有一項非常傑出的專長.	1	2	3	4	5	6	7
14. 若你沒有人可以依靠，你註定是悲哀的.	1	2	3	4	5	6	7
15. 人若受到批評但卻不覺得心煩意亂是有可能的.	1	2	3	4	5	6	7
16. 我必須是個有用,有貢獻或有創造力的人,否則人生便無意義.	1	2	3	4	5	6	7
17. 即使沒有人愛我，我也能找到幸福.	1	2	3	4	5	6	7
18. 我們應該做好任何我們所從事的事情.	1	2	3	4	5	6	7
19. 如果我總是不能將事情做好，就得不到別人的尊重.	1	2	3	4	5	6	7
20. 我不需要別人的贊同才覺得幸福.	1	2	3	4	5	6	7
21. 若我夠努力，我應該能夠把我想嘗試的任何事做到最好.	1	2	3	4	5	6	7
22. 有好想法的人，比沒有的人來得有價值.	1	2	3	4	5	6	7
23. 我們不需要藉由別人的喜歡，才會覺得幸福.	1	2	3	4	5	6	7
24. 每當我冒險嘗試某事，我只是在自找麻煩.	1	2	3	4	5	6	7

認知三元素問卷

(本量表已獲得美國 University of Oklahoma, Dr. William Lebar 之授權同意使用)

> 本問卷列出一些人們有時候會有的不同想法，藉由圈選**最能描述你意見**的答案，回答你有多同意這些想法，每一個想法只能夠圈選一個答案，請現在開始作答.

	完全同意	相當同意	有點同意	一半同意一半反對	有點不同意	相當不同意	完全不同意
1. 我有多項才幹與技能.	1	2	3	4	5	6	7
2. 我的工作(如家事，學業，日常工作)令我不愉快.	1	2	3	4	5	6	7
3. 大部分的人是友善及有助力的.	1	2	3	4	5	6	7
4. 對我而言，似乎沒有事情是進行順利的.	1	2	3	4	5	6	7
5. 我是個失敗者.	1	2	3	4	5	6	7
6. 我喜歡去想我將面臨的好事情.	1	2	3	4	5	6	7
7. 我能勝任我的工作(如公事，家事，學業).	1	2	3	4	5	6	7
8. 在我需要時，我認識的人都會幫我.	1	2	3	4	5	6	7
9. 未來的幾年內，我預期事情將會進行非常順利.	1	2	3	4	5	6	7
10. 我幾乎已搞砸了我所有重要的人際關係.	1	2	3	4	5	6	7
11. 對我而言，未來充滿許多刺激.	1	2	3	4	5	6	7
12. 我的日常活動是有趣且令我覺得值得的.	1	2	3	4	5	6	7
13. 我什麼事都做不好.	1	2	3	4	5	6	7
14. 我是受歡迎的.	1	2	3	4	5	6	7
15. 在我的生命中，已經沒有任何好事情值得去期待了.	1	2	3	4	5	6	7
16. 我現在的問題或憂慮將總是以某種方式存在著.	1	2	3	4	5	6	7
17. 我和其他我所認識的人一樣,可以恰如其分地做好每項工作.	1	2	3	4	5	6	7
18. 這個世界充滿了敵意.	1	2	3	4	5	6	7
19. 沒有理由讓我覺得我的未來會有希望.	1	2	3	4	5	6	7
20. 在我生命中的重要人物是對我有幫助且支持我的.	1	2	3	4	5	6	7
21. 我討厭我自己.	1	2	3	4	5	6	7
22. 我將會克服我的問題.	1	2	3	4	5	6	7
23. 壞事常常發生在我的身上.	1	2	3	4	5	6	7
24. 我有溫暖及支持我的配偶或朋友.	1	2	3	4	5	6	7
25. 我能做好許多事.	1	2	3	4	5	6	7
26. 我的未來簡直可怕到不能去想像.	1	2	3	4	5	6	7
27. 我的家人不關心我發生了什麼事.	1	2	3	4	5	6	7
28. 在未來，事情將會進行順利.	1	2	3	4	5	6	7
29. 我對許多事情感到內疚.	1	2	3	4	5	6	7

30. 無論我做什麼事，別人都刁難我，讓我很難去達到我要的. 　1　2　3　4　5　6　7

31. 我是個有價值的人. 　1　2　3　4　5　6　7
32. 在未來幾年，沒有什麼值得期待的好事情. 　1　2　3　4　5　6　7
33. 我喜歡我自己. 　1　2　3　4　5　6　7
34. 我面臨許多困難. 　1　2　3　4　5　6　7
35. 我的人格有嚴重缺點. 　1　2　3　4　5　6　7
36. 隨著時間飛逝，我期望我會覺得滿足. 　1　2　3　4　5　6　7

