A PROSPECTIVE EXAMINATION OF BECK’S COGNITIVE THEORY OF
DEPRESSION IN UNIVERSITY STUDENTS IN MAINLAND CHINA

by

DARREN STOLOW

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Written under the direction of
John R. Z. Abela, Ph.D.

And approved by
Robert Karlin, Ph.D.
Robert Woolfolk, Ph.D.
Benjamin Hankin, Ph.D.

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ABSTRACT OF THE THESIS

A Prospective Examination of Beck’s Cognitive Theory of Depression in University Students in Mainland China

by DARREN STOLOW

Thesis Director:
John R. Z. Abela, Ph.D.

The current multi-wave longitudinal study examined the applicability of Beck’s (1967, 1983) cognitive theory of depression to university students in mainland China. During an initial assessment, participants completed measures assessing dysfunctional attitudes and depressive/anxious symptoms. Participants subsequently completed measures assessing negative events and depressive/anxious symptoms once a month for six months. Results provided support for the applicability of Beck’s cognitive theory to university students in mainland China. More specifically, higher levels of dysfunctional attitudes were associated with greater increases in depressive symptoms following the occurrence of negative events. At the same time, contrary to findings obtained in Western samples, higher levels of dysfunctional attitudes were also associated with greater increases in anxious symptoms following the occurrence of negative events. These findings may suggest that dysfunctional attitudes exhibit non-specificity as a predictor of depressive symptoms in mainland China.
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INTRODUCTION

Depression in China

The results of epidemiological studies suggest that the prevalence rate of depression in China has been rising in recent decades. More specifically, whereas research conducted during the 1980s estimated the point-prevalence rate of depression to be 0.3% (Xiang, 1986), research conducted during the 1990s estimated it to be 1.4% (Murray & Lopez, 1996). More recently, findings from a comprehensive epidemiological survey conducted within China yielded a one-month prevalence rate of depression of 6.0% (Phillips et al., 2009). In response to this upward trend, depression has become a major public health concern in China, increasingly drawing the attention of both Chinese and Western mental health researchers. One demographic group within China’s population that has received considerable attention is China’s university student population. Although no formal epidemiological studies have been conducted examining the prevalence rate of depression among university students, recent reports in the Chinese media highlight the growing problem of depression among this demographic (e.g., Qiang, 2006). Most distressing in these reports is the strong association noted between depression and suicidal behavior. Estimated mortality rates reveal that suicide is the leading cause of death among Chinese young adults between the ages of 15 and 34 (Philipps, Li, & Zhang, 2002). Despite these findings, however, little research has examined models of the etiology of depression in university students in mainland China. Furthermore, of the studies conducted, the majority are cross-sectional providing little insight into causal mechanisms.
Cognitive Vulnerability-Stress Models of Depression

One theoretical perspective that has proven useful in understanding the development of depression in Western young adults is the cognitive vulnerability-stress perspective (Abela & Hankin, 2008). Cognitive theories of depression define vulnerability as an internal and stable feature of an individual that predisposes him/her to develop depression following the occurrence of negative events (Ingram, Miranda, & Segal, 1998). Cognitive models are fundamentally diathesis-stress models in that they posit that depression is produced by the interaction between cognitive vulnerability factors (the diatheses) and certain environmental conditions (the stressors) that trigger such diatheses into operation (Ingram et al., 1998). Evidence suggests that under ordinary conditions, individuals vulnerable to depression are indistinguishable from the general population. Only when confronted with certain stressors do differences between vulnerable and non-vulnerable individuals emerge (Ingram et al., 1998; Ingram & Luxton, 2005; Monroe & Simons, 1991). For individuals who possess cognitive vulnerability factors, negative events trigger a pattern of negatively biased, self-referent information processing that initiates a downward spiral into depression. Non-vulnerable individuals react to such events with an appropriate level of distress and depressive affect, but do not spiral downwards into depression.

Beck’s Cognitive Theory of Depression

One prominent cognitive vulnerability-stress model of depression is Beck’s (1967, 1983) cognitive theory. Central to Beck’s cognitive theory is the construct of schema. Beck defines schema as stored bodies of knowledge (i.e., mental representations of the
self and prior experiences) that are relatively enduring characteristics of a person's cognitive organization. When an individual is confronted with a situation, the schema most relevant to the situation is activated. Schema activation subsequently influences how the person perceives, encodes, and retrieves information regarding the situation. Beck proposed that certain individuals possess depressogenic schema that confer vulnerability to depression. Beck (1983) hypothesizes that depressogenic schemata are typically organized as sets of dysfunctional attitudes such as “I am nothing if a person I love doesn’t like me” or “If I fail at my work then I am a failure as a person.” Among individuals who possess depressogenic schema, the occurrence of negative events triggers a pattern of negatively biased, self-referent information processing characterized by negative errors in thinking (e.g., negatively skewed interpretations of negative life events such as overgeneralization and catastrophizing). Negative errors in thinking increase the likelihood that the individual will develop the negative cognitive triad, comprising three types of depressogenic thought patterns: (1) negative views of the self (e.g., the belief that one is deficient, inadequate or unworthy); (2) negative views of the world (e.g., construing life experiences in terms of themes of defeat or disparagement); and (3) negative views of the future (e.g., the expectation that one's difficulties will persist into the future and there is nothing one can do to change this). According to the theory, the development of the negative cognitive triad triggers the onset of depressive symptoms.