Appendix F: Hospital consent form for permission to collect information from patients

高雄醫學大學附設中和紀念醫院
807高雄市三民區自由一路100號
電話：07-3121101 傳眞：07-3213931

KAOHSIUNG MEDICAL UNIVERSITY
CHUNG-HO MEMORIAL HOSPITAL
100 Tzyou 1st Road, Kaohsiung 807, Taiwan
TEL:886-7-3121101 FAX:886-7-3213931

同意臨床試驗證明書

澳洲國立 ADELAIDE 大學心理系計畫主持人古永利主持之「憂鬱症病人自殺表現整合模式：特異質-壓力取向之追蹤研究」案，於九十四年六月三十日經本院人體試驗審查委員會同意，特此 證明。

計畫編號：KMUH-IRB-940126

計畫主持人：古永利

高雄醫學大學附設中和紀念醫院

人體試驗審查委員會

召集人：許勝雄

中 華 民 國 九 十 四 年 六 月 三 十 日

DEPARTMENT OF PSYCHOLOGY

THE UNIVERSITY OF ADELAIDE
SA 5005
AUSTRALIA
TELEPHONE: +61 8 8303 5693
FACSIMILE: +61 8 8303 3770

2 July 2005

25, Lane 442, Sec. 1, Jingguo Rd.

Department of Psychiatry

Hsin Chu General Hospital

Hsin Chu, 300

Taiwan, R. O. C.

Hospital Consent Form for Permission to Collect Information from Patients

I,_____, having received and understood a written description of the project entitled *Toward an Integrated Model of Suicidal Manifestations in Patients with Major Depressive Disorder in Taiwan: A Follow-Up Study Using the Diathesis-Stress Approach,* including its purposes and the procedures involved, hereby grant permission for Yung-Li Ku under the supervision of Dr. Helen Winefield, Dr. Jane Blake-Mortimer, the University of Adelaide, Australia, and Dr. Yong-Yuan Chang, Kaohsiung Medical University, Taiwan, to conduct the above-named study among patients with major depressive disorder.

_____   _____
       (signature)   *(date)*

Director of Department of Psychiatry

Hsin Chu General Hospital

(Please return after signing this Consent Form to

Yung-Li Ku, PhD postgraduate student,

Department of Psychology,

The University of Adelaide,

SA 5005, Australia)

17, May, 2005

2, Jhongiheng 1st road
Military Kaohsiung General Hospital
Taiwan, R.O.C.

Hospital Consent Form for Permission to collect information from patients

I,_____, having received and understood a written
description of the project entitled *"Toward an Integrated Model of Suicidal
Manifestations in Patients with Major Depressive Disorder: a Follow-Up Study Using
the Diathesis-Stress Approach"*, including its purposes and the procedures involved,
hereby grant permission for Yung-Li Ku under the supervision of Dr. Helen Winefield,
Dr. Jane Blake-Mortimer, the University of Adelaide, Australia, and Dr. Yong-Yuan
Chang, Kaohsiung Medical University, Taiwan, to conduct the above-named study
among patients with major depressive disorder.

_____   _____

(signature)   *(date)*

Director, Department of Medicine & Psychiatry.
Military Kaohsiung General Hospital.
Professor, Kaohsiung Medical University.

(Please return after signing this Consent Form to
Yung-Li Ku, PhD postgraduate student
Department of Psychology
The University of Adelaide
SA 5005, Australia)

Appendix G: Consent form for people who participate in the research project (English version)

1. I, _____, consent to take park in the research project entitled: A test of competing models to predict suicidality in patients with major depressive disorder in Taiwan.

2. I acknowledge that I have read the attached Information Sheet and understand that the purpose of this study is to investigate the risk factors of depressive disorders and suicidality. In addition, I should answer some questions in the questionnaires.

3. I have had the project, so far as it affects me, fully explained to my satisfaction by the researcher, Yung-Li Ku. My consent is given freely.

4. Although I understand that the purpose of this research project is to improve the quality of medical care for depressed patients, it has also been explained that my involvement may not be of any benefit to me.

5. I understand that I am free to withdraw from the project at any time and that this will not affect medical advice in the management of my health, now or in the future.

6. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.

7. I have been given the opportunity to have a member of my family or a friend present while the project was explained to me.

8. I am aware that I should retain a copy of this Consent Form, when completed, and the attached Information Sheet.

_____, _____
(signature)   (date)

Witness:

_____, _____
(signature)   (date)

I have described to _____(name of subject)_____ the nature of the procedures to be carried out. In my opinion she/he understood the explanation.