**Research Support for Beck’s Cognitive Model of Depression**

Prospective studies using Western university student samples have provided support for Beck’s (1967, 1983) cognitive theory of depression. More specifically,
several studies have found that dysfunctional attitudes interact with the occurrence of negative life events to predict increases in depressive symptoms (Hankin, Abramson, Miller, Haefel, 2004; Hankin, Fraley & Abela, 2005; Joiner, Metalsky, Lew & Klocek, 1999; Klocek, Oliver & Ross, 1997; Brown, Hammen, Craske, and Wickens, 1995) as well as a greater likelihood of developing a depressive episode (Hankin et al., 2004). In addition, individuals possessing a high level of dysfunctional attitudes have been found to be more likely to report a past history of depressive episodes (Alloy et al., 2000) and to experience future depressive episodes (Alloy et al., 2006, Hankin et al. 2004) than individuals without such a vulnerability.

Far less research has examined the applicability of Beck’s (1983, 1967) cognitive theory to Chinese samples. Preliminary cross-sectional research, however, has yielded findings consistent with the theories’ hypotheses. For example, Xu, Li and Wang (2007) found that psychiatric patients diagnosed with major depressive disorder showed significantly higher levels of dysfunctional attitudes than did non-depressed controls. Similarly, Bian, Yang and Li (2007) reported higher levels of dysfunctional attitudes in remitted depressives as compared to normal controls. Last, several studies conducted with Chinese university students have found higher levels of dysfunctional attitudes – particularly those centered on themes of perfectionism - to be associated with higher levels of psychiatric symptoms (e.g., Yang & Zhang, 2004; Yang, 2007; Fang, Qian, Luo & Zi, 2009).
Goals of the current study

The primary goal of the current study was to examine the applicability of Beck’s (1967, 1983) cognitive theory of depression to university students in mainland China. The procedure involved an initial assessment during which students completed measures assessing dysfunctional attitudes and symptoms of depression. The procedure also involved a series of six follow-up assessments, occurring once a month for six months, during which symptoms of depression and the occurrence of negative events were assessed. The use of a multi-wave longitudinal design allowed us to take an idiographic approach towards examining the diathesis-stress hypotheses of Beck’s (1967, 1983) theory. More specifically, we examined whether the slope of the relationship between negative events and symptoms of depression within participants varied across participants as a function of level of dysfunctional attitudes. In line with the vulnerability-stress hypothesis of Beck’s (1967, 1983) cognitive theory, we hypothesized that higher levels of dysfunctional attitudes would be associated with greater increases in depressive symptoms following the occurrence of negative events.

The second objective of the current study was to examine the specificity of dysfunctional attitudes as a predictor of depressive symptoms. Beck’s (1967, 1983) theory posits that dysfunctional attitudes predict the development of depressive symptoms but not symptoms of other forms of psychopathology. Prospective studies using Western university student (Alloy et al., 2000, 2006; Hankin, Abramson, Miller, & Haefelf, 2004) and adolescent samples (Hankin, Wetter, Cheely & Oppenheimer, 2008) have provided support for the specificity hypothesis of the theory. More specifically, dysfunctional attitudes have been found to interact with negative events to
predict increases in depressive symptoms but not symptoms of anxiety or other disorders in both university student (Hankin et al., 2004) and adolescent samples (Hankin et al. 2008). Similarly, although university students possessing a high level of dysfunctional attitudes have been found to be more likely than other university students to report a past history of depressive episodes (Alloy et al., 2000) and to experience future depressive episodes (Alloy et al., 2006) they have not been found to differ from their low-risk counterparts in terms of past history or future occurrence of other psychological disorders (Alloy et al., 2000, 2006).

With respect to the current study, it is possible that differences may emerge between Chinese and Western samples in terms of the types of symptoms predicted by dysfunctional attitudes. More specifically, cultural psychopathologists have proposed that cultural factors shape the phenomenology of psychiatric symptoms as well as the conceptualization and classification of disorders (Kleinman, 2004; Mezzich et al., 1999). As such, the experience of psychopathology may exhibit unique features in different cultures with diagnostic categories developed in one cultural context not being valid in another (Kleinman, 1977, 1996). Neuresthenia, known in China as *shenjing shuairuo (SJSR)*, is a diagnostic entity characterized by (1) physical and mental weakness and fatigability, (2) sleep disturbances, (3) irritability and worry, (4) excitability, (5) nervous pain, and (6) memory difficulty (Taylor, 2001). Historically, *SJSR* was a Western disease concept that subsequently evolved to become a widely utilized diagnostic entity within China (Lee & Wong, 1995). Some cultural psychopathologists have posited that *SJSR* represents a somatized form of depression. This claim, however, has been met with significant controversy (e.g., Lee, 1997;
Critics dispute the notion that Chinese psychiatric patients are “somatizers” who manifest few or no emotional symptoms and who attribute distress to physical causes. Rather, they argue that SJSR gained widespread acceptance in China as it was a non-stigmatizing diagnosis that allowed individuals experiencing psychosocial distress to seek help during a time in which traditional cultural beliefs and political influences led to severe sanction and stigmatization of individuals suffering from mental illnesses (Lee, 1998, 1999; Phillips, 1998; Shixie, 1989). At the same time, other Chinese researchers and clinicians have continued to defend neurasthenia as both a valid diagnostic category and a clinically useful means of communicating with patients (Rin & Huang, 1989; Yan, 1989; Young, 1989). Due to continued debate on this topic, it is essential that researchers examining models of vulnerability to depression within China assess multiple symptom outcomes as the types of symptoms predicted by vulnerability factors may vary as a function of cultural context. Hence, in the current study, we also assessed levels of anxious symptoms to provide a test of the specificity hypothesis of Beck’s (1967, 1983) cognitive theory.

In order to provide a powerful examination of our hypotheses concerning (1) the applicability of the diathesis-stress component of Beck’s (1967, 1983) cognitive theory to Chinese university students, and (2) the specificity of dysfunctional attitudes as predictors of depressive, as opposed to anxious symptoms, participants’ scores on the neuroticism subscale of the Five-factor Inventory (FFI-N) were included as a control variable in all analyses. Several critical reviews of the literature examining theories of cognitive vulnerability to depression (e.g., Barnett & Gotlib, 1998; Coyne & Whiffen,
1995) have argued that cognitive vulnerabilities to depression, such as that featured in Beck’s cognitive theory, may be equivalent to or reducible to trait neuroticism, and thus may not confer independent risk for depression. In response to such claims, a recent study conducted with university students examining the degree of factorial independence versus overlap between trait neuroticism and dysfunctional attitudes has shown them to be distinct constructs, each loading onto separate factors (Hankin et al., 2007). At the same time, however, there remains a need to examine whether dysfunctional attitudes and trait neuroticism represent unique risk factors for depression, particularly in young adults in China. Hence, in the current study, participants’ scores on the neuroticism subscale of the Five-factor Inventory (FFI-N) were included as a control variable in order to account for any of the variance in fluctuations in depressive (and anxious) symptoms that may be shared between dysfunctional attitudes and trait neuroticism, thereby isolating and highlighting their unique predictive effects.

METHOD

Participants:

Participants included 662 university students (aged 19-21) from Changsha – an industrial city in the province of Hunan with a population of approximately 6,000,000. In terms of the annual gross domestic product, Hunan ranks 23rd (10,336 RMB) out of the 34 provinces in China placing it well below the national provincial average (μ = 29,719 RMB; SD = 47,462 RMB; National Bureau of Statistics of China, 2006). Demographic variables for the sample are presented in Table 1.
Procedure:

Consent forms were distributed to all students in participating classes. Consent rates were greater than 95% in all the classes. After consent forms were collected, researchers returned to the school to meet with participating students. Written consent was obtained from each participant at the beginning of the initial assessment. During the initial assessment, students completed a demographics form and each of the following questionnaires: (1) Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), (2) Mood and Anxiety Symptom Questionnaire (MASQ; Clark & Watson, 1991), (3) Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978), and (4) NEO Five Factor Inventory- Neuroticism Subscale (FFI-N; Costa & McCrae, 1992). Once a month for the subsequent six-months, researchers returned to the school and met with participating students to conduct follow-up assessments. At each of these follow-up assessments, students were asked to complete each of the following questionnaires: (1) CES-D, (2) MASQ, and (3) the General, Academic, Social Hassles Scale for Students (GASHSS; Blankstein & Flett, 1993).

Measures:

The Chinese versions of all self-report measures were developed using the back-translation method. Original English versions were translated into Chinese by a bilingual translator from the Psychology department at Second Xiangya Medical College of Central South University, Hunan. Translated Chinese versions were then back-translated into English by another bilingual translator from the Psychology department at McGill University, Quebec. Original versions were then compared with the back-translation. If inconsistencies were found in the back-translation, translators
worked together to make corrections to the final Chinese versions until all final versions were agreed upon. No items from any of the measures were removed or significantly altered during the translation process.