Researcher:

_____, _____
(signature)   (date)

個案參加研究同意書 (Chinese version)

1. 我_____同意參加澳洲國立 ADELAIDE 大學心理學博士班古永利研究生及其指導教授所進行的 ”台灣憂鬱症病人自殺整合模式之比較研究”.

2. 我已經閱讀過個案參加說明書, 並完全了解這只是一個研究, 要調查憂鬱症與自殺意圖的危險因子, 因此我將需要在問卷上回答一些問題.

3. 古永利研究生已經對我說明了研究過程, 目的, 也說明了可能產生的不便, 也對我的相關疑問做了完整答覆, 因此我的同意是自願的.

4. 我了解本研究的目的對憂鬱症病人的醫療有所貢獻, 但對我本人不一定有直接貢獻.

5. 我知道可以在任何時間退出研究, 且此中途退出不會對我的目前醫療行爲造成任何影響.

6. 我已被告知本研究的結果會被發表, 但所有我的個人資料都會被保密.

7. 當本計畫對我解釋時, 我有一位朋友及家人陪同在場.

8. 我瞭解自己應該保留一份同意書及個案參加說明書.

_____   _____
    . *(病人簽名)*   *(日期)*

見證人:
_____   _____ .
    (簽名)   *(日期)*

我已對病人完全解釋清楚將要進行的研究之過程, 目的, 可能有的不便, 本研究之貢獻, 以及中途退出研究的後果, 我相信這位病人完全了解我的解釋.

研究者:
_____   _____ .
    (簽名)   *(日期)*

Appendix H
Information sheet for participants (English version)

Name of Project:
A test of competing models to predict suicidality in patients with major depressive disorder in Taiwan

Name of Investigators:
Yung-Li Ku

Dear Participant,

As part of a study to design a model of factors relating to your disorder, you will be asked to complete a series of eight questionnaires regarding your symptoms, attitudes and life events. By completing the questionnaires, you will assist in contributing towards the development of an important model in the field of psychology. I hope you are able to answer them to the best of your ability and I appreciate your honest responses.

All the information you provide will be kept confidential. Your personal information will be recorded separately. I will use corresponding numbers to collate your personal information and identify them without affecting your anonymity.

If you choose to participate in this study, you will be given the same questionnaires now and six months later. These questionnaires will be done on the same day as your appointment with your doctor so as to minimize any inconvenience.

You may refuse to participate in this research project and need not give any reasons or justification for your decision, and your medical treatment will not be affected should you refuse to participate. After your participation, you are free to withdraw at any time from further involvement in this research. No consequence will arise from such withdrawal.

This study is being conducted by Yung-Li Ku and supervised by Dr. Helen Winefield, Dr. Nicholas R. Burns and Dr. Yong-Yuan Chang as a requirement of the Ph.D in Psychology program at The University of Adelaide and with the permission of the school principal.

Thank you for your assistance.

Yours sincerely

Yung-Li Ku
(School of Psychology,
The University of Adelaide)

個案參加說明書 (Chinese version)

計畫名稱:

台灣憂鬱症病人自殺整合模式之比較研究

計畫研究者:

古永利 (澳洲 ADELAIDE 大學心理學研究所博士班)

指導教授:

Dr. Helen Winefield (澳洲 ADELAIDE 大學心理學系教授)

Dr. Nicholas R. Burns (澳洲 ADELAIDE 大學心理學系副教授)

張永源博士 (高雄醫學大學公衛系暨行為科學研究所副教授)

親愛的各位病友:

本研究計畫之目的乃在探討與你的憂鬱症與自殺意圖有關的危險因子，在此我們設計了一些問卷，並需要請你在問卷上面做答，藉由你的參與，會使我們對於憂鬱症之心理病因更加了解，並進而對爾後自殺之預防及治療有所貢獻，故本人希望能得到你的大力協助.

在本研究中你所提供的個人資料都只供研究之用並會被妥善保密，若未獲得你本人的同意絕不會移做他用，故請安心參與.

如果你選擇參加此計劃，你會在現在與六個月之後分別填寫一些問卷，第一次所回答的問卷約包含200題項目，約一小時可做完，故會花費你的一些時間，但絕不會造成身體健康的危害或不適，六個月之後的問卷約有 30 題項目，會在你回診時給予填答，以減少你的不便，若你確定無法回診，我們會郵寄問卷至府上，再由本人將你所填完的問卷回收.

你可以拒絕參與本計劃，而且你的醫療行為絕不會受到任何影響，若你選擇參加本計劃，亦可在參與之後的任何時段退出，絕不會對你有任何影響.

本研究計畫已獲得澳洲國立 ADELAIDE 大學之人體研究倫理委員會之同意並准予進行.