**Depressive Symptoms:** Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D is a 20-item self-report measure designed to assess depressive symptoms in the general population. For each item, participants are asked to indicate how often they experienced the particular symptom over the last week. Responses range from 1 (e.g., rarely or none of the time) to 4 (e.g., most or all of the time). Scores range from 20-80 with higher score indicating higher levels of depressive symptoms. In the current study, the CES-D exhibited high internal consistency, with Cronbach’s alpha values ranging from .90 to .94 ($\mu = 29.18$, $SD = 8.14$) over the 7 time points.

**Anxious Symptoms:** Mood and Anxiety Symptom Questionnaire (MASQ; Watson & Clark, 1991). The MASQ is a 62-item questionnaire designed to assess both specific and nonspecific depressive and anxious symptoms. For each item, participants are asked to rate on a scale of 1 to 5 the extent to which they have felt this way “during the past 24 hours”. Within the current study, we utilized the anxious symptoms (11 items) and anxious arousal (17 items) subscales which together provide an index of overall anxious symptoms. Higher scores on each subscale reflect greater levels of anxious symptoms. In the current study, the MASQ exhibited high internal consistency, with Cronbach’s alpha values ranging from .90 to .95 ($\mu = 38.47$, $SD = 11.17$) over the 7 time points.
Dysfunctional Attitudes: Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978). The DAS (Form A) is a 40-item questionnaire designed to measure the cognitive vulnerability factor featured in Beck’s cognitive theory. Examples of items include: “If I do not do well all the time people will not respect me”, “If a person asks for help, it is a sign of weakness”, and “My value as a person depends greatly on what others think of me.” Items are rated on a 7-point Likert scale ranging from 1 (totally disagree) to 7 (totally agree), providing a range of scores from 40 to 280, with higher scores reflecting more dysfunctional attitudes. In the current study, the DAS exhibited high internal consistency, with Cronbach’s alphas of .89 and .88 obtained for the first and second administrations, respectively. In addition, a test-retest reliability coefficient of .72 was obtained indicating strong stability over time.

Neuroticism: NEO Five Factor Inventory - Neuroticism Subscale (FFI-N; Costa & McCrae, 1992). The FFI-N is a 12- item self-report measure that assesses neuroticism. Examples of questions include: "I often feel inferior to others," "I am seldom sad or depressed," and "Sometimes I feel completely worthless." Items are rated on a 5-point Likert scale ranging from 0 (strongly disagree) to 4 (strongly agree), providing scores ranging from 0 to 48, with higher scores indicating higher levels of neuroticism. The NEO-FFI-N has proven reliable across different cultural samples and item pools (Costa & McCrae, 1992). In the current study, Cronbach’s alpha was .81 indicating strong internal consistency.

Negative Life Events: General, Academic, Social Hassles Scale for Students (GASHSS; Blankstein & Flett, 1993). Participants completed a 30-item abbreviated version of the GASHSS. The measure is comprised of items assessing general hassles
(8 items), academic hassles (10 items) and social hassles (12 items). For each item participants are asked to rate how persistent the given hassle was (i.e., its frequency and duration) over the last 30 days (0 = no hassle; not at all persistent to 6 = extremely persistent hassle; high frequency and/or duration).
RESULTS

Descriptive Data

Means, standard deviations, and inter-correlations between Time 1 measures are presented in Table 2.

Prospective Diathesis-Stress Analyses - Depression

Multilevel modeling was used to test our hypothesis that higher levels of dysfunctional attitudes would be associated with greater increases in depressive symptoms following increases in stress. Analyses were carried out using the SAS (version 8.1) MIXED procedure and maximum likelihood estimation. Our dependent variable was within-subject fluctuations in CES-D scores during the follow-up interval (DEPRESSION). Our primary predictors of DEPRESSION were DAS scores (DYSFUNCTIONAL ATTITUDES) and fluctuations in GASHSS scores during the follow-up interval (STRESS). As DYSFUNCTIONAL ATTITUDES is a between-subject predictor, DAS scores were standardized prior to analyses. As STRESS is a within-subject predictor, STRESS reflects upward or downward fluctuations in an individual’s level of stress compared to his/her mean level of stress.

When fitting hierarchical linear models, one must specify appropriate mean and covariance structures. Mean structures refer to the various fixed and random effect components that can be included in the model. Covariance structures refer to alternative methods of specifying the pattern of covariance between observations taken from the same subject at different time points. It is important to note that mean and covariance structures are not independent of one another. Rather, an appropriate covariance structure is essential in order to obtain valid inferences for the parameters in the mean
structure. Overparametrization of the covariance structure can lead to inefficient estimation and poor assessment of standard errors (Altham, 1984). On the other hand, too much restriction of the covariance structure can lead to invalid inferences when the assumed structure does not hold (Altham, 1984).