最後，再次感謝你的大力協助

古永利　敬上
(澳洲 ADELAIDE 大學心理學博士班研究生)

Appendix I: Factor scree plots for the Chinese versions of the scales (patient Sample)
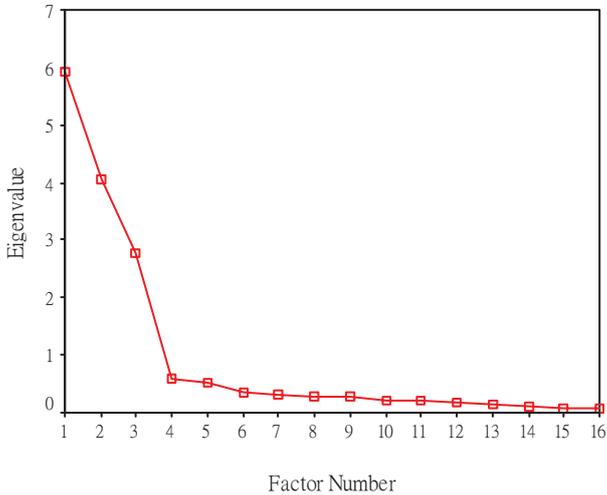
Figure 1. Factor Scree Plot for the C-MDSS
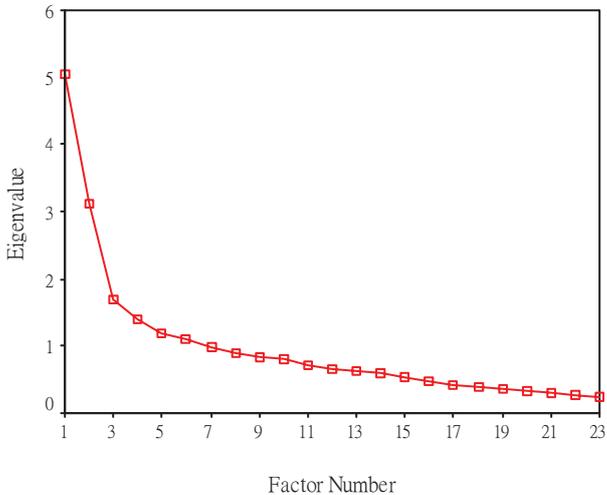
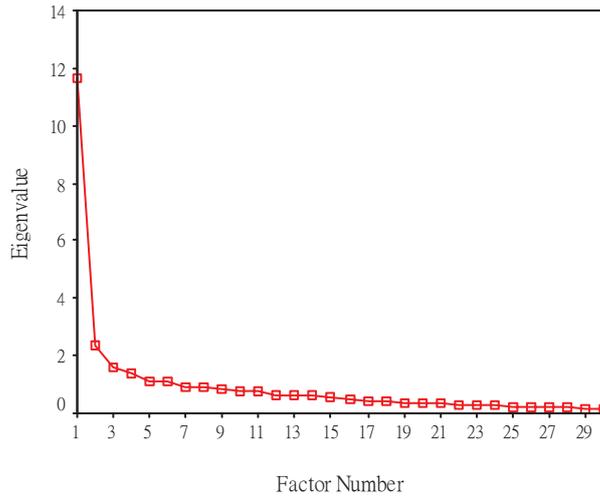Figure 2. Factor Scree Plot for the C-DAS

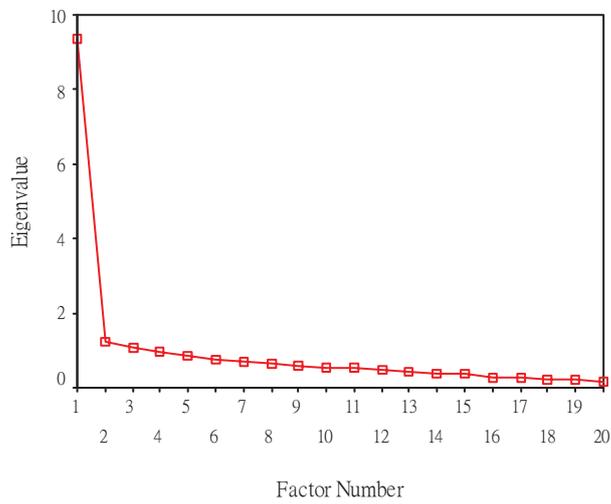Figure 3. Factor Scree Plot for the C-CTI