In our first set of analyses, we were interested in examining the effects of DYSFUNCTIONAL ATTITUDES, STRESS, and the DYSFUNCTIONAL ATTITUDES \times STRESS interaction on participant’s CES-D scores during the follow-up interval. Consequently, in line with Diggle, Liang, and Zeger’s (1994) recommendation that one use a “saturated” model for the mean structure while searching for an appropriate covariance structure, we chose a mean structure that included DYSFUNCTIONAL ATTITUDES, STRESS, and the DYSFUNCTIONAL ATTITUDES \times STRESS interaction. Four additional effects were also included in this mean structure. First, as different individuals report different levels of depressive symptoms when at their own average level of stress, a random effect for intercept was included in the model. Second, given that STRESS is a within-subject predictor whose effect is expected to vary from participant to participant, a random effect for slope was included in the model. Third, in order to control for individual differences in baseline levels of depressive symptoms, Time 1 CES-D scores were included in the model. Fourth, in order to examine whether DYSFUNCTIONAL ATTITUDES represent a vulnerability factor independent of neuroticism, participants’ FFI-N scores were entered in the model.

Commonly used covariance structures in studies in which multiple responses are obtained from the same individual over time (and consequently within-subject
residuals over time are likely to be correlated) include compound symmetry, first-order autoregressive, heterogeneous autoregressive, and banded Toeplitz. In order to select one of these covariance structures for our analyses, we fitted models using each structure and chose the “best” fit based on Akaike information criterion (AIC and AICC) and Schwarz Bayesian criterion (BIC). In all cases, the best fit for our data was a first-order heterogeneous autoregressive structure (ARH [1]). After choosing the appropriate covariance structure, we next examined the random-effects component of our model.

With respect to random effects, the ARH [1] parameter (r = .31, p<.001), RE_INTERCEPT (p<.001) and RE_SLOPE (p<.001) were each significant and thus were retained in the model. The final results with respect to the fixed-effects component of the model are presented in the upper section of Table 3. Of primary importance, the DYSFUNCTIONAL ATTITUDES × STRESS interaction was a significant predictor of fluctuations in depressive symptoms during the follow-up interval. In order to examine the form of this interaction, the model summarized in the upper section of Table 3 was used to calculate predicted CES-D scores for individuals exhibiting either high or low levels of dysfunctional attitudes (plus or minus 1.5 SD) who are experiencing either high or low levels of stress in comparison to their own average level of stress (plus or minus 1.5 × mean within-subject SD). The results of such calculations are presented in the left panel of Figure 1.

Analyses were conducted for each DYSFUNCTIONAL ATTITUDES condition examining whether the slope of the relationship between stress and depressive symptoms significantly differed from 0. Analyses indicated that both
individuals exhibiting high ($t(2459) = 8.62, p < 0.001$) and low ($t(2459) = 3.47, p < 0.001$) levels of dysfunctional attitudes reported significantly higher levels of depressive symptoms when experiencing high levels of stress than when experiencing low levels of stress. Planned comparisons of the slopes of the relationship between stress and depressive symptoms, however, revealed that the slope was significantly greater in individuals exhibiting high levels of dysfunctional attitudes (slope = 0.13) than in individuals exhibiting low levels of dysfunctional attitudes (slope = 0.05; $t(2459) = 3.28, p = 0.001$).

**Prospective Diathesis-Stress Analyses - Anxiety**

The same data-analytic approach as described above was used to examine whether higher levels of dysfunctional attitudes would be associated with greater increases in anxious symptoms following increases in stress. Again, in order to examine whether DYSFUNCTIONAL ATTITUDES represent a vulnerability factor independent of neuroticism, participants’ FFI-N scores were entered in the model.

With respect to random effects, the ARH[1] parameter ($r = .23, p < .001$), RE_INTERCEPT ($p<.001$) and RE_SLOPE ($p<.001$) were each significant and thus were retained in the model. The final results with respect to the fixed-effects component of the model are presented in the lower section of Table 3. Of primary importance, the DYSFUNCTIONAL ATTITUDES × STRESS interaction was a significant predictor of within-subject fluctuations in anxious symptoms during the follow-up interval. In order to examine the form of this interaction, the model summarized in the lower section of Table 3 was used to calculate predicted MASQ scores for individuals exhibiting either high or low levels of dysfunctional attitudes.
(plus or minus 1.5 SD) who are experiencing either high or low levels of stress in comparison to their own average level of stress (plus or minus 1.5 × mean within-subject SD). The results of such calculations are presented on the right panel of in Figure 1.

Analyses were conducted for each DYSFUNCTIONAL ATTITUDES condition examining whether the slope of the relationship between stress and anxious symptoms significantly differed from 0. Analyses indicated that both individuals exhibiting high ($t(2470) = 7.68, p < 0.001$) and low ($t(2470) = 3.37, p < 0.001$) levels of dysfunctional attitudes reported higher levels of anxious symptoms when experiencing high levels of stress than when experiencing low levels of stress. Planned comparisons of the slopes of the relationship between stress and anxious symptoms, however, revealed that the slope was significantly greater in individuals exhibiting high levels of dysfunctional attitudes (slope = 0.09) than in individuals exhibiting low levels of dysfunctional attitudes (slope = 0.03; $t(2470) = 2.78, p < 0.01$).

Additional Analyses

Given that the DYSFUNCTIONAL ATTITUDES × STRESS interaction prospectively predicted both symptoms of depression and anxiety, two additional analyses were conducted in order to examine (1) whether the DYSFUNCTIONAL ATTITUDES × STRESS interaction continued to be a significant predictor of within-subject fluctuations in depressive symptoms after controlling for within-subject fluctuations in anxious symptoms, and (2) whether the DYSFUNCTIONAL ATTITUDES × STRESS interaction continued to predict within-subject fluctuations in anxious symptoms after controlling for within-subject fluctuations in depressive
symptoms. Such analyses allowed us to examine whether the above mentioned pattern of findings may have been due to the high correlation observed in the current study between depressive and anxious symptoms.

Analyses were conducted in the same manner as described above with the exception that an additional within-subject variable (i.e., DEPRESSION or ANXIETY) was included in each model in order to control for within-subject fluctuations in the alternate symptom. With respect to the prediction of depressive symptoms, the DYSFUNCTIONAL ATTITUDES × STRESS interaction remained a significant predictor after controlling for within-subject fluctuations in anxious symptoms ($\beta = 0.01$, $SE = 0.00$, $F = 4.10$, $p < .05$). With respect to the prediction of anxious symptoms, however, the DYSFUNCTIONAL ATTITUDES × STRESS interaction was no longer a significant predictor after controlling for within-subject fluctuations in depressive symptoms ($\beta = 0.01$, $SE = 0.00$, $F = 1.48$, $p = .22$).

**DISCUSSION**

The results of the current study provide support for the cross-cultural applicability of Beck’s (1967, 1983) cognitive theory to university students in Hunan, China. More specifically, consistent with hypotheses and with results obtained from past research examining Beck’s cognitive theory in Western samples of university students (Hankin et al., 2004; Hankin et al., 2005; Joiner et al., 1999; Klocek et al., 1997; Brown et al., 1995), higher levels of dysfunctional attitudes were associated with greater increases in depressive symptoms following increases in negative event frequency during the six-month follow-up interval. Given the considerable differences between the current sample and Western samples in terms of demographic
characteristics and cultural factors, such a finding strongly attests to the robustness of Beck’s cognitive theory. Moreover, integrating the current findings with those obtained in research examining Beck’s theory in other non-Western samples suggests that Beck’s theory may represent a powerful explanatory model of the development of depressive symptoms among individuals from diverse cultural settings. For example, consistent with the theory, higher levels of dysfunctional attitudes have been shown to be associated with higher levels of depressive symptoms in Japanese (Tanaka et al. 2006), Puerto-Rican (Bonilla, Bernal, Santos & Santos, 2003), Turkish (Sahin & Sahin, 1992), Norwegian (Chioqueta & Stiles, 2004), Singaporean (Oei, Goh, & Kwon, 1996) and Swedish (Ohrt & Thorell, 1998) adult samples. In addition, it is important to note that the current findings expand upon past correlational research examining the association between dysfunctional attitudes and depression in Chinese samples through the use of a multi-wave longitudinal design.

When examining the specificity of dysfunctional attitudes as a predictor of depressive symptoms, the current study did not obtain support for specificity. More specifically, contrary to the specificity hypothesis of Beck’s cognitive theory and to results obtained in Western samples of university students (Alloy et al., 2000, 2006; Hankin et al., 2004), higher levels of dysfunctional attitudes were associated with greater increases in both depressive and anxious symptoms following increases in negative event frequency. There are two alternative ways of interpreting the non-specificity finding observed in the current study. First, it is possible that the types of thoughts individuals possessing high levels of dysfunctional attitudes experience following negative events varies as a function of cultural context. In other words, in
Western samples, such individuals may primarily experience the types of cognitions that are associated with the development of depressive symptoms (i.e., appraisals of personal loss and failure). In contrast, in Chinese samples, individuals possessing high levels of dysfunctional attitudes may experience a wider array of cognitions, some of which are associated with the development of depressive symptoms and some of which are associated with the development of anxious symptoms (i.e., evaluations of impending threat or danger). Such an explanation would be consistent with Beck’s cognitive content-specificity hypothesis (Clark & Beck, 1999) which posits that each affective state and psychological disorder has a specific cognitive profile. Second, it is possible that the types of symptoms individuals possessing high levels of dysfunctional attitudes experience following negative events varies as a function of cultural context. More specifically, it may be that dysfunctional attitudes specifically predict symptoms of depression in both samples except that in Western samples, depression manifests in pure depressive symptoms whereas in Chinese samples depression manifests as a combination of depressive and anxious symptoms. Such an explanation would be consistent with cultural psychopathologists’ hypotheses that cultural factors shape the phenomenology of psychiatric symptoms (Kleinman, 2004; Mezzich et al., 1999). Moreover, dysfunctional attitudes predicting a combination of depressive and anxious symptoms in Chinese samples would be consistent with the construct of neurasthenia - a construct hypothesized by some to represent a somatized form of depression that is still widely seen within China (Lee & Wong, 1995).