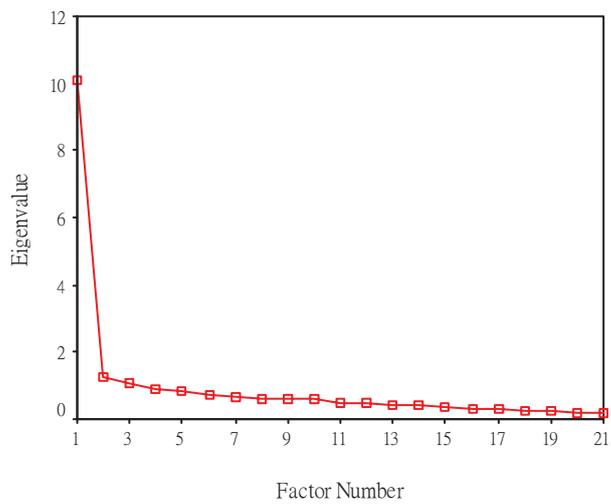Figure 4. Factor Scree Plot for the C-HS
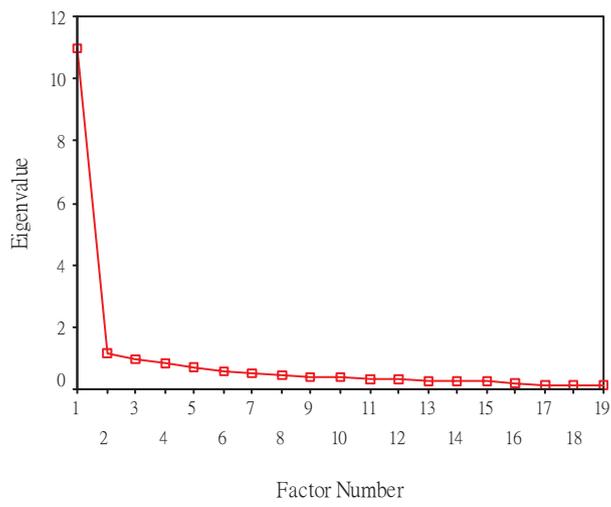

Figure 5. Factor Scree Plot for the C-BDI-II

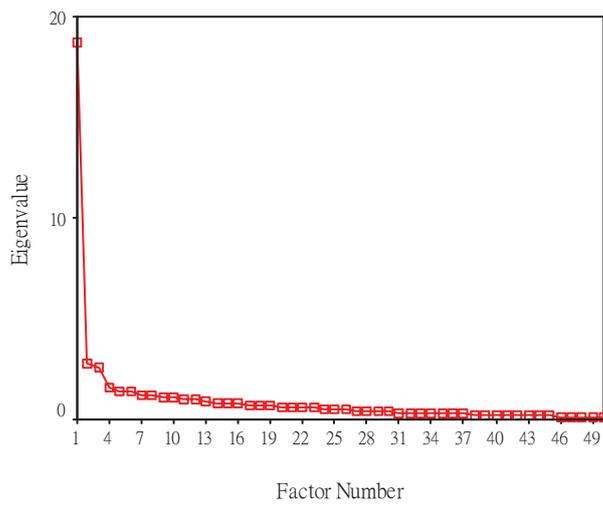Figure 6. Factor Scree Plot for the C-BSS

Figure 7. Factor Scree Plot for the combined items from the C-CTI and the C-HS

Appendix J: Item-total correlations for the Chinese versions of the scales (student sample)

Table 1

Item-Total Correlations of the Chinese Version of the Multidimensional Support Scale (C-MDSS) for the 255 University Students

No. Item of the C-MDSS	Item-total Correlation	Sig.
A. Firstly, think of your family and close friends, especially the 2-3 who are most important to you.		
1. How often did they really listen to you when you talked about your concerns or problems?	.45	<.001
2. How often did you feel that they really trying to understand your problem?	.56	<.001
3. How often did they really make you feel loved?	.55	<.001
4. How often did they help you in practical ways, like doing things for you or lending you money?	.57	<.001
5. How often did they answer your questions or give you advice about how to solve your problems?	.54	<.001
6. How often could you use them as examples of how to deal with your problems?	.52	<.001
B. Now, think of other hospital patients that you know.		
1. How often did they really listen to you when you talked about your concerns or problems?	.62	<.001
2. How often did you feel that they really trying to understand your problem?	.59	<.001
3. How often did they help you in practical ways, like doing things for you or lending you money?	.58	<.001
4. How often did they answer your questions or give you advice about how to solve your problems?	.65	<.001
5. How often could you use them as examples of how to deal with your problems?	.58	<.001
C. Lastly, think about the doctors who are helping you with your mental health.		
1. How often did they really listen to you when you talked about your concerns or problems?	.62	<.001
2. How often did you feel that they really trying to understand your problem?	.61	<.001
3. How often did they look after your health in practical ways?	.63	<.001
4. How often did they answer your questions or give you advice about how to solve your problems?	.65	<.001
5. How often could you use them as examples of how to deal with your problems?	.67	<.001
Cronbach's alpha = .87		

Table 2

Item-Total Correlations of the Chinese Version of the Dysfunctional Attitude Scale (C-DAS) for the 255 University Students