Interesting in this regard and, perhaps speaking to the primacy of depressive symptoms in the current findings, analyses indicated that the DYSFUNCTIONAL
ATTITUDES × STRESS interaction no longer predicted anxious symptoms after controlling for depressive symptoms. The reverse, however, was not true as the DYSFUNCTIONAL ATTITUDES × STRESS interaction continued to predict depressive symptoms after controlling for anxious symptoms.

It is important to note that the current study employed a particularly conservative approach to analyses in that we examined the effects of dysfunctional attitudes on depressive and anxious symptoms after controlling for the effect of neuroticism on such symptoms. Providing particularly powerful support for Beck’s (1967, 1983) cognitive theory, across analyses, dysfunctional attitudes predicted levels of depressive and/or anxious symptoms experienced during the six month follow-up interval independent of the effect of neuroticism. Thus, contrary to past critical reviews of the cognitive literature (Barnett & Gotlib, 1998; Coyne & Whiffen, 1995) and consistent with past findings (Hankin et al., 2007), the current results indicate that cognitive vulnerabilities to depression, such as dysfunctional attitudes, are not reducible to trait neuroticism but rather represent factors that confer independent risk for depression.

**Limitations and Future Directions**

Several limitations of the current study should be noted. First, self-report measures were used to assess depressive and anxious symptoms. Although the CES-D and MASQ both possess high degrees of reliability and validity, it is difficult to draw conclusions about clinically diagnosed depression or anxiety based on self-report questionnaires. Second, self-report measures were used to assess stress. Although measures of stress that require participants only to indicate whether or not an event
occurred are less likely to be influenced by informant bias than those that ask participants to rate the subjective impact of each event, more sophisticated methods of analysis such as interviewing procedures that assess contextual threat may provide better assessments of stress. Third, the measures of dysfunctional attitudes, stress, and depressive and anxious symptoms used in the current study were each Western-developed. Future research should examine these hypotheses using indigenous measures, in addition to Western-developed measures, in order to assess possible similarities and/or differences in patterns of findings. Fourth, the current study only examined depression and anxiety as symptom outcomes. Future research conducted within China should examine a wider array of symptom outcomes, such as somatization, physical complaints, and externalizing behaviors, in order to provide a more thorough and culturally sensitive test of the specificity hypotheses of Beck’s cognitive model. Fifth, the current study examined the applicability of Beck’s (1967, 1983) cognitive theory to Chinese undergraduate students and thus the extent to which our findings may be generalized to other demographics within China’s population is unclear. Last, the current study broadly examined the applicability of Beck’s (1967, 1983) cognitive theory to Chinese university students. Future research should examine the constructs and processes posited by this model in greater detail in order to develop a deeper understanding of how they may be uniquely molded by socio-cultural factors. Such research would benefit from examining the specific types of stressors experienced by Chinese university students as they may vary as a function of socio-cultural factors from those experienced by Western undergraduates. For example, severe pressure to succeed academically in order to secure access to a limited number of post-
undergraduate educational opportunities - one of the few paths towards upward mobility available to Chinese students seeking secure and gainful employment in what has increasingly become a very highly competitive job market - may represent a particularly salient stressor for the development of depressive symptoms among this population (Qiang, 2006).

In conclusion, the results from the current study provide support for the applicability of Beck’s cognitive theory to university students in mainland China. More specifically, consistent with findings obtained in the West, results indicate that dysfunctional attitudes confer vulnerability to the development of depressive symptoms following the occurrence of negative events in Chinese university students. At the same time, however, the current findings suggest cultural variation in the profile of symptoms which emerge following the occurrence of negative events in cognitively vulnerable individuals in Western and Chinese samples. Specifically, whereas in the West, dysfunctional attitudes have been shown to confer vulnerability to depressive symptoms, in Chinese university students dysfunctional attitudes appear to confer vulnerability to a combined depressive and anxious symptom profile. Future research using more sophisticated assessments of stress and depressive symptoms, more diverse samples and symptom outcome measures, and indigenously-developed measures, is likely to enhance our understanding of the cognitive and environmental mechanisms underlying the development of depression in Chinese university students. Discovering that cognitive theories of vulnerability to depression extend to university students in China highlights the potential role for cognitive-behavioral depression prevention and treatment interventions in stemming the tide of distress experienced by this population.
REFERENCES


Table 1. Demographic Variables

<p>| | | |</p>
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<tbody>
<tr>
<td></td>
<td>Age</td>
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<tr>
<td>Gender</td>
<td>Male</td>
<td>47.2%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>52.3%</td>
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<td>Parents’ Marital Status</td>
<td>Married</td>
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<td>Divorced</td>
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<td></td>
<td>Single</td>
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<td></td>
<td>Remarried</td>
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<td>Unemployed</td>
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</tr>
<tr>
<td></td>
<td>Farmer</td>
<td>35.6%</td>
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<tr>
<td></td>
<td>Worker</td>
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<tr>
<td></td>
<td>Small Business</td>
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</tr>
<tr>
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<tr>
<td></td>
<td>Farmer</td>
<td>40.6%</td>
</tr>
<tr>
<td></td>
<td>Worker</td>
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<tr>
<td></td>
<td>Small Business</td>
<td>7.6%</td>
</tr>
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<td></td>
<td>Professional</td>
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<td>13.7%</td>
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<td>Monthly Income</td>
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</tr>
<tr>
<td></td>
<td>&gt; 5,000 RMB</td>
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**Table 2.** Means, Standard Deviations, and Inter-correlations Between Time 1 Measures

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<tbody>
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<td>1. Depressive Symptoms</td>
<td>29.63 (7.80)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Anxious Symptoms</td>
<td>.52**</td>
<td>37.53 (9.18)</td>
<td></td>
</tr>
<tr>
<td>3. Dysfunctional Attitudes</td>
<td>.48**</td>
<td>.33**</td>
<td>181.20 (23.04)</td>
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<tr>
<td>4. Neuroticism</td>
<td>.63**</td>
<td>.42**</td>
<td>.53**</td>
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</table>

*Note:* Means and standard deviations (in parentheses) are on the diagonal; Depressive Symptoms = Center for Epidemiological Studies Depression Scale; Anxious Symptoms = Mood and Anxiety Symptom Questionnaire Overall Anxiety subscale; Dysfunctional Attitudes = Dysfunctional Attitudes Scale; Neuroticism = NEO Five Factor Inventory, Neuroticism subscale. ** *p < .01*. 

Table 3. Dysfunctional Attitudes Predicting Within-Subject Fluctuations in CES-D Scores (upper section) and MASQ Scores (lower section) during the Follow-Up Interval

<table>
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<th>F</th>
<th>df</th>
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<tr>
<td>Time 1 CESD-D</td>
<td>2.97</td>
<td>0.26</td>
<td>129.87***</td>
<td>1,572</td>
</tr>
<tr>
<td>Stress</td>
<td>0.05</td>
<td>0.00</td>
<td>108.60***</td>
<td>1,2459</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>1.34</td>
<td>0.27</td>
<td>25.18***</td>
<td>1,572</td>
</tr>
<tr>
<td>Dysfunctional Attitudes</td>
<td>-0.55</td>
<td>0.40</td>
<td>-1.83</td>
<td>1,572</td>
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<tr>
<td>Dysfunctional Attitudes × Stress</td>
<td>0.01</td>
<td>0.00</td>
<td>10.78***</td>
<td>1,2459</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>SE</th>
<th>F</th>
<th>df</th>
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</thead>
<tbody>
<tr>
<td>Time 1 MASQ</td>
<td>5.02</td>
<td>0.33</td>
<td>231.58***</td>
<td>1,575</td>
</tr>
<tr>
<td>Stress</td>
<td>0.06</td>
<td>0.00</td>
<td>89.63***</td>
<td>1,2470</td>
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<tr>
<td>Neuroticism</td>
<td>0.80</td>
<td>0.33</td>
<td>5.96*</td>
<td>1,575</td>
</tr>
<tr>
<td>Dysfunctional Attitudes</td>
<td>-0.52</td>
<td>0.51</td>
<td>-1.06</td>
<td>1,575</td>
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<tr>
<td>Dysfunctional Attitudes × Stress</td>
<td>0.02</td>
<td>0.01</td>
<td>7.74**</td>
<td>1,2470</td>
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</table>

Note: Time 1 CES-D = Time 1 Center for Epidemiological Studies Depression Scale; Stress = Within-Subject Fluctuations in General, Academic, Social Hassles Scale for Students (GASHSS) scores during the follow-up interval; Neuroticism = NEO Five Factor Inventory, Neuroticism subscale; Dysfunctional Attitudes = Dysfunctional Attitudes Scale; Time 1 MASQ = Time 1 Mood and Anxiety Symptom Questionnaire, Overall Anxiety subscale;  * p < .05; ** p < .01; *** p < .001
FIGURES

Figure 1. Predicted slope of the relationship between stress and depressive symptoms (left panel) and anxious symptoms (right panel) as a function of dysfunctional attitudes.