No. Item of the C-DAS	Item-Total Correlation	Sig.
1. If I fail partly, it is as bad as being a complete failure.	.56	<.001
2. If others dislike you, you cannot be happy.	.57	<.001
3. I should be happy all the time.	.26	<.001
4. People will probably think less of me if I make a mistake.	.62	<.001
5. My happiness depends more on other people than it dose on me.	.44	<.001
6. I should always have complete control over my feelings.	.29	<.001
7. My life is wasted unless I am a success.	.67	<.001
8. What other people think about me is very important.	.65	<.001
9. I ought to be able to solve my problems quickly and without a great deal of effort.	.32	<.001
10. If I don't set the highest standards for myself, I am likely to end up a second rate person.	.57	<.001
11. I am nothing if a person I love doesn't love me.	.55	<.001
12. A person should be able to control what happens to him.	.27	<.001
13. If I am to be a worthwhile person, I must be truly outstanding in at least one major respect.	.46	<.001
14. If you don't have other people to lean on, you are bound to be sad.	.57	<.001
15. It is possible for a person to be scolded and not get upset.	.05	.409
16. I must be a useful, productive, creative person or life has no purpose.	.59	<.001
17. I can find happiness without being loved by other person.	.26	<.001
18. A person should do well at everything he undertakes.	.16	.013
19. If I do not de well all the time, people will not respect me.	.52	<.001
20. I do not need the approval of other people in order to be happy.	.35	<.001
21. If I try hard enough, I should be able to excel at anything I attempt.	.19	.003
22. People who have good ideas are more worthy than those who do not.	.32	<.001
23. A person doesn't need to be well liked in order to be happy.	.33	<.001
24. Whenever I take a chance or risk I am only looking for trouble.	.33	<.001
Cronbach's alpha = .82		

Table 3

Item-Total Correlations of the Chinese Version of the Cognitive Triad Inventory (C-CTI) for the 255 University Students

No. Item of the C-CTI	Item-Total Correlation	Sig.
1. I have many talents and skills. (filler)		
2. My job (housework, schoolwork, daily duties) is unpleasant. (filler)		
3. Most people are friendly and helpful.	.47	<.001
4. Nothing is likely to work out for me. (filler)		
5. I am a failure.	.73	<.001
6. I like to think about the good things that lie ahead for me.	.47	<.001
7. I do my work (job, schoolwork, house work) adequately. (filler)		
8. The people I know help me when need it.	.53	<.001
9. I expect that things will be going very well for me a few years from now.	.56	<.001
10. I have messed up almost all the important relationships I have ever had.	.57	<.001
11. The future holds a lot of excitement for me.	.50	<.001
12. My daily activities are fun and rewarding.	.63	<.001
13. I can't do anything right.	.70	<.001
14. People like me. (filler)		
15. There is nothing left in my life to look forward to.	.66	<.001
16. My current problems or concerns will always be there in one way or another.	.44	<.001
17. I am as adequate as other people I know.	.47	<.001
18. The world is a very hostile place.	.61	<.001
19. There is no reason for me to be hopeful about my future.	.66	<.001
20. The important people in my life are helpful and supportive.	.46	<.001
21. I hate myself.	.71	<.001
22. I will overcome my problem. (filler)		
23. Bad things happen to me a lot.	.67	<.001
24. I have a spouse or friend who is warm and supportive.	.61	<.001
25. I can do a lot of things well.	.62	<.001
26. My future is simply too awful to think about.	.61	<.001
27. My family doesn't care what happens to me.	.46	<.001
28. Things will work out well for me in the future.	.67	<.001
29. I am guilty of a great many things.	.37	<.001
30. No matter what I do, others make it difficult for me to get what I want.	.61	<.001
31. I am a worthwhile human being.	.63	<.001
32. There is nothing to look forward to in the years ahead.	.74	<.001
33. I like myself.	.69	<.001
34. I am faced with many difficulties.	.34	<.001
35. I have serious flaws in my character.	.53	<.001
36. I expect to be content and satisfied as the years go by.	.41	<.001
Cronbach's alpha = .93		

Table 4

Item-Total Correlations of the Chinese Version of the Hopelessness Scale (C-HS) for the 255 University Students

> NOTE:
> This table is included on page 332 of the print copy of the thesis held in the University of Adelaide Library.

Table 5

Item-Total Correlations of the Chinese Version of the Beck Depression Inventory—Second Edition (C-BDI-II) for the 255 University Students

No. Item of the C-BDI-II	Item-Total Correlation	Sig.
1. Sadness	.60	<.001
2. Pessimism	.64	<.001
3. Past failure	.63	<.001
4. Loss of Pleasure	.56	<.001
5. Guilty Feelings	.41	<.001
6. Punishment Feelings	.54	<.001
7. Self-Dislike	.62	<.001
8. Self-Criticalness	.57	<.001
9. Suicidal Thoughts or Wishes	.63	<.001
10. Crying	.57	<.001
11. Agitation	.63	<.001
12. Loss of Interest	.60	<.001
13. Indecisiveness	.58	<.001
14. Worthlessness	.68	<.001
15. Loss of Energy	.72	<.001
16. Changes in Sleeping Pattern	.46	<.001
17. Irritability	.61	<.001
18 Changes in Appetite	.53	<.001
19. Concentration Difficulty	.69	<.001
20. Tiredness or Fatigue	.59	<.001
21. Loss of Interest in Sex	.46	<.001
Cronbach's alpha = .90		

Table 6

Item-Total Correlations of the Chinese Version of the Beck Scale for Suicidal ideation (C-BSS) for the 255 University Students

No. Item of the C-BSS	Item-Total Correlation	Sig.
1. Wish to live	.68	<.001
2. Wish to die	.69	<.001
3. Reason for living	.75	<.001
4. Active attempt	.77	<.001
5. Passive attempt	.72	<.001
6. Duration of thoughts	.73	<.001
7. Frequency of ideation	.51	<.001
8. Attitude toward ideation	.80	<.001
9. Control over action	.81	<.001
10. Deterrents to attempt	.78	<.001
11. Reasons for attempt	.74	<.001
12. Specificity of planning	.63	<.001
13. Availability/opportunity	.60	<.001
14. Capability	.76	<.001
15. Expectancy	.79	<.001
16. Actual preparation	.65	<.001
17. Suicidal note	.53	<.001
18. Final acts	.48	<.001
19. Deception	.70	<.001
Cronbach's alpha = .93		

Appendix K: Factor scree plots for the Chinese versions of the scales (student sample)
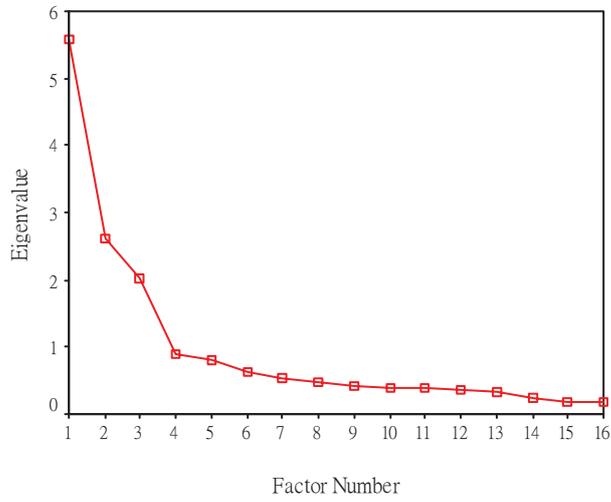
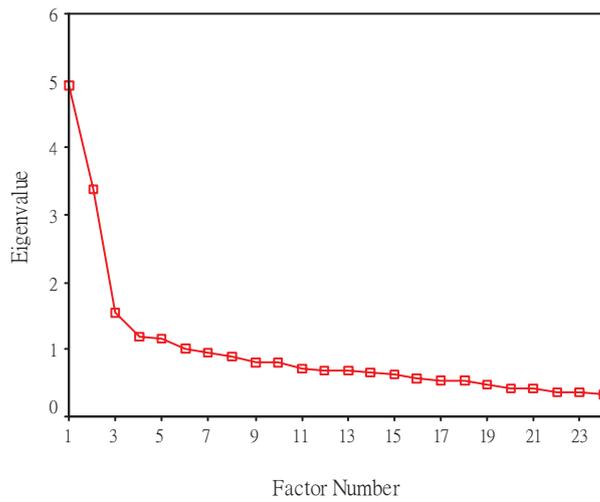

Figure 1. Factor Scree Plot for the C-MDSS

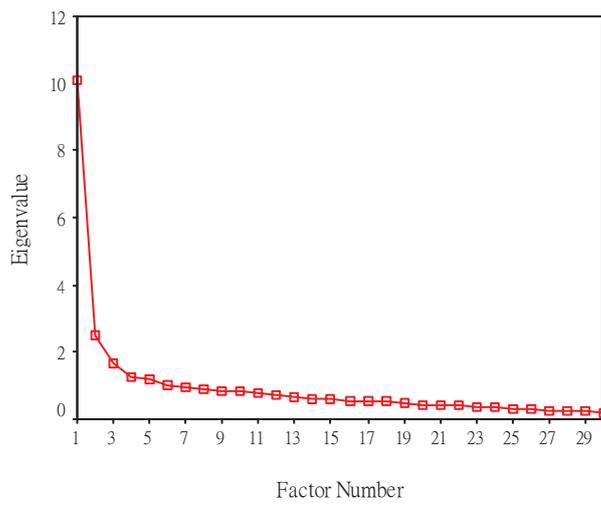Figure 2. Factor Scree Plot for the C-DAS
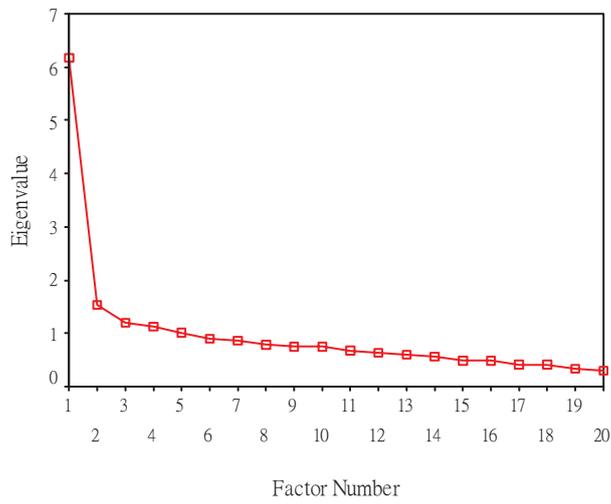
Figure 3. Factor Scree Plot for the C-CTI

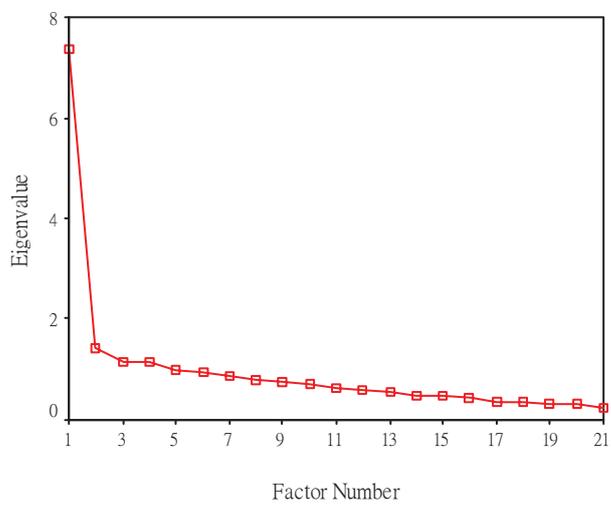Figure 4. Factor Scree Plot for the C-HS
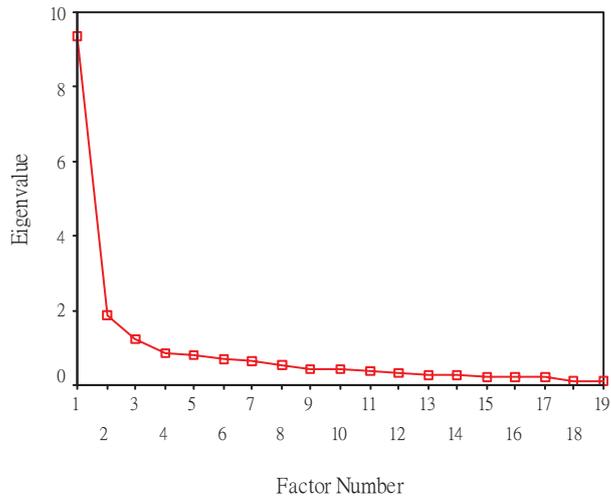
Figure 5. Factor Scree Plot for the C-BDI-II

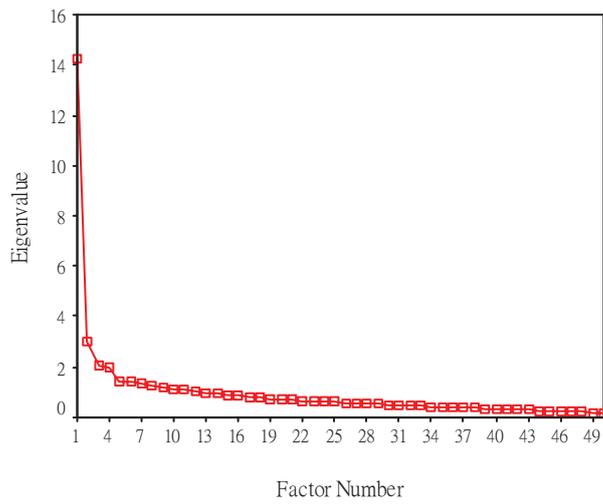Figure 6. Factor Scree Plot for the C-BSS

Figure 7. Factor Scree Plot for the combined items from the C-CTI and the C-HS

